UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

December 8, 2021

Bryan Bondy
Executive Director
Upper Ventura River Groundwater Sustainability Agency
C/O Meiners Oaks Water District
202 W. El Roblar Drive
Ojai, CA 93023

Re: Draft Upper Ventura River Groundwater Agency Groundwater Sustainability Plan (August 2021)

Dear Mr. Bondy:

Enclosed with this letter are NOAA's National Marine Fisheries Service's (NMFS) comments on the Draft Upper Ventura River Groundwater Sustainability Plan (Draft GSP) prepared by the Upper Ventura River Groundwater Agency.

The Draft GSP was developed pursuant to, and intended to meet, requirements of the California Sustainable Groundwater Management Act (SGMA). The SMGA includes specific requirements to identify and consider adverse impacts on all recognized beneficial uses of groundwater and related interconnected surface waters, including Groundwater Dependent Ecosystems (GDE). (See Cal. Water Code §§ 10720.1, 10721, 10727.2.)

As explained more fully in the enclosure, the Draft GSP does not, but should, adequately address the recognized instream beneficial uses of the Upper Ventura Rive Groundwater Basin, as well as other GDE, potentially affected by the management of groundwater within the subject basin. Additionally, the Draft GSP should also recognize the important relationship between the extensive groundwater extractions and water diversion and storage within the basin (including the Robles and Foster Park diversion facilities) and its potential adverse effects on the amount and extent of surface flows and other water dependent habitat features utilized by the federally listed endangered southern California steelhead (*Oncorhynchus mykiss*). 94

The revised Draft GSP should be re-circulated to give NMFS, and other interested parties, an opportunity to review the revisions before the Draft GSP is finalized.

NMFS appreciates the opportunity to comment on the Draft GSP. If you have a question regarding this letter or enclosure, please contact Mr. Mark H. Capelli in our Santa Barbara Office (805) 963-6478 or mark.capelli@noaa.gov, or Mr. Andres Ticlavilca in our Santa Rosa Office (707) 575-6-54 or andres.ticlavilca@noaa.gov.

Sincerely,

Anthony P. Spina
Chief, Southern California Branch
California Coastal Office

cc:
Rick Bush, NMFS, California Coastal Office
Rick Rogers, NMFS, California Coastal Office
Andres Ticlavilca, NOAA Affiliate, California Coastal Office
Natalie Stork, SWRCB
Anita Regmi, SWRCB
Craig Altare, SWRCB
Ed Pert, CDFW, Region 5
Erinn Wilson-Olgin, CDFW, Region 5
Angela Murvine, CDFW, Water Branch
Mary Larson, CDFW, Region 5
Kyle Evans, CDGW, Region 5
Robert Holmes, CDFW, Sacramento
Bryan Demucha, CDFW, Sacramento
Steve Gibson, CDGFW, Region 5
Steve Slack, CDFW, Region 5
Mary Ngo, CDFW, Region 5
Greg Martin, CDDR, Channel Coast District
Nate Cox, CDPR, Channel Coast District
Kristie Klose, USFS, Los Padres National Forest
Christopher Diel, USFWS, Ventura Field Office
Chris Dellith, USFWS, Ventura Field Office

NOAA's National Marine Fisheries Service's Comments on Draft Upper Ventura River Groundwater Agency Groundwater Sustainability Plan (2021)

December 8, 2021

Overview

NOAA's National Marine Fisheries Service (NMFS) provides the following comments on the Draft Upper Ventura River Groundwater Sustainability Plan (Draft GSP), with a focus on its relevance to the federally listed endangered southern California steelhead (*Oncorhynchus mykiss*). Prior to presenting these comments, NMFS first provides background information on the endangered steelhead and their closely resident cohort, which utilize and reside in the Ventura River watershed, including the reach of the mainstem of the Ventura River underlain by the Upper Ventura River Groundwater Basin (hereafter "Basin"). That background information includes the status of the species, life history and habitat requirements, and actions that are essential for recovery of the species. This information is essential for understanding the potential implications of implementing the Draft GSP for the endangered steelhead. Our general and specific comments on the Draft GSP are presented in subsequent sections.

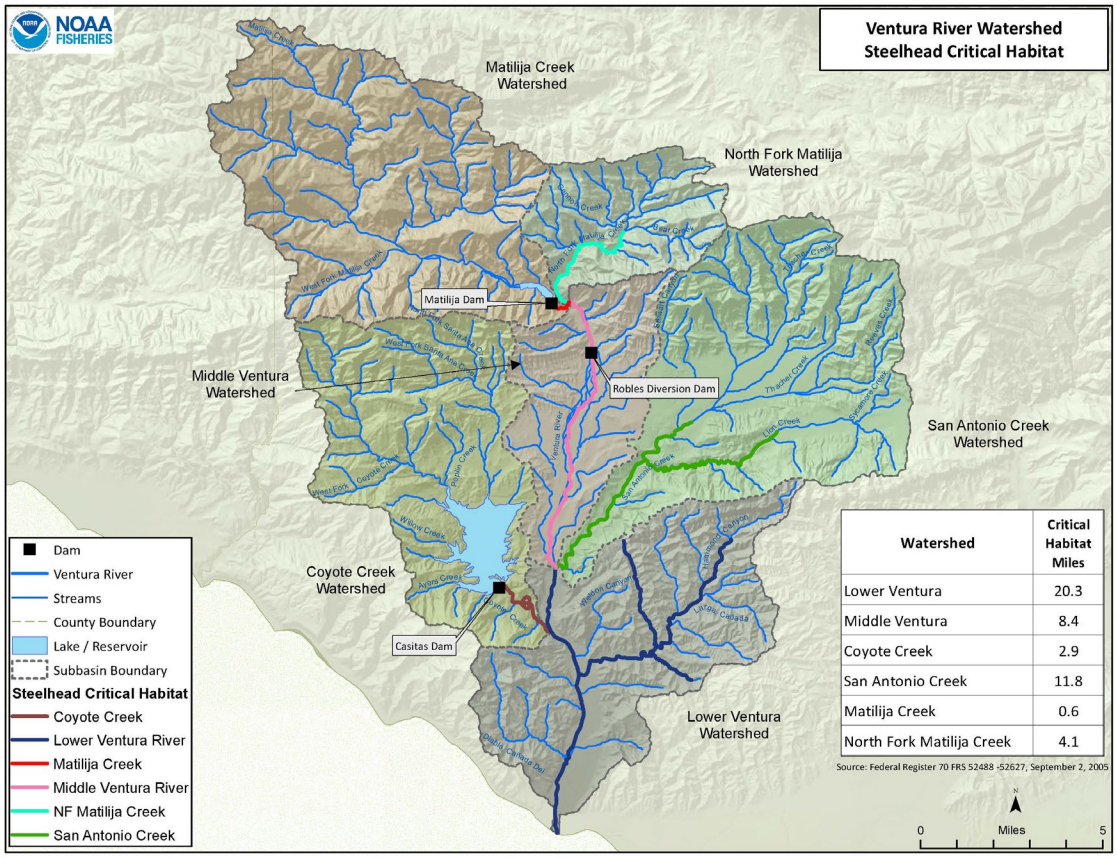
Status of Steelhead, Life History and Habitat Requirements, and Recovery Needs

Status of steelhead and habitat for the species in the Ventura River Watershed

NMFS listed southern California steelhead, including the populations in the Ventura River watershed (which includes the Basin), as endangered in 1997 (62 FR 43937), and reaffirmed the endangered listing in 2006 (71 FR 5248).

NMFS designated critical habitat for southern California steelhead in 2005 (70 FR 52488). Within the Basin, this designation includes the mainstem of the Ventura River, but also the lower Ventura River and the Ventura River Estuary (See Figures 1 and 2).

Critical habitat for endangered steelhead includes: 1) freshwater spawning habitat with water quality and quantity conditions and substrate that support spawning, incubation, and larval development; 2) freshwater rearing sites with water quality and floodplain connectivity to form and maintain physical habitat conditions that support juvenile growth and mobility, and natural cover such as shade, submerged and overhanging vegetation that provide forage and refugia opportunities; and 3) freshwater migration corridors free of anthropogenic passage impediments that promote adult and juvenile mobility and survival.



Watershed	Critical Habitat Miles
Lower Ventura	20.3
Middle Ventura	8.4
Coyote Creek	2.9
San Antonio Creek	11.8
Matilija Creek	0.6
North Fork Matilija Creek	4.1

Figure 1. Ventura River Watershed Steelhead Critical Habitat. Dotted line depicts the boundaries of the Upper Ventura River Groundwater Basin.

Of particular relevance to the GSP are the existing and projected groundwater withdrawals from the Basin and their effects on instream beneficial uses of the interconnected surface water of the Ventura River and its tributaries (*e.g.*, Coyote Creek, San Antonio Creek, Matilija Creek, and North Fork Matilija Creek), including the use by adult and rearing juvenile steelhead, as well as other Groundwater Dependent Ecosystems (GDE).

NMFS Southern California Steelhead Recovery Plan (2012) noted:

> "Baseflows in some river reaches can be influenced significantly by groundwater stored and transported through faults and fractured rock formations. Many rivers and streams naturally exhibit interrupted baseflow patterns (alternating channel reaches with and without perennial surface flow) controlled by geologic formations, and a strongly seasonal precipitation pattern characteristic of a Mediterranean climate. Water temperatures are generally highest during summer months, but can be locally controlled by springs, seeps, and rising groundwater, creating micro-aquatic conditions suitable for salmonids [citation omitted]" p. 2-16.

NMFS' Southern California Steelhead Recovery Plan (2012) also noted:

> "Groundwater is an important source of surface flows during dry periods in many southern California watersheds. Groundwater can therefore contribute to sustaining suitable oversummering juvenile rearing conditions in mainstem and tributary habitats. Surface flows can be maintained as a result of the intersection of a high groundwater table or through the transmission of water through geologic fault systems." p. 5-4.

Habitat for this species has been adversely affected by loss and modification of physical or biological features (substrate, water quality and quantity, water temperature channel morphology and complexity, passage conditions, riparian vegetation, introduction of non-native invasive species, *etc*.) through activities such as surface-water diversions and groundwater extractions (See "Current DPS-Level Threats Assessment", pp. 4-1 – 4-11, and "Threats and Threat Sources", pp. 9-14 – 9-17, in NMFS 2012; also, NMFS 2016). Thus many of the physical and biological features of designated critical habitats have been significantly degraded (and in some cases lost) to the detriment of the biological needs of steelhead. These habitat modifications have hindered the ability of designated critical habitat to provide for the survival and ultimately recovery of this species.

NMFS has also modeled and mapped potential intrinsic potential spawning and rearing habitat in the Ventura River watershed. Intrinsic potential habitat was identified as part of NMFS' recovery planning process for the endangered Southern California DPS of Steelhead (See Figure 2). This method uses observed associations between fish distribution and the quantitative values of environmental parameters such as stream gradient, summer mean discharge and air temperature, valley width to mean discharge, and the presence of alluvial deposits – habitat features that are critical to steelhead spawning and rearing (Boughton and Goslin 2006).

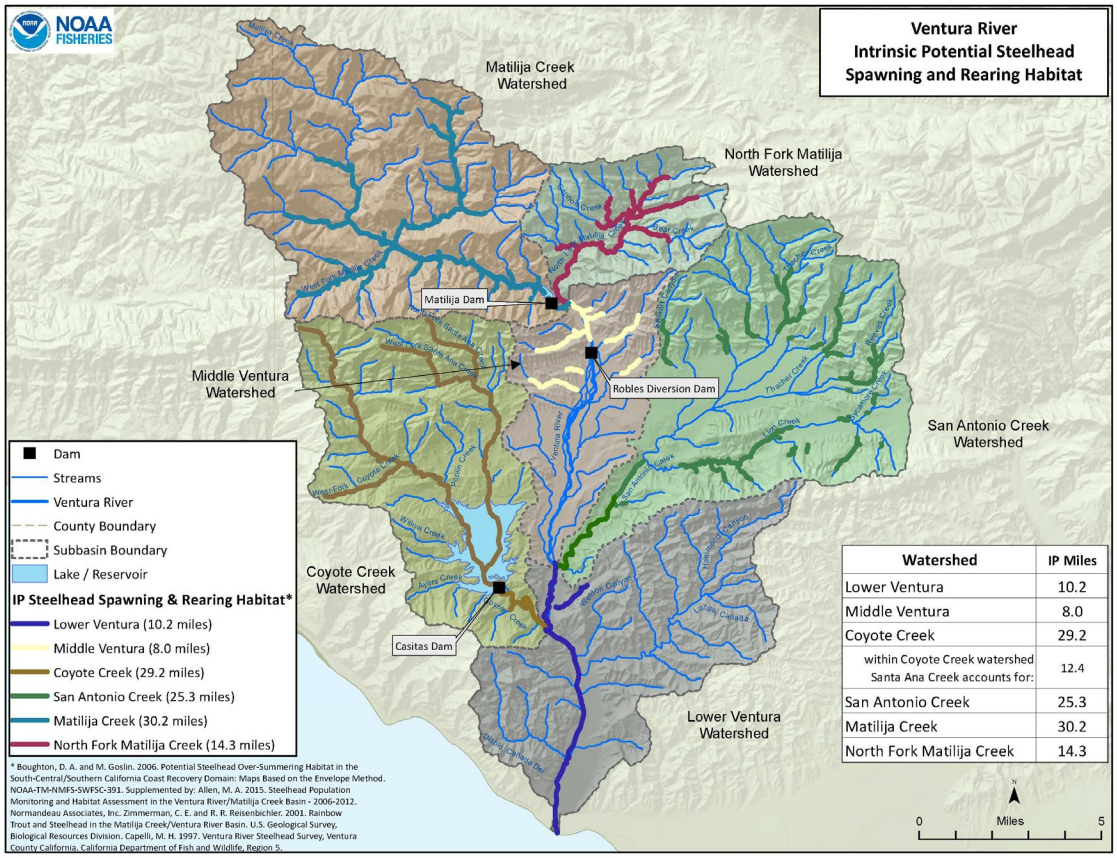


Figure 2. Ventura River Watershed Intrinsic Potential Steelhead Spawning and Rearing Habitat. Dotted line depicts the boundaries of the Upper Ventura River Groundwater Basin.

Steelhead life history and habitat requirements

Adult steelhead spend a majority of their adult life in the marine environment. However, the reproductive and early development stages of this species' life history occurs in the freshwater environment (migration to and from spawning areas, spawning, incubation of eggs and the rearing of juveniles), including in the main stem and tributaries such as those in the Ventura River watershed. Many of the natural variables (such as seasonal surface flow patterns, water quality, including water temperature) are significantly impacted by the artificial modification of these freshwater habitats. This includes both surface and sub-surface extractions that lower the water table and can, in turn, affect the timing, duration, and magnitude of surface flows essential for steelhead migration, spawning and rearing. Juvenile steelhead must have access to perennial stream reaches (including coastal estuaries) with tolerable water temperature for growth and survival (See, for example, Boughton *et al*. 2009). Surface diversions in combination with lowered groundwater tables during the dry season can *indirectly* affect rearing individuals by reducing vegetative cover, and *directly* by reducing or eliminating the summertime surface flows (or pool depths) in parts of the watershed. These conditions have been and

are being exacerbated by global climate change (Beighley *et al*. 2008, Feng *et al*. 2019, Gudmundsson *et al*. 2021).

Recovery needs of endangered steelhead

Among other federally mandated responsibilities, NMFS administers the U.S. Endangered Species Act for the protection and conservation of endangered steelhead utilizing the Ventura River Watershed. As part of this responsibility, NMFS developed the Southern California Steelhead Recovery Plan (NMFS 2012)[1]. Through a comprehensive analysis of systemic threats to this species, diversion of surface-flow and groundwater extractions were identified as "very high" threats to the long-term survival of endangered steelhead in the Ventura River (NMFS 2012, pp. 9-1 through 9-17).

To address the identified threats to endangered steelhead in the Ventura River Watershed, NMFS' Southern California Steelhead Recovery Plan identifies a number of recovery actions targeting surface diversions and groundwater extraction (NMFS 2012, p. 8-6, Table 9-7, p. 9-42). These include:

VenR-SCS-4.2 Develop and implement a water management plan to identify the appropriate diversion rates for all surface water diversions that will maintain surface flow necessary to support all *O. mykiss* life history stages, including adult and juvenile *O. mykiss* migration, and suitable spawning, incubation, and rearing habitat.

VenR-SCS-6.1 Conduct groundwater extraction analysis and assessment. Conduct hydrological analysis to identify groundwater extraction rates, effects on the natural stream pattern (timing, duration and magnitude) of surface flows in the mainstem and tributaries, *and the estuary*, and effects on all *O. mykiss* life history stages, including adult and juvenile *O. mykiss* migration, spawning, incubation, and rearing habitats. (emphasis added)

VenR-SCS-6.2 Develop and implement groundwater monitoring and management program. Develop and implement groundwater monitoring program to guide management of groundwater extractions to ensure surface flows provide essential support for all *O. mykiss* life history stages, including adult and juvenile *O. mykiss* spawning, incubation and rearing habitats.

GSPs developed under SGMA provide an important mechanism for implementing these recovery actions for the Ventura River watershed. The GSP for the Basin is an essential mechanism for implementing specific steelhead recovery actions for the Ventura River.

[1] National Marine Fisheries Service. 2012. Southern California Coast Steelhead Recovery Plan. West Coast Region, California Coastal Area Office, Long Beach, California; see also, Keir Associates and National Marine Fisheries Service. 2008, Hunt & Associates Biological Consulting Services 2008.

General Comments on Groundwater Withdrawals and the Draft GSP

Improperly withdrawing groundwater is of concern because the natural process of groundwater inputs to surface flows and water surface elevations can buffer daily water temperature fluctuations (Heath 1983, Brunke and Gosne1997, Barlow and Leake 2012, Hebert 2016). Artificially reducing the groundwater inputs can expand or shrink the amount of fish habitat and feeding opportunities for rearing juvenile steelhead (Fetter 1997, Sophocleous 2002, Glasser *et al.* 2007, Croyle 2009,), and reduce opportunities for juveniles to successfully emigrate to the estuary and the ocean (Bond 2006, Hayes *et al.* 2011). Low summer baseflow, likely caused by both surface water diversions and pumping hydraulically connected groundwater, is noted as a significant stress to steelhead survival in the Ventura and tributaries (See, for example, Table 9-2, p. 9-15 in NMFS 2012).

Management of the groundwater resources within the Ventura River watershed has affected the water resources and other related natural resources throughout the Ventura River watershed. For example, extraction of groundwater from the Basin has lowered groundwater levels causing the lowering, and truncation (by both delaying the onset and hastening the cessation) of surface flows that support the habitat characteristics and condition for endangered steelhead, as well as other aquatic species in the Ventura River watershed (Hunt & Associates Biological Consulting Services 2008, Kier Associates and National Marine Fisheries Service 2008).

The development and operation of groundwater supply facilities throughout the Basin are integral in the management of the water resources of the Ventura River. Facilities such as Robles Diversion and Foster Park Diversion (along with Matilija and Casitas dams) have profoundly altered the natural surface flow and groundwater recharge patterns in the Ventura River watershed, from the headwaters to the Pacific Ocean (*e.g.*, NMFS 2003, 2007). Unless the Draft GSP is revised to reflect the operation of these integral components of the groundwater management program for the Ventura River, the future adopted GSP is unlikely to meet the requirement of SGMA to effectively provide for the protection of habitats, including those recognized instream beneficial uses that are dependent on groundwater such as fish migration, spawning and rearing, as well as other GDE within the Basin. 95

When analyzing impacts on steelhead or other aquatic organisms resulting from groundwater and related streamflow diversions, identifying flow levels that effectively support essential life functions of this organism is critical (Barlow and Leake 2012). Specifically, it is essential to determine what flows adequately supports steelhead migration during the winter and spring, and juvenile rearing year round. Without an understanding of these hydrologic/biotic relationships, a GSP cannot ensure that significant and unreasonable adverse impacts from groundwater depletion (and in the case of the Ventura River, the integrally related surface water diversion/groundwater extraction program) are avoided (Heath 1983, California Department of Water Resources 2016, Belin 2018, CDFW 2019). 96

Specific Comments on the Draft GSP

The following comments on the Executive Summary of the Draft GSP are arranged by page and paragraph number; additional comments on individual Draft GSP elements are presented subsequently.

Executive Summary

Introduction

ES-2 Beneficial Uses

Pages ES-iii-iv

The Draft Plan states:

> "The beneficial uses of groundwater extracted from the Basin include municipal, industrial, and agricultural water supply." p. ES-iii

The listed beneficial uses extracted from the boundaries of the Basin include only out-of-stream beneficial uses, and largely ignores the instream beneficial uses, including those linked to GDE. The Draft GSP should be revised to explicitly acknowledge the instream beneficial uses supported by the Basin, including the GDE associated with the upper Ventura River, as well as those affected by groundwater extraction from the Basin, including the lower Ventura River and the Ventura River Estuary. The recognized instream beneficial uses for the portion of the upper Ventura River within the Basin include: warm freshwater habitat, cold freshwater habitat, wildlife habitat, habitat for rare, threatened and endangered species, fish migration, and wetland habitat. Ventura River Estuary instream beneficial uses include: estuarine habitat, marine habitat, wildlife habitat, habitat for rare, threatened and endangered species, fish migration, spawning habitat, and wetland habitat.[2] 97

The Draft GSP recognized only two GDE areas within the Basin: 1) Confluence Aquatic Habitat Area, and 2) Foster Park Aquatic Habitat Area. This recognition of GDE underrepresents the known function and value of the river reach within the Basin for adult and juvenile endangered southern California steelhead. Steelhead use the entire reach of the Ventura River within the Basin for completing their life-cycle. See Figures 1 and 2 for a depiction of the designated steelhead critical habitat and intrinsic potential habitat within the Ventura River watershed, including the Basin B. See additional comments below regarding the GDE areas identified in the Basin. 98

ES-3 Regional Water Management Framework 99
Page ES-iv
Casitas Municipal Water District Water Supply Management

[2] Table 2. Beneficial Use of Inland Surface Waters, California Regional Water Quality Control Board, Los Angeles Region (2014). p. 2-6

It should also be recognized that the Casitas Municipal Water District (CMWS) manages the Matilija Dam conjunctively with the Robles Diversion and Casitas Dam. 99

ES-4 Basin Setting and Groundwater Conditions

The Draft GSP notes that:

> "Groundwater extractions are secondary to spring discharge to the Ventura River except during dry periods when spring flows decrease substantially due to low Ventura River stream flow entering the northern end of the Basin" p. vii

The Ventura River watershed encompasses a system of connected groundwater and surface water that may become disconnected when groundwater levels are very low during drought *and* heavy groundwater extractions (or surface diversions), but this condition is anomalous, and does not represent the natural functioning of the system under unimpaired conditions. The SWRCB groundwater-surface flow study of the Ventura River (which includes the tributary groundwater basins) clearly demonstrates the connections between groundwater levels and surface flow (SWRCB 2021).

100

The regulations governing SGMA do not stipulate that the provisions of SGMA cover only "principal aquifers" as the Draft GSP appears to presume. The regulations define interconnected surface water as "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water . . ." (23 CCR Section 351(0). Significantly, "continuous" refers specifically to hydrologic connection, not a continuous temporal connection.

The Draft GSP does not adequately recognize the potential role of groundwater in the Basin, including the lower Ventura River and Ventura River Estuary, for ensuring suitable surface water in habitat for supporting different life-history phases of steelhead. Further, because groundwater-management activities within the Ventura River watershed involve the CMCD diversion operations at the Robles Diversion, the relationship between these diversion activities and groundwater elevations along the affected portion of the Ventura River (and estuary) should be addressed in the revised Draft GSP.

See additional comments below on interconnected groundwater and surface flows water surface elevations in Confluence Aquatic Habitat Area GDE and Foster Park Aquatic Habitat Area GDE within the Basin.

ES-4 Water Budget

Pages ES-x-xiii

The Draft GSP notes that:

101

> "It was concluded that these factors [*i.e.*, land use changes and population growth] are not anticipated to have a material impact on future water

> demand and the water budgets for the Basin because of land use policies and ordinances that greatly limit the potential for material growth in the basin" p. ES-x

This statement is misleading because it is does not recognize that groundwater resources of the Basin are used outside the Basin; for example, a substantial amount of groundwater extracted from the City of Ventura's groundwater wells in the vicinity of the Foster Park Aquatic Habitat Area GDE are used outside of the Basin to support development in eastern of Ventura, the fastest growing portion of the City of Ventura. The revised Draft GSP should acknowledge that future land use development and population growth outside of the Basin has the potential to affect the groundwater budget within the Basin. 101

Overdraft Assessment

Pages xi-xii

The Draft GSP concludes that:

> "The water budget results do not indicate an overdraft condition in the Basin currently or in the future. Groundwater level have not been observed to decline over a period of years without fully recovering. Numerical model result for the project water budge indicate that groundwater levels will continue to fully recovery following droughts." p. xii

Several aspects of this statement are problematic. First, the years of record used for this assement include extensive periods of drought, and represent a groundwater/surface water system substantially impacted by past and currently unregulated groundwater extractions. Therefore, it is not surprising that an overdraft condition was not indicated. 102

Second, relying on an assessment that is influenced by an extensive drought period and unregulated groundwater pumping is not likely to inform a proper environmental baseline for determining the true effects of a proposed groundwater-withdrawal program on GDE, including those supporting endangered steelhead.

Third, using a degraded environmental baseline as the comparative barometer has the potential to perpetuate a degraded environmental baseline into the future.

Fourth, the assessment appears to relate primarily to providing groundwater for traditional out-of-stream beneficial uses such a municipal and industrial supply, not instream beneficial uses, including use of ground and related surface waters by the federally endangered southern California steelhead, as well as other GDE.

We would also note while more frequent and prolonged depression groundwater levels can sometimes be offset with water storage systems, or temporary water conservation use, to ensure out-of-stream uses of water demands, GDEs do not function in the same way. Even though a groundwater basin may "fully recover" its groundwater levels, the species depending upon an adequate supply of water do not respond or recovery in the same way as the physical system can. The revised GSP should recommend this

fundamental difference in the role of groundwater supplies in supporting out-of-stream and instream beneficial uses, and the related GDE. 102

Sustainable Yield

Pages xii-xiii

The Draft GSP concludes:

> "In summary the concept of a sustainable yield over a long-term average period is not relevant to management of the UVRGB." P. xii 103

While expression of groundwater conditions in term of long-term averages conditions may have limited utility (particularly with respect to GDE) in a highly variable rainfall and run-off pattern, a long-term water budget is relevant. See comments above regarding the overdraft assessment.

ES-6 Sustainable Management Criteria

Pages ES-xiii-x

The sustainable criteria are expressed explicitly and in terms of groundwater levels, storage water quality and depletion of interconnected surface waters, and do not clearly relate to the habitat conditions necessary to support steelhead during incubation and rearing phases of their life-cycle. 104

Chronic Lowering of Groundwater Levels and Reduction of Groundwater Storage

Page xiv-xv

While the Draft GSP recognizes potential significant and unreasonable effects from groundwater extractions, the minimum thresholds identified to address this is are based on historical low groundwater levels in the representative groundwater level monitoring wells. Using this standard, which includes significant periods of drought and unregulated groundwater extraction, is not likely to provide long-term protection for all the recognized beneficial uses of the Basin. Specifically, the exceedances caused by groundwater extraction and the related measurable objectives for groundwater storage do not adequately recognize the needs of the federally endangered southern California steelhead, or other GDE. The proposed standards appear aimed at seasonally refilling the Basin for the purposes of protecting existing groundwater extractions for traditional out-of-stream beneficial uses, and not for the protection of GDE. See additional comments below. 105

Degraded Water Quality

Page xvi-xvii 106

The Draft GSP does adequately recognize the important relationship between groundwater levels and the surface flows (particularly base flows) or water quality parameters (such as temperature, dissolved oxygen, *etc*.) that contribute to the maintenance of GDE within the Basin (including the lower Ventura River and the Ventura River Estuary). 106

Depletions of Interconnected Surface Water

Page xvii-xix

As noted above, the Draft GSP recognized only two GDE areas within the Basin: 1) Confluence Aquatic Habitat Area and 2) Foster Park Aquatic Habitat Area. This limited recognition of the actual extent of GDE within the Basin does not accurately reflect the use of the river reach within the Basin by endangered southern California steelhead. Steelhead use the entire reach of the Ventura River within the Basin in completing their life-cycle. See Figures 1 and 2 for a depiction of the designated critical habitat and intrinsic potential habitat within the Ventura River watershed, including the Basin. 107

The Draft GSP indicates that the sustainable management criteria for interconnected surface waters in the Foster Park Aquatic Habitat Area GDE relied on a field study performed by Hopkins (2013). This study, which the Draft GSP characterized as "the best available science for the Foster Park Aquatic Habitat Area", identified a flow of 2 cfs measured at the USGS Foster Park gauge (1118500) as adequate to prevent significant and unreasonable effects on steelhead. This claim warrants a couple of comments:

First, the base flows are difficult to accurately measure in alluvial river settings that are characterized by shifting channel, and where and groundwater and hyporheic flows constitute an important component of the surface flow conditions. We would note in this regard that there are reported discrepancies between the Hopkins and USGS gauge measurements, as well the City of Ventura's gauge measurements, and those done by other groups such as Santa Barbara Channel Keeper as part of their water quality monitoring pursuant to the State Water Board's Quality Assurance Plan (USGS Station 11118500 Ventura R NR Ventura nwis.waterdata.usgs.gov/nwis, Foster Park gauge reporting website https://www.picovale.com. 108

Second, NMFS has conducted an analysis of the effects of the groundwater extractions of the City of Ventura's well field in the Foster Park area and concluded that the groundwater extractions would have significant effects of rearing steelhead in wet, average and dry hydrologic conditions, and has identified a minimum flow (11-12 cfs) that is considerably larger than that proposed in the Hopkins study (NMFS 2007).

In its analysis, NMFS noted that the rate of pumping during wet years analyzed groundwater extractions from the Foster Park well field varied between 1 cfs and 20 cfs, and most commonly ranged between 9 to 12 cfs. These well pumping rates reduced surface flow in the Foster Park area by more than 50%, from about 15 cfs to less than 5 cfs in during the summer or fall in 1992, 1993, and 2001 when juvenile rearing would be expected to utilize the habitat. During average hydrologic conditions, the maximum and

minimum flows in the lower Ventura River were reduced by well field withdrawals. The range of well field withdrawals during average rainfall years was also from about 2 cfs to 20 cfs, and ranged between 8 and 10 cfs. The reduction of surface flows from the Foster Park well field operations would result in extremely low surface flow levels (< 2 cfs), and would occur earlier in the year, compared to wet hydrologic conditions. Flow records during average rainfall years show that flows dropped to levels at or near zero due to the Foster Park well field extractions during the summer and fall rearing period in almost all average rainfall year (NMFS 2007, pp. 24-25). 108

Based on this analysis, and an assement of the effects of groundwater extractions in the Foster Park area, NMFS identified a limit on groundwater extractions that would prevent a reduction of surface flow in the Foster Park area below 11 to 12 cfs (measured at the USGS Foster Park gauge 11118500), a level significantly higher that that identified by Hopkins, and adopted by the Draft GSP.

ES-7 Monitoring Networks

Pages x-xii

The proposed monitoring is aimed primarily at addressing the limited Sustainable Management Criteria for only two GDE. There is little in the monitoring program that specifically addresses the potential effects of groundwater extractions on other GDE, including, but not limited to, the upper reaches of Basin, as well as the lower Ventura River and the Ventura River Estuary. As noted above, the Draft GSP recognized only two GDE areas within the Basin: 1) Confluence Aquatic Habitat Area and 2) Foster Park Aquatic Habitat Area. This limited recognition of GDE does not accurately affect the use of the reaches of the Ventura River within the Basin made by the endangered southern California steelhead, as well as other reaches and which may affected by groundwater extractions from the Basin. 109

ES-8 Projects and Management Actions

Page xxii-xxiii

Regarding the Foster Park Protocols, see comments above. 110

The Draft GSP should also recognize the potential changes to water supply operations associated with the Matilija Dam Removal and Ecosystem Restoration Project (*e.g.*, the retro-fitting of the Robles Diversion and fish passage facilities).

Draft Upper Ventura River Valley Basin GSP

1.0 Introduction to Plan Contents [Article 5 §354]

The following comments are addressed to the specific sections and provisions of the Draft GSP, arranged by the Draft GSP section headings.

2.2. Description of the Plan Area [§354.8]

Page 8

In addition to the agencies listed, we would note that a considerable amount land area is owned and managed by the Ojai Valley Land Conservancy (including land within the Confluence Aquatic Habitat Area GDE). 111

2.2.2.2 Existing Water Resource Management Programs [§354.8(c) and (d)]

Pages 9-11

One of the largest and most significant water-resource-management programs within the Ventura River watershed, the CMWD's water development program, consists of the combined facilities of the Robles Divers (and conjunctively operated Matilija Dam) and Casitas Dam and Reservoir This program and its related facilities should be included in this section because it affects the natural recharge to the other groundwater basins in upper lower Ventura River, as well as the lower Ventura River basin and the Ventura River Estuary (NMFS 2003). 112

2.2.2.3 Conjunctive Use Programs [§354.8(e)]

Page 12

The City of Ventura's water supply includes groundwater extractions (as well as surface diversions) and this fact should be noted in the revised GSP. See comment above. 113

2.2.3.1 Land Use/General Plans [§354.8(f)(1),(f)(2), and (f)(3)])]

Pages 13-20

The Draft GSP should also include NMFS' Southern California Steelhead Recovery Plan (2012) which includes essential actions for the recovery of this species that pertain to existing land-use and water management policies. See comments above regarding the relevant policies from NMFS' Southern California Steelhead Recovery Plan. 114

2.3 Notice and Communication [§354.10]

Pages 22-24

The Draft GSP is focused on out-of-stream users of the Basin and does not adequately recognize the public trust natural resources that may be affected by the extractions of groundwater from the Basin. The GSP is therefore be of interest to state and federal natural resource regulatory agencies such as NMFS, U.,S. Fish and Wildlife Service, and the California Department of Fish and Wildlife, and the California Department of Parks and Recreation (which owns a portion of the Ventura River Estuary). 115

2.3.1 Beneficial Uses and Users [§354.10(a)]

Pages 23-26 116

See comments above regarding instream beneficial uses within the Ventura River watershed, including the Basin. 116

3.0 Basin Setting [Article 5, SubArticle 2]

3.1. Hydrogeologic Conception Model [§354.14]

Pages 30-52

HCM Overview – Key Features of the UVRGB

Page 30

I In addition to the older alluvium that is generally elevated above the groundwater table directly underlying the alluvial aquifer between the banks of the Ventura River, a large, perhaps a majority of the groundwater collected in the alluvium originates from the up-slope portions of the watershed. In effect, the area of the percolation lens that feeds the Basin is more extensive than the two areas identified in the Draft GSP (*i.e.*, alluvial aquifer and the older alluvium). Significantly, not all the wells in the upper Ventura River are located and drilled into the shallow aquifer directly underlying the river channel that is most directly recharged by surface flows in the Ventura River. The GSP should explicitly address these groundwater extractions from the Basin. 117

3.1.2.2 Surface Water Bodies [§354.14(5)]

Page 33

In addition to groundwater discharge, hyporheic flows are an important component of surface flows, particularly base flows. These conditions create an interrupted surface flow regime during a large portion of the year in the middle reaches of the Ventura River (from approximately the Robles Diversion down to the confluence of San Antonio Creek), and can be significantly affected by groundwater extractions, particularly from shallow wells. 118

Page 34

Springs along the Ventura River are generally associated with east-west trending faults that run perpendicular to the mainstem. These faults have been mapped, though the production of the springs associated with them have not been measured (Ventura River Watershed Council 2015). 119

Page 35

Water from Casitas Reservoir is also used in the west end of the City of Ventura that lies outside the Basin (Ventura River Watershed Council 2015). See comment above.

3.1.3.2 Groundwater Recharge and Discharge Areas [§354.14(d)(4)]

Pages 46-47

See comments above regarding the extent of the groundwater recharge area in the Ventura River watershed. 120

3.1.4 Data Gaps and Uncertainty [§354.1(b)(5)]

Surface Water Bodies

Page 52

One of the largest data gaps is the rate of surface flow under base flow conditions, including the diurnal changes. Because of their relatively small size and dependence on groundwater and hyporheic flows and groundwater levels, these flows measured in a way that records their seasonal and diurnal fluctuations, and should be a major focus of current and future modeling efforts. 121

3.1.4.4 Primary Beneficial Uses [§354.14(b)(4)(E)]

Pages 50-52

See comments above regarding beneficial uses of the groundwater resource of the Basin, and interconnected surface waters. 122

3.2 Groundwater Conditions [§354.16]

Pages 54-69

The Draft GSP notes that:

> "Vertical gradients may exist between the alluvium and the bedrock, but no paired wells screened in the bedrock and alluvial exist to estimate this gradient." p. 55

The Draft GSP does not, but should, provide details regarding the well construction showing the intervals of the well through which groundwater enters the wells. In addition, the revised GSP should clarify whether "sanitary plugs" are installed in the wells that retard or prevent flow through shallow and deep aquifers. See comment above regarding the assertion that "No data gaps or significant uncertainties were identified." 123

3.2.1 Groundwater Elevations [§354.16(a)]

Page 55-56

The Draft GSP acknowledges that: 124

> "The Basin groundwater level and storage trends closely mimic surface water flows, with groundwater levels and storage exhibiting large and rapid fluctuation relative to the total started thickness and total

> groundwater storage – more so than perhaps any other groundwater basin in the State." p 56

124

We would note that base surface flows closely mimic groundwater levels, making the management of groundwater extraction particularly importance in the maintenance of GDE, including habitat for the endangered southern California steelhead.

3.2.2 Change in Storage [§354.16(b)]

Page 57

125

See comments above regarding groundwater elevations

3.2.3 Seawater Intrusion [§354.16(c)]

Page 58

The Draft GSP notes that:

> "The UVRGB is an inland groundwater basin, with no connection to the ocean." p. 62

126

The analysis appears to be focused on the effects of seawater intrusion on the Basin, but does not address the effects of groundwater extraction from the Basin on the lower Ventura River or the estuary. The GSP should address the issue of reducing groundwater levels underlying the lower reaches that are hydrologically connected to the Basin.

3.3.4 Groundwater Quality Impacts [§354.16(d)]

Pages 58-60

127

See comments above regarding water quality.

3.2.6 Interconnected Surface Water Systems [§354.16(f)]

Pages 63-65

128

See comments above regarding interconnected surface waters.

3.2.7 Groundwater-Dependent Ecosystems [§354.16(g)]

Pages 66-69

129

The Draft GSP relies heavily on the Nature Conservancy's (TNC) guidance for GDE analysis (TNC 2019, 2020). According to this guidance, GDE are defined on their dependence on groundwater for all or a portion of their water needs. The method used by TNC in identifying GDE is based on statewide data on "vegetation known to use

groundwater", and therefore does not adequately reflect the uses made of groundwater by other biological resources, such as seasonal migration of fishes, or other organisms such as invertebrates that have differing life-cycles and environmental requirements than plants (TNC 2019, 2020).

In addition to supplying water to the root zone of plants, groundwater can also contribute to surface flows, influencing the timing, duration, and magnitude of surface flows, particularly base flows. These base flows provide essential support to aquatic invertebrates, avian fauna, and fish species, including native resident and anadromous fishes. In addition, groundwater that only seasonally supports surface flows can contribute to the life-cycle of migratory fishes, such as steelhead, that can make use of intermittent flows for both migration, spawning and rearing (Erman and Hawthorne 1976, Boughton *et al*. 2006, 2009). 129

The methodology used in the Draft GSP focuses almost exclusively on vegetation known to use groundwater and, therefore, ignores the seasonal variation in the groundwater levels in the reach of the Ventura River underlain by the Basin that can periodically (seasonally, or intra-annually) exhibit surface flows by affecting their timing magnitude, and duration.

As a result, the Draft GSP only identified 5 potential GDE and included only two for further consideration in the formulation of sustainable management criteria: 1) Confluence Aquatic Habitat Area and 2) Foster Park Aquatic Habitat Area. This limited view of the GDE does not accurately reflect the use of the river reach within the Basin by endangered southern California steelhead. Steelhead use the entire reach of the Ventura River within the Basin for completing their life-cycle. The GSP should be revised to recognize the role that groundwater plays in supporting base flows that support other GDE, including those used by steelhead. 130

3.3 Water Budget [§354.18]

Pages 70-75

See comments above regarding the water budget for the Basin. 131

3.3.1 Historical Water Budget [§354.18(c)(2) (B)]

Pages 76-82

The Draft GSP notes that:

> "The SGMA Regulations require that the historical surface water and groundwater budget be based on a minimum of 10 years of historical data." p. 79 132

The Draft GSP does not refer to or account for the effects of the operation of the CMWD's Robles Diversion on the Upper Ventura River, which supplies on average 45% of the total amount of water diverted and stored in the Casitas reservoir acre-feet per year

from the main stem of the Ventura River (NMFS 2003, Ventura River Watershed Council 2015). This diversion operation affects recharge to all of the Ventura River groundwater basins, not just the Basin, including the shallow alluvial aquifer and the other deeper aquifers within Basin. These operations have the potential to impact endangered adult and juvenile steelhead in the upper Ventura River and estuary (NMFS 2003, 2007). The Draft GSP should therefore include as part of its water-budget analysis the operations of the Robles Diversion. Specifically, the relationship of groundwater management activities (including both recharge and groundwater extraction activities) and the effects of the related Robles Diversion on surface flows below the diversion and the maintenance of surface flows supported by groundwater should be explicitly addressed a in the revised GSP. 132

3.3.2 Current Water Budget [§354.18(c)(1)]

Pages 84-86

As noted above, the Draft GSP does not refer to or account for the effects of the operation of the CMWD's Robles Diversion on the upper Ventura River, but should as part of its current water budget. See comments above regarding the CMWD's Robles Diversion. 133

3.3.3 Projected Water Budget

Pages 84-91

As noted above, the Draft GSP does not refer to or account for the effects of the operation of the CMWD's Robles Diversion on the upper Ventura River, but should be included as part of its projected water budget. See comments above regarding the CMWD's Robles Diversion. 134

3.3.4.1 Overdraft Assessment

Page 91

The Draft GSP notes that:

> "The water budget result do not indicate an overdraft condition in the Basin currently or in the future. . . . Numerical model results for the projected water budge indicate the groundwater level will continue to fully recovery following droughts." p. 91 135

As noted above, this analysis does not take into account the effects of either the protracted drought or the past unregulated extraction of groundwater, or the differing effects of temporary drawn of the groundwater table on traditional out-of-stream beneficial uses and instream beneficial uses of the waters of the Ventura River watershed.

4.0 Sustainable Management Criteria [Article 5, SubArticle 3]

Pages 98-136

See comments below on individual sub-sections of the Draft GSP.

4.2 Sustainability Goal [§354.24]

Pages 90-100

The Draft GSP states, in part, that:

> "The goal of this Groundwater Sustainability Plan (GSP) is to sustainably manage the groundwater resources of the Upper Ventura River Basin for the benefit of current and anticipated future beneficial users of groundwater, including the environment and the welfare of the general public who rely directly or indirectly on groundwater. Sustainable groundwater management will ensure the long-term reliability of the Upper Ventura River Basin groundwater resources by avoiding undesirable results pursuant to the Sustainable Groundwater Management Act (SGMA) no later than 20 years from Plan adoption and through implementation of a data-driven and performance-based adaptive management framework." p. 94

136

Nothing in the language of the goal specifically refers to the protection of instream beneficial uses associated with the GDE of the Basin, such as the upper Ventura River or the downstream reaches of the Ventura River, including the Ventura River Estuary. This appears to be the result, in part, of not fully recognizing interconnected surface waters or GDE within the boundaries of the Basin. However, as noted above, the Basin contains interconnected surface water and GDE beyond the two that are identified for sustainable management criteria. See comments above, and Figures 1 and 2, regarding the extent of steelhead habitat within the Ventura River watershed, including within the boundaries of the Basin.

4.4. Chronic Lowering of Groundwater Levels

Pages 97-106

137

See comments above regarding groundwater Basin dynamics.

Evaluation of Potential Effects on Beneficial Uses and Users, Land Uses, and Property Interests [§354.26(b)(3)]

Pages 98-99

The discussion in this section is focused on out-of-stream beneficial uses of the groundwater resources of the Basin., It does not directly address the instream beneficial uses of interest to state and federal natural resource regulatory agencies such as NMFS, U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife, and the California Department of Parks and Recreation. These would include, but are not limited to, the GDE associated with the upper Ventura River, lower Ventura and the Ventura River Estuary.

138

The causes that could lead to undesirable results should include the operations of CMWD's Robles Diversion on the upper Ventura River. See comments above, particularly regarding GDE. 138

4.4.2 Minimum Thresholds [§354.28]

Pages 101-103

None of the minimum thresholds in the Draft GSP addresses specifically the endangered southern California steelhead (other than the Foster Park Aquatic Habitat Area GDE). As noted, this standard is not supported by the best available science. This is a significant omission from the Draft GSP that should be addressed in the revised Draft GSP for the Basin. 139

4.4.2.4 Impact of Minimum Thresholds on Beneficial Uses and Users [§354.28(b)(4)]

Page 102

See comments above regarding the interest of state and federal natural resource regulatory agencies such as NMFS, U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife, and the California Department of Parks and Recreation (which owns a portion of the Ventura River Estuary). 140

4.4.2.6 Current Standards Relevant to Sustainability Indicator [§354.28(b)(5)]

Page 104

The Draft GSP states that:

> "UVRG is unaware of any federal, state, or local standards for chronic lowering of groundwater levels." p. 104 141

While there is no general numeric standards for chronic lowering of groundwater levels, this statement fails to recognize the over-arching standards established by SGMA, particularly those intended to protect GDE.

4.4.2.7 Measurement of Minimum Thresholds [§354.28(b)(6)]

Page 104

The Draft GSP indicates that:

> "Groundwater elevations will be directly measured to determine their relation to minimum thresholds. Groundwater level monitoring will be conducted in accordance with the monitoring plan outlined in Section 5." p. 111 142

The groundwater-monitoring plan only provides for annual monitoring. A more appropriate approach would be to monitor seasonally to account for the strong effect of

seasonal changes in hydrologic and hydraulic conditions that are of significant to GDE, including, but not limited to, those associated with the Basin. For example, monitoring towards the end of summer or beginning of fall, as well as the beginning of spring each year could help inform groundwater and other natural resource managers of the effects of both recharge (natural and artificial) as well as groundwater pumping patterns on GDE within the Basin.

Without shallow groundwater wells that would provide specific data on the relationship between groundwater levels and surface flows, a reliable assessment of the effects of extracting groundwater from these areas on GDE is not possible. This is a significant data gap that could be addressed by the installation of shallow groundwater wells (or piezometers) to better describe these relationships. 142

Additionally, data gathered from groundwater well monitoring should be correlated with stream flow in the upper Ventura River. This can and should be accomplished by added a stream flow gauges capable of monitoring base flows in the upper Ventura.

4.4.3.3 Measurable Objectives and Interim Milestones [§354.30(a),(b),(d),(g) and §354(g)(3)]

Page 105-106

4.4.3.1 Description of Measurable Objectives

Page 103-106

The Draft GSP indicates that:

> "The chronic lowering of groundwater levels measurable objectives were developed by applying the concept of providing a reasonable margin of operational flexibility under adverse conditions." p. 105 143

This strategy is more suitable for managing traditional out-of-stream beneficial uses that instream beneficial uses associated with GDE, including river flows for the endangered southern California steelhead. See additional comments above.

4.5 Reduction of Groundwater Storage

4.5.1 Undesirable Results [§354.26]

Evaluation of Potential Effects on Beneficial Uses and Users, Land Uses, and Property Interests [§354.26(b)(3)]

The Draft GSP states that:

> "The evaluation of potential effects on beneficial uses and users, and property interests for the reduction of groundwater storage sustainability indicate is the 144

> same as for chronic lowering of groundwater levels and depletions of interconnected surface water sustainability criteria and its incorporated by reference" p. 108

144

As noted previously, the Draft GSP should be revised to explicitly acknowledge all the instream beneficial uses supported by the Basin. The recognized instream beneficial uses for the portion of the upper Ventura River include: warm freshwater habitat, cold freshwater habitat, wildlife habitat, habitat for rare, threatened and endangered species, fish migration, and wetland habitat. See comments above, and Figures 1 and 2, regarding the extent of steelhead habitats within the Ventura River Watershed, including the Basin.

Criteria Used to Define Undesirable Results [§354.26(b)(2)]

The Draft GSP states that:

> "The criteria used to define undesirable results for the reduction of groundwater storage sustainability indicator are based on the qualitative description of undesirable results, which is causing other sustainability indicators to have undesirable results. As explained in Section 4.5.2, groundwater levels will be used as a proxy for the reduction of groundwater storage sustainability indicator minimum thresholds. Based on the foregoing, the combination of minimum threshold exceedances that is deemed to cause significant and unreasonable effects in the basin for the reduction of groundwater storage sustainability indicator is the same as the combinations deemed to cause undesirable results for the chronic lowering of the groundwater levels sustainability indicator (Table 4.1-01)." p. 108

145

While groundwater levels are an important indicator of the general condition of the Basin, there are other more meaningful metrics specifically aimed at informing management of the Basin for the protection of instream beneficial uses associated with GDE (*e.g.*, base flow rates, pool depth, stream with, depth across riffles, etc.) Specifically, the current approach is based on criteria that do not, but should, address whether there may be significant stream flow depletion or lowered water surface elevation (from a biological perspective) caused by groundwater pumping within the Basin.

4.5.2.3 Relationships Between Minimum Thresholds and Sustainability Indicators [§354.28(b)(2)]

The Draft GSP indicates that:

> "The relationships between the minimum thresholds for the reduction of groundwater storage sustainability indicator and other sustainability indicators are the same as the potential effects of the minimum thresholds for the chronic lowering of groundwater levels on the other sustainability indicators . . ." p. 110

146

This approach and analysis may be appropriate when considering groundwater supplies for out-of-stream beneficial uses for which there may be alternatives. However, it does not take into account the adverse effects of periodic reduction of groundwater on GDE, including the use by migrating, spawning or rearing steelhead. The effects of periodic groundwater reductions on out-of-stream beneficial uses (*e.g.*, domestic or agricultural water supplies) may be addressed with alternative water sources. However, instream uses such as GDE are more vulnerable to periodic groundwater reductions, because there is generally no alternative water source to sustain the GDE, and even a short-term depletion or limitation of stream flow or water surface elevation can be lethal to aquatic species. 146

4.5.2.5 Impact of Minimum Thresholds on Beneficial Uses and Users [§354.28(b)(4)]

Page 110

See comment above regarding the relationship between Minimum Thresholds and Sustainability Indicators. 147

4.5.2.6 Current Standards Relevant to Sustainability Indicator [§354.28(b)(5)]

Page 110

As noted above, while there are no numeric standards, this statement does not appear to recognize the standards that that are established by SGMA, particularly regarding GDE. 148

4.5.2.7 Measurement of Minimum Thresholds [§354.28(b)(6)]

Page 111

See the comments above regarding "Minimum Thresholds", "Criteria Used to Define Undesirable Results" and "Relationship Between Minimum Thresholds and Sustainability Indicators." 149

4.5.3 Measurable Objectives and Interim Milestones [§354.30(a),(b),(c),(d),(e),(g)]

Page 111

See the comments above regarding "Minimum Thresholds", "Criteria Used to Define Undesirable Results" and "Relationship Between Minimum Thresholds and Sustainability Indicators." 150

4.6 Seawater Intrusion

Page 112

See comment above regarding the seawater intrusion. 151

Criteria Used to Define Undesirable Results [§354.26(b)(2)]

Page 114 152

See the comments above regarding "Minimum Thresholds", "Criteria Used to Define Undesirable Results" and "Relationship Between Minimum Thresholds and Sustainability Indicators." 152

4.7.2 Minimum Thresholds [§354.28]

4.6.2.1 Information and Criteria to Define Minimum Thresholds [§354.28(a), (b)(1),(c)(3)(A),(c)(3)(B), and (e)]

Page 115

See the comments above regarding "Minimum Thresholds", "Criteria Used to Define Undesirable Results" and "Relationship Between Minimum Thresholds and Sustainability Indicators." 153

4.7.2.3 Relationships Between Minimum Thresholds and Sustainability Indicators [§354.28(b)(3)]

Page 119

As noted above, the groundwater extraction from the Basin can affect recharge of the groundwater basin underlying the lower Ventura River and Ventura River Estuary. 154

4.7.2.3 Minimum Thresholds in Relation to Adjacent Basins [§354.28(b)(3)]

Page 119

See comment above. 155

4.7.2.4 Impact of Minimum Thresholds on Beneficial Uses and Users [§354.28(b)(4)]

Page 120

See the comments above regarding "Minimum Thresholds", "Criteria Used to Define Undesirable Results" and "Relationship Between Minimum Thresholds and Sustainability Indicators." 156

4.7.2.5 Current Standards Relevant to Sustainability Indicator [§354.28(b)(5)]

Page 120

As noted, the Draft GSP does not appear to recognize the broad standards that that are established by SGMA. 157

4.6.2.6 Measurement of Minimum Thresholds [§354.28(b)(6)]

Page 121 158

See the comments above regarding "Minimum Thresholds", "Criteria Used to Define Undesirable Results" and "Relationship Between Minimum Thresholds and Sustainability Indicators." 158

4.7.3 Measurable Objectives and Interim Milestones [§354.30(a),(b),(c),(d),(e),(g)]

Page 121

See the comments above regarding "Minimum Thresholds", "Criteria Used to Define Undesirable Results" and "Relationship Between Minimum Thresholds and Sustainability Indicators." 159

4.9 Depletion of Interconnected Surface Water

Pages 123-124

See comments above regarding interconnected surface water and GDE. 160

Process and Criteria for Defining Undesirable Results [§354.26(a)]

Page 124

See comments above regarding the interest of state and federal natural resource regulatory agencies such as NMFS, U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife, and the California Department of Parks and Recreation (which owns a portion of the Ventura River Estuary). 161

Evaluation of Potential Effects on Beneficial Uses and Users, Land Uses, and Property Interests [§354.26(b)(3)]

Page 125

As noted previously, the Draft GSP should be revised to explicitly acknowledge the instream beneficial uses supported by the Basin, including the GDE associated with the upper reaches and middle of Ventura River. See comment above regarding "Process and Criteria for Defining Undesirable Results." 162

Effects on Surface Water Diversions

Page 126

See the discussion above regarding the City of Ventura's Foster Park well field and the CMWD's Robles Diversion. 163

Effects on Aquatic GDEs

Page 127 164

The Draft GSP only identified 5 potential GDE and included only two for further consideration in the formulation of sustainable management criteria: 1) Confluence Aquatic Habitat Area and 2) Foster Park Aquatic Habitat Area. This limited recognition of GDE does not accurately reflect the use of the river reach within the Basin by endangered steelhead. Steelhead use the entire reach of the Ventura River within the Basin for completing their life-cycle. See Figures 1 and 2 for a depiction of the designated critical habitat and intrinsic potential habitat within the Ventura River watershed, including the Basin. 164

Confluence Habitat Area

Page 127

The Draft GSP's assertion that because the Basin has 20 years to achieve sustainable management, there is ample time available to implement appropriate management of the groundwater levels associated with the Confluence Habitat Area does not appropriately recognize the endangered status of the steelhead that utilize and occupy the Ventura River, including the area the Confluence Habitat Area. This statement reflects the same perspective that was expressed in the assertion that the periodic depletion of the Basin is acceptable or reasonable because the Basin has the ability to refill rapidly. As noted above, instream beneficial uses such as GDE are more vulnerable to periodic groundwater reductions, because there is generally no alternative water source to sustain the GDE during periodic periods of groundwater depletion. Even a short-term depletion or limitation of stream flow or water surface elevation can be lethal to aquatic species. 165

Foster Park Habitat Area

Page 128

See the discussion above regarding the City of Ventura's Foster Park well field, as well as the discussion below under Section 6.0., Project and Management Actions. 166

4.9.2 Minimum Thresholds [§354.28]

Page 131

See the comments above regarding "Minimum Thresholds", "Criteria Used to Define Undesirable Results" and "Relationship Between Minimum Thresholds and Sustainability Indicators." 167

4.10 Measurable Objectives and Interim Milestones for Additional Plan Elements [§354.30(f)]

Page 136

The Draft GSP indicates that "No additional plan elements that have measurable objectives are include in the GSP". P. 136. 168

See the comments above regarding the Confluence Habitat Area, Foster Park Habitat Area, and other GDE within the Basin, which are not adequately addressed. 168

5.0 Monitoring Networks [Article 5, SubArticle 4]

Pages 137-154

As noted above, the monitoring proposed is aimed at addressing the limited Sustainable Management Criteria. There is nothing identified in the monitoring program that addresses the potential effects of groundwater extractions on GDE (with the exceptions of the Confluence Habitat Area and the Foster Park Habitat Area) within the Basin. Shallow groundwater wells within the alluvial overlaying the Basin would provide specific data on relationship between groundwater levels and surface flows. This appears to be a significant data gap that should be addressed by the installation of shallow groundwater wells (or piezometers) to better described these relationships. 169

6.0 Projects and Management Actions [Article 5, SubArticle 5]

Pages 163-173

6.3 Foster Park Protocols to Address Direct Depletion of Interconnected Surface Water[§354.44)b)(1)(d)]

It should be recognized that NMFS was not a party to the settlement agreement between Santa Barbara Channel Keep and the State Water Recourses Control Board and the City of San Buenaventura, and has not reviewed or endorsed that settlement agreement which uses a different (lower) minimum flow standard recommended by NMFS for the operation of the City's Foster Park well field. See the comments above regarding the City of Ventura's Foster Park Well Field. 170

7.0 GSP Implementation

Pages 174-183

See comment above regarding "Projects and Management Actions". 171

References

Barlow, P. M. and S. L. Leake. 2012. Streamflow Depletion of Well – Understanding and Managing the Effects of Groundwater Pumping on Streamflow. United State Geological Survey *Circular* 1376.

Beighley, R. E., T. Dunne, and J. M. Melack. 2008. Impacts of Climate Variability and Land Use Alterations on Frequency Distributions of Terrestrial Runoff, Loading to Coastal Waters in Southern California. *Journal of the American Water Resources Association* 49(1):62-74.

Belin. A. 2018. Guide to Compliance with California Sustainable Groundwater Management Act: How to avoid the "undesirable result" of "significant and unreasonable adverse impacts on surface waters". Stanford University.

Bond M. H. 2006. *Importance of Estuarine Rearing to Central California Steelhead (Oncorhynchus mykiss) Growth and Marine Survival.* Master's Thesis, University of California, Santa Cruz.

Boughton, D. H., H. Fish, J. Pope, and G. Holt. 2009. Spatial patterning of habitat for *Oncorhynchus mykiss* in a system of intermittent and perennial stream. *Ecology of Freshwater Fishes* 18: 92-105.

Boughton, D. A. and M. Goslin. 2006. Potential Steelhead Over-Summering Habitat in the South-Central/Southern California Recovery Domain: Maps Based on the Envelope Method. NOAA Technical Memorandum NMFS-SWFSC TM-391.

Boughton, D., P. Adams, E. Anderson, C. Fusaro, E. Keller, E. Kelley, L. Lentsch, J. Nielsen, K. Perry, H. Regan, J. Smith, C. Swift, L. Thompson, and F. Watson. 2006. Steelhead of the South-Central/Southern California Coast: Population Characterization for Recovery Planning. NOAA Technical Memorandum NMFS-SWFSC TM-394.

Brunke, M. and T. Gosner. 1977. The Ecological Significance of Exchange Processes between Rivers and Groundwater. *Freshwater Biology* 37(1977):1-33.

California Department of Fish and Wildlife. 2019. Fish & Wildlife Groundwater Planning Considerations. State of California. Natural Resources Agency.

California Department of Water Resources. 2016. Bulletin 118. California Groundwater: Working Towards Sustainability, and Interim Update 2016.

California Regional Water Quality Control Board, Los Angeles Region. 2014. Los Angeles Region Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties. (Updated 2014)

Croyle, Z. 2009. Analysis of Baseflow Trends Related to Upland Groundwater Pumping for Los Garzas, San Clemente, Potrero, and San Jose Creeks. Master's Thesis. California State University, Monterey Bay.

Erman, D. C., and V. M. Hawthorne. 1976. The quantitative importance of an intermittent stream in the spawning of rainbow trout. *Transactions of the American Fisheries Society* 6: 675-681.

Feng, D., E. Beighley, R. Raoufi, J. M. Melack, Y. Zhao, S. Iacobellis, and D. Cayan. 2019. *Climate Change* 153(2019): 199-218.

Fetter, C. W. 1977. Statistical analysis of the impact of groundwater pumping on low-flow hydrology. *Journal of American Association* 32(4):733-744.

Glasser, S., J. Gauthier-Warinner, J. Gurrieri, J. Kelly, P. Tucci, P. Summers, M. Wireman, and K. McCormack. 2007. Technical Guide to Managing Groundwater Resources. U.S. Department of Agriculture, FS-881.

Gudmundsson, L., J. Boulange, H. X. Do, S. N. Gosling, M. G. Grillakis, A. G. Koutroulis, M. Leonard, J. Liu, H. M. Schmied, L. Papadimitriou, Y. Pokhrel, S. I. Seneviratne, Y. Satoh, W. Thiery, S. Westra, X. Zhang, and F. Zhao. 2021. Globally observed trends in mean and extreme river flow attributed to climate change. *Science* 371:1159-1162.

Hayes, S. A., M. H. Bond. C. V. Hanson, A. W. Jones, A. J. Ammann, J. A. Harding, A. L. Collins, J. Peres, and R. B. MacFarlane. 2011. Down, up, down and "smolting" twice? Seasonal movement patterns by juvenile steelhead (*Oncorhynchus mykiss*) in a coastal watershed with a bar closing estuary. *Canadian Journal of Fisheries and Aquatic Sciences* 68(80:1341-1350.

Heath, R. C. 1983. Basic Ground-Water Hydrology. U.S. Geological Survey. Water Supply Paper 2220.

Hebert, A. 2016. Impacts to Anadromous Fish through Groundwater Extraction. Master's Project and Capstone. 366. University of San Francisco.

Hopkins Groundwater Consultants. 2013. Preliminary Hydrogeological Study City of San Buenaventura Surface Water/Groundwater Interaction Study Foster Park, California. Prepared for the City of San Buenaventura.

Hunt & Associates Biological Consulting Services. 2008. Southern California Coast Steelhead Recovery Planning Area Conservation Action Planning (CAP) Workbooks Threats Assessment. Prepared for the National Marine Fisheries Service, Southwest Region, Protected Resources Division.

Keir Associates and National Marine Fisheries Service. 2008. Fifty-Five South-Central/Southern California Steelhead DPS Conservation Action Planning (CAP) Workbooks (DVD).

National Marine Fisheries Service. 2016. South-Central/Southern California Coast Steelhead Recovery Planning Domain. 5-Year Review: Summary and Evaluation.

Southern California Coast Steelhead District Population segment National Marine Fisheries Service. West Coast Region. California Coastal Office. Long Beach, California.

National Marine Fisheries Service. 2012. Southern California Steelhead Recovery Plan. National Marine Fisheries Service, West Coast Region, Long Beach, California.

National Marine Fisheries Service. 2007. Endangered Species Act Section 7 Consultation and Draft Biological Opinion: Issued to U.S. Army Corps of Engineers 404 Permit Authorization for the City of Ventura's Foster Park Well Facility Repairs Project. National Marine Fisheries Services, Southwest Region, California Coastal Office. SWR/2005/05969.

National Marine Fisheries Service. 2003. Endangered Species Action Section 7 Consultation Biological Opinion: Issued to U.S. Bureau of Reclamation. Authorization for the Construction and Operation of the Robles Diversion Fish Passage Facility. National Marine Fisheries Service, Southwest Region, California Coastal Office. 15 I 422SWR02PR6 I 68: FR.

Sophocleous, M. 2002. Interactions between Groundwater and Surface Water: The State of the Science. *Hydrogeology Journal* 10.1 (2002):52-67.

State Water Resources Control Board. 2021. *Preliminary Draft Groundwater-Surface Water Model of Ventura River Watershed*. State Water Resources Control Board, Division of Water Rights and Los Angeles Regional Water Quality Control Board. August 31, 2021.

The Nature Conservancy. 2019. Identifying GDE under SGMA, Best Practices for Using the NC Data Set.

The Nature Conservancy. 2020. Groundwater Resource Hub: GDE Rooting Depths Database. Available for download at https://groundwaterresourcehub.org/sgma-tools/gde-rooting-depths-database-for-gdes/

Ventura River Watershed Council. 2015. Ventura River Watershed Management Plan, 3.4 Water Supplies and Demands.

Federal Register Notices

62 FR 43937. 1997. Final Rule: Endangered and Threatened Species: Listing of Several Evolutionarily Significant Units (ESUs) of West Coast Steelhead.

70 FR 52488. 2005. Final Rule: Designation of Critical Habitat for Several Evolutionarily Significant Units (ESUs) of West Coast Steelhead.

71 FR 5248. 2006. Final Rule: Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead.