Table C-1. List of Commenters

| Comment ID | | Comment Date |
|---|---|---|
| **Organizations** | | |
| 0-1 | The Nature Conservancy | November 26, 2019 |
| 0-2 | California Poultry Federation | November 27, 2019 |
| 0-3 | Clean Water Action Clean Water Fund; Local Government Commission; Audubon California; The Nature Conservancy | December 2, 2019 |
| 0-4 | Westlands Water District | December 2, 2019 |
| 0-5 | Supervisor Doug Verboon, Kings County Board of Supervisors | December 2, 2019 |
| **Individuals** | | |
| I-1 | Bill Miguel | October 15,2019 |
| I-2 | Colleen Courtney | October 11,2019 |
| I-3 | Bill Toss | December 2, 2019 |

# Attachment A

# Public Comment Letters

**From:** Colleen Courtney <colleencourtney66@gmail.com>

**Sent:** Saturday, October 12, 2019 1:01 AM

**To:** Colleen Courtney <colleencourtney66@gmail.com>; comments@southforkkings.org; jwyrick@jgboswell.com; kcwdh20@sbcglobal.net

**Subject:** GSAS-Kings County Resident STATES NO ON GROUND WATER FOR AGRICULTURAL PURPOSES!

Colleen Courtney
14234 16th Avenue
Lemoore, CA 93245-9517
Email: colleencourtney66@gmail.com

October 11,2019

To: GSAS Commissioners Board;

HELL NO! These sod Busters DO NOT DRAIN the Valleys Ground Water for their crops that ships out of State or over seas for your personal Padding Their wallets!

NOT AT this Valleys populations expense for their personal gains!

We need that water for drinking for people, animales we eat and other business endeavors other than these Sod Busters causing our lungs to fill with their crop dirt, pesticides from those dam planes or choppers that keep sprayers on to do a turns. Bull shit!

You sod Busters use your homes water well resource to water your acreages! Or drill more water wells on your own property or truck in tankers of water from the Rockies or Serras!

Or tap into your local City water line. Their water line is petty much secured source for your crop of your own choice of Occupational decision of becoming a FATCAT Farmer! At the other people's thirst expense!

We are already breathing your property's dirt and pesticides! Your surface soil covers our house and vechicals in one month! And pushing your sludge mixed with our water down that dam drive away!

I am about to phone the Sheriffs Department on that sod buster's property that constantly trespasses and squats on our property and buries everything!
We accumulated more of his farm land than he actually possesses!

These sodbusters are like city slumlords just purchased cheap property sell high, cut costs, don't maintain, rape the earth, suck it out of every earthly nutrients, minerals possible drain others water for your sole purposes to pad your wallets. And in the end abandon the worthless property your raped the hell out of. To go to another place to fu ck up for the next generation to overhaul that damage you caused in the first place!

NO GROUND WATER To SOD BUSTERS!
And SOD BUSTERS are NOT in the
AGRICULTURAL COMMUNITIES!

The Real Farmers know how to take care of the earth and would not ever think of asking people to give up their drinking water for themselves and their animals. For his crops. This Farmer would sacrifice his crops for those people when it came to water rights. And not directed by padding his wallet!

VOTE NO ON GROUND WATER! Let these sod busters truck in their water from Rockies or Serras! Just a cheap expense compared to Shipping crops to New York or Over Seas!

Cheap son of a bitches! Go dry up!

Colleen Courtney

South Fork Kings Groundwater Sustainability Agency
4886 E Jensen Avenue
Fresno, CA 93725

TO: SFKGSA Board Members and members of the Public.

RE: Response to SFKGSA Sustainability Plan.

I use this opportunity to respond to the South Fork Kings Groundwater Sustainability Plan. I understand that the SFKGSA is limited in its scope of responsibility and governance, however I feel the SFKGSA can become a useful proponent and informational resource for public awareness.

The primary source of groundwater recharge is the sandy bottom of the Kings River. Domestic wells, agriculture wells, groundwater dependent ecosystems, and other beneficial users are dependent upon the river's natural surface water flows to recharge underground aquifers. These surface water flows are managed by the Kings River Water Association (KRWA) whose 28 member districts receive water from a designated "point of diversion" on the Kings River. It has become common practice to divert surface water from lower stream points of diversion to upper stream diversion points to reduce what is commonly termed "channel loss". However, channel loss is also groundwater recharge. These diversions have a direct and negative impact on holders of overlying groundwater rights by diminishing groundwater recharge and adding to groundwater overdraft.

**PART 1.**

**GROUNDWATER RIGHT HOLDERS:**

**SUSTAINABLE GROUNDWATER MANAGEMENT ACT: 10723.2.**

"The groundwater sustainability agency shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing groundwater sustainability plans. These interests include, but are not limited to, all of the following:"

(a) Holders of overlying groundwater rights, including:

(1) Agricultural users.

(2) Domestic well owners.

(b) Municipal well operators.

(c) Public water systems.

(d) Local land use planning agencies.

(e) Environmental users of groundwater.

**Excerpts from CALIFORNIA WATER CODE:**

**§ 1706**. The person entitled to the use of water by virtue of an appropriation other than under the Water Commission Act or this code may change the point of diversion, place of use, or purpose of use if others are not injured by such change...

**§ 1707**. (a) (1) Any person entitled to the use of water, whether based upon an appropriative, riparian, or other right, may petition the board pursuant to this chapter, Chapter 6.6 (commencing with Section 1435) or Chapter 10.5 (commencing with Section 1725) for a change for purposes of preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in, or on, the water.

Being a public entity, it is incumbent on the SFKGSA monitor and quantify the amount of groundwater recharge lost due to points of diversion changes. Further, it is an inherent responsibility of the SFKGSA to challenge any such diversions per California Water Code Sections 1706 and 1707, and by other codes sections not mentioned, and to advocate on behalf of those harmed by such diversions.

**PART 2.**

**DECISION 1290**

In 1967 the State of California State Water Rights Board issued its Decision 1290, a pivotal benchmark for Kings River water management. The following are excerpts from the Decision:

***Page 16: "The primary source of all ground water in the Kings River service area is the river and its distributaries...".***

***Page 21: "The contracts with members of the KRWA result in the controlled release of water from these reservoirs* (Courtright, Wishon, Pine Flat) *to satisfy downstream requirements for irrigation and ground-water recharge."***

***Page 35-36: "...the association* (KRWA) *members have planned their overall project to take maximum advantage of all storage facilities available to them. This includes recharge of ground water and underground storage as well as the storage of flood waters in Tulare Lake Basin and maximum retention in Pine Flat Reservoir. Consulting Engineer Henry Karrer testified to the effect that under certain ideal conditions, about 2,000,000 acre-feet could be stored and regulated in Pine Flat Reservoir in any one year (RT192). He also said that up to 1,000,000 acre-feet of water could be stored in the cellular dyke system in Tulare Lake Basin (RT 192)."***

This position was reaffirmed in a July 30, 2019 letter to Mitchell Moody of the State Water Resource Control Board when stating; "Decision 1290 expressly recognized the KRWA member units planned their overall project to take maximum advantage of all available storage facilities...".

Present estimate of King River Basin groundwater overdraft is 120,000 acre-feet per year, while average annual floodwater diverted to the San Joaquin River is 100,000 acre-feet. Opportunities of using Tulare Lake as a storage facility have been repeatedly missed as it has become common practice to redirect flood release water away from the ***cellular dyke system in Tulare Lake Basin*** to the San Joaquin. The beneficial use of this un-stored water is then lost to all.

It is understandable that stakeholders who would be harmed by the flooding of the Tulare Lake Basin would wish that flood release waters be diverted. The flooding of the Tulare Lake Basin would cause economic hardship to business interests. However, as noted in Decision 1290 and empirically known, the Kings River waters do naturally flow to the Tulare Lake Basin, into what is known as Tulare Lake.

It is likewise understandable that this diversion of flood release water comes at an equal price to stakeholders outside the Tulare Lake Basin. Water diverted away from the dyke system storage facility is water waisted and unused for negating groundwater overdraft and recharge. If full usage of the cellular dyke system were utilized as stated in Decision 1290, groundwater overdraft could be diminished by as much as 100,000 per year.

With SGMA deadlines approaching, stakeholders up-stream of the Tulare Lake Basin find themselves mired in a groundwater overdraft problem. They face the economic consequence of fallowed land and tax surcharges for groundwater pumping, while 100,000 acre-feet of Kings River surface water is re-routed to the San Joaquin River. Simply put; until the cellular dyke system in Tulare Lake Basin is fully utilized as intended, upstream right-holders and stakeholders a will pay the price for the problem Tulare Lake Basin interests pass on.

As stated, SFKGSA is a public entity and has an inherent responsibility to monitor, quantify and make publicly known the amount of groundwater recharge lost and the groundwater overdraft resulting from the non-use of the cellular dyke storage system as stated in Decision 1290. Additionally, it is requested that the SFKGSA study and make known the impact changes in points of diversion (Part 1) and non-use of the cellular dyke storage system in Tulare Lake Basin (Part 2) have upon groundwater recharge and overdraft prior to implementation of overdraft enforcement procedures.

Thank you for your consideration.

Bill Miguel
21425 Grangeville Blvd
Lemoore, California
October 11, 2019

The Nature Conservancy
Protecting nature. Preserving life.

CALIFORNIA WATER | **GROUNDWATER**

555 Capitol Mall, Suite 1290
Sacramento, California 95814
[916] 449-2850

nature.org
GroundwaterResourceHub.org

November 26, 2019

South Fork Kings Groundwater Sustainability Agency
4886 E. Jensen Avenue
Fresno, CA 93725
comments@southforkkings.org

Submitted online via: https://southforkkings.org/wp-content/uploads/2019/09/2019-0906-tulare-lake-subbasin-gsp-prelim-draft_for-upload.pdf

Re: Tulare Lake Subbasin Groundwater Sustainability Plan, Preliminary Draft

Dear Agency Staff,

The Nature Conservancy (TNC) appreciates the opportunity to comment on the Groundwater Sustainability Plan (GSP) for the Tulare Lake Subbasin that is 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 California. 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. SGMA must be successful for us to achieve a sustainable future, in which people and nature can thrive within the Tulare Lake Groundwater Subbasin and California.

We believe that 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. TNC has developed a suite of tools based on best available science to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at

GroundwaterResourceHub.org. TNC'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 (GDEs) [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 and users, which include environmental uses, such as plants and animals. TNC has identified each part of GSPs where consideration of beneficial uses and users are required. That list is available here: https://groundwaterresourcehub.org/importance-of-gdes/provisions-related-to-groundwater-dependent-ecosystems-in-the-groundwater-s. Please ensure that environmental beneficial users are addressed accordingly throughout the GSP. 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, TNC has prepared a checklist (**Attachment A**) for GSAs and their consultants to use. TNC believes the following elements are foundational for 2020 GSP submittals. For detailed guidance on how to address the checklist items, please also see our publication, *GDEs under SGMA: Guidance for Preparing GSPs*[1].

**1. Environmental Representation**

SGMA requires that 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 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[2] 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 California Department of Fish and Wildlife (CDFW) and TNC. We also recommend using GDE Pulse, which is also available on the internet at https://gde.codefornature.org/#/home. We also recommend using the California Natural

[1]GDEs under SGMA: Guidance for Preparing GSPs is available at: https://groundwaterresourcehub.org/public/uploads/pdfs/GWR_Hub_GDE_Guidance_Doc_2-1-18.pdf

[2] The Department of Water Resources' Natural Communities Commonly Associated with Groundwater dataset is available at: https://gis.water.ca.gov/app/NCDatasetViewer/

Diversity Database (CNDDB) provided by CDFW to look up species occurrences within your area.

**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. In addition to identifying GDEs in the basin, TNC recommends identifying beneficial users of surface water, which include environmental users. This is a critical step, as it is impossible to define "significant and unreasonable adverse impacts" without knowing *what* is being impacted. For your convenience, we've provided a list of freshwater species within the boundary of the Tulare Lake Groundwater Subbasin (Subbasin) in **Attachment C**. Our hope is that this information will help your GSA better evaluate the impacts of groundwater management on environmental beneficial users of surface water. We recommend that after identifying which freshwater species exist in your basin, especially federal- and state-listed species, that you contact staff at CDFW, United States Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Services (NMFS) to obtain their input on the groundwater and surface water needs of the organisms on the GSA's freshwater species list. We also refer you to the Critical Species Lookbook[3] prepared by TNC and partner organizations for additional background information on the water needs and groundwater reliance of critical species. Since 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.

TNC has reviewed the Tulare Lake Preliminary Draft GSP and appreciates the use of some our relevant resources in addressing GDE-related topics. However, we consider it to be **inadequate** under SGMA since key environmental beneficial uses and users are not adequately identified and considered. In particular, 1) ISWs and GDEs are not adequately identified and evaluated for ecological importance or adequately considered in the basin's sustainable management criteria, and 2) connectivity and extent of the of ISWs and GDEs with the shallow / perched zones of the unconfined / semiconfined aquifer were not characterized. **Please present a more thorough analysis of the 1) connectivity of the shallow and perched portions of the unconfined aquifer, 2) extent of the perched and shallow areas within the aquifer, and 3) identification and evaluation of ISWs and GDEs in subsequent drafts of the GSP. Once potential GDEs and ISWs are identified, they must be considered when defining undesirable results and evaluated for further monitoring needs until data gaps are filled in the future. If they are not adequately defined, then they need to be identified as a data gap in the interim.**

Our specific comments related to the Tulare Lake GSP are provided in detail in **Attachment B** and are in reference to the numbered items in **Attachment A. Attachment C** provides a list of the freshwater species located in the Subbasin. **Attachment D** describes six best practices that GSAs and their consultants can apply when using local groundwater data to confirm a connection to groundwater for DWR's NC Dataset. **Attachment E** provides an overview of a new, free online tool (i.e., GDE Pulse) that allows GSAs to assess changes in GDE health using satellite, rainfall, and groundwater data.

[3] Available online at: https://groundwaterresourcehub.org/sgma-tools/the-critical-species-lookbook/

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

## Environmental User 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.

| GSP Plan Element* | | GDE Inclusion in GSPs: Identification and Consideration Elements | Check Box |
|---|---|---|---|
| **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 |
| **Planning Framework** | **2.1.2 to 2.1.4 Description of Plan Area** *23 CCR §354.8* | **Description of jurisdictional boundaries, existing land use designations, water use management and monitoring programs; general plans and other land use plans relevant to GDEs and their relationship to the GSP.** | 2 |
| | | **Description of instream flow requirements, threatened and endangered species habitat, critical habitat, and protected areas.** | 3 |
| | | **Summary of process for permitting new or replacement wells for the basin, and how the process incorporates any protection of GDEs** | 4 |
| **Basin Setting** | **2.2.1 Hydrogeologic Conceptual Model** *23 CCR §354.14* | **Basin Bottom Boundary:** Is the bottom of the basin defined as at least as deep as the deepest groundwater extractions? | 5 |
| | | **Principal aquifers and aquitards:** Are shallow aquifers adequately described, so that interconnections with surface water and vertical groundwater gradients with other aquifers can be characterized? | 6 |
| | | **Basin cross sections:** Do cross-sections illustrate the relationships between GDEs, surface waters and principal aquifers? | 7 |
| | **2.2.2 Current & Historical Groundwater Conditions** *23 CCR §354.16* | **Interconnected surface waters:** | 8 |
| | | 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). | 9 |
| | | Estimates of current and historical surface water depletions for interconnected surface waters quantified and described by reach, season, and water year type. | 10 |
| | | **Basin GDE map included** (as figure in text & submitted as a shapefile on SGMA Portal). | 11 |

| | | | | |
|---|---|---|---|---|
| | | 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). | 12 |
| | | | 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). | 13 |
| | | | GDEs polygons are consolidated into larger units and named for easier identification throughout GSP. | 14 |
| | | 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. | 15 |
| | | **Description of GDEs included:** | | 16 |
| | | Historical and current groundwater conditions and variability are described in each GDE unit. | | 17 |
| | | Historical and current ecological conditions and variability are described in each GDE unit. | | 18 |
| | | Each GDE unit has been characterized as having high, moderate, or low ecological value. | | 19 |
| | | Inventory of species, habitats, and protected lands for each GDE unit with ecological importance (Worksheet 2, can be attached in GSP section 6.0). | | 20 |
| | **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. | | 21 |
| | | 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. | | 22 |
| **Sustainable Management Criteria** | **3.1 Sustainability Goal** *23 CCR §354.24* | **Environmental stakeholders/representatives were consulted.** | | 23 |
| | | Sustainability goal mentions GDEs or species and habitats that are of particular concern or interest. | | 24 |
| | | 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. | | 25 |
| | **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.** | | 26 |
| | **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:** | | 27 |
| | | 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? | | 28 |
| | | 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? | | 29 |
| | **3.4 Undesirable Results** *23 CCR §354.26* | **For GDEs, hydrological data are compiled and synthesized for each GDE unit:** | | 30 |
| | | 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). | 31 |
| | | | Baseline period in the hydrologic data is defined. | 32 |

| | | | | |
|---|---|---|---|---|
| | | | GDE unit is classified as having high, moderate, or low susceptibility to changes in groundwater. | 33 |
| | | | Cause-and-effect relationships between groundwater changes and GDEs are explored. | 34 |
| | | If hydrological data *are not available* within/nearby the GDE | Data gaps/insufficiencies are described. | 35 |
| | | | Plans to reconcile data gaps in the monitoring network are stated. | 36 |
| | | **For GDEs, biological data are compiled and synthesized for each GDE unit:** | | 37 |
| | | Biological datasets are plotted and provided for each GDE unit, and when possible provide baseline conditions for assessment of trends and variability. | | 38 |
| | | Data gaps/insufficiencies are described. | | 39 |
| | | Plans to reconcile data gaps in the monitoring network are stated. | | 40 |
| | | **Description of potential effects on GDEs, land uses and property interests:** | | 41 |
| | | Cause-and-effect relationships between GDE and groundwater conditions are described. | | 42 |
| | | Impacts to GDEs that are considered to be "significant and unreasonable" are described. | | 43 |
| | | Known hydrological thresholds or triggers (e.g., instream flow criteria, groundwater depths, water quality parameters) for significant impacts to relevant species or ecological communities are reported. | | 44 |
| | | Land uses include and consider recreational uses (e.g., fishing/hunting, hiking, boating). | | 45 |
| | | Property interests include and consider privately and publicly protected conservation lands and opens spaces, including wildlife refuges, parks, and natural preserves. | | 46 |
| **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. | | 47 |
| | | Description of how hydrological data gaps and insufficiencies will be reconciled in the monitoring network. | | 48 |
| | | Description of how impacts to GDEs and environmental surface water users, as detected by biological responses, will be monitored and which GDE monitoring methods will be used in conjunction with hydrologic data to evaluate cause-and-effect relationships with groundwater conditions. | | 49 |
| **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. | | 50 |
| | | Description of how projects and management actions will be evaluated to assess whether adverse impacts to the GDE will be mitigated or prevented. | | 51 |

* 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**
**Tulare Lake Subbasin Groundwater Sustainability Plan, Preliminary Draft**

A complete draft of the Tulare Lake Subbasin GSP is available at https://southforkkings.org/wp-content/uploads/2019/09/2019-0906-tulare-lake-subbasin-gsp-prelim-draft_for-upload.pdf for public review and comment and is dated August 2019. This attachment summarizes our comments on the complete public draft GSP. Comments are provided in the order of the checklist items included as Attachment A.

Checklist Item 1 - Notice & Communication (23 CCR §354.10)

[Section 2.5.3 Beneficial Uses and Users (p. 2-28)]

- The flow chart on p. 2-28 shows the engagement process with groundwater users during the development and implementation of the GSP. Table 2-4 (pp. 2-47 to 2-49) identifies all the beneficial uses and users of groundwater within the Subbasin by GSA in greater detail, but does not include environmental uses and users. Users identified include agricultural, public water systems, domestic well owners, municipal water systems, planning agencies, Native American Tribes, Disadvantaged Communities, monitoring entities, and surface water users (as represented by GSA members). California Water Code §1305(f) defines that beneficial uses of waters of the State include "preservation and enhancement of fish, wildlife, and other aquatic resources and preserves". **Please expand Table 2-4 to include environmental uses and users that are present in the Subbasin, such as:**
    - **ecological areas; preserves; potential ISWs and GDEs; managed wetlands;**
    - **Protected Lands, including conservation areas; and**
    - **Public Trust Uses including wildlife, aquatic habitat, fisheries, and recreation.**

Checklist Items 2 to 4 - Description of the Plan Area (23 CCR §354.8)

[Section 2.0 Plan Area (pp. 2-1 to 2-2)]

- The types and locations of environmental uses, species and habitats supported, and the designated beneficial environmental uses and users of surface waters that may be affected by groundwater extraction in the Subbasin should be specified in the section and in Table 2-4. **Please elaborate on the "surface water uses and users" by identifying the environmental uses and users of surface water for all GSAs in Table 2-4. Please explicitly identify the environmental users and take particular note of the species with protected status and any critical habitat that exists within the Subbasin.** The following are resources that can be used:
    - Natural Communities Commonly Associated with Groundwater dataset (NC Dataset) - https://gis.water.ca.gov/app/NCDatasetViewer/

    - The list of freshwater species located in the Tulare Lake Subbasin in Attachment C of this letter.
    - The California Department of Fish and Wildlife's California Natural Diversity Database (CNDDB) for species occurrences.
    - The USFWS's Environmental Conservation Online System (ECOS) for mapping critical habitat, wildlife and contaminants - https://ecos.fws.gov/ecp/
- The GSP addresses state and federal land ownership to some degree, but there is no mention of uses related to open space areas, managed wetlands, natural preserve areas, or other protected lands that contain natural resources. Per the USFWS ECOS website the Kern National Wildlife Refuge Complex, Tulare Basin Wildlife Management Area (on southern boundary), and Pixley National Wildlife Refuge (to the east of Highway 43) abut the GSP area. Within these areas there is critical habitat mapped for the Buena Vista Lake ornate shrew (*Sorex ornatus relictus*) near the Lemoore Naval Air Station and in the Kern National Wildlife Refuge, and the vernal pool fairy shrimp (*Branchinecta lynchyi*) in the Pixley National Wildlife Refuge. These habitat areas or species are not addressed in the description of the plan area, nor are sensitive habitats within the plan area acknowledged.
    - **Please identify the natural resources within the plan area and elaborate on any and all state, federal or other land ownership that exists within the plan area that provide protection of natural resources.**
    - **Please address how the GSP will address natural resource management on a regional scale since management within the GSP could affect neighboring sensitive resources.**
- The GSP goes on to state on p. 2-2 that the primary land use designations are for agricultural, urban, residential, commercial and industrial lands; however, the figure on that page shows riparian vegetation and water surface land use classifications that amount to more than residential and semi-agricultural. **Please revise the statement concerning primary land use designations to accurately reflect the percentages on the chart (i.e., agricultural, urban, riparian vegetation, water surface, etc.). Please identify the natural resources within the plan area and elaborate on any and all state, federal or other land ownership that exists within the plan area that provide protection of natural resources.**
- On page 2-2, it is stated that it was not possible to differentiate types of well uses between irrigation and domestic extractors because DWR does not have that data. However, these data are available on well completion reports which may be accessed on line through the GeoTracker GAMA website (https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/Default.asp). This is the approach taken in almost every other GSP we have reviewed and is an important distinction of use as it relates to prioritization of project needs and management decisions. **Please either address this issue or identify this as a data gap to reconcile in the 5-year GSP update.**

[Section 2.1 Summary of Jurisdictional Areas and Other Features (pp. 2-3 to 2-10)]

- The Plan summarizes the GSP Area and describes the jurisdictional areas and entities of the GSAs, but does not say anything about the jurisdictional areas of the resource agencies. **Please elaborate on the jurisdictional areas of the resource agencies and what resources they are in place to protect.**
- With exception of a short description of the Kings River Fisheries Management Program in Section 2.2.2.4, the GSP does not provide a description of other instream flow requirements, if any, or how the water infrastructure is in compliance with regulatory requirements set to protect species of concern. **Please provide a description of any current and planned instream flow requirements for Tulare Subbasin streams / rivers including Kings, Tule, White, Kaweah, and St. John's Rivers; and undammed streams including Deer, Dry, Mill, Cottonwood, and Poso Creeks. If there are no other instream flow requirements in place or planned, then please state that in the document.**

[Section 2.2.1 Monitoring and Management Programs (pp. 2-11 to 2-12)]

- This section addresses the water resources management actions that are being undertaken to monitor groundwater level, extraction and quality; subsidence; irrigated lands; and surface water. Management of natural resources is not considered in this section but should be described in order to provide a context for how groundwater management actions will be coordinated with environmental requirements to prevent undesirable results. **Please include a description of the natural resource management and monitoring programs occurring within the GSP area that affects instream, wetland and riparian ecosystems that have the potential to be groundwater dependent (i.e., interconnected surface water [ISWs] and groundwater dependent ecosystems [GDEs]).**

[Section 2.3 Relation to General Plans (pp. 2-14 to 2-17)]

- The GSP includes a very short description of the general plans within the GSP area but fails to specifically elaborate on the goals and policies outlined in the plans, and how the GSP will fit in with or affect the general plans' goals and policies related to the protection and management of GDEs, ISWs and aquatic resources that could be affected by groundwater withdrawals. **Please include a discussion of how implementation of the GSP may affect and be coordinated with General Plan policies and procedures regarding the protection of wetlands, aquatic resources, other GDEs and ISWs, and related threatened or endangered species.**
- This section should identify other land use plans, including Habitat Conservation Plans (HCPs) or Natural Community Conservation Plans (NCCPs) within the Subbasin and if they are associated with areas with instream flow requirements; or critical, GDE or ISW habitats. **Please identify all relevant HCPs and NCCPs within the Subbasin, and any reaches with instream flow and critical habitat requirements. Please elaborate on the natural resources within the Subbasin and address how GSP implementation will coordinate with the**

**goals of these plans and requirements. If there are no HCPs, NCCPs, or preservation areas that could be affected, then that should be stated.** The Critical Species Lookbook[4] includes the potential groundwater reliance of critical species in the basin. **Please include a discussion regarding the management of critical species and their habitats for these aquatic ecosystems and its relationship to the GSP.**

- **Please describe how the GSP will coordinate with the General Plan elements within the GSP area. Specifically, please elaborate on conservation, recreation and open space elements.**
- This section states (p. 2-15) that "It is considered unlikely that any Kern County General Plan Policies have any practical relevance to the plan area". The Kern National Wildlife Refuge Complex abuts the GSP area and it is difficult to understand that the General Plan for Kern County does not address habitat concerns and conservation that could be directly or indirectly affected by potential groundwater management actions within and adjacent to the Kern Subbasin. **Please 1) elaborate on the Kern County General Plan's conservation elements, 2) how the Tulare Lake Subbasin's GSP will comply with or not impact conservation elements being employed within protected habitat areas adjacent to the Tulare Subbasin, and 3) expand this conversation to include other neighboring habitat areas, such as Pixley National Wildlife Refuge.**

[Section 2.3.4 Permitting Process for New or Replacement Wells (pp. 2-17 to 2-19)]

- This section summarizes well permitting requirements and county ordinances for the counties of Kings, Kern and Tulare. **Please include a discussion of the following in this section:**
    - Future well permitting must be coordinated with the GSP to assure achievement of the Plan's sustainability goals.
    - How the well permitting process incorporates protection of GDEs within the Subbasin.
    - The State Third Appellate District recently found that Counties have a responsibility to consider the potential impacts of groundwater withdrawals on public trust resources when permitting new wells near streams with public trust uses (ELF v. SWRCB and Siskiyou County, No. C083239). **The need for well permitting programs to comply with this requirement should be stated in the text.**

<u>Checklist Items 5 to 7 – Hydrogeologic Conceptual Model (23 CCR §354.14)</u>

[Section 3.1.7 Definable Bottom of the Basin (pp. 3-16 to 3-19)]

- The GSP uses two methods (Water Quality and Geologic) to define the bottom of the basin but which method, or combination of the methods, that is being relied on for this GSP is not clearly stated. **Please explicitly state the final decision on how the bottom of the basin was determined, and what it was determined to be.**

[4] Available online at: https://groundwaterresourcehub.org/sgma-tools/the-critical-species-lookbook/

- Defining the bottom of the Subbasin based on geochemical properties is a suitable approach for defining the base of freshwater, however, as noted on page 9 of DWR's Hydrogeologic Conceptual Model BMP (https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_HCM_Final_2016-12-23.pdf) "the definable bottom of the basin should be at least as deep as the deepest groundwater extractions". **Thus, groundwater extraction well depth data should also be included in the determination of the basin bottom.** This will prevent the possibility of extractors with wells deeper than the basin boundary (defined by the base of freshwater) from claiming exemption of SGMA due to their well residing outside the vertical extent of the basin boundary. **Please characterize groundwater well extractions from the deepest wells in relation to defining the basin bottom**.

[Section 3.1.8 Hydrogeologic Setting: Principal Groundwater Aquifers and Aquitards (pp. 3-19 to 3-23)]

- Although there is robust description of the confined (lower) and unconfined / semi-confined (upper) aquifers there is no explicit description with supporting data and information of how groundwater above the A- and C-clays in the upper aquifer interacts with the unconfined aquifer, or is influenced by pumping in the unconfined portion of the upper aquifer. DWR's definition of a principal aquifer, is defined as an "aquifer or aquifer system that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems" [*23 CCR §351(aa)*]. These shallow and perched areas within the upper aquifer range from near surface to 30 feet below ground surface (bgs) (Figure 3-17, p. 3-74) and likely provide water supply to GDEs and ISWs. As such, they yield significant quantities of groundwater to surface water systems and beneficial users, and should not be dismissed because they do not yield groundwater for human use. **Please expand the description of the upper aquifer to include the interaction of the unconfined and shallow areas of the upper aquifer. Include cross-sections to show their connectivity and relationship to potential ISWs and GDEs.**
- Regional geologic cross sections are provided in Figures 3-14a, 3-14b and 3-14c (pp. 3-69 to 3-71). These cross-sections do not include a graphical representation of the shallow groundwater-bearing zones that may be connected to GDEs and ISWs in the GSP area, and how they are connected to the upper aquifer system. **Please include example near-surface cross section details that depict the conceptual understanding of shallow groundwater and stream interactions at different locations, including the shallow zones, any perched aquifers, and the unconfined / semi-confined upper aquifer**.
- Based on the information provided in the GSP, it appears that the confined lower aquifer is being considered a principal aquifer because of the large amount of consumption for agriculture and municipal water supply, but this is not explicitly stated. The unconfined / semi-confined aquifer is stated to have limited use because of water quality. On pages 3-18 and 3-19, there is a discussion of water quality and although water with TDS higher than 3,000 is not considered suitable for water supply or most agriculture, it is potentially suitable for livestock and production of crops with higher tolerance to salinity. Conversely, in Section 3.1.11 (pages 3-25

and 3-26), the GSP states that the upper aquifer is primarily used for domestic and municipal supplies, and agricultural pumping does occur in the deeper portion of the upper aquifer. Also, if water in the unconfined aquifer is significantly supporting GDEs and ISWs, production of salt tolerant crops, or livestock operations, then it should also be identified as a principal aquifer. Even if ultimately the GSA doesn't define shallow groundwater as a principal aquifer, the text indicates current or future use that could impact ISWs and GDEs. **Thus, disregarding this shallow groundwater as a principal aquifer due to its water quality is not supported by the data and is inadequate.** SGMA requires GSAs to sustainably manage groundwater resources in all aquifers, especially if groundwater use and management can result in impacts to beneficial uses and users. Please refer to Best Practice #1 in Attachment D for further explanation and accompanying graphics. **Please explicitly enumerate the principal aquifer(s) and intervening aquitards, their relationship to each other, and their role in supplying groundwater to all beneficial uses and users of groundwater (including environmental).**

[Section 3.2 Groundwater Conditions (pp. 3-26 to 3-28)]

- Groundwater elevation contours are shown for 1905-1907, 1952, 1990, 1995, 2000, 2005, 2010 and 2016 on Figures 3-24 through 3-27 with respect to mean sea level. However, the wells used to contour groundwater levels in the upper aquifer do not necessarily monitor shallow or perched groundwater that may be in communication with GDEs and ISWs. In addition, depth to groundwater cannot be readily assessed from the maps because they are presented with respect to sea level. **Please provide the following:**
    1) **Groundwater level contour maps representative of the uppermost aquifer where GDEs and ISWs may be reliant. If this data does not exist, then identify it as a data gap that will be addressed in the GSP when the GSP is updated.**
    2) **Depth to water contour maps that allow interpretation of beneficial groundwater uses by environmental users.**
    3) **If these data are not available, please identify this as a data gap and outline measures to address the data gap in subsequent sections of the GSP.**

[Section 3.2.5 Groundwater Quality (pp. 3-30 to 3-31)]

- There is water quality information for the upper aquifer and a statement that increases in TDS concentrations, arsenic, nitrate and volatile organic chemicals (VOCs) are largely due to agricultural practices and pumping, but there is no information regarding water quality of the perched water or other areas of the upper aquifer to understand how water quality may affect GDEs, ISWs and associated aquatic species. **Please modify this section of the GSP to include data about water quality in the zones where GDEs are present. If there are no data available, then please recognize this as a data gap and specify that additional data will be collected and analyzed for the GSP update.**

Checklist Items 8 to 10 – Interconnected Surface Waters (ISWs) (23 CCR §354.16)

[Figure 3.1.10 Groundwater Recharge and Discharge Areas (p. 3-25)]

- The text states that "Some discharge is impacted by direct soil evaporation and evapotranspiration, particularly in areas where groundwater is less than 10 feet bgs." Elsewhere the text states that agricultural drainage must be provided in some areas, indicating very shallow groundwater, or makes reference to deeper groundwater levels of about 30 feet for groundwater above the A-Clay. Earlier in this comment letter we pointed out the discrepancy between the various shallow groundwater levels that are presented (see Section 3.2 Groundwater Conditions [pp. 3-26 to 3-28]). This GSP also states that riparian and emergent marsh ecosystems are prevalent in certain areas where they have not already been degraded by land development. **Please 1) rectify the discrepancies in groundwater levels, particularly as they pertain to ISWs and GDEs; and 2) include the locations of phreatophytes and other GDEs to provide a complete representation of evapotranspiration within all groundwater discharge areas. If the regional groundwater connection of phreatophytes and other GDEs is not known, 1) please identify this data gap, 2) provide an approach to address it, and 3) include the ISWs and GDEs as potential features on a figure until they can be more conclusively evaluated.**

[Section 3.2.8 Interconnected Surface Water and Groundwater Systems (pp. 3-33 to 3-34)]

- The regulations [23 CCR §351(o)] define ISWs as "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted". "At any point" has both a spatial and temporal component. Even short durations of interconnections of groundwater and surface water can be crucial for surface water flow and supporting environmental users of groundwater and surface water. ISWs can be either gaining or losing. The GSP disregards IWSs by stating that hydrologic conditions have been so altered that the ISWs that were historically connected are not any longer. There are inconsistencies throughout this GSP in regard to ISWs. The GSP states:
    - Section 3.1.10 (p. 3-25, also see the comment directly above): "Groundwater recharge in the Subbasin occurs primarily by two methods: 1) infiltration of surface water from the Kings River and unlined conveyances; and 2) infiltration of applied water for irrigation of crops." **ISWs can be either gaining or losing (see the definition above). If recharge primarily occurs through infiltration from rivers and streams, then these features must be included as an ISW with gaining and losing reaches defined on a map.**
    - Section 3.2.8 (p. 34): "A persistent, shallow perched water table at a depth of about 30 feet bgs is often present above the A-clay in the vicinity of surface water conveyances and below recharge facilities; however, this shallow perched zone is disconnected from the regional unconfined aquifer. Other localized shallow perched zones may exist elsewhere in the Subbasin, but these are not considered a significant source of groundwater." Section 3.1.8

states (p. 3-21) that the perched water is as shallow as 15 feet in some areas, and the groundwater elevation contour maps show it ranging from 0-20 feet AMSL. Data to support the claims about the nature of the perched aquifers is conflicting and the claims that perched units are disconnected or insignificant are not supported by data. **Please clarify the discrepancy between groundwater depths reported for the shallow perched water table that are provided in the text and on figures. If the location and size of other shallow perched zones is unknown, this information needs to be identified as a data gap, rather than a reason to completely disregard the features.** It is inadequate to assume that shallow perched zones are not a significant source of groundwater if they have not been fully characterized, and could be a significant source for GDEs and ISWs. **Please reconcile data gaps (shallow monitoring wells, stream gauges, and nested/clustered wells) along surface water features in the Monitoring Network section of the GSP to improve identification of ISWs prior to disregarding them in the GSP.**

Checklist Items 11 to 15 – Identifying and Mapping GDEs (23 CCR §354.16)

[Section 3.2.8.1 Groundwater Dependent Ecosystems (GDEs) (p. 3-34 to 3-35)]

- The text states (p. 3-35): "Groundwater pumping from the principal aquifer system is not likely to impact the occurrence of perched groundwater because the two systems are separated by the A-Clay aquitard. Perched groundwater above the A-Clay is not directly interconnected with the underlying unconfined / semiconfined aquifer in that pumping from the unconfined / semiconfined aquifer does not induce increased leakage through the A-Clay aquitard." This statement is not supported by the data provided in the GSP (see comments above) and is not a valid reason to disregard potential GSPs without further evidence. The A-Clay is reported to vary significantly in thickness and to contain permeable sands in some locations. **Please:**
    1) **Explicitly identify the principal aquifers;**
    2) **Provide data regarding the competence of the A-Clay as an aquitard**
    3) **Evaluate the potential degree of connection between the perched and unconfined aquifer based on objective data;**
    4) **Acknowledge the extent of the perched aquifers throughout the Subbasin as a data gap;**
    5) **Address data gaps associated with the interconnectivity with the unconfined / semiconfined aquifer to be reconciled in the GSP update; and**
    6) **Acknowledge the potential for GDEs and ISWs to be dependent on these groundwater resources.**
- Although this GSP did use the NCCAG database to preliminarily identify GDEs (p. 3-34), all were disregarded without acknowledgment of data gaps and further characterization of the natural communities in association with potential perched aquifers, and disparities in groundwater levels that have not yet been characterized. This evaluation potentially misses GDEs due to the potential for GDEs to utilize the

shallow and perched areas of the unconfined / semi-confined aquifer. The following comments apply:

- While depth to groundwater levels within 30 feet are generally accepted as being a proxy for deciding if polygons in the NC dataset are connected to groundwater, it is highly advised that seasonal and interannual groundwater fluctuations in the groundwater regime are taken into consideration. Utilizing groundwater data from one point in time or during a discrete season can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Based on a study we recently submitted to *Frontiers in Environmental Science*, we've observed riparian forests along the Cosumnes River to experience a range in groundwater levels between 1.5 and 75 feet over seasonal and interannual timescales. Seasonal fluctuations in the regional water table can support perched groundwater near an intermittent river that seasonally runs dry due to such fluctuations. While perched groundwater itself cannot directly be managed due to its position in the vadose zone, the water table position within the regional aquifer (via pumping rate restrictions, restricted pumping at certain depths, restricted pumping around GDEs, well density rules, etc.) and its interactions with surface water (e.g., timing and duration) can be managed to prevent adverse impacts to ecosystems due to changes in groundwater quality and quantity under SGMA. **We highly recommend using depth to groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) to determine the range of depth to groundwater around NC dataset polygons. Please refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer. If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset seasonally and interannually, or to determine conclusively whether shallow groundwater is hydraulically connected (directly or indirectly) to underlying aquifers, include those polygons in the GSP until data gaps are reconciled in the monitoring network, and include specific measures and time tables to address the data gaps.**
- If there are insufficient groundwater level data in the shallow and perched zones, then the NCCAGs in these areas should be included as GDEs in the GSP until data gaps are reconciled in the monitoring network. **Confirmation of GDEs should be based on depth to groundwater in the shallow and perched areas. Please revise the GDE analysis in the GSP to include a complete analysis and identification of data gaps.**
- **Please provide depth to groundwater contour maps and note the following best practices for doing so:**
    - Are the wells used for interpolating depth to groundwater sufficiently close (<5km) to NC Dataset polygons to reflect local conditions relevant to ecosystems?

        - Are the wells used for interpolating depth to groundwater screened within the surficial unconfined aquifer and capable of measuring the true water table?
        - Is depth to groundwater contoured using groundwater elevations at monitoring wells to get groundwater elevation contours across the landscape? This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM) to estimate depth-to-groundwater contours across the landscape. This will provide much more accurate contours of depth to groundwater along streams and other land surface depressions where GDEs are commonly found. Depth to groundwater contours developed from depth to groundwater measurements at wells assumes that the land surface is constant, which is a poor assumption to make. It is better to assume that water surface elevations are constant in between wells, and then calculate depth to groundwater using a DEM of the land surface to contour depth to groundwater.
    - Groundwater requirements of GDEs vary with vegetation types and rooting depths. In identifying GDEs, care should be taken to consider rooting depths of vegetation. **Please indicate what vegetation is present in the potential GDEs, and whether the GDE was eliminated or retained based solely on a specified depth limit.** While Valley Oak (*Quercus lobata*) have been observed to have a maximum rooting depth of ~24 feet (https://groundwaterresourcehub.org/gde-tools/gde-rooting-depths-database-for-gdes/), rooting depths vary spatially and temporally based on local hydrologic conditions. Also, maximum rooting depths do not take capillary action into consideration, which will vary with soil type and is an important consideration since woody phreatophytes generally do not prefer to have their roots submerged in groundwater for extended periods of time, and hence effectively redistribute their root systems to straddle the water table as it fluctuates. Hence, many riparian, floodplain and desert ecosystem species are highly capable of accessing groundwater at much deeper depths when needed.
    - Rohde, Froend and Howard (2017) acknowledged GDEs as ecosystems that can rely on groundwater for some or all their requirements. This publication can be found at: https://ngwa.onlinelibrary.wiley.com/doi/pdf/10.1111/gwat.12511. GDEs can rely on multiple water sources simultaneously and at different temporal and / or spatial scales (e.g., precipitation, river water, reservoir water, soil moisture in the vadose zone, groundwater, applied water, treated wastewater effluent, urban stormwater, irrigated return flow). SGMA (Section 351.0) defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface". **Hence, we recommend using depth to groundwater contour maps derived from subtracting groundwater levels from a DEM, as described above, to identify whether a connection to groundwater exists for the wetlands mapped in Figure 3-38 in the Subbasin.**

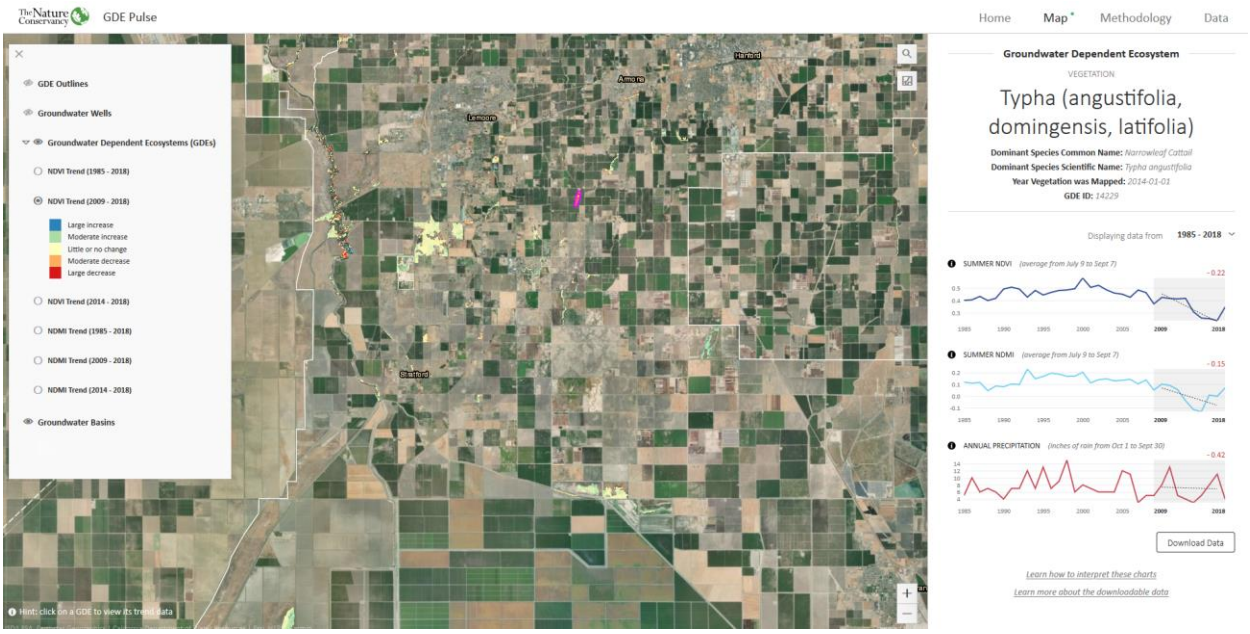
**Please refer to Attachments D and E of this letter for best practices for using local groundwater data to 1) verify whether polygons in the NC Dataset are supported by groundwater in an aquifer, and 2) verify ecosystem decline or recovery is correlated with groundwater levels.**

- The GSP states (p. 3-35), "Most of these vegetation types/plant species [identified in the NCCGA] are associated with riparian habitat that rely on surface water", and goes on to disregard them because they are primarily located on the perched areas above the A-Clay layer and the " A-Clay is not directly interconnected with the underlying unconfined / semi-confined aquifer". Section 354.16 of the California Code of Regulations states that "each Plan shall provide a description of current and historical groundwater conditions in the basin, including data from January 1, 2015, to current conditions, based on the best available information that includes…GDEs". Just because GDEs are thought to rely on surface water and the perched areas are thought to not be directly connected to the unconfined aquifer, does not make them insignificant to the environment. Many data gaps exist that could clarify these statements, for example: 1) indirect and direct connection of perched aquifers have not been fully characterized, 2) the location and extent of perched areas have not been fully characterized, and 3) species composition and potential max rooting depths have not be tabulated. Many rare and protected species reside in GDEs since they are very unique ecosystems. **Please provide further information on the analysis of GDEs and potential ISWs, including citing field studies or modeling studies that show the hydrologic nature of these systems. Specifically indicate 1) which streams and GDE polygons were excluded, 2) identify any data gaps, and 3) ensure that GDE polygons are retained until data gaps are reconciled.**

Checklist Items 16 to 20 - Describing GDEs (23 CCR §354.16)

[Section 3.2.8.1 Groundwater Dependent Ecosystems (GDEs) (p. 3-34 to 3-35)]

- **Please provide information on the historical or current groundwater conditions specifically near the GDEs or the ecological conditions present**. **If data gaps exist, please acknowledge them and state how they may be reconciled in the future.** Refer to GDE Pulse (https://gde.codefornature.org; See Attachment E of this letter for more details) or any other locally available data (e.g., leaf area index, evapotranspiration or other data) to describe depth to groundwater trends in and around GDE areas, as well as trends in plant growth (e.g., NDVI) and plant moisture (e.g., NDMI). Below is a screenshot example of data available in GDE Pulse for NC dataset polygons found in the Tulare Lake GSP Area.




- **Please provide an ecological inventory (see Appendix III, Worksheet 2 of the GDE Guidance) for all potential GDEs that includes vegetation or habitat types and rank the GDEs as having a high, moderate or low value. Explain how each rank was characterized.**
- **Please identify whether any endangered or threatened freshwater species of animals and plants, or areas with critical habitat were found in or near any of the GDEs since some organisms rely on uplands and wetlands during different stages of their lifecycle**. Resources for this include the list of freshwater species located in the Subbasin that can be found in Attachment C of this letter, the Critical Species Lookbook, and the USFWS's ECOS and CDFW's CNDDB databases / mapping tools.

<u>Checklist Items 21 and 22 – Water Budget (23 CCR §354.18)</u>

[Section 3.3.1.2 Outflows (pp. 3-39 to 3-40)]

- Evapotranspiration (ET) is included as an outflow category in the water budget; however, it is only included as it pertains to crop water requirements. Groundwater outflow to the ET of natural ecosystems (i.e., GDEs, riparian areas, etc.) should be identified as a groundwater budget component. If the outflow is not known, it should be identified as a data gap and provisional information should be provided until an analysis can be performed to address the data gap. **Since natural ecosystems may be beneficial users of groundwater: 1) please provide a breakdown of ET for all land-cover types, including native and riparian vegetation (such as wetlands, riparian vegetation, phreatophytes and other communities); 2) identify any data gaps; 3) outline the actions needed to address them; 4) and the schedule for their implementation.**

Checklist Item 23-26 Sustainability Goal (23 CCR §354.24)

[Section 4.0 Sustainable Management Criteria (p. 4-1)]

- The GSP states that there is no ISW connectivity within the entire Subbasin, but data to support this broad assertion are insufficient to dismiss this sustainability indicator. It is acknowledged earlier in the GSP that recharge primarily occurs through surface streams / rivers and unlined canals; however, there isn't any quantitative analysis, monitoring data, or other information provided to support that ISWs are not present, and statements within the GSP are contradictory. **Please address ISWs in the Sustainable Management Criteria and the Sustainability Goal until sufficient data is available to conclude the status of ISWs.**
- The GSP states "Indicators for the sustainable management of groundwater were determined by SGMA based on factors that have the potential to impact the health and general well-being of the public." This chapter starts off by disregarding the environmental use and users of groundwater. Sweeping statements like this should be modified throughout the chapter to acknowledge all beneficial users. **Since GDEs and ISWs may be present in and near the GSP area due to the prevalence of shallow groundwater (please see comments under Checklist Items 16-20) they should be explicitly recognized in the establishment of sustainable management criteria for the groundwater level decline and ISW sustainability indicators. Please also update this section to recognize environmental beneficial groundwater uses as a component of the sustainable management goals.**

[Section 4.1 Sustainability Goal (pp. 4-1 to 4-3)]

- The Sustainability Goal states that "…the sustainability goal works as a tool for managing groundwater, basin-wide, on a long-term basis to protect quality of life through the continuation of existing economic industries in the area, including but not limited to agriculture". The overall theme is to protect groundwater resources for developed water users, particularly agriculture. **The narrative discussion of the sustainability goal should be expanded to include other beneficial uses and users of groundwater including environmental uses and users of groundwater.**
- The Discussion of Measures states that "management actions will be implemented to help mitigate overdraft based on the demand from beneficial uses and users", but developed users are the only parties identified in this chapter. Criteria used to evaluate the priority given to beneficial users during overdraft periods is not described. **Please update this section to provide a discussion of how human and environmental beneficial uses will be balanced in the implementation of management actions during periods of drought and overdraft.**
- **Since GDEs and ISWs may be present in the Subbasin (please see comments under Checklist Items 16-20) they should be recognized as beneficial users of groundwater and should be included in the Sustainability Goal and Discussion of Measures. In addition, a statement about any intention to address pre-SGMA impacts should be included.**

- GDEs are dependent, in part, on suitable water quality; however, the GSP focuses on subsidence, groundwater levels and changes in groundwater storage; and only considers water quality for irrigation and domestic use. **Given that there are potential GDEs and ISWs in the Subbasin, and they may be affected by water quality they should be included in the Sustainability Goal and addressed in the Sustainable Management Criteria established for the Water Quality Sustainability Indicator.**

[Section 4.2.4 Groundwater Quality Indicator (pp. 4-5 to 4-6)]

- The GSP states that the GSAs will rely on the existing programs in place for monitoring groundwater quality, and the "local GSAs will focus on water quality issues that are related to groundwater pumping rather than on issues related to contamination". However, since much of the groundwater is being used for irrigation, which then leaches back into the soil or drains elsewhere and carries nutrients and other solutes with it, the GSA should monitor constituents related to agriculture in addition to those related to pumping, such as arsenic. This includes nitrates, phosphates, salts, sodium, boron, chloride and acidification from carbonic acid which affects soil biota, structure, geochemistry, GDEs and ISWs. **Please consider revising this section to include monitoring for agricultural constituents.**

Checklist Item 26 – Measurable Objectives (23 CCR §354.30)

[Section 4.5 Measurable Objectives (pp. 4-18 to 4-20)]

- This Measurable Objectives do not consider the water quality needs of GDEs and ISWs. **Please modify this section to include impacts from degraded water quality on the plant and wildlife communities, and species they support within these habitats**.
- This GSP states that "ISWs do not exist within the Subbasin". However, this conclusion was based on well groundwater levels that are not reasonably close to the drainages, shallow or nested monitoring wells to assess potential interaction with surface water and GDEs and connectivity to underlying aquifers, or hydrogeologic data that does not fully characterize the location and extent of perched and shallow zones within the upper aquifer. In addition, there are no supporting data and information that demonstrates shallow groundwater near the streams and rivers is not supporting ISWs or GDEs. As such, the data are insufficient to dismiss this sustainability indicator under the GSP regulations. **Please modify this section of the GSP to retain ISWs as a sustainability indicator, pending the characterization of the shallow / perched zones and analysis of monitoring data or monitoring from additional wells to be installed in the future.**
- Since there are wildlife refuges and protected wildlife area that contain critical habitat directly adjacent to the GSP area, the GSP needs to address these areas, whether there are potential GDEs or ISWs, and how management actions within the Subbasin would affect these sensitive habitats. **Please explain how the measurable objectives will benefit adjacent subbasins and not hinder the**

**ability of adjacent subbasins to be sustainable; and how the measurable objectives would benefit adjacent critical habitat areas. What are the mechanisms for this benefit?**

- Sweeping statements, such as (p. 4-20) "interconnected surface waters do not exist within the Subbasin, so this indicator will not be further discussed in terms of Measurable Objectives" are completely dismissive with disregard for data gaps. There is not enough evidence to make statements like these. Many of the wells are screened too deep, not in the proper location to make comparisons, and / or nested wells have not been installed to inform how shallow groundwater interacts with potential ISWs, GDEs or the unconfined aquifer. **Please include all potential ISWs in the analysis and develop measurable objectives and minimum thresholds for these, to be managed until data gaps prove they are not interconnected.**

Checklist Item 27-29 – Minimum Thresholds (23 CCR §354.28)

[Section 4.4.1.2 Description of Minimum Thresholds and Processes to Establish [for Groundwater Level Indicator (p. 4-13), Section 4.4.1.4 Description of Minimum Thresholds and Processes to Establish [for Groundwater Quality Indicator (p. 4-14), and Section 4.4.1.5 Description of Minimum Thresholds and Processes to Establish [for Interconnected Surface Water Intrusion (p. 4-14)]

- These Minimum Thresholds do not consider GDEs and ISWs. **Please include GDEs (see comments under checklist items 8-20) in this section and whether the minimum thresholds and interim milestones will help achieve the potential sustainability goal as it pertains to the environment.**
- Section 4.4.1.5 (p. 4-14) states that "Interconnected surfaces waters are not considered present in the Subbasin are; therefore, no further discussion will occur on this indictor in terms of MTs". However, the GSP fails to provide any monitoring data, analysis or other information to substantiate this position. Based on the inconsistencies in groundwater levels presented previously in the GSP and this letter, and the unknowns associated with the extent and location of shallow and/or perched zones in the upper aquifer, it is possible that rivers, streams and GDEs may be hydraulically connected to the regional aquifer system. Minimum thresholds must be established for ISWs and GDEs unless and until sufficient data are provided to eliminate them from consideration. **Please modify this section of the GSP to 1) develop minimum thresholds for possible ISWs, including GDEs, and 2) include a statement that a data gap exists related to the interconnectedness of the of the Tulare Lakebed, rivers / streams, and shallow groundwater zones.**

[Section 4.4.4 Potential Effects to Beneficial Uses and Users (p. 4-17 to 4-18)]

- The evaluation of minimum thresholds completely disregards consideration of environmental beneficial users, such as ISWs, GDEs or the species they support. Effects to beneficial uses and users is focused on well capacity, pumping costs, extraction, and impacts from subsidence on infrastructure. There is no mention about potential impacts to GDEs or ISWs that could be affected by lowering of the

shallow portions of the unconfined or semi-confined portions of the upper aquifer since a continuity / discontinuity between the two is a data gap. Although there are many data gaps associated with ISWs and GDEs, it must be assumed that potential significant and unreasonable impacts to these beneficial users could occur. As such, they should be addressed in the evaluation of minimum thresholds. Section 4.4.4 should be modified to address how potential ISWs and GDEs would be affected by further lowering of groundwater levels. **Please address how 1) potential ISWs and GDEs would be affected by further lowering of groundwater levels, 2) these beneficial users will be protected / managed in the interim until data gaps are filled, and 3) what measures will be employed to protect GDEs and ISWs that are confirmed after data gaps are filled.**

- This Section does not include the required analysis of how the selected minimum thresholds for decline in groundwater levels could affect potential ISWs and GDEs within and near the GSP area. **Please include an analysis of the potential effect of the established minimum thresholds on ISWs and GDES within and near the GSP area, particularly in adjacent wildlife preserves / refuges.**
- Although agricultural and domestic water quality concerns have been articulated, similar concerns were not identified for environmental users. Degradation of water quality can impact terrestrial and aquatic wildlife that live in or near these ecosystems during at least part of the year even if the water is not a concern from an agricultural or municipal standpoint. **Please include a discussion about GDEs and water quality and whether the minimum thresholds and interim milestones will help achieve sustainability for environmental users.**

Checklist Item 30-46 – Undesirable Results (23 CCR §354.26)

[Section 4.3 Undesirable Results (pp. 4-6 to 4-12), and Subsection 4.3.3 Potential Effects to Beneficial Uses and Users (pp. 4-11 to 4-12)]

- The GSP states that there are no ISWs; however, this is largely based on assumptions and there are no monitoring data, analyses or other information to support this statement. In addition, the GSP indicates that 1) streams and rivers are the primary source of recharge; 2) a connection may exist between shallow and perched groundwater, but the extent and location of perched groundwater is unknown; and 3) surface and groundwater may be periodically connected in Tulare Lake. Furthermore, GDEs may exist within and near the GSP area. This is a data gap that needs to be identified and rectified by employing a monitoring network to verify the status of ISWs prior to complete dismissal of ISWs from the GSP. **Please modify this section of the GSP to include:**
    1) **A statement that there are potential ISWs and GDEs, unless adequate data can be provided to dismiss them.**
    2) **An assessment of the nature of potential undesirable results to ISWs and GDEs.**
    3) **A statement that the aquifers will be managed such there will be no depletion of ISWs that results in a significant and unreasonable impacts to ISWs or GDEs.**

4) **Data gaps and specific steps to verify the presence or absence of ISWs and GDEs with monitoring wells screened at the appropriate depths.**

- This section only describes undesirable results relating to human beneficial uses of groundwater and neglects environmental beneficial uses / users that could be adversely affected by chronic groundwater level decline or depletion of ISWs. **Please add "possible adverse impacts to potential GDEs and ISWs" to the list of potential undesirable results.**
- The GDE Pulse web application developed by TNC provides easy access to 35 years of satellite data to view trends of vegetation metrics, groundwater depth (where available), and precipitation data. This satellite imagery can be used to observe trends for NC dataset polygons within and near the GSA. Over the past 10 years (2009-2018), some NC dataset vegetation polygons have experienced adverse impacts to vegetation growth and moisture. An example screen shot of GDEs near Lemoore, California from the GDE Pulse tool is presented under Checklist items 16 to 20 above.
    - **For each potential GDE unit with supporting hydrological datasets please include the following:**
        - Plot and provide hydrological datasets for each GDE.
        - Define the baseline period in the hydrologic data.
        - Classify GDE units as having high, moderate, or low susceptibility to changes in groundwater.
        - Explore cause-and-effect relationships between groundwater changes and GDEs.
    - **For each identifiable GDE unit without supporting hydrological datasets please describe data gaps and / or insufficiencies.**
    - **Compile and synthesize biological data from CDFW's CNDDB, USFWS' ECOS Mapper, NC dataset, and / or the GDE Pulse tool (as applicable) for each GDE unit by:**
        - Characterizing biological resources for each GDE unit, and when possible provide baseline conditions for assessment of trends and variability.
        - Describing data gaps / insufficiencies.
    - **Describe possible effects on potential ISWs, GDEs, land uses, and property interests, including:**
        - Cause-and-effect relationships between potential ISWs and GDEs with groundwater conditions.
        - Impacts to potential ISWs and GDEs that are considered to be "significant and unreasonable".
        - Report known hydrological thresholds or triggers (e.g., instream flow criteria, groundwater depths, water quality parameters) for significant impacts to relevant species or ecological communities.
        - Land uses should include recreational uses (e.g., fishing/hunting, hiking, boating).
        - Property interests should include and consider privately and publicly protected conservation lands and opens spaces, including wildlife refuges, parks, and natural preserves.

- This section discusses water quality with respect to agricultural and municipal use but does not include a discussion of potential undesirable results for GDEs and ISWs. **Please modify this section to address how degraded water quality could affect vegetation and wildlife species that rely on GDEs and ISWs. Although arsenic is mentioned in this GSP, please consider adding a statement that over-pumping and dewatering of aquitards has been identified as a potential source of elevated arsenic concentrations above drinking water standards in San Joaquin Valley aquifers.** The following is a link to a paper by Smith, Knight and Fendorf (2018) titled "Overpumping leads to California groundwater arsenic threat": https://www.nature.com/articles/s41467-018-04475-3

Checklist Items 47-49 – Monitoring Network (23 CCR §354.34)

[Chapter 5 Monitoring Network (pp. 5-1 to 5-3), and Section 5.1 Description of Monitoring Network (pp. 5-3 to 5-15)]

- The GSP describes groundwater monitoring locations and states that groundwater monitoring in areas de-designated by the Tulare Lake Basin Plan amendment and associated aquifer zones is not proposed as decided by the GSAs. Although these areas (designated Management Area A and B) are not designated for municipal and agricultural uses in the Basin Plan, the groundwater could still potentially be used or is being used for livestock, crops with a higher tolerance to salt, domestic supply, public supply, and potentially other uses in the future. Since it is currently unclear how withdrawals within the unconfined aquifer will affect the perched and shallow areas of the aquifer (as associated with the A-Clay and C-Clay layers), Management Areas A and B still need to be monitored to assess effects to the unconfined aquifer as a whole. As stated above in the comments for other Checklist Items, **please reconcile data gaps (shallow monitoring wells, stream gauges, and nested/clustered wells, GDE and ISW responses to groundwater levels) along rivers, creek and the Tulare Lakebed in this section of the GSP to improve ISW and GDE mapping in future GSPs**.
- It is not acceptable to completely disregard these Management Areas based purely on a de-designation from municipal and agricultural uses only when there are still current and potential environmental uses of this groundwater. In addition, there is much uncertainty how the shallow aquifers are interacting with GDEs and ISWs. **Please add Representative Monitoring Sites (RMS) for these areas in order to better understand the interaction of the A-Clay and C-Clay layers with the unconfined aquifer, and potential GDEs and ISWs.**
- This section lists the proposed facilities for monitoring groundwater levels, storage and quality, and subsidence on pp. 5-9 through 5-15. This section proposes to use groundwater level monitoring to assess potential groundwater level and storage declines, existing programs to monitor water quality, and monitored surface conditions to evaluate land subsidence. It may acceptable to use groundwater level [in combination with assessment of vegetation response, for example by remote sensing] as a proxy for assessing potential effects on ISWs and GDEs, but the data gaps associated with the A-Clay, C-Clay, and shallow water tables need to be addressed. A set of representative wells have been selected to monitor the upper

and lower aquifer (Figures 5-1 to 5-3). There are only five wells that represent the "Above A-Clay and Shallow Groundwater Levels (i.e., Zone A)", and there are three data gaps areas identified (Figure 5-1). **Please describe 1) how these five wells are considered representative of the entire GSP Area, 2) how those data gap areas were selected, and 3) what methodologies would be used to extrapolate results to other areas where there are no wells or identified data gaps.**

- Many of the monitoring wells are not screened in the upper portion of the unconfined aquifer, where environmental beneficial users would obtain the groundwater on which they rely. Finally, there are currently no plans to monitor groundwater level declines to assess the potential for significant and unreasonable impacts to ISWs or GDEs in response to groundwater level declines. **Please modify the description of the new well network in the Proposed Facilities Section (Sections 5.1.4, p. 5-9) and Groundwater Levels Section (Section 5.1.4, p.5-9 to 5-11) to provide methodologies, data and other information to support the monitoring of GDEs and ISWs so as to assess and prevent potential significant and unreasonable impacts. This modification should include 1) locating new wells that are appropriately screened to detect connectivity of GDEs and ISWs with the unconfined aquifer and 2) identifying or installing additional stream gages in areas where there is potential for ISWs and GDEs. In addition, monitoring GDE responses to groundwater level declines should be included. GDE Pulse represents an example of how remote sensing can be used to achieve this objective. Please expand on the discussion of how the new well, stream and other data will be used to improve ISW mapping and inform an adequate analysis, and how the data will be used to verify possible GDEs and their sensitivity to groundwater level declines.**

[Section 5.1.1 Monitoring Network Objectives (p. 5-6)]

- The monitoring objectives listed include developing data to evaluate impacts to beneficial uses and users of groundwater but does not include filling data gaps as they specifically pertain to environmental users of groundwater. **Please expand this list to include monitoring to inform data gaps associated with groundwater use by potential GDEs, ISWs and the species that they support.**

[Section 5.4.1.4 Site Selection (p. 5-23)]

- This section includes the scientific rationale for the groundwater level monitoring network and the rationale used to add new wells to the monitoring system. However, evaluation and monitoring of potential GDEs and ISWs were not considered in new well site selection. **Please modify the site selection criteria to include the potential to install new wells that will provide information to support the investigation of GDEs and ISWs. This modification should include locating new / existing wells that are appropriately screened to detect connectivity of GDEs and ISWs with the shallow zones of the unconfined**

**aquifer, and 2) expanding information on the extent and location of shallow / perched areas within the unconfined aquifer.**

[Section 5.5 Data Storage and Reporting (pp. 5-31 to 5-32)]

- The data management system (DMS) described in this section allows for upload and storage of information related to the development and implementation of the GSP. The types of information that will be stored in the DMS are listed. Other than groundwater elevations, quality, and site information, there is no information being stored specific to the monitoring and evaluation of GDEs or ISWs. **We recommend adding remote sensing information to this list to evaluate possible correlations of ecosystem response to potential declines in groundwater level or quality due to pumping. This can be accomplished by incorporating the GDE pulse tool, Sentinel data, evapotranspiration, or leaf area index.**

Checklist Items 50 and 51 – Projects and Management Actions to Achieve Sustainability Goal (23 CCR §354.44)

[Chapter 6 Projects and Management Actions to Achieve Sustainability (pp. 6-1 to 6-21)]

- **This chapter should identify the specific actions and schedules proposed to address data gaps in the hydrogeologic conceptual model, water budget and monitoring network.**

[Section 6.3 Projects (pp. 6-4 to 6-17)]

- This section identifies many important types of projects, including conveyance facilities modifications and construction of new facilities, above-ground surface water storage, intentional recharge basins, on-farm recharge, and aquifer storage and recovery through injection. However, the descriptions of Measurable Objectives for these projects only identifies benefits to water level and storage through changes in allocation, imports, surface water diversions, pumping allowances; and adding recharge projects or water banking. Since maintenance or recovery of groundwater levels, or construction of recharge facilities, may have potential environmental benefits it would be advantageous to demonstrate multiple benefits from a funding and prioritization perspective.
    - **For the projects already identified, please consider stating how ISWs and GDEs will benefit or be protected, or what other environmental benefits will accrue.**
    - If ISWs will not be adequately protected by those listed, **please include and describe additional management actions and projects targeted for protecting potential ISWs.**
    - Storage and recharge projects can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. In some cases, such facilities have been incorporated into local HCPs and NCCPs, more fully recognizing the value of the habitat that they provide and the species they support. On-farm recharge may benefit waterfowl during migration, and recreational hunting and birdwatching depending on the time of year that fields are flooded. For

recharge projects, **please consider identifying if there is habitat value incorporated into the design and how the recharge ponds can be managed as multiple-benefit projects to benefit environmental users. Grant and funding opportunities for SGMA-related work may be available for multi-benefit projects that can address water quantity as well as provide environmental benefits. Please include environmental benefits and multiple benefits as criteria for assessing project priorities.**

- The GSP states that recharged water typically remains in the unconfined aquifer, above the A-Clay, C-Clay and E-Clay; and that existing wells in the area will be used for extraction of stored water. There appear to be many unknowns as to the extent and location of perched and shallow areas in the unconfined aquifer, and the connectivity of those areas with the aquifer. In addition, there are currently only five wells that will be used to monitor shallow zones throughout the entire GSP area. There remains a fair amount of uncertainty as to how this would operate or affect potential GDEs and ISWs. **Please acknowledge these uncertainties and address 1) how these recharge operations could affect environmental beneficial users, 2) how ecosystems that could be affected by recharge in the unconfined aquifer, particularly above the A- and C-Clay layers will be monitored if there are only five wells.**
- For examples of case studies on how to incorporate environmental benefits into groundwater projects, please visit our website: https://groundwaterresourcehub.org/case-studies/recharge-case-studies/

[Section 6.5 GSA Sustainable Methods (pp. 6-18 to 6-21)]

- The Subbasin potentially includes GDEs and ISWs (see our comments under Checklist Items 8-10 and 16-20 above) that are beneficial uses and users of groundwater and may include sensitive and protected resources. Protection of these environmental users and uses should be considered in establishing project priorities. In addition, and consistent with existing grant and funding guidelines for SGMA-related work, **priority should be given to multi-benefit projects that can address water quantity and quality as well as providing environmental benefits or benefits to disadvantaged communities.**

# Attachment C

## Freshwater Species Located in the Tulare Lake Subbasin

To assist in identifying the beneficial users of surface water necessary to assess the undesirable result "depletion of interconnected surface waters", Attachment C provides a list of freshwater species located within the Tulare Lake Subbasin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the GSA's boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[5]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife's BIOS[6] as well as on TNC's science website[7].

| | | Legally Protected Status | | |
|---|---|---|---|---|
| **Scientific Name** | **Common Name** | **Federal** | **State** | **Other** |
| **BIRDS** | | | | |
| Actitis macularius | Spotted Sandpiper | | | |
| Aechmophorus clarkii | Clark's Grebe | | | |
| Aechmophorus occidentalis | Western Grebe | | | |
| Agelaius tricolor | Tricolored Blackbird | BCC | SSC | BSSC - First priority, BLM |
| Aix sponsa | Wood Duck | | | |
| Anas acuta | Northern Pintail | | | |
| Anas americana | American Wigeon | | | |
| Anas clypeata | Northern Shoveler | | | |
| Anas crecca | Green-winged Teal | | | |
| Anas cyanoptera | Cinnamon Teal | | | |
| Anas discors | Blue-winged Teal | | | |
| Anas platyrhynchos | Mallard | | | |
| Anas strepera | Gadwall | | | |
| Anser albifrons | Greater White-fronted Goose | | | |
| Ardea alba | Great Egret | | | |
| Ardea herodias | Great Blue Heron | | | |
| Aythya affinis | Lesser Scaup | | | |
| Aythya americana | Redhead | | SSC | BSSC - Third priority |
| Aythya collaris | Ring-necked Duck | | | |

[5] Howard, J.K. et al. 2015. Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California. PLoSONE, 11(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130710
[6] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS
[7] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

| | | | | |
|---|---|---|---|---|
| Aythya marila | Greater Scaup | | | |
| Aythya valisineria | Canvasback | | SSC | |
| Botaurus lentiginosus | American Bittern | | | |
| Bucephala albeola | Bufflehead | | | |
| Bucephala clangula | Common Goldeneye | | | |
| Butorides virescens | Green Heron | | | |
| Calidris alpina | Dunlin | | | |
| Calidris mauri | Western Sandpiper | | | |
| Calidris minutilla | Least Sandpiper | | | |
| Chen caerulescens | Snow Goose | | | |
| Chen rossii | Ross's Goose | | | |
| Chlidonias niger | Black Tern | | SSC | BSSC - Second priority |
| Chroicocephalus philadelphia | Bonaparte's Gull | | | |
| Cistothorus palustris palustris | Marsh Wren | | | |
| Cygnus columbianus | Tundra Swan | | | |
| Dendrocygna bicolor | Fulvous Whistling-Duck | | SSC | BSSC - First priority |
| Egretta thula | Snowy Egret | | | |
| Empidonax traillii | Willow Flycatcher | BCC | Endangered | USFS |
| Fulica americana | American Coot | | | |
| Gallinago delicata | Wilson's Snipe | | | |
| Gallinula chloropus | Common Moorhen | | | |
| Grus canadensis | Sandhill Crane | | | |
| Himantopus mexicanus | Black-necked Stilt | | | |
| Icteria virens | Yellow-breasted Chat | | SSC | BSSC - Third priority |
| Limnodromus scolopaceus | Long-billed Dowitcher | | | |
| Lophodytes cucullatus | Hooded Merganser | | | |
| Megaceryle alcyon | Belted Kingfisher | | | |
| Mergus merganser | Common Merganser | | | |
| Mergus serrator | Red-breasted Merganser | | | |
| Numenius americanus | Long-billed Curlew | | | |
| Numenius phaeopus | Whimbrel | | | |
| Nycticorax nycticorax | Black-crowned Night-Heron | | | |
| Oxyura jamaicensis | Ruddy Duck | | | |

| | | | | |
|---|---|---|---|---|
| Pelecanus erythrorhynchos | American White Pelican | | SSC | BSSC - First priority |
| Phalacrocorax auritus | Double-crested Cormorant | | | |
| Phalaropus tricolor | Wilson's Phalarope | | | |
| Plegadis chihi | White-faced Ibis | | Watch list | |
| Pluvialis squatarola | Black-bellied Plover | | | |
| Podiceps nigricollis | Eared Grebe | | | |
| Podilymbus podiceps | Pied-billed Grebe | | | |
| Porzana carolina | Sora | | | |
| Rallus limicola | Virginia Rail | | | |
| Recurvirostra americana | American Avocet | | | |
| Riparia riparia | Bank Swallow | | Threatened | |
| Setophaga petechia | Yellow Warbler | | | BSSC - Second priority |
| Tachycineta bicolor | Tree Swallow | | | |
| Tringa melanoleuca | Greater Yellowlegs | | | |
| Tringa semipalmata | Willet | | | |
| Tringa solitaria | Solitary Sandpiper | | | |
| Xanthocephalus xanthocephalus | Yellow-headed Blackbird | | SSC | BSSC - Third priority |
| **CRUSTACEANS** | | | | |
| Branchinecta lindahli | Versatile Fairy Shrimp | | | |
| **HERPS** | | | | |
| Actinemys marmorata marmorata | Western Pond Turtle | | SSC | ARSSC, BLM, USFS |
| Ambystoma californiense californiense | California Tiger Salamander | Threatened | Threatened | ARSSC |
| Anaxyrus boreas boreas | Boreal Toad | | | |
| Spea hammondii | Western Spadefoot | Under Review in the Candidate or Petition Process | SSC | ARSSC, BLM |
| Thamnophis sirtalis sirtalis | Common Gartersnake | | | |
| **INSECTS AND OTHER INVERTEBRATES** | | | | |
| Ameletus amador | A Mayfly | | | |
| Ameletus spp. | Ameletus spp. | | | |

| | | | | |
|---|---|---|---|---|
| Anax walsinghami | Giant Green Darner | | | |
| Archilestes californica | California Spreadwing | | | |
| Argia emma | Emma's Dancer | | | |
| Baetis adonis | A Mayfly | | | |
| Baetis spp. | Baetis spp. | | | |
| Caudatella columbiella | | | | Not on any status lists |
| Caudatella spp. | Caudatella spp. | | | |
| Cinygmula gartrelli | A Mayfly | | | |
| Cinygmula spp. | Cinygmula spp. | | | |
| Doroneuria baumanni | Cascades Stone | | | |
| Drunella coloradensis | A Mayfly | | | |
| Drunella doddsii | A Mayfly | | | |
| Drunella spinifera | A Mayfly | | | |
| Drunella spp. | Drunella spp. | | | |
| Enallagma carunculatum | Tule Bluet | | | |
| Enallagma civile | Familiar Bluet | | | |
| Epeorus albertae | A Mayfly | | | |
| Epeorus spp. | Epeorus spp. | | | |
| Ephemerella tibialis | A Mayfly | | | |
| Erythemis collocata | Western Pondhawk | | | |
| Hetaerina americana | American Rubyspot | | | |
| Heterlimnius corpulentus | | | | Not on any status lists |
| Ischnura barberi | Desert Forktail | | | |
| Ischnura cervula | Pacific Forktail | | | |
| Ischnura denticollis | Black-fronted Forktail | | | |
| Libellula saturata | Flame Skimmer | | | |
| Malenka bifurcata | | | | Not on any status lists |
| Malenka spp. | Malenka spp. | | | |
| Optioservus canus | Pinnacles Optioservus Riffle Beetle | | SSC | |
| Optioservus spp. | Optioservus spp. | | | |
| Oroperla barbara | Gilltail Springfly | | | |
| Pachydiplax longipennis | Blue Dasher | | | |
| Pantala flavescens | Wandering Glider | | | |
| Pantala hymenaea | Spot-winged Glider | | | |
| Parapsyche almota | A Caddisfly | | | |
| Parapsyche elsis | A Caddisfly | | | |

| | | | | |
|---|---|---|---|---|
| Parapsyche spp. | Parapsyche spp. | | | |
| Rhionaeschna multicolor | Blue-eyed Darner | | | |
| Rhithrogena decora | A Mayfly | | | |
| Rhithrogena spp. | Rhithrogena spp. | | | |
| Rhyacophila acuminata | A Caddisfly | | | Not on any status lists |
| Rhyacophila spp. | Rhyacophila spp. | | | |
| Simulium anduzei | | | | Not on any status lists |
| Simulium spp. | Simulium spp. | | | |
| Skwala americana | American Springfly | | | |
| Skwala spp. | Skwala spp. | | | |
| Sperchon spp. | Sperchon spp. | | | |
| Sperchon stellata | | | | Not on any status lists |
| Sweltsa adamantea | | | | Not on any status lists |
| Sweltsa spp. | Sweltsa spp. | | | |
| Telebasis salva | Desert Firetail | | | |
| Tramea lacerata | Black Saddlebags | | | |
| Zapada columbiana | Columbian Forestfly | | | |
| **MAMMALS** | | | | |
| Castor canadensis | American Beaver | | | Not on any status lists |
| Ondatra zibethicus | Common Muskrat | | | Not on any status lists |
| **MOLLUSKS** | | | | |
| Anodonta californiensis | California Floater | | SSC | USFS |
| **PLANTS** | | | | |
| Cephalanthus occidentalis | Common Buttonbush | | | |
| Cirsium crassicaule | Slough Thistle | | SSC | CRPR - 1B.1, BLM |
| Cyperus erythrorhizos | Red-root Flatsedge | | | |
| Cyperus squarrosus | Awned Cyperus | | | |
| Eragrostis hypnoides | Teal Lovegrass | | | |
| Euthamia occidentalis | Western Fragrant Goldenrod | | | |
| Galium trifidum | Small Bedstraw | | | |
| Juncus effusus effusus | NA | | | |
| Lasthenia ferrisiae | Ferris' Goldfields | | SSC | CRPR - 4.2 |

| | | | | |
|---|---|---|---|---|
| Ludwigia peploides peploides | NA | | | Not on any status lists |
| Myosurus minimus | NA | | | |
| Persicaria lapathifolia | | | | Not on any status lists |
| Rorippa palustris palustris | Bog Yellowcress | | | |
| Salix gooddingii | Goodding's Willow | | | |
| **FISHES** | | | | |
| Catostomus occidentalis occidentalis | Sacramento sucker | | | Least Concern - Moyle 2013 |
| Cottus asper ssp. 1 | Prickly sculpin | | | Least Concern - Moyle 2013 |
| Lavinia exilicauda exilicauda | Sacramento hitch | | SSC | Near-Threatened - Moyle 2013 |
| Oncorhynchus mykiss irideus | Coastal rainbow trout | | | Least Concern - Moyle 2013 |
| Oncorhynchus tshawytscha - CV fall | Central Valley fall Chinook salmon | SSC | SSC | Vulnerable - Moyle 2013 |
| Oncorhynchus tshawytscha - CV late fall | Central Valley late fall Chinook salmon | SSC | | Endangered - Moyle 2013 |
| Orthodon microlepidotus | Sacramento blackfish | | | Least Concern - Moyle 2013 |
| Ptychocheilus grandis | Sacramento pikeminnow | | | Least Concern - Moyle 2013 |

Notes:
ARSSC = At-Risk Species of Special Concern
BCC = Bird of Conservation Concern
BSSC = Bird Species of Special Concern
CRPR = California Rare Plant Rank
CS = Currently Stable
IUCN = International Union for Conservation of Nature
SSC = Species of Special Concern

# Attachment D

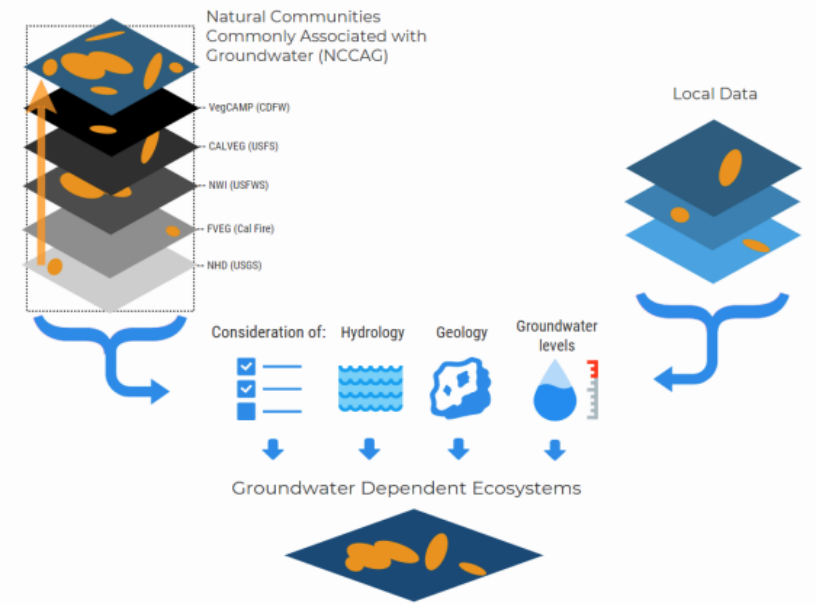
The Nature Conservancy

**July 2019**

## 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). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[8] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[9]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.




[8] *NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/*

[9] California Department of Water Resources (DWR). 2018. 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 identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[10]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[11] on the Groundwater Resource Hub[12], a website dedicated to GDEs.

### BEST PRACTICE #1. Establishing a Connection to Groundwater

Groundwater basins can be comprised of one continuous aquifer (Figure 2a) or multiple aquifers stacked on top of each other (Figure 2b). In unconfined aquifers (Figure 2a), using the depth-to-groundwater and the rooting depth of the vegetation is a reasonable method to infer groundwater dependence for GDEs. If groundwater is well below the rooting (and capillary) zone of the plants and any wetland features, the ecosystem is considered disconnected and groundwater management is not likely to affect the ecosystem (Figure 2d). However, it is important to consider local conditions (e.g., soil type, groundwater flow gradients, and aquifer parameters) and to review groundwater depth data from multiple seasons and water year types (wet and dry) because intermittent periods of high groundwater levels can replenish perched clay lenses that serve as the water source for GDEs (Figure 2c). Maintaining these natural groundwater fluctuations are important to sustaining GDE health.

Basins with a stacked series of aquifers (Figure 2b) may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs (Figure 2). This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water. The goal of SGMA is to sustainably manage groundwater resources for current and future social, economic, and environmental benefits. While groundwater pumping may not be currently occurring in a shallower aquifer, use of this water may become more appealing and economically viable in future years as pumping restrictions are placed on the deeper production aquifers in the basin to meet the sustainable yield and criteria. Thus, identifying GDEs in the basin should done irrespective to the amount of current pumping occurring in a particular aquifer, so that future impacts on GDEs due to new production can be avoided. A good rule of thumb to follow is: *if groundwater can be pumped from a well - it's an aquifer*.

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[10] *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*

[11] "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/

[12] *The Groundwater Resource Hub: www.GroundwaterResourceHub.org*

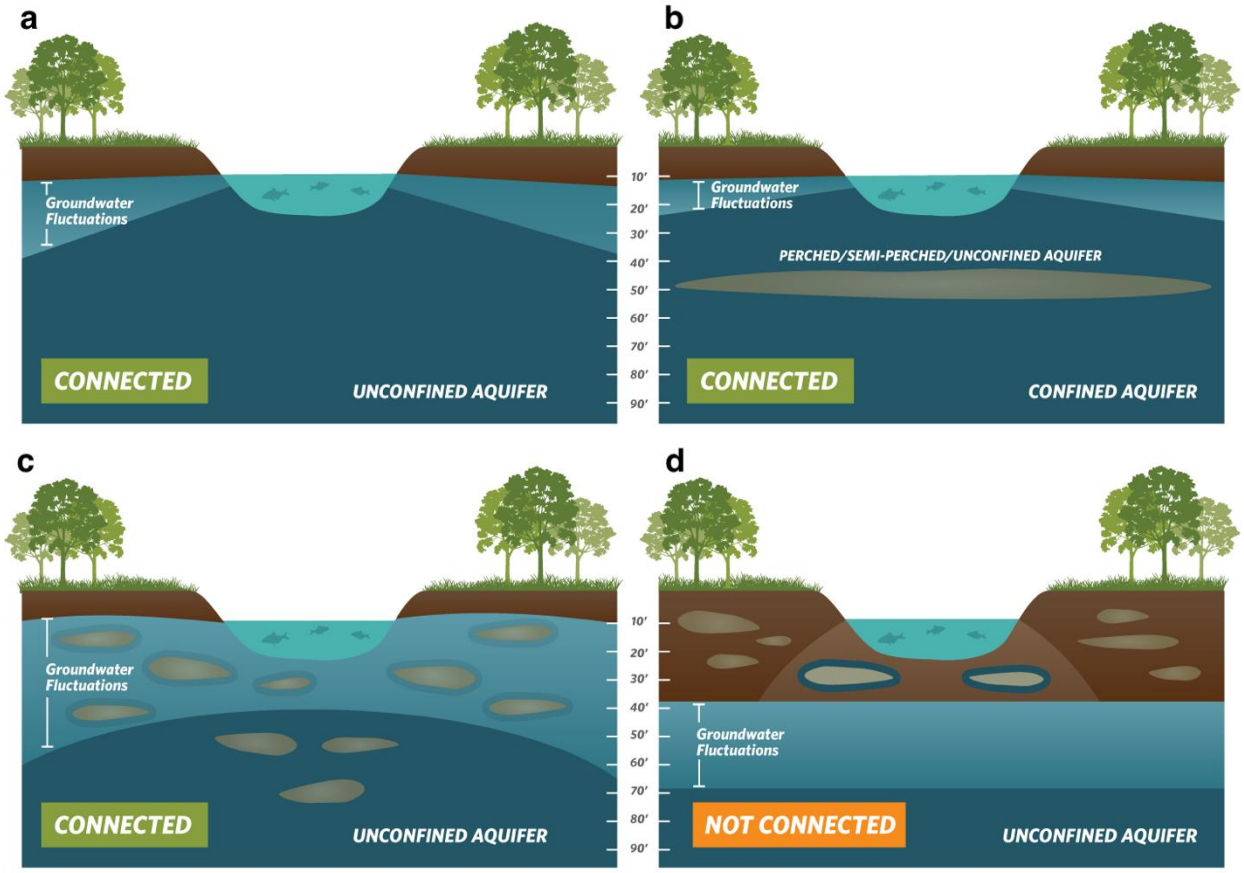



**Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a)** Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying ecosystem. Pumping predominately occurs in the confined aquifer, but pumping is possible in the shallow aquifer. **Bottom: (c)** Depth-to-groundwater fluctuations are seasonally and interannually large, however, clay layers in the near surface prolong the ecosystem's connection to groundwater. **(d)** Groundwater is disconnected from surface water, and any water in the vadose (unsaturated) zone is due to direct recharge from precipitation and indirect recharge under the surface water feature. These areas are not connected to groundwater and typically support species that do not require access to groundwater to survive.

## BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[13] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[14] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[15] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[16]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP until data gaps are reconciled in the monitoring network (see Best Practice #6).

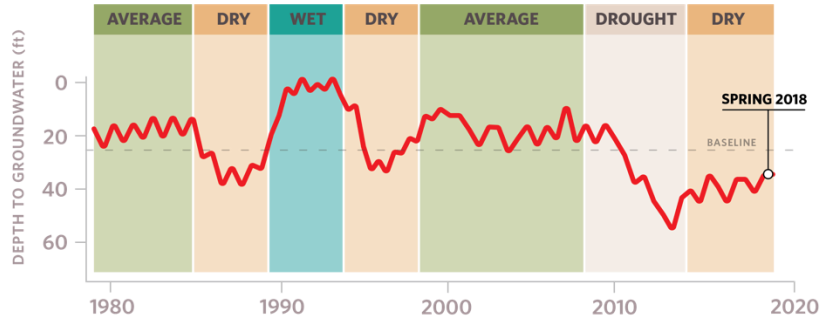



**Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time.** Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so adverse impacts are avoided.

[13] DWR. 2016. Water Budget Best Management Practice. Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_Water_Budget_Final_2016-12-23.pdf

[14] *Baseline is defined under the GSP regulations as "historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin." [23 CCR §351(e)]*

[15] 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[4]).

[16] *SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer*

## BEST PRACTICE #3. Ecosystems Often Rely on Both Groundwater and Surface Water

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[17], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

GSAs are only responsible for impacts to GDEs resulting from groundwater conditions in the basin, so if adverse impacts to GDEs result from the diversion of applied water, treated wastewater, or irrigation return flow away from the GDE, then those impacts will be evaluated by other permitting requirements (e.g., CEQA) and may not be the responsibility of the GSA. However, if adverse impacts occur to the GDE due to changing groundwater conditions resulting from pumping or groundwater management activities, then the GSA would be responsible (Figure 4).

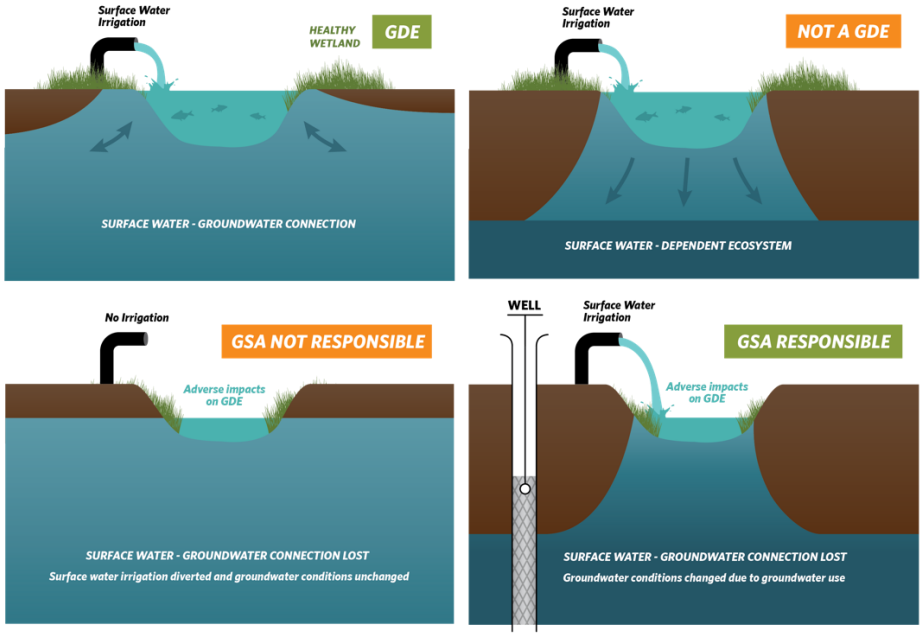



**Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left)** Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. **Bottom: (Left)** An ecosystem that was once dependent on an interconnected surface water, but loses access to groundwater solely due to surface water diversions may not be the GSA's responsibility. **(Right)** Groundwater dependent ecosystems once dependent on an interconnected surface water system, but loses that access due to groundwater pumping is the GSA's responsibility.

[17] *For a list of environmental beneficial users of surface water by basin, visit: https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/*

## BEST PRACTICE #4. Select Representative Groundwater Wells

Identifying GDEs in a basin requires that groundwater conditions are characterized to confirm whether polygons in the NC dataset are supported by the underlying aquifer. To do this, proximate groundwater wells should be identified to characterize groundwater conditions (Figure 5). When selecting representative wells, it is particularly important to consider the subsurface heterogeneity around NC polygons, especially near surface water features where groundwater and surface water interactions occur around heterogeneous stratigraphic units or aquitards formed by fluvial deposits. The following selection criteria can help ensure groundwater levels are representative of conditions within the GDE area:

- Choose wells that are within 5 kilometers (3.1 miles) of each NC Dataset polygons because they are more likely to reflect the local conditions relevant to the ecosystem. If there are no wells within 5km of the center of a NC dataset polygon, then there is insufficient information to remove the polygon based on groundwater depth. Instead, it should be retained as a potential GDE until there are sufficient data to determine whether or not the NC Dataset polygon is supported by groundwater.

- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.

- Avoid relying on wells that have insufficient information on the screened well depth interval for excluding GDEs because they could be providing data on the wrong aquifer. This type of well data should not be used to remove any NC polygons.

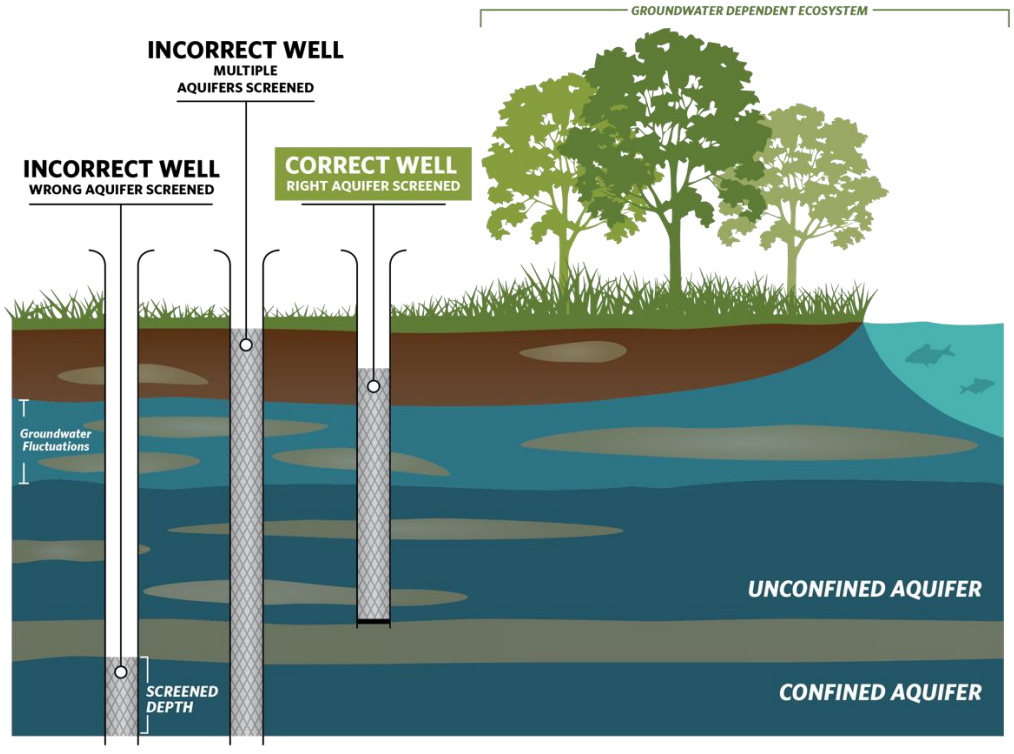



**Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.**

## BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate **groundwater elevations** at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[18] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

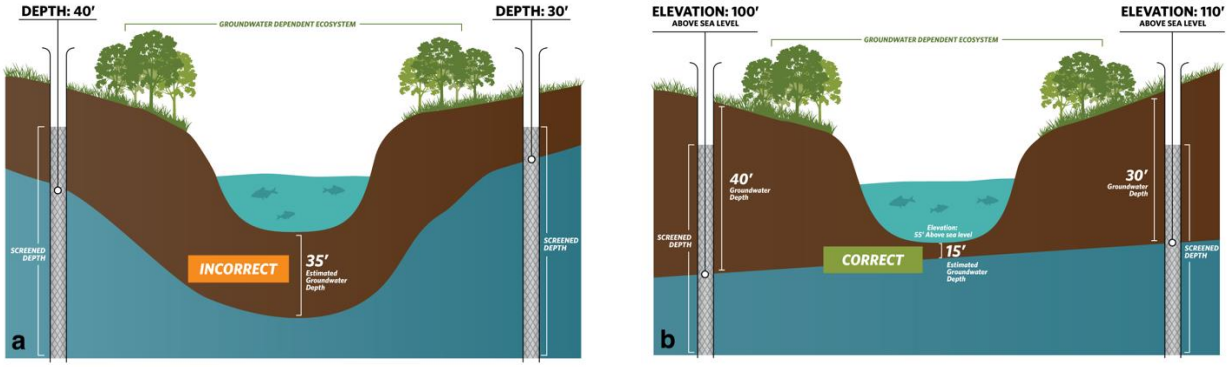



**Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a)** Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

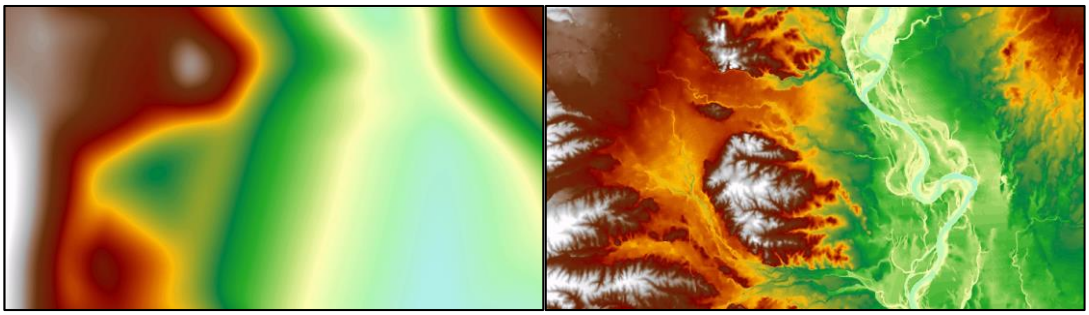


**Figure 7. Depth-to-groundwater contours in Northern California. (Left)** Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation from DEM spatial data to generate depth-to-groundwater contours. The image on the right shows a more accurate depth-to-groundwater estimate because it takes the local topography and elevation changes into account.

[18] USGS Digital Elevation Model data products are described at: https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services and can be downloaded at: https://iewer.nationalmap.gov/basic/

### BEST PRACTICE #6. Best Available Science

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 decisions, and using the data collected through monitoring programs to revise decisions in the future. In many situations, the hydrologic connection of NC dataset polygons will not initially be clearly understood if site-specific groundwater monitoring data are not available. 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.

### KEY DEFINITIONS

**Groundwater basin** is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction, based on features that significantly impede groundwater flow, and a definable bottom. *23 CCR §341(g)(1)*

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

**Interconnected surface water (ISW)** surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. *23 CCR §351(o)*

**Principal aquifers** are 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)*

### 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.

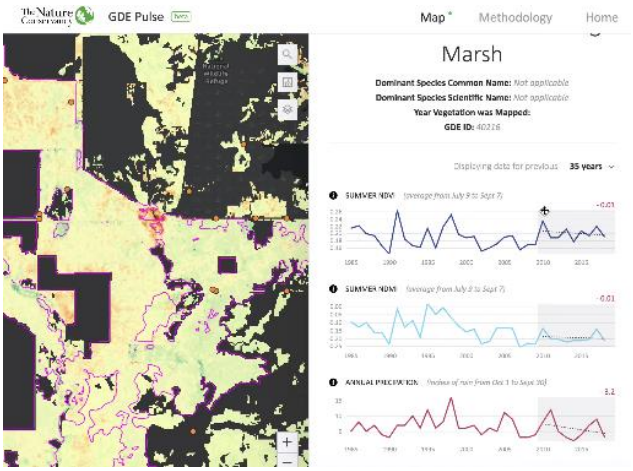
# Attachment E

## GDE Pulse

A new, free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data.

The Nature Conservancy
Protecting nature. Preserving life.®

Visit
https://gde.codefornature.org/




Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset[19]. The following datasets are included:

**Normalized Difference Vegetation Index (NDVI)** is a satellite-derived index that represents the greenness of vegetation. Healthy green vegetation tends to have a higher NDVI, while dead leaves have a lower NDVI. We calculated the average NDVI during the driest part of the year (July - Sept) to estimate vegetation health when the plants are most likely dependent on groundwater.

**Normalized Difference Moisture Index (NDMI)** is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water stressed tends to have lower NDMI. We calculated the average NDVI during the driest part of the year (July–September) to estimate vegetation health when the plants are most likely dependent on groundwater.

**Annual Precipitation** is the total precipitation for the water year (October 1st – September 30th) from the PRISM dataset[20]. The amount of local precipitation can affect vegetation with more precipitation generally leading to higher NDVI and NDMI.

**Depth to Groundwater** measurements provide an indication of the groundwater levels and changes over time for the surrounding area. We used groundwater well measurements from nearby (<1km) wells to estimate the depth to groundwater below the GDE based on the average elevation of the GDE (using a digital elevation model) minus the measured groundwater surface elevation.

[19] The Natural Communities Commonly Associated with Groundwater Dataset is hosted on the California Department of Water Resources' website: https://gis.water.ca.gov/app/NCDatasetViewer/#

[20] The PRISM dataset is hosted on Oregon State University's website: http://www.prism.oregonstate.edu/

California Poultry FEDERATION
4640 Spyres Way, Suite 4 | Modesto, CA 95356 | Phone: (209) 576-6355 | Fax: (209) 576-6119 | www.cpif.org

**VIA E-MAIL** (lsales@ppeng.com)

November 27, 2019

Members of the Tulare Lake Subbasin Board
of Directors
c/o Laurie Sales, Project Administrator
Southwest Kings GSA
286 West Cromwell Avenue
Fresno, California 93711

Re: Tulare Lake Subbasin GSP

Dear Board Members:

The California Poultry Federation ("CPF") appreciates the opportunity to comment on the draft Tulare Lake Subbasin Groundwater Sustainability Plan (the "Draft GSP"). CPF is the trade association for California's diverse and dynamic poultry industry. Our members include growers, hatchers, breeders, and processors that work with chickens, turkeys, ducks, game birds, and squab. Water is essential for all of them—both for nutrition and for maintaining sanitary conditions. CPF therefore supports effective measures to assure reliable water supplies.

In this regard, CPF recommends that each Tulare Lake Subbasin Groundwater Sustainability Agency ("GSA") make supply augmentation its top priority. We were encouraged to see that the Draft GSP incorporated storage, recharge, and conveyance projects and that Table 7-1 listed consideration of incentives as a means of encouraging participation in augmentation. Additional extraction rights in particular would be an excellent method of increasing landowner support for supply projects.

But we are concerned that the Draft GSP also emphasized substantial demand management without explaining precisely how that would be done. The listed management actions are "conceptual" (Draft GSP page 6-2) and Appendix E, which is to contain GSA appendices, is blank. Nor does the Draft GSP appear to set out any principles—which should include minimizing economic impact, maintaining established water rights, and incentivizing investment in water supply infrastructure—for developing demand management measures. The public will need to have meaningful opportunities to participate in the development of any specific demand management measures, which means that there must be sufficient time to evaluate supporting information and submit written comments. That is especially important in light of the finding (at Draft GSP page 7-7) that "[a]t this time there is not sufficient information to develop a financial

impact due to demand reduction." CPF expects all the Subbasin GSAs to do their best to ameliorate economic impacts by adopting implementation measures that are cost-effective.

One other point about public comment deserves mention. It was difficult to ascertain when written comments on the Draft GSP were due and where they should be sent. The Subbasin GSAs should establish, utilize, and publicize one central clearinghouse available through the Internet for disseminating information about further proposed actions in the Subbasin and receiving written comments.

Please contact me if you need any further information about these comments.

Very truly yours,

Bill Mattos

Bill Mattos
President

December 1, 2019

*Sent via email to djackson@tcwater.org and dmelville@ppeng.com*

**Re: Comments on Draft Groundwater Sustainability Plan for Tri County Water Authority Tulare Lake Groundwater Basin**

To Whom It May Concern,

On behalf of the above-listed organizations, we would like to offer the attached comments on the draft Groundwater Sustainability Plan for the Tri County Water Authority Tulare Lake Groundwater Basin. Our organizations are deeply engaged in and committed to the successful implementation of the Sustainable Groundwater Management Act (SGMA) because we understand that groundwater is a critical piece of a resilient California water portfolio, particularly in light of our changing climate. Because California's water and economy are interconnected, the sustainable management of each basin is of interest to both local communities and the state as a whole. This letter adopts by reference the comments and recommendations submitted by The Nature Conservancy on this draft plan.

Our organizations have significant expertise in the environmental needs of groundwater and the needs of disadvantaged communities.

- The Nature Conservancy, in collaboration with state agencies, has developed several tools[1] for identifying groundwater dependent ecosystems in every SGMA groundwater basin and has made that tool available to each Groundwater Sustainability Agency.
- Local Government Commission supports leadership development, performs community engagement, and provides technical assistance dealing with groundwater management and other resilience-related topics at the local and regional scales; we provide guidance and resources for statewide applicability to the communities and GSAs we are working with directly in multiple groundwater basins.
- Audubon California is an expert in understanding wetlands and their role in groundwater recharge and applying conservation science to develop multiple-benefit solutions for sustainable groundwater management.
- Clean Water Action and Clean Water Fund are sister organizations that have deep expertise in the provision of safe drinking water, particularly in California's small disadvantaged communities, and co-authored a report on public and stakeholder engagement in SGMA[2].

[1] https://groundwaterresourcehub.org/

[2] https://www.cleanwater.org/publications/collaborating-success-stakeholder-engagement-sustainable-groundwater-management-act

Because of the number of draft plans being released and our interest in reviewing every plan, we have identified key plan elements that are necessary to ensure that each plan adequately addresses essential requirements of SGMA. A summary review of your plan using our evaluation framework is attached to this letter as Appendix A. Our hope is that you can use our feedback to improve your plan before it is submitted in January 2020.

This review does not look at data quality but instead looks at how data was presented and used to identify and address the needs of disadvantaged communities (DACs), drinking water and the environment. In addition to informing individual groundwater sustainability agencies of our analysis, we plan to aggregate the results of our reviews to identify trends in GSP development, compare plans and determine which basins may require greater attention from our organizations.

**Key Indicators**

Appendix A provides a list of the questions we posed, how the draft plan responds to those questions and an evaluation by element of major issues with the plan. Below is a summary by element of the questions used to evaluate the plan.

1. Identification of Beneficial Users. This element is meant to ascertain whether and how DACs and groundwater-dependent ecosystems (GDEs) were identified, what standards and guidance were used to determine groundwater quality conditions and establish minimum thresholds for groundwater quality, and how environmental beneficial users and stakeholders were engaged through the development of the draft plan.
2. Communications plan. This element looks at the sufficiency of the communications plan in identifying ongoing stakeholder engagement during plan implementation, explicit information about how DACs were engaged in the planning process and how stakeholder input was incorporated into the GSP process and decision-making.
3. Maps related to Key Beneficial Uses. This element looks for maps related to drinking water users, including the density, location and depths of public supply and domestic wells; maps of GDE and interconnected surface waters with gaining and losing reaches; and monitoring networks.
4. Water Budgets. This element looks at how climate change is explicitly incorporated into current and future water budgets; how demands from urban and domestic water users were incorporated; and whether the historic, current and future water demands of native vegetation and wetlands are included in the budget.
5. Management areas and Monitoring Network. This element looks at where, why and how management areas are established, as well what data gaps have been identified and how the plan addresses those gaps.
6. Measurable Objectives and Undesirable Results. This element evaluates whether the plan explicitly considers the impacts on DACs, GDEs and environmental beneficial users in the development of Undesirable Results and Measurable Objectives. In addition, it examines whether stakeholder input was solicited from these beneficial users during the development of those metrics.
7. Management Actions and Costs. This element looks at how identified management actions impact DACs, GDEs and interconnected surface water bodies; whether mitigation for impacts to DACs is discussed or funded; and what efforts will be made to fill identified data gaps in the first five years of the plan. Additionally, this element asks whether any changes to local ordinances or land use plans are included as management actions.

**Conclusion**

We know that SGMA plan development and implementation is a major undertaking, and we want every basin to be successful. We would be happy to meet with you to discuss our evaluation as you finalize your Plan for submittal to DWR. Feel free to contact Suzannah Sosman at suzannah@aginnovations.org for more information or to schedule a conversation.

Sincerely,

Jennifer Clary
Water Program Manager
Clean Water Action/Clean Water Fund

Samantha Arthur
Working Lands Program Director
Audubon California

Sandi Matsumoto
Associate Director, California Water Program
The Nature Conservancy

Danielle V. Dolan
Water Program Director
Local Government Commission

**Appendix A**
**Review of Public Draft GSP**

**Groundwater Basin/Subbasin:** Tulare Lake Subbasin (DWR 5-22-12)
**GSA:** Five GSAs (Mid-Kings River, South Fork Kings, Southwest Kings, El Rico, and the Tri-County Water Authority GSAs)
**GSP Date:** August 2019 Public Review Draft

## 1. Identification of Beneficial Users

*Were key beneficial users identified and engaged?*

Selected relevant requirements and guidance:
GSP Element 2.1.5, "Notice & Communication" (§354.10):
*(a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.*
GSP Element 2.2.2, "Groundwater Conditions" (§354.16):
*(d) Groundwater quality issues that may affect the supply and beneficial uses of groundwater, including a description and map of the location of known groundwater contamination sites and plumes.*
*(f) Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems, utilizing data available from the Department, as specified in Section 353.2, or the best available information.*
*(g) Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or the best available information.*
GSP Element 3.3, "Minimum Thresholds" (§354.28):
*(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.*

| Review Criteria | | Yes | No | N/A | Relevant Info per GSP | Location (Section, Page[1]) |
|---|---|---|---|---|---|---|
| 1. Do beneficial users (BUs) identified within the GSP area include: | a. Disadvantaged Communities (DACs) | X | | | From Table 2-4, DACs include Armona, Home Garde, Hardwick, Community of Stratford, Kettleman City, and City of Corcoran. | Table 2-4, Page 94 |
| | b. Tribes | X | | | "The only Native American Tribe within the Tulare Lake Subbasin boundary is the Santa Rosa Rancheria Tachi-Yokut Tribe. The Tachi-Yokut Tribe was invited to participate in GSP development via a letter sent on June 28, 2016 by the then Upper Tulare Lake GSA MOU Group (now known as the South Fork Kings GSA). A copy of the letter is included in the Appendix A of the Tulare Lake Subbasin GSAs' Communication & Engagement Plan. The Tribe's EPA director attended one of the South Fork Kings GSA's board meetings, and has been on their Interested Parties List since April 2017, receiving regular updates about GSP development within the SFKGSA and the Tulare Lake Subbasin. In addition, a Sacred Lands File & Native American Contacts List Request was also sent to the Native American Heritage Commission." | Appendix B, Page 373 |
| | c. Small community public water systems (<3,300 connections) | X | | | Public water systems such as Armona CSD and Home Garden CSD are included in Table 2-4. It is not clear from the GSP which systems have fewer than 3,300 connections. | Table 2-4, Page 94 |
| 2. What data were used to identify presence or absence | d. DWR DAC Mapping Tool[2] | | X | | Data source is not clear from the GSP. | |
| | i. Census Places | | X | | | |

[1] Page numbers refer to the page of the PDF.
[2] DWR DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | of DACs? | ii. Census Block Groups | | X | | | |
| | | iii. Census Tracts | | X | | | |
| | | e. Other data source | | X | | | |
| 3. | Groundwater Conditions section includes discussion of: | f. Drinking Water Quality | X | | | "Currently, as described in Section 5.4.3, groundwater quality in the northern portion of the Subbasin encompassing the Mid-Kings River GSA and South Fork Kings GSA is generally excellent for irrigation and satisfactory for municipal and industrial use (KCWD 2011). South of Stratford and Corcoran, groundwater quality diminishes, and portions of the Tulare Lakebed have been undesignated from being suitable for municipal, domestic, agricultural irrigation, and stock watering supply. Shallow groundwater contamination from fuel hydrocarbons, agricultural chemicals, or solvents are localized in the urbanized areas of Lemoore and Hanford and some smaller communities. Limited regional data is available for determining current nutrient concentrations based on groundwater depth and location. As discussed in Section 3.2.5, shallow groundwater can have elevated concentrations of nitrates and TDS, but the majority of the region is generally below Maximum Contaminant Levels (MCLs)." | 4.4.1.4, Page 248 |
| | | g. California Maximum Contaminant Levels (CA MCLs)[3] (or Public Health Goals where MCL does not exist, e.g. Chromium VI) | | X | | See above. MCLs are only briefly discussed. | 4.4.1.4, Page 248 |
| 4. | What local, state, and federal standards or plans were used to assess drinking water BUs in the development of Minimum Thresholds (MTs)? | h. Office of Environmental Health Hazard Assessment Public Health Goal (OEHHA PHGs)[4] | | X | | | |
| | | i. CA MCLs[3] | X | | | "The basic authority of the GSAs is to locally determine the sustainable amount of groundwater that can be pumped and to manage the transition from the current groundwater usage to a groundwater usage that is sustainable. Also, GSAs do not have the authority to modify surface water rights. Federal and state agencies provide direct oversight of quality and set their own appropriate thresholds such as Maximum Contaminant Levels for drinking water. These will be utilized by the Subbasin for MOs and MTs. For these reasons, the local GSAs will focus on water quality issues that are related to groundwater pumping rather than on issues related to contamination."<br><br>"MTs will follow the state, federal, and local standards related to the relevant sustainability indicators set by the coalitions." | 4.2.4, Page 239<br>4.4.2.4, Page 249 |
| | | j. Water Quality Objectives (WQOs) in Regional Water Quality Control Plans | | X | | | |
| | | k. Sustainable Communities Strategies/ Regional Transportation Plans[5] | | X | | | |

[3] CA MCLs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html
[4] OEHHA PHGs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html
[5] CARB: https://ww2.arb.ca.gov/resources/documents/scs-evaluation-resources

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|---|---|---|---|---|---|---|
| | l. County and/or City General Plans, Zoning Codes and Ordinances[6] | | **X** | | | |

**Summary/ Comments**
It is recommended that the GSP clearly identify the data sources that were used to identify the presence of DACs, and include as maps showing the locations of DACs. The representative monitoring networks should be shown on maps that include the location of DACs so that one can assess the networks' ability to monitor potential impacts to these sensitive beneficial users.

The GSP should provide much more thorough information on what the water quality MTs/MOs are and what standards were used in the development of MTs/MOs. Such information is crucial to the drinking water beneficial users in the subbasin.

[6] OPR General Plan Guidelines: http://www.opr.ca.gov/planning/general-plan/

## 2. Communications Plan

*How were key beneficial users engaged and how was their input incorporated into the GSP process and decisions?*

Selected relevant requirements and guidance:
GSP Element 2.1.5, "Notice & Communication" (§354.10):
*Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:*
*(c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.*
*(d) A communication section of the Plan that includes the following:*
*(1) An explanation of the Agency's decision-making process.*
*(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.*
*(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.*
*(4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.*

**DWR Guidance Document for GSP Stakeholder Communication and Engagement**[7]

| Review Criteria | Yes | No | N/A | Relevant Info per GSP | Location (Section, Page) |
|---|---|---|---|---|---|
| 1. Is a Stakeholder Communication and Engagement Plan (SCEP) included? | X | | | Appendix B: Stakeholder Communication and Engagement Plan (no date) | Appendix B, Page 368 |
| 2. Does the SCEP or GSP identify that ongoing engagement will be conducted during GSP implementation? | X | | | "During the implementation phase, communication and engagement efforts focus on educational and informational awareness of the requirements and processes for reaching groundwater sustainability as set forth in the submitted GSP. Active involvement of all stakeholders is encouraged during implementation, and public notices are required for any public meetings, as well as prior to imposing or increasing any fees. Public outreach is also completed by the individual GSAs with collaborative efforts when target audiences span more than one GSA boundary." | 2.5.1, Page 73 |
| 3. Does the SCEP or GSP specifically identify how DAC beneficial users were engaged in the planning process? | X | | | "Communication and educational outreach efforts with disadvantaged communities (DAC) and severely disadvantaged communities (SDAC) was needed for the development and implementation of the Tulare Lake Subbasin's GSP according to the Department of Water Resources' Best Management Practices. Information used to communicate to and engage the DACs in the GSP process, included an explanation of SGMA and soliciting feedback. GSA representatives regularly communicated with DACs and gave presentations on SGMA to community representatives, while gathering their feedback and input.<br>By including DACs and SDACs in communication efforts during the development, public review and implementation phases of the GSP, residents were more likely to participate and provide feedback that could be crucial to long-term solutions for groundwater sustainability within their communities. | Appendix B, Page 374, 377 |

[7] DWR Guidance Document for GSP Stakeholder Communication and Engagement
https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Guidance-Document-for-Groundwater-Sustainability-Plan---Stakeholder-Communication-and-Engagement.pdf

| | | | | | |
|---|---|---|---|---|---|
| | | | | Any feedback received from DAC/SDAC residents was reviewed and evaluated by the Tulare Lake Subbasin GSAs during the GSP development and public review phases."<br><br>"For outreach to DACs/SDACs, fliers were available in both English and Spanish languages." | |
| 4. Does the SCEP or GSP explicitly describe how stakeholder input was incorporated into the GSP process and decisions? | **X** | | | "As active stakeholders, members of the Boards of Directors and Stakeholder/Advisory Committees are direct representatives of their districts, communities and industries, and they continually gather feedback/input, and the concerns/needs of their constituents and report back to their respective meetings. Any stakeholder input received was reviewed by the GSA and Subbasin technical teams and taken into consideration during GSP development."<br>"Stakeholder input was utilized during the GSA formation phase, as beneficial users and stakeholders with interests in groundwater usage within the GSAs' boundaries were notified via public meeting notices as soon as the process began."<br>"With the goal of having the draft GSP before the end of the third quarter in 2019, 2018 was primarily the technical development of the plan, while working with GSA Boards of Directors, technical teams/committees, and GSA management at the subbasin level, as well as stakeholders for feedback and input. During the last quarter of 2018, the first round of public outreach meetings and interaction with stakeholder groups and other community organizations and entities was held with the purpose of educating and informing stakeholders about SGMA and the GSP process, while also soliciting feedback and input from these groups to consider and possibly include feedback and input into the GSP. Public outreach for this phase was completed by the individual GSAs."<br>"Once the draft of the GSP was completed in September 2019, the public review process began. A 90-day comment period was held, with the GSP draft posted on the Tulare Lake Subbasin GSAs' websites for all stakeholders to conveniently download and review and provide comments. Outreach meetings were held during this phase both on subbasin-wide level, as well as by individual GSAs. These meetings focused on an overview of the GSP content, while giving stakeholders a public forum to provide their feedback and comments."<br><br>Outreach tracking is also presented in tables by each GSA in Appendix D. | Appendix B, Page 370 |

**Summary/ Comment**
It is important that stakeholder engagement be maintained through the development of future projects and management actions and other SGMA compliance and implementation steps.

## 3. Maps Related to Key Beneficial Uses

*Were best available data sources used for information related to key beneficial users?*

Selected relevant requirements and guidance:
GSP Element 2.1.4 "Additional GSP Elements" (§354.8):
*Each Plan shall include a description of the geographic areas covered, including the following information:*
*(a) One or more maps of the basin that depict the following, as applicable:*
*(5) The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information.*

GSP Element 3.5 Monitoring Network (§354.34)
*(b) Each Plan shall include a description of the monitoring network objectives for the basin, including an explanation of how the network will be developed and implemented to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater, with sufficient temporal frequency and spatial density to evaluate the affects and effectiveness of Plan implementation. The monitoring network objectives shall be implemented to accomplish the following:*
*(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*
*(1) Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:*
*(A) A sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.*
*(4) Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.*
*(6) Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:*
*(A) Flow conditions including surface water discharge, surface water head, and baseflow contribution.*
*(B) Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.*
*(C) Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.*
*(D) Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.*
*(f) The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:*
*(3) Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.*

| Review Criteria | | Yes | No | N/A | Relevant Info per GSP | Location (Section, Page) |
|---|---|---|---|---|---|---|
| 1. Does the GSP Include Maps Related to Drinking Water Users? | a. Well Density | | X | | No maps are provided. Page 47 indicates that there are 75 public supply wells in the Subbasin and the total number of wells is about 3,871. | Section 2, Page 47 |
| | b. Domestic and Public Supply Well Locations & Depths | | X | | The GSP does not appear to include information on domestic and public supply well locations and depths. | |
| | i. Based on DWR Well Completion Report Map Application[8]? | | | X | | |

[8] DWR Well Completion Report Map Application: https://www.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ii. Based on Other Source(s)? | | | | X | | |
| 2. Does the GSP include maps of monitoring networks? | a. Existing Monitoring Wells | | X | | | Existing monitoring wells for subsidence and water quality can be found in Figure 5-4 and 5-5. | Figure 5-4, Page 301<br>Figure 5-4, Page 302 |
| | b. Existing Monitoring Well Data sources: | i. California Statewide Groundwater Elevation Monitoring (CASGEM) | X | | | "Groundwater levels are measured in the various networks and types of wells including: […] CASGEM Wells: DWR collects groundwater levels reported by local agencies and reports them through the CASGEM program. There are currently 17 CASGEM wells in the Subbasin." | 5.1.5, Page 276 |
| | | ii. Water Board Regulated monitoring sites | X | | | "Water quality data will be obtained from the below-mentioned coalitions: […] RWQCB - Regional Water Quality Control Board"<br><br>"Though water quality has been periodically analyzed within the Subbasin for irrigation suitability, monitoring programs are generally not in place with defined temporal and spatial distribution, except for municipal water suppliers, RWQCB sites with WDRs, and monitoring at evaporation ponds." | 4.4.2.4, Page 250<br><br>5.4.3, Page 291 |
| | | iii. Department of Pesticide Regulation (DPR) monitoring wells | X | | | "The California Department of Pesticide Regulation (DPR) maintains a Surface Water Database (SURF) containing data from a wide variety of environmental monitoring studies designed to test for the presence or absence of pesticides in California surface waters. As part of DPR's effort to provide public access to pesticide information, this database provides access to data from DPR's SURF (DPR 2019)." | 2.4.3.3, Page 68 |
| | c. SGMA-Compliance Monitoring Network | | X | | | Figure 5-1 to Figure 5-5 | Figure 5-1 to Figure 5-5, Page298-302 |
| | i. SGMA Monitoring Network map includes identified DACs? | | | X | | DACs are not included. However, public water systems are shown on the maps. | |
| | ii. SGMA Monitoring Network map includes identified GDEs? | | | X | | GDEs are not included. | |

**Summary/ Comments**

The draft GSP does not provide maps showing "The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information" as required by 23 CCR § 354.8.(a)(5). The GSP should include the density, location and depths of all domestic and public supply wells in the GSA area using the best available information, and present this information on maps along with the proposed SGMA-compliance monitoring network so that the public can evaluate how well the monitoring network addresses these key beneficial users.

Providing maps of the monitoring network overlaid with location of DACs, GDEs, and any other sensitive beneficial users will also allow the reader to evaluate adequacy of the network to monitor conditions near these beneficial users.

## 4. Water Budgets

*How were climate change projections incorporated into projected/future water budget and how were key beneficial users addressed?*

Selected relevant requirements and guidance:
GSP Element 2.2.3 "Water Budget Information" (Reg. § 354.18)
*Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored. Water budget information shall be reported in tabular and graphical form.*

*Projected water budgets shall be used to estimate future baseline conditions of supply, **demand**, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components. The projected water budget shall utilize the following methodologies and assumptions to estimate future baseline conditions concerning hydrology, water demand and surface water supply availability or reliability over the planning and implementation horizon:*
*(b) The water budget shall quantify the following, either through direct measurements or estimates based on data:*
*(5) If overdraft conditions occur, as defined in Bulletin 118, the water budget shall include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions.*
*(6) The water year type associated with the annual supply, demand, and change in groundwater stored.*
*(c) Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:*
*(1) Current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, **water demand**, and land use information.*

**DWR Water Budget BMP**[9]
**DWR Guidance for Climate Change Data Use During GSP Development and Resource Guide**[10]

| Review Criteria | Yes | No | N/A | Relevant Info per GSP | Location (Section, Page) |
|---|---|---|---|---|---|
| 1. Are climate change projections explicitly incorporated in future/ projected water budget scenario(s)? | X | | | "The projected water budget for the Subbasin represents a hypothetical forecast for the 54-year period from 2017 through 2070 based on an assumed "normal hydrology" period and estimated future climate change impacts." | 3.3.7, Page 141 |
| 2. Is there a description of the methodology used to include climate change? | X | | | "In a climate period analysis, climate change is modeled as a shift from a baseline condition, usually historically observed climate where every year or month of the simulation it is shifted in a way that represents the climate change signal at a future 30-year climate period. Climate period analysis provides advantages in this situation because it isolates the climate change signal independent of the monthly variability signal. In a climate period analysis, monthly variability is based on the reference period from which change is being measured, meaning that all differences between the future | 3.3.7.3, Page 142-143 |

[9] DWR BMP for the Sustainable <management of Groundwater Water Budget:
https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget.pdf
[10]DWR Guidance Document for the Sustainable Management of Groundwater Guidance for Climate Change Data Use During GSP Development:
https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final.pdf

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | simulation and the reference period are the result of the climate change signal alone.<br>Climate period analysis was utilized to modify the 54-year forecast of "normal hydrology" to account for future climate change. The 2017-2070 forecast incorporates climate period analysis using the 2030 and 2070 monthly change factors (CNRA 2018) for each forecast analog month (Figure 3-52). The 2030 monthly change factors were applied to the forecast months January 2017 through December 2030. The 2070 monthly change factors were applied to the forecast months January 2031 through December 2070. There is a notable increase in magnitude of the 2070 change factors compared to the 2030 change factors." | |
| 3. What is used as the basis for climate change assumptions? | a. DWR-Provided Climate Change Data and Guidance[11] | | x | | | "The DWR provides guidance on how to incorporate climate change into hydrology forecasts. There are two basic approaches that have been used to simulate climate change in water resource modeling: 1) transient analysis; and 2) climate period analysis (DWR 2018)." | 3.3.7.3, Page 142 |
| | b. Other | | | x | | | |
| 4. Does the GSP use multiple climate scenarios? | | | | x | | | |
| 5. Does the GSP quantitatively incorporate climate change projections? | | | x | | | Based on the information presented in Figure 3-53, the GSP appears to have quantitatively incorporated climate change projections. However, no descriptions or tables are provided regarding the quantitative results of the climate change projections. | Figure 3-53, Page 219 |
| 6. Does the GSP explicitly account for climate change in the following elements of the future/projected water budget? | a. Inflows: | i. Precipitation | x | | | "The climate change factors were also applied to 54-year forecasts of monthly inflows (effective precipitation, surface water deliveries, lake bottom storage, and canal and river seepage) and outflows (agricultural demand) for the "normal hydrology" forecast." | 3.3.7.4, Page 143 |
| | | ii. Surface Water | x | | | | |
| | | iii. Imported Water | x | | | | |
| | | iv. Subsurface Inflow | x | | | | |
| | b. Outflows: | i. Evapotranspiration | x | | | | |
| | | ii. Surface Water Outflows (incl. Exports) | | | x | | |
| | | iii. Groundwater Outflows (incl. Exports) | x | | | | |
| 7. Are demands by these sectors (drinking water users) explicitly included in the future/projected | a. Domestic Well users (<5 connections) | | x | | | "Municipal and domestic groundwater pumping are estimated upward based on projected population growth at an annual rate of 0.03%."<br>It is not clear from the GSP if demands by some or all of these community and non-community water systems were considered.<br>The GSP also does not identify the number of connections of the various | 3.3.7.4, Page 143 |
| | b. State Small Water systems (5-14 connections) | | | x | | | |
| | c. Small community water systems (<3,300 connections) | | | x | | | |

[11] DWR Guidance Document for the Sustainable Management of Groundwater Guidance for Climate Change Data Use During GSP Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final.pdf
DWR Resource Guide DWR-Provided Climate Change Data and Guidance for Use During GSP Development: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Resource-Guide-Climate-Change-Guidance_v8.pdf

| | | | | | | |
|---|---|---|---|---|---|---|
| water budget? | d. Medium and Large community water systems (> 3,300 connections) | | X | | public water systems present in the basin. | |
| | e. Non-community water systems | | X | | | |

**Summary/ Comments**

Given the uncertainties of climate change, the GSP should include and analyze the effects of multiple climate change scenarios.

The GSP should present the results of the projected water budget in a tabulated, transparent format. The GSP should also clearly identify and quantify water demands of all drinking water users in the projected water budget, including the small and large public water systems. Such information is necessary for the public to assess whether drinking water demands were fully and appropriately considered in the GSP.

## 5. Management Areas and Monitoring Network

*How were key beneficial users considered in the selection and monitoring of Management Areas and was the monitoring network designed appropriately to identify impacts on DACs and GDEs?*

Selected relevant requirements and guidance:
GSP Element 3.3, "Management Areas" (§354.20):

*(b) A basin that includes one or more management areas shall describe the following in the Plan:*
*(2) The minimum thresholds and measurable objectives established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.*
*(3) The level of monitoring and analysis appropriate for each management area.*
*(4) An explanation of how the management area can operate under different minimum thresholds and measurable objectives without causing undesirable results outside the management area, if applicable.*
*(c) If a Plan includes one or more management areas, the Plan shall include descriptions, maps, and other information required by this Subarticle sufficient to describe conditions in those areas.*

**CWC Guide to Protecting Drinking Water Quality under the SGMA**[12]
**TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs**[13]

| Review Criteria | Yes | No | N/A | Relevant Info per GSP | Location (Section, Page) |
|---|---|---|---|---|---|
| 1. Does the GSP define one or more Management Area? | X | | | "In order to facilitate implementation of the GSP, management areas have been created for the Subbasin. There are five Primary Management Areas and two Secondary Management Areas." | 3.4, Page 144 Figure 3-54, Page 220 |
| 2. Were the management areas defined specifically to manage GDEs? | | X | | "Primary Management Areas have been formed from each of the five GSAs." "Two Secondary Management Areas have been formed for the Subbasin. These two Secondary Management Areas are different from the Primary Management Areas and each other due to distinctly different groundwater conditions in each area." | 3.4, Page 144 |
| 3. Were the management areas defined specifically to manage DACs? | | X | | | |
| a. If yes, are the Measurable Objectives (MOs) and MTs for GDE/DAC management areas more restrictive than for the basin as a whole? | | | X | | |
| b. If yes, are the proposed management actions for GDE/DAC management areas more restrictive/ aggressive than for the basin as a whole? | | | X | | |
| 4. Does the GSP include maps or descriptions indicating what DACs are located in each Management Area(s)? | X | | | Table 2-4 describes DACs in each GSA area. | Table 2-4, Page 94 |
| 5. Does the GSP include maps or descriptions indicating what GDEs are located in each Management Area(s)? | X | | | Figure 3-38. Distribution of Wetlands and Phreatophyte Vegetation | Figure 3-38, Page 198 |

[12] CWC Guide to Protecting Drinking Water Quality under the SGMA: https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858
[13] TNC's Groundwater Dependent Ecosystems under the SGMA, Guidance for Preparing GSPs: https://www.scienceforconservation.org/assets/downloads/GDEsUnderSGMA.pdf

**Summary/ Comments**
It is recommended that the GSP includes maps of the identified DACs located within each Management Area.

Care should be taken so that the management areas and the associated monitoring network are designed to adequately assess and protect against impacts to all beneficial users, including GDEs and DACs.

## 6. Measurable Objectives, Minimum Thresholds, and Undesirable Results

*How were DAC and GDE beneficial uses and users considered in the establishment of Sustainable Management Criteria?*

Selected relevant requirements and guidance:
GSP Element 3.4 "Undesirable Results" (§ 354.26):
*(b) The description of undesirable results shall include the following:*
*(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results*

GSP Element 3.2 "Measurable Objectives" (§ 354.30)
*(a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.*

| Review Criteria | Yes | No | N/A | Relevant Info per GSP | Location (Section, Page) |
|---|---|---|---|---|---|
| 1. Are DAC impacts considered in the development of Undesirable Results (URs), MOs, and MTs for groundwater levels and groundwater quality? | | X | | The impacts to DACs are not explicitly considered.<br><br>Water Level URs:<br>"Exceedance of MTs leading to undesirable results related to groundwater level in the Subbasin would cause a diminished level of groundwater supplies for agricultural and municipal needs. Groundwater levels are anticipated to continue to decrease at current rates in the next several years before implemented programs have a positive effect on the stabilization of groundwater levels based on the variability of hydrology and availability of flood water. As stated above, agriculture is the main economic enterprise of the Subbasin, so effective management of groundwater for sustainable future use is critical to the continuation of current economic interests, which add value to the Subbasin's communities. Decreases in groundwater levels will continue to increase the cost of energy for pumping. If MT levels are reached or exceeded, wells have the potential to go dry and require deepening to reach the lowered water table. Alternatively, pumps may be lowered if the existing well casing is sufficiently deeper. However, once the Subbasin reaches sustainability in the future, the depth of the wells will be known and can be designed to meet those depths to prevent future wells from becoming dry."<br><br>Water Level MTs:<br>"Due to the timely process of infrastructure development and program implementation, and variability in hydrology and the availability of flood water, groundwater levels are expected to continue to decrease in the next several years before programs have a positive effect on the stabilization of groundwater levels. Decreases in groundwater levels will continue to increase the cost of energy for pumping. If MT levels are reached, there may be some wells that go dry and require deepening to reach the water table. Alternatively, pumps may be lowered if the existing well casing is sufficiently deeper. However, once the Subbasin reaches sustainability in the future, the design depth for wells will be known and will be used in planning of future | 4.3.3, Page 245<br>4.4.4, Page 251 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | well construction to minimize future wells from becoming dry."<br><br>Water Quality MTs:<br>"If water quality is allowed to deteriorate to levels set by MTs, agricultural producers may experience a decrease in crop yield and/or crop quality. Poor water quality would cause a buildup of salts and nitrates in the surface layers of soil. The best way to treat nutrient build up is by leaching or over-irrigating enough to push soluble contaminants through the soil column." | |
| 2. | Does the GSP explicitly discuss how stakeholder input from DAC community members was considered in the development of URs, MOs, and MTs? | | X | | The GSP does not explicitly discuss how stakeholder input from DACs was considered. | |
| 3. | Does the GSP clearly identify and detail the anticipated degree of water level decline from current elevations to the water level MOs and MTs? | | X | | The GSP does not clearly identify the anticipated degree of water level decline. However, current water levels and MOs/MTs are presented in Table 4-1. Based on this if water levels reach MTs, this will represent an average decline of approx. 100 feet below 2017 conditions, and over 200 feet below current conditions in some parts of the subbasin (i.e., wells SFK_B_1920E19A001M, SFK_C_20S20E07H001M, and SFK_C_LEM_12). Even MOs represent over 100 feet of decline below 2017 water levels in many areas of the Subbasin. | Table 4-1, Page 262 |
| 4. | If yes, does it include: | a. Is this information presented in table(s)? | X | | | |
| | | b. Is this information presented on map(s)? | X | | | |
| | | c. Is this information presented relative to the locations of DACs and domestic well users? | X | | | |
| | | d. Is this information presented relative to the locations of ISW and GDEs? | X | | | |
| 5. | Does the GSP include an analysis of the anticipated impacts of water level MOs and MTs on drinking water users? | | X | | "Due to the timely process of infrastructure development and program implementation, and variability in hydrology and the availability of flood water, groundwater levels are expected to continue to decrease in the next several years before programs have a positive effect on the stabilization of groundwater levels. Decreases in groundwater levels will continue to increase the cost of energy for pumping. If MT levels are reached, there may be some wells that go dry and require deepening to reach the water table. Alternatively, pumps may be lowered if the existing well casing is sufficiently deeper. However, once the Subbasin reaches sustainability in the future, the design depth for wells will be known and will be used in planning of future well construction to minimize future wells from becoming dry."<br><br>Impacts on drinking water users are not explicitly considered. Based on the water level declines identified above, it would be expected that such impacts could be significant. | 4.4.4, Page 251 |
| 6. | If yes: | a. On domestic well users? | X | | | |
| | | b. On small water system production wells? | X | | | |
| | | c. Was an analysis conducted and clearly illustrated (with maps) to identify what wells would be expected to be partially and fully dewatered at the MOs? | X | | | |
| | | d. Was an analysis conducted and clearly illustrated (with maps) to identify what wells would be expected to be partially and fully dewatered at the MTs? | X | | | |
| | | e. Was an economic analysis performed to assess the increased operation costs associated with increased lift as a result of water level decline? | X | | | |
| 9. | Does the sustainability goal explicitly include drinking water and nature? | | X | | "This GSP aims to manage groundwater resources to continue to provide an adequate water supply for existing beneficial uses and users in accordance with counties and cities general plans while meeting established measurable objectives (MO) to maintain a sustainable yield. This goal aims to continue to provide adequate water supply for existing beneficial uses and users while ensuring the future, sustainable use of groundwater. Additionally, the sustainability goal works as a tool for managing groundwater, basin-wide, on a long-term basis to protect quality of life through the continuation of existing economic industries in the area including but not limited to agriculture." | 1.3.1, Page 40<br>Table 2-4, Page 94 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | Table 2-4. Beneficial Uses and Users by GSA<br><br>The sustainability goal does not include nature. | |

**Summary/ Comments**

Based on the presented information, impacts to DACs are not explicitly considered in the discussion of URs, MOs, and MTs. More detail and specifics regarding DACs, including those that rely on smaller community drinking water systems and domestic wells, is necessary to demonstrate that these beneficial users were adequately considered. It is recommended that the GSP present a thorough and robust analysis, supported by maps, that identifies: (1) what domestic wells are likely to be impacted (including partially dewatered) at the MTs and at the MOs and (2) the location of the likely impacted wells with respect to DACs and other communities and systems dependent on groundwater.

Based on the information presented in Table 4-1 of the draft GSP, if water levels reach MTs, this will represent an average decline of approx. 100 feet below 2017 water levels, and over 200 feet below current conditions in some parts of the subbasin (i.e., wells SFK_B_1920E19A001M, SFK_C_20S20E07H001M, and SFK_C_LEM_12). Even MOs represent an average decline of over 50 feet below current conditions and over 100 feet of decline in many areas of the Subbasin. The GSP needs to explain how such water level declines represent sustainable conditions and are protective of beneficial uses and users in the Subbasin.

A proactive assistance program should be developed for potentially impacted beneficial users, including DACs, small water systems, and domestic wells, to mitigate potential future adverse impacts.

The GSP should also explicitly demonstrate whether and how the stakeholder input from DACs was considered in the development of URs, MOs, and MTs.

We recommend that the sustainability goal explicitly includes environmental beneficial uses of groundwater.

## 7. Management Actions and Costs

*What does the GSP identify as specific actions to achieve the MOs, particularly those that affect the key BUs, including actions triggered by failure to meet MOs? What funding mechanisms and processes are identified that will ensure that the proposed projects and management actions are achievable and implementable?*

Selected relevant requirements and guidance

GSP Element 4.0 Projects and Management Actions to Achieve Sustainability Goal (§ 354.44)

*(a) Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.*

*(b) Each Plan shall include a description of the projects and management actions that include the following:*

*(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action.*

| Review Criteria | Yes | No | N/A | Relevant Info per GSP | Location (Section, Page) |
|---|---|---|---|---|---|
| 1. Does the GSP identify benefits or impacts to DACs as a result of identified management actions? | | X | | The impacts to DACs are not explicitly discussed in the GSP.<br>Recharge projects are noted in the GSP as expected to improve water quality. | 6.3.3, Page 323 |
| 2. If yes: a. Is a plan to mitigate impacts on DAC drinking water users included in the proposed Projects and | | X | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Management Actions? | | | | | |
| | b. | Does the GSP identify costs to fund a mitigation program? | | X | | | |
| | c. | Does the GSP include a funding mechanism to support the mitigation program? | | X | | | |
| 3. | Does the GSP identify any demand management measures in its projects and management actions? | | X | | | Section 6.3 and 6.4 provide potential P/MAs options that may be utilized by the GSAs. Table 6-1 to 6-4 in Section 6.5 list the P/MAs chosen for each GSA. | 6.3, Page 317-330<br>6.4, Page 330-331<br>6.5, Page 331-334 |
| 4. | If yes, does it include: | a. Irrigation efficiency program | | X | | | |
| | | b. Ag land fallowing (voluntary or mandatory) | X | | | Fallowing programs are identified by Mid-Kings River GSA, El Rico GSA, and South Fork Kings GSA.<br>"The Subbasin may adopt a policy to incentive farmers to permanently fallow land. Policy will solicit volunteers first then look towards mandatory fallowing based on percentage reductions possibly on a rotation basis." | |
| | | c. Pumping allocation/restriction | X | | | Groundwater allocation is listed as a potential management action in Section 6.4. | |
| | | d. Pumping fees/fines | X | | | Pumping fees for groundwater allocation exceedances and groundwater extractions are listed as potential management actions in Section 6.4. | |
| | | e. Development of a water market/credit system | X | | | Groundwater marketing and trade is listed as a potential management action in Section 6.4. | |
| | | f. Prohibition on new well construction | | X | | | |
| | | g. Limits on municipal pumping | | X | | It is not clear if there would be limits on municipal pumping. | |
| | | h. Limits on domestic well pumping | | X | | It is not clear if there would be limits on domestic well pumping. | |
| | | i. Other | X | | | "Require new developments (non-de minimis extractors) to prove sustainable water supplies if land use conversion is not a conservation measure" | |
| 5. | Does the GSP identify water supply augmentation projects in its projects and management actions? | | X | | | Section 6.3 and 6.4 provide potential P/MAs options that may be utilized by the GSAs. Table 6-1 to 6-4 in Section 6.5 list the P/MAs chosen for each GSA. | 6.3, Page 317-330<br>6.4, Page 330-331<br>6.5, Page 331-334 |
| 6. | If yes, does it include: | a. Increasing existing water supplies | X | | | "Each GSA is proposing to use their existing contract and rights for surface water as access to import more surface water into the Subbasin." | |
| | | b. Obtaining new water supplies | | X | | | |
| | | c. Increasing surface water storage | X | | | Storage projects are identified by South Fork Kings GSA, El Rico GSA, and Tri-County Water GSA. | |
| | | d. Groundwater recharge projects – District or Regional level | X | | | Recharge projects are identified by Mid-Kings River GSA and South Fork Kings GSA. | |
| | | e. On-farm recharge | X | | | On-Farm Improvements project is identified by South Fork Kings GSA. | |
| | | f. Conjunctive use of surface water | X | | | The recharge projects also involve conjunctive use of surface water. | |
| | | g. Developing/utilizing recycled water | | X | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | h. Stormwater capture and reuse | | X | | | |
| | i. Increasing operational flexibility (e.g., new interties and conveyance) | X | | | The Mid-Kings River GSA plans to pursue improvement to conveyance systems and expanded surface water delivery system. | |
| | j. Other | | X | | | |
| 7. Does the GSP include plans to fill identified data gaps by the first five-year report? | | X | | | Section 5.4.1.3 discusses plans to fill data gaps in groundwater level monitoring network, including plans to collect well completion reports, perform a video inspection of wells to obtain construction information, construct a dedicated monitoring well, and replace monitor point with another alternate private well.<br>Some P/MAs in Table 7-1 are also noted in the GSP as expected to help fill data gaps, including (1) Flood Flows (Spills into the Subbasin), include, Tule River, Deer Creek, Cross-Creeks and Kings River; (2) Registration of extraction facilities; (3) Require self-reporting of groundwater extraction, water level, and water quality data; and (4) Require well meters, sounding tubes, and water quality sample ports. | 5.4.1.3, Page 286<br>Table 7-1, Page 343 |
| 8. Do proposed management actions include any changes to local ordinances or land use planning? | | X | | | "Require new developments (non-de minimis extractors) to prove sustainable water supplies if land use conversion is not a conservation measure" | 6.4, Page 330 |
| 9. Does the GSP identify additional/contingent actions and funding mechanisms in the event that MOs are not met by the identified actions? | | | X | | "This section identifies the proposed project and management action targets envisioned to achieve sustainability. These preliminary amounts will be reevaluated, and conditions monitored while efforts are implemented. This will allow the GSA to compare the anticipated versus resulting change in groundwater levels as well as other sustainability criteria to determine if additional measures need to be employed to achieve sustainability."<br>However, the GSP does not provide details on what projects and management actions will be implemented as additional measures. | 6.5, Section 331 |
| 10. Does the GSP provide a plan to study the interconnectedness of surface water bodies? | | | X | | "As discussed in Section 3.2.8, Interconnected Surface Water and Groundwater Systems, the Subbasin does not contain interconnected surface and groundwater systems based on review of groundwater potentiometric surface maps. Groundwater contours indicate the Kings River, Cross Creek, and Mill Creek are losing streams that directly recharge groundwater. Groundwater is not in contact with these streams and cannot contribute any base flow to them. Due to the lack of connected water systems, interconnected surface water will not be monitored or considered when making management decisions." | 4.2.5, Page 240 |
| 11. If yes: | a. Does the GSP identify costs to study the interconnectedness of surface water bodies? | | | X | | |
| | b. Does the GSP include a funding mechanism to support the study of interconnectedness surface water bodies? | | | X | | |

**Summary/ Comments**

The GSP should identify the potential impacts of the proposed projects or management actions on DACs. If impacts are expected, the GSP should include plans to monitor for, prevent, and/or mitigate against such impacts, provide the estimated costs, and identify the funding sources.

The GSP does not appear to include any plans to address impacts to domestic well users if water quality in these wells is degraded in the future. The GSP should include plan to

| |
|---|
| monitor for and mitigate impacts to DAC drinking water users. |

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December 2, 2019

Southwest Kings Groundwater Sustainability Agency
Kings Subbasin
Basin Number 5-22.08
Transmitted via online submission at: info@swkgsa.org

**Subject: Tulare Lake Subbasin Draft Groundwater Sustainability Plan**

Dear Southwest Kings GSA Group:

Westlands Water District ("Westlands GSA") appreciates the opportunity to provide comments on the Tulare Lake Subbasin Draft Groundwater Sustainability Plan ("Draft GSP"). The Westlands Groundwater Sustainability Agency ("GSA") respectfully submits the following comments.

Finding 1 (Page 3-27): Figures 3-26 and 3-27, Table 3-6, and Section 3.2.2 of the GSP states with respect to groundwater flow in the unconfined aquifer that, "[i]n general, groundwater flowed into the Subbasin from the Kings, Kaweah, and Tule Subbasins and out of the Subbasin to the Westside Subbasin." This statement is supplemented by contours of unconfined potentiometric head developed by DWR from 1990 through 2016.

**Westlands' Comment:** The unconfined water level data are used to make inferences about general groundwater flow directions. As stated in Section 3.2.3 of the GSP, vertical gradients can exceed 50 feet per 100 feet suggesting that flow directions can be heavily dependent on the depth horizons that are selected and therefore, change considerably with depth. Model results provided in Appendix D also highlight how groundwater flow directions vary with depth.

DWR does not provide groundwater contours for the majority of the boundary shared between the Westside and Tulare Lake Subbasin. In fact, contours from 2005, 2010 and 2016 provide almost no overlap with the shared Subbasin boundary. As a result, there is no substantial evidence to support the statements regarding groundwater flows "out of the Subbasin to the Westside Subbasin."

The spatial information for wells used to develop the DWR water level contours are readily available for 2016 (DWR, 2019). Review of these data reveals that the majority of wells used by DWR to develop contours of unconfined potentiometric head within the Westside Subbasin are screened in the Lower Aquifer (**WWD Attachment: Figure 1**). Given that groundwater level readings can vary considerably between the Upper Aquifer and Lower Aquifer, water levels from the Lower Aquifer are unlikely to be representative of unconfined water levels (even in the Spring) and should not be used to support the GSP conclusions of subsurface flow in the unconfined aquifer between the Westside and Tulare Lake Subbasins.

Therefore, the analysis is not supported by substantial evidence and we respectfully disagree with the conclusion set forth in the GSP relating to groundwater conditions in the unconfined aquifer.

Finding 2 (Page 3-87): Figures 3-28b, 3-28c and 3-28d display wells within the Tulare Lake Subbasin with long term hydrographs.

**Westlands' Comment**: Figures 3-28b to 3-28d shows long term hydrographs for wells within the Tulare Lake Subbasin. Unfortunately, the data displayed by the hydrographs is pixelated, therefore unreviewable. Westlands GSA recommends revising the mentioned figures to display hydrographs using a higher resolution to allow the public to review.

Finding 3 (Page 3-93): Figures 3-30 through 3-32, and Section 3.2.5 describes groundwater quality data in the Tulare Lake and Westside Subbasins. With respect to TDS, the GSP cites reports from Davis et al., 1956 and Hansen et al., 2018.

**Westlands Comments:** Both reports highlight how depth significantly influences TDS concentrations. However, Figure 3-30 does not report the depth of the wells or the aquifer the TDS sample represents which can substantially influence how data is interpreted. Furthermore, none of the maps shows the time period being represented. With respect to the concentration of arsenic in groundwater, neither the most recent nor the maximum arsenic concentration in the data available from GeoTracker is as high as those shown in Figure 3-31 (**WWD Attachment: Figure 2 and 3**). Furthermore, the density of wells with available arsenic data in the Geotracker GAMA database is substantially less than that shown in Figure 3-31.

The concentration of nitrate in groundwater is shown in Figure 3-32. This map shows nitrate concentration exceeding the MCL in four locations adjacent to the Westside Subbasin boundary. A review of data available from Geotracker GAMA show that samples exceeding the MCL were measured in the mid to late-1980's and likely do not reflect the current ambient nitrate concentration at these locations.

We recommend that the draft GSP be revised to accurately convey groundwater quality data by aquifer and by the timeframe the data represents. In addition, we recommend that the groundwater quality data be reviewed for accuracy.

Finding 4 (Page 3-87): Figures 3-34 displaying historical subsidence in the San Joaquin Valley from 1949 – 2005.

**Westlands' Comment**: Figures 3-34 contains a legend that is incomplete and is unable to be reviewed. Westlands GSA recommends applying the corresponding color scheme to the vertical displacement legend to allow readers to be able to review the presented information.

Finding 5 (Page 4-18): Section 4.5.1.1 introduces the following sustainable management criteria for Groundwater Levels paraphrased as follows: The Sustainable Management Criteria for Groundwater Level (Section 4.5.1.1) proposes the Measurable Objective to be set at a groundwater level using Method 4, which forecasts water levels to 2035 and sets the 2035 water level as the Measurable Objective. Minimum Thresholds were based on assumed stability of groundwater levels between 2035 and 2040 and are designed to be a last-resort warning before more severe measures must be taken to protect groundwater resources. Section 4.4.3 (Selection Process of Minimum Thresholds to Avoid

Undesirable Results) establishes the Minimum Thresholds as "one standard deviation of all observed head data in compliance wells or modeled forecasted data." Figure 4-2 through 4-6 describe establishment of the Minimum Thresholds as "one standard deviation or 50 feet, whichever is greater."

**Westlands' Comment**: Sustainable Management Criteria, which includes the measurable objectives and the minimum thresholds, allows groundwater levels in the aquifer to decline past the Westside Subbasin's Measurable Objectives and Minimum Thresholds, set at 2015 groundwater levels, and may negatively impact the Westside Subbasin's ability to achieve sustainability by reducing net inflow into the Westside Subbasin and/or reversing the groundwater flow direction. More specifically, the proposed decline of groundwater levels in the Southwest Kings GSA may alter the groundwater conditions near the boundary between the Westside Subbasin and the Kings Subbasin and result in a lowering of groundwater levels in the Westside Subbasin. This action would have the effect of shifting the burden of SGMA compliance from the Southwest Kings GSA to Westlands GSA. This is not permissible. The GSP is devoid of substantial evidence and any explanation as to how the Minimum Thresholds will avoid a significant and unreasonable reduction in groundwater storage and significant and unreasonable land subsidence contributing to the impairment of surface uses within the Westside Subbasin.

Water Code section 10733, subdivision (c) provides in relevant part:

> "The department shall evaluate whether a groundwater sustainability plan adversely affects the ability of an adjacent basin to implement their groundwater sustainability plan or impedes achievement of sustainability goals in an adjacent basin"

Further, we respectfully call your attention to Code of Regulations, title 23, section 355.4, subdivision (b)(7):

> "When evaluating whether a Plan is likely to achieve the sustainability goal for the basin, the Department shall consider . . . whether the Plan *will adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of its sustainability goal.*" (emphasis added)

and Code of Regulations, title 23, section 354.28, subdivision (b)(3):

> "The description of minimum thresholds shall include . . . how minimum thresholds have been selected to *avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.*" (emphasis added)

Moreover, the implementation of SGMA and a GSP cannot be used to override the protections afforded common law water rights. Overlying and appropriative uses of groundwater within the Westside Subbasin are entitled to legal and equitable protection against infringement by an action that deprives them of their historical subsurface inflows. (*City of Lodi v. East Bay Municipal Utility District* (1936) 7 Cal.2d 316, 344 [protecting groundwater levels against lowering from another party's pumping]; *Trussell v. City of San Diego* (1959) 172 Cal.App.2d 593, 611 [enjoining a party for lowering water table by interrupting surface flow].)

Practically speaking, proposing a continued decline of groundwater levels in the Lower Aquifer is not supported by substantial evidence because the GSP acknowledges that it does not have enough data to support its finding that there will be no impact to historical boundary flow conditions between the

Subbasins. The potential for curtailing historic underflow into the Westside Subbasin may be a substantial factor in contributing to significant and unreasonable subsidence and frustrate the Westlands' GSA ability to achieve the sustainability goal.

Finding 6 (Page 4-21): Section 4.5.33 Land Subsidence references Table 4-2: *Lemoore-Average Land Subsidence Interim Milestones based on Measurable Objectives for the Subbasin,* which displays modeled subsidence rates and interim milestones for those subsidence rates. The Tulare Lake Subbasin also proposes a minimum threshold of 16 ft by 2040 in Section 4.4.1.3.

**Westlands' Comment**: Westlands GSA is concerned that allowing subsidence rates as proposed may impact critical infrastructure such as roads, railroads, and may increase flood risks to existing land uses, especially near Corcoran where subsidence rates are critical, in the Westside Subbasin and other neighboring subbasins. Westlands GSA strongly recommend selecting Measurable Objectives and Minimum Thresholds to subsidence rates that will not negatively impact infrastructure in neighboring subbasins. The GSP fails to reference any substantial evidence that the minimum threshold will avoid significant and unreasonable land subsidence that impairs surface uses in the Westside Subbasin.

Finding 7 (Appendix D): The information provided in the GSP suggests a conceptual error leading to flows between the Westside Subbasin and Tulare Lake Subbasin to be misrepresented in the numerical model and GSP. Figure D5-5 in Appendix D shows the average model simulated net lateral subsurface flow of 158,405 AFY from the Lower Aquifer to the general head boundary (GHB) in the Westside Subbasin. Contours of simulated Lower Aquifer groundwater levels from 2015 in Figure D5-3 show a cone of depression along the GHB in the Westside Subbasin. Figure D5-5 shows pumping from the Lower Aquifer is a net positive suggesting that intraborehole flow from the Upper Aquifer to the Lower Aquifer is greater than the amount extracted from wells, suggesting the GHB is driving the flow across the boundary between the Westside and Tulare Lake Subbasins and out of the Westside Subbasin.

**Westlands' Comment:**
Lower Aquifer contours developed from water level data at the end of the 2014 irrigation year (one year before the simulated contour data provided) do not show a cone of depression in the location of the GHB (**WWD Attachment: Figure 4**). These contours also cannot be interpreted to suggest that groundwater flow is from the Tulare Lake Subbasin to the Westside Subbasin. Furthermore, it is unclear what physical process would cause a localized cone of depression to form in this location, especially considering that the groundwater model simulates positive net pumping from the Lower Aquifer in the Westside Subbasin.

The analysis is not supported by substantial evidence and for the reasons set forth above, Westlands recommends reanalyzing the water level contour data from the numerical model and GSP.

Lastly, the Westlands GSA identified the following reporting discrepancies within the text of the GSP and Appendix D that should be reviewed:

1. Total lateral subsurface inflow into the Westside Subbasin shown in Figure D5-5 averages 72,296 AFY (67,347 from the Tulare Lake Subbasin and 4,948 AFY from the Kings Subbasin). Table 3-6 of the GSP shows average annual subsurface flow from the Tulare Lake Subbasin to the Westside Subbasin of 41,390. What is the source of this discrepancy?

2. In the graphic depicting aquifer specific fluxes in Figure D5-5, the sum of the "Net GW Flux" (which presumably is lateral subsurface flow between adjacent subbasins) totals 4,936 AFY while the total in the table shown in Figure D5-5 is 72,296 AFY. What is the source of this discrepancy?

3. Figure numbers in the Appendix D text do not correspond to the correct figures. Figure D5-10 is titled "Simulated Subsidence 1990-2016". Figure D5-8 shows "Groundwater Mass Balance Tule Subbasin".

**Westlands' General Comment:** The GSP Regulations include a provision authorizing GSAs in adjacent basins to enter into interbasin agreements. The interbasin agreements can "establish compatible sustainability goals" and be included in GSPs to "support a finding that implementation of the Plan will not adversely affect an adjacent basin's ability to implement its Plan or impede the ability to achieve its sustainability goal." (Code Regs., tit. 23, § 357.2.)[1] The interbasin agreements may also address: (1) "an estimate of groundwater flow across basin boundaries;" (2) how the GSAs will reconcile differing minimum thresholds and measurable objectives in the basins to avoid undesirable results; and (3) a process for resolving conflicts between the GSAs. (*Id.*) Given the potential reduction of historical cross-boundary flow attributable to the planned operation with the Tulare Lake Subbasin Draft GSP, Westlands strongly recommends that we meet and confer at the earliest opportunity to determine whether an interbasin agreement can be reached. Our intention is to reach a cooperative resolution of these important issues that will enable coordinated sustainable management in our GSAs.

If you have any questions or concerns, regarding these comments, please contact Kiti Campbell by email at kcampbell@wwd.ca.gov or by phone at (559) 241-6226. Thank you for the opportunity to provide comments on the Tulare Lake Subbasin Draft GSP.

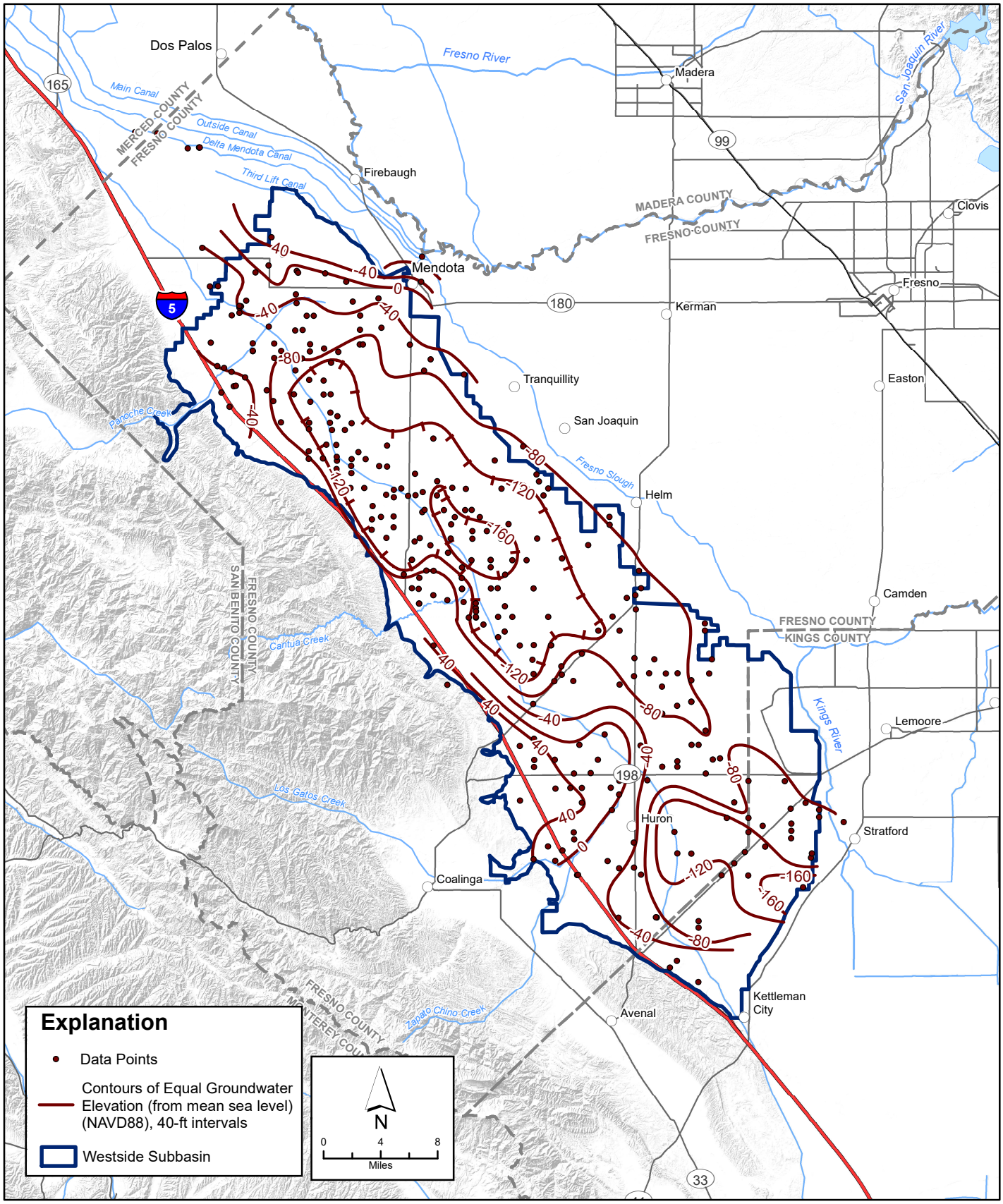
Sincerely,

Russ Freeman

Russ Freeman, P.E.
Deputy General Manager – Resources
Westlands Water District

[1] See Appendix A for the complete text of the provisions of SGMA and the GSP Regulations (Code Regs., tit. 23, § 350, *et seq.*) cited herein.

# Figure 4

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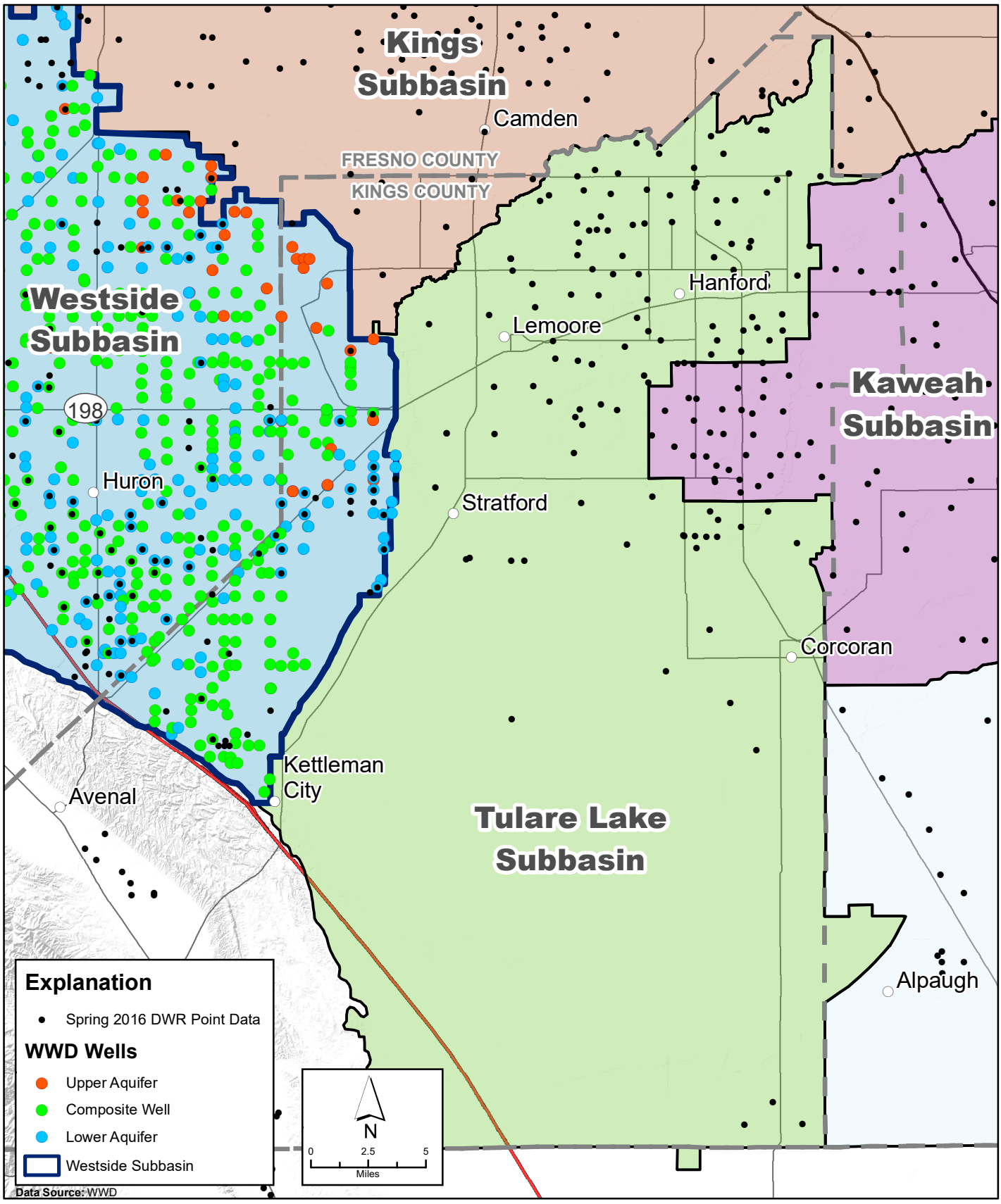
Luhdorff & Scalmanini
Consulting Engineers

**FIGURE 2-40**
**Contours of Equal Groundwater Elevation**
**Lower Aquifer, Winter 2014/2015**

*Groundwater Sustainability Plan*
*Westside Subbasin*

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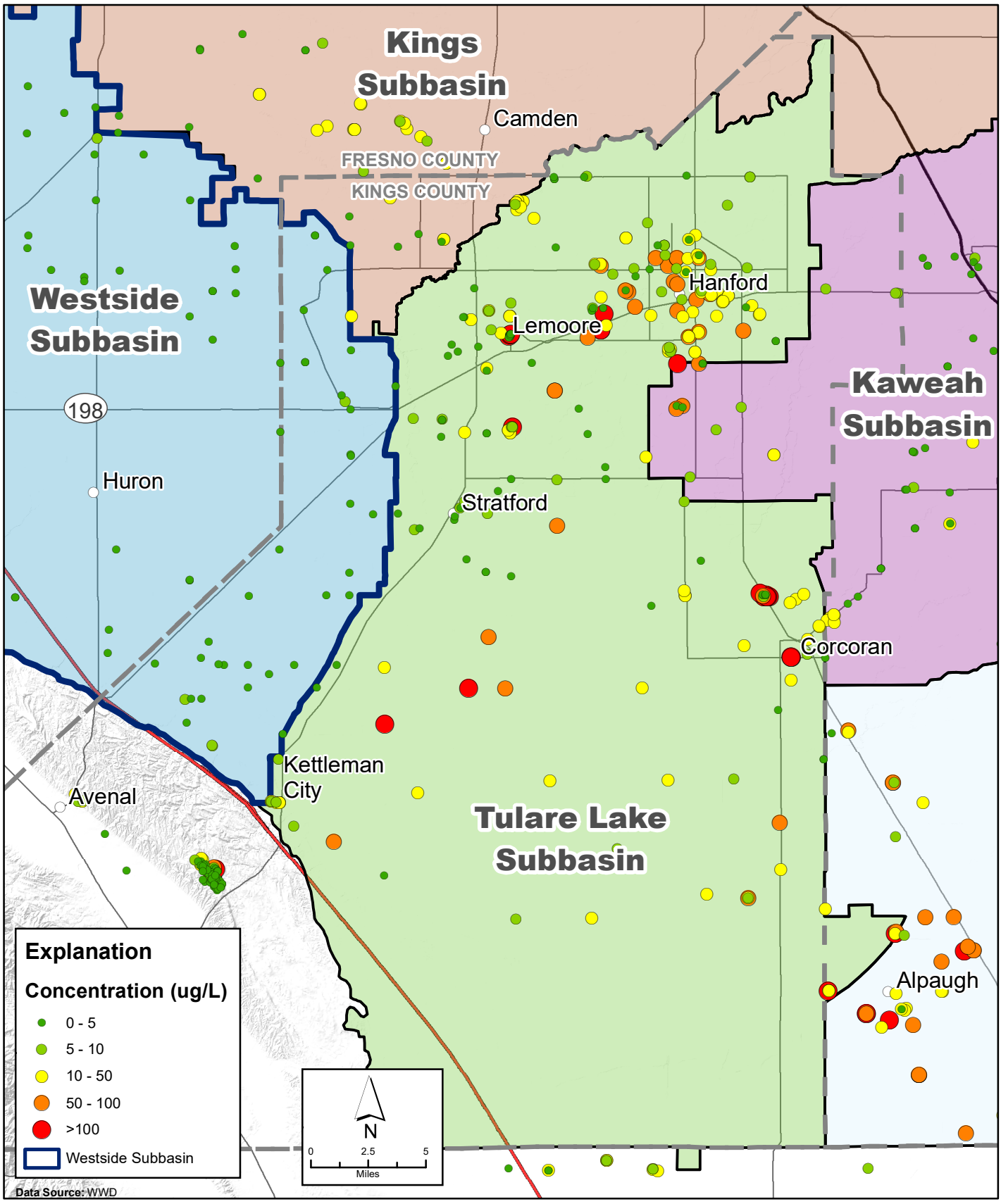
Luhdorff & Scalmanini
Consulting Engineers

**FIGURE 1**

**DWR Point Data Used to Develop Contours of the Unconfined Aquifer vs Westlands Well Construction**

*Groundwater Sustainability Plan*
*Westside Subbasin*

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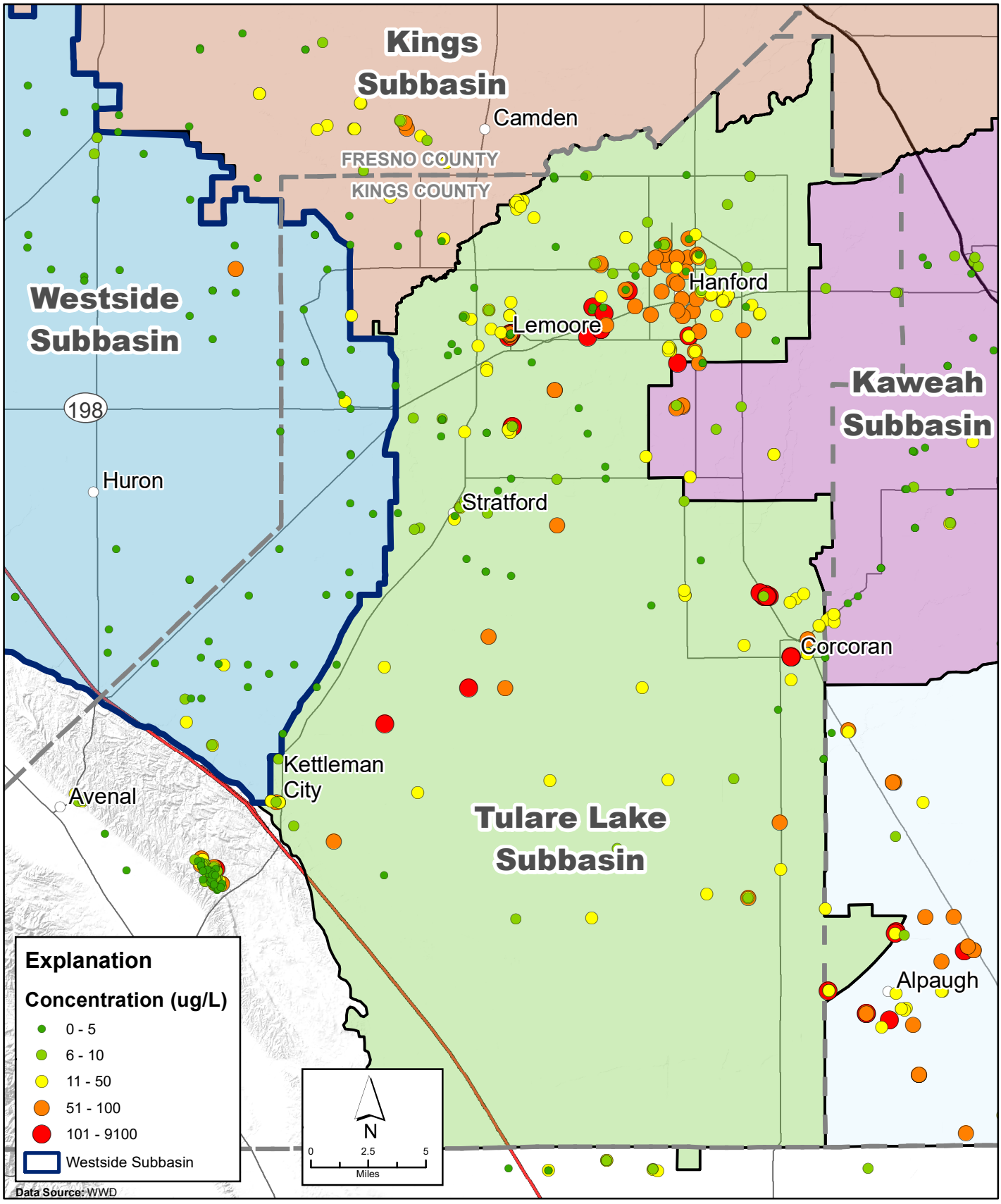
Luhdorff & Scalmanini
Consulting Engineers

**FIGURE 2**
**Arsenic Concentration in Groundwater Wells**
**Most Recent Reported Value**
*Groundwater Sustainability Plan*
*Westside Subbasin*

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Luhdorff & Scalmanini
Consulting Engineers

**FIGURE 3**
**Arsenic Concentration in Groundwater Wells**
**Maximum Reported Value**
*Groundwater Sustainability Plan*
*Westside Subbasin*

**DOUG VERBOON**
Supervisor
District 3

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December 2, 2019

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**Re: Comments on the Tulare Lakes Subbasin Groundwater Sustainability Plan**

Dear Messrs. and Madams:

I am writing as a duly elected Supervisor for the County of Kings (the "County") and not on behalf of the Board of Supervisors. I am also writing on behalf of the other signatories to this letter, who care as deeply as I do about the issues raised in the Tulare Lakes Subbasin Groundwater Sustainability Plan (the "GSP") that has been proposed and is subject to this public hearing. I am submitting my comments and proposed changes in writing so that they may be incorporated into the GSP prior to its submission to the State Department of Water Resources ("DWR") by January 31, 2020.

**Procedural Defects**

The Groundwater Sustainability Agencies addressed above ("GSAs") issued a notice on September 3, 2019 for the December 2, 2019 public hearing to comment on the GSP. The narrative part of the GSP – approximately 500 pages – was not issued until three days later, on September 6, 2019. The Appendix D to the GSP – the Water Modeling Report – and the Water Model itself were not released to the public for review until October 17th, 2019, a month and half later. Even though the County requested to, and did, coordinate with the GSAs on Wednesday, November 6th, the GSAs' delay in getting the complete GSP out for the full 90-day review period set out in Section 10728.4 of the Water Code impeded any serious review and feedback on the GSP.

Under Section 10728.4, you were required to provide the County – and, consequently, the public – with at least 90-days written notice of the public hearing at which you planned to adopt the GSP. When the GSAs were told their "notice" was inadequate because of the lengthy delay in issuing the entire GSP, the responses have typically been two-fold: First, they claim the statute is ambiguous as to what it meant by "notice" of the public hearing. In other words, the statute does not say with specificity that the GSP had to be released at the same time as the notice. The second response has been, "Well, you'll get to comment at the State level once the GSP is lodged with the State in January, so it shouldn't matter whether you had adequate opportunity to comment now." Neither of these responses excuses the GSAs from giving the County and its water users a full opportunity to review and comment on the draft GSP.

For public notice to be effective, it must satisfy the requirements of administrative due process. Federal and California courts have ruled over the last half-century that adequate notice must be "reasonably calculated, under all the circumstances, to apprise the interested parties of the pendency of the action and afford them an opportunity to present their objections . . . ." (*Mullane v. Cent. Hanover Bank & Trust Co.* (1950) 339 U.S. 306, 314.) Furthermore, the notice must "convey the required information" within "a reasonable time for those interested" to be heard "at a meaningful time and in a meaningful manner." (See *id;* see also *Mathews v. Eldridge* (1976) 424 U.S. 319, 333.) From these cases and others, it is clear that the September 3rd notice needed to include at least 90-days written notice of the date, time, and location of the public hearing, as well as service of the entire GSP.

Second, regardless of whether the County or anyone else has an opportunity to comment to the State on the final GSP submission, it was the legislature's intent that all interested parties have a meaningful opportunity to comment *before* it was submitted to the State. At least the legislature believed that the GSAs should be given the benefit of substantive input on the GSP before they submitted it. Unfortunately, the GSAs' delay in getting the draft GSP prepared in time for any substantive review, feedback and opportunity to revise the draft GSP in response to the public's comments has compromised the successful adoption and implementation of the GSP.

**Project Vagueness**

One of the most important parts, in my view, of a successful GSP is convincing the State that the GSAs are committed to creating a sustainable source of groundwater for the region and that they can be trusted to implement an approved GSP. I am concerned that the purported "projects" set out in the GSP are too vague and non-committal and, consequently, won't convince the State to defer to the GSAs when it comes to groundwater sustainability. If the State rejects the GSP as being too vague – or for any other reason – the Sustainable Groundwater Management Act ("SGMA") makes clear that the State will take over our groundwater management and local control of that essential water resource will be history.

I attended the October 22nd, 2019, Board of Supervisors meeting when Dennis Mills addressed the Board and stated openly that the GSAs had made a judgment decision to keep the description of the GSP's proposed projects vague; he said the GSAs didn't want to commit to any specific projects in case, on further review, it was determined a project was not viable. I was also part of the delegation from the County that met with the GSAs on November 6th to consult on the draft GSP. As we discussed whether the GSAs had considered certain elements of certain projects,

such as CEQA requirements, Dennis stated that none of the GSA Boards had committed to any of the projects in the GSP. The fact that the GSA Boards haven't committed to doing anything (other than perhaps a groundwater monitoring program) as part of the GSP process is not going to instill confidence in the State and I'm concerned it could lead to the State's rejection of the GSP. The "projects" that have been proposed in the GSP should be firmed up as much as possible before the plan is submitted in January.

**Land Fallowing Project**

Finally, and most importantly, I am very concerned about the GSP proposal to fallow significant amounts of land within the County so as to cut agricultural demand for groundwater by at least 25 percent in 12 years. When we spoke with the GSAs during the November 6th consultation meeting, Jeof Wyrick confirmed that the GSP model incorporated an assumption that two percent (2%) of the land in the subbasin – not even spread out over the entire County – would be fallowed each year until we met the 2040 compliance deadline. If that is pursued, it would result in approximately 220,000 acres of agricultural land being fallowed. A good portion of that fallowed land would have to be permanent tree crops, which would result in the destruction of a significant amount of the value of the land (as they have to be irrigated every year) as well as the County's tax base.

During our consultation meeting, Jeof said that the water model consultants had erroneously incorporated the two percent (2%) assumption into the model, thus, overstating the amount of land to be fallowed as a result of GSP implementation. He said the GSP was going to be revised to incorporate an assumption of one percent (1%) per year fallowing that would result in "only approximately 100,000 acres" in the GSAs' boundaries being fallowed. I have no idea whether that has been done already or if it actually will be done before the GSP is submitted to the State. That amount of fallowed land is certainly less by half than what was previously projected, but when there are only approximately 420,000 acres of agricultural land within the GSAs' boundaries, that is an unacceptable level of fallowing both to the farmers whose land would be fallowed and, I believe, to the residents of the County. This 25 percent of total agricultural land fallowing is consistent with representations that the GSAs made publicly at the public outreach meeting in Lemoore, California, on October 15, 2019.

I was also surprised when Jeof said at our consultation meeting that implementation of the GSP was really "farmer versus farmer warfare" and that what was going to happen is "private adjudication of water rights in a public forum" (*i.e.*, before the GSAs). We all know what's going to happen when the few large farm and agricultural interests in the County go after the small, family-owned farms: The small farms are going to lose. I'm going to do everything in my power as a member of the Board of Supervisors to make sure that doesn't happen.

For this reason alone, the GSP should be revised to clarify that land fallowing in Kings County will be deployed only as a last resort after every other possible means of demand reduction and water recharge have been fully implemented and only at the minimal levels absolutely necessary to achieve sustainability. It is important to have survivability for the small farmer so that he can be competitive with the large corporate famers when it comes to ground water pumping. The Tulare Lake Subbasin will never achieve sustainability if the exported ground water from the subbasin to surrounding areas in the region is left unaddressed.

I am available to answer questions and discuss these concerns.

Sincerely,

DOUG VERBOON
Supervisor

Name: Jerome Warmerdam
Business: Warmerdam Walnut Co.

Name:
Business: Casaca Vineyards

Name: Stanley Neves
Business: Golden Valley Farms

Name: Eddie Warmerdam
Business: Warmerdam Farms

Name:
Business: Trinity Ranches LLC

Name: Cornelius Warmerdam
Business:

Name: Rocky Silveira
Business: 4-B Farms

Name:
Business: Kimba Farms

Name: Eddie Warmerdam
Business: ENW Farms Inc

Name:
Business: Millers Rentaland Inc

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# Memorandum

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| **To:** | Tulare Lake Subbasin GSAs' Managers and Technical Team |
| **From:** | Trilby Barton, Public Outreach Coordinator, Provost & Pritchard |
| **Subject:** | Tulare Lake Subbasin GSAs' Groundwater Sustainability Plan Public Hearing Comments |
| **Date:** | December 2, 2019 |

## December 2, 2019 Draft GSP Public Hearing Recap

The Tulare Lake Subbasin Groundwater Sustainability Agencies (GSAs) held a public hearing on the Draft Groundwater Sustainability Plan (GSP) on December 2, 2019. The hearing was held in the County of Kings Board of Supervisors' Chambers, and was called to order at 10:01 a.m. by Mid-Kings River GSA Manager, Dennis Mills.

Mr. Mills introduced himself and the other four GSA managers: Deanna Jackson with Tri-County Water Authority, Dale Melville with Southwest Kings GSA, Jeof Wyrick with El Rico GSA, and Charlotte Gallock with South Fork Kings GSA. Mr. Mills also introduced Trilby Barton, public outreach consultant with Provost & Pritchard Consultant Group. Mr. Mills and Ms. Barton explained the process for the public hearing, and Mr. Mills opened the floor for public comments.

Twenty stakeholders were in attendance, and one public comment was provided:

- **Bill Toss, Grower in Mid-Kings River GSA**
  "Reading through the plan that is available, the only thing that really struck out to me was the 25 percent set aside for reduction. That of course is most likely very damaging, and would not be sustainable economically here for Kings County or for us as growers. I hope that there is a change to that, and to make sure that is not the status quo."

Upon seeing that no other stakeholders wanted to provide oral comments, Mr. Mills thanked everyone for attending and closed the public hearing at 10:06 a.m.