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

January 13, 2022

Ms. Amy Reeh
General Manager
Yuima Municipal Water District
P.O. Box 177
Pauma Valley, CA 92061-0177

Re: Draft Upper Pauma Valley Groundwater Sustainability Plan for the Upper San Luis Rey River Valley (November 22, 2021)

Dear Ms. Reeh:

Enclosed with this letter are NOAA's National Marine Fisheries Service's (NMFS) comments on the Draft Groundwater Sustainability Plan (Draft GSP) prepared by the Yuima Municipal Water District for the Upper San Luis Rey River Valley Groundwater Basin.

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 San Luis Rey River Valley 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 surface water impoundments and diversions and its potential adverse effects on the amount and extent of surface flows and other water dependent habitat features utilized by the federally endangered southern California steelhead (*Oncorhynchus mykiss*).

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 at (805) 963-6478 or mark.capelli@noaa.gov.

Sincerely,

Anthony P. Spina
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NOAA's National Marine Fisheries Service's Comments on Draft Upper San Luis Rey River Valley River Groundwater Sustainability Plan (2021)

January 13, 2022

Overview

NOAA's National Marine Fisheries Service (NMFS) provides the following comments on the Draft Upper San Luis Rey River Valley 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, which utilize and reside in the San Luis Rey River watershed, including the reach of the mainstem of the San Luis Rey River underlain by the Upper San Luis Rey 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 San Luis Rey River Watershed

NMFS listed southern California steelhead, including the populations in the San Luis Rey River watershed (which includes the Basin), as endangered in 1997 (62 FR 43937), extended the initial listing range from the Santa Monica Mountains south to the U.S.-Mexico border in 2002 (67 FR 21568), and reaffirmed the endangered listing in 2006 (71 FR 5248).

NMFS identified and mapped intrinsic potential habitat for southern California steelhead in 2006 (Boughton and Goslin 2006). Within the San Luis Rey Basin, habitat for steelhead includes the mainstem river, the major tributaries (*e.g.*, Pala Creek, Trujillo Creek Fry Creek, Pauma Creek), and the San Luis Rey River estuary (See Figures 1 and 2). These habitat areas for the species overlay areas that the proposed draft GSP will affect.

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 San Luis Rey River and its tributaries (*e.g.*, Pauma Pala Creek, Agua Tibia Creek, and Yuma Creek), including the use by adult and rearing juvenile steelhead, as well as other Groundwater Dependent Ecosystems (GDE).

The role of groundwater in creating and maintaining habitat for endangered steelhead is described in NMFS' Southern California Steelhead Recovery Plan (2012), which provides:

> "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.

Unfortunately, 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.

As part of the steelhead recovery planning process, NMFS identified intrinsic potential habitat within core recovery watersheds. The identification of intrinsic potential habitat was used to determine the historic location, distribution and extent of suitable steelhead habitat (particularly over-summering habitat) within the species known range along the south-central and southern California coastal watersheds. The methods utilized to generate maps of this habitat was based on information on observed associations between fish distributions and the values of environmental factors such as stream gradient, summer mean discharge and air temperature, valley width to mean discharge, and the presence of alluvial deposits which are essential to steelhead spawning and rearing.[1] This

[1] We note in this regard the Draft GSP recognized the prevalence of these alluvial deposits: "The majority of groundwater in the USLR [Upper San Luis River] Valley Groundwater Subbasin is produced from the

method can be considered conservative because it did not account for groundwater inputs, which could not be consistently accounted for on a landscape scale (Boughton and Goslin 2006). See Figures 1 and 2.

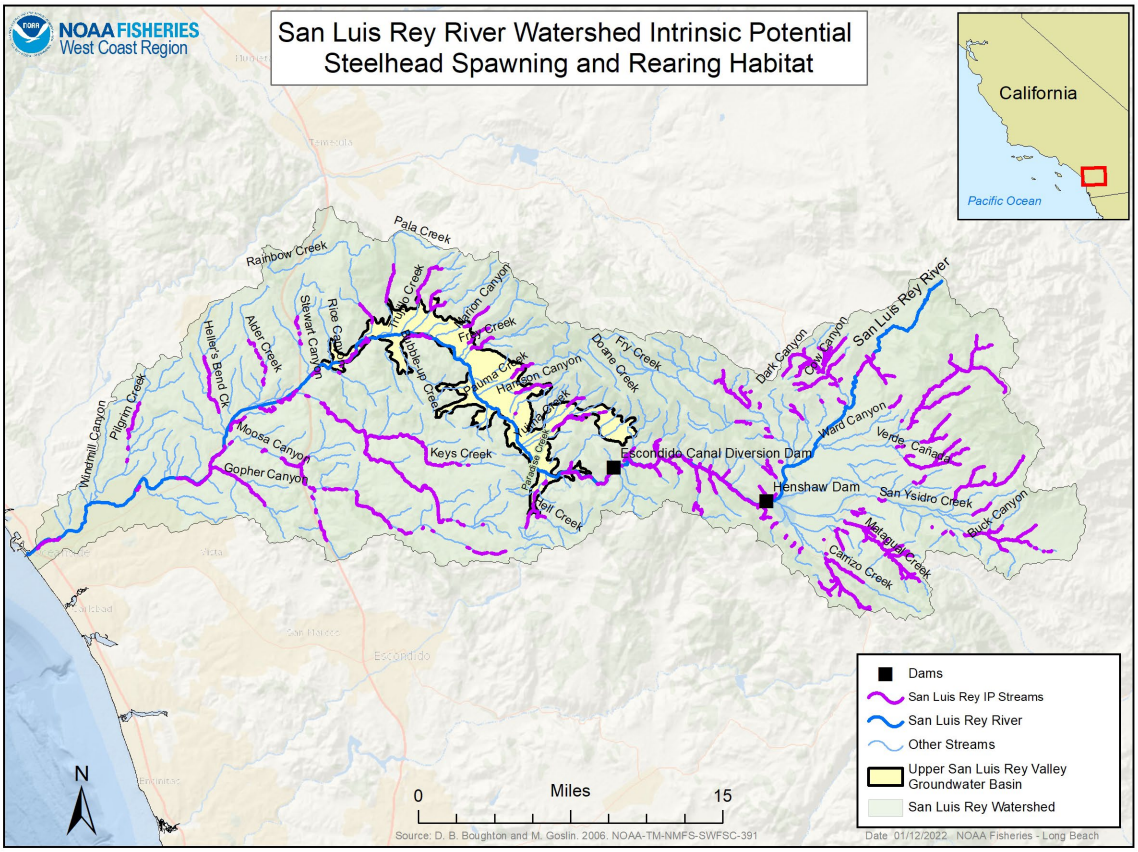

Figure 1. San Luis Rey River Watershed Intrinsic Potential Steelhead Spawning and Rearing Habitat. Black line depicts the boundaries of the Upper San Luis Rey River Valley Groundwater Basin.

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 San Luis Rey 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

porous flood plain and alluvial material representing valley fill. . . . Alluvial sediments in valleys are generally thickest under the San Luis Rey River. . . . The Pauma and Pala Subbasins are hydraulically connected, with groundwater from the upgradient Pauma Subbasin flowing into Pala Subbasin." p. 08, *passim.*

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) and surface hydrologic connection between the mainstem and tributaries (*e.g*., Pala Creek and Pauma Creek) 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 San Luis Rey River watershed. As part of this responsibility, NMFS developed the Southern California Steelhead Recovery Plan (NMFS 2012)[2]. 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 San Luis Rey River watershed (NMFS 2012, pp. 13-1 through 13-20).

To address the identified threats to endangered steelhead in the San Luis Rey River Watershed, NMFS' Southern California Steelhead Recovery Plan identifies a number of recovery actions targeting groundwater extraction (NMFS 2012, Table 8-1, pp. 8-5 – 8-6, and Table 13-8, pp. 13-45). These include[3]:

SLR-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)

SLR-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.

[2] 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.

[3] NMFS' Southern California Steelhead Recovery Plan also contains specific recovery actions dealing with the management of surface water diversion operations and the provision of fish passage at dams and diversions (*e.g*., Henshaw Dam and Escondido Diversion) on the San Luis Rey River; *see*, SLR-SCS-4.1, SLR-SCS-4.2, and SLR-SCS-4.3.

Because the SGMA requires that a GSP must account for GDE, which include steelhead, a GSP should reasonably account for the recovery needs of endangered steelhead in the San Luis Rey River. As explained more fully in these comments, the proposed draft GSP does not reasonably account for GDE, including endangered steelhead. The GSP for the Basin is an important mechanism for implementing specific steelhead recovery actions for the San Luis Rey River watershed and should include specific provisions as noted below.

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 (Brunke and Gosner 1977, Heath 1983, 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 San Luis Rey River and tributaries (See, for example, Table 9-2, p. 9-15 in NMFS 2012).

Exploitation of the groundwater resources within the San Luis Rey River watershed appears to have lowered groundwater levels causing reduction 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 San Luis Rey River watershed (Hunt & Associates Biological Consulting Services 2008, Kier Associates and National Marine Fisheries Service 2008, *see* also California Department of Fish and Wildlife's [CDFW] letter to Yuima Municipal Water District, January 6, 2022).

The development and operation of groundwater and surface water supply facilities *(e.g.*, Henshaw Dam and the Escondido Diversion) throughout the Basin are integral in the management of the water resources of the San Luis Rey River. These facilities have altered the natural surface flow and groundwater recharge patterns in the San Luis Rey River watershed, from the headwaters to the Pacific Ocean (Geoscience 2021). Unless the Draft GSP is revised to reflect the operation of these integral components of the groundwater management program for the San Luis Rey 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.

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 support steelhead migration during the winter and spring, and juvenile rearing year round, including volitional movement of juveniles to perennial stream reaches. 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 San Luis Rey River, the integrally related surface water diversion/groundwater extraction program) are avoided (Heath 1983, California Department of Water Resources 2016, Belin 2018, CDFW 2019).

Finally, 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 the 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).

Specific Comments on the Draft GSP

Section 1.0 Introduction

Page 1-1 – 4.

The Draft Plan acknowledges:

> "For groundwater basins designated as medium or high priority, SGMA requires . . . Groundwater Sustainability Plan (GSP) that considers the interests of all beneficial uses and users of the groundwater basin. p.1-1.

However, the Draft Plan does not specifically identify instream recognized beneficial uses, and focuses primarily on out-of-stream consumptive beneficial uses. The Draft GSP should be revised to explicitly acknowledge the instream beneficial uses supported by the Basin, including the GDE affected by groundwater extraction from the Basin, including the lower San Luis Rey River and estuary. The recognized instream beneficial uses for the portion of the Upper San Luis Rey River Valley within the Basin include warm

freshwater habitat, cold freshwater habitat, and wildlife habitat.[4] We also note that the 1994 and 2021 update of the San Diego Water Quality Control Plan did not take into account the southern California Steelhead, whose range was extended from the Santa Monica Mountains south to the U.S. Mexico border in 2002 (67 FR 21568).
The Draft GSP recognized only GDE associated with several vegetation types (principally riparian woodlands). This underrepresents the known function and value of the river reach within the Basin for adult and juvenile endangered southern California steelhead. Steelhead may use the entire reach of the San Luis Rey River within the Basin for completing their life-cycle. See Figures 1 and 2 for a depiction of the intrinsic potential steelhead habitat within the San Luis Rey River watershed, including the Upper San Luis Rey Valley. See also the additional comments below regarding the GDE areas identified in the Basin.

Section 2.0 Plan Area

Section 2.3 General Plan and Related Land Use Planning

Pages 2-13 – 15.

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

Section 2.4.8 Groundwater Dependent Ecosystems

Page 2-18.

The Draft GSP only notes that:

> "The USLRRCD [Upper San Luis Rey River Resource Conservation District] has several conservation easements for Arroyo Toads in the USLR Valley Groundwater Subbasin, but these habitat areas are primarily dependent on seasonal surface water and the vernal pools created after storm events." p. 2-18.

There are additional GDE within the Basin not addressed in the Draft GSP. See additional comments below under Section 3.3.3.4, "Interconnected Surface Water Systems and Groundwater Dependent Ecosystems".

Section 3.0 Basin Setting

Pages 3-1 – 26.

[4] Table 2-2. Beneficial Use of Inland Surface Waters, San Water Quality Control Plan (1994; updated S 2021). pp. 40-45.

The San Luis Rey 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). The SGMA 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. In effect, an intermittent drying condition does not preclude a reach of stream or river from being considered as an interconnected surface water.

The Draft GSP does not adequately recognize the potential role of groundwater in the Basin, including the lower San Luis Rey River and estuary, for ensuring suitable aquatic habitat to supporting different life-history phases of steelhead, or other aquatic species. Further, groundwater-management activities within the San Luis Rey River watershed involve the Vista Irrigation District's water impoundment at Henshaw Dam and the downstream Escondido Diversion operations on the mainstem of the San Luis Rey River. The relationship between these impoundment and diversion activities and groundwater extraction along the affected reaches of the San Luis Rey River (including tributaries and the estuary) should be addressed in the revised Draft GSP.

Section 3.3.4.4 Interconnected Surface Water Systems and Groundwater Dependent Ecosystems

Pages 3-20 – 21.

The Draft GSP does not accurately characterize sensitive fish and wildlife species known to occur in the Upper San Luis Rey River.

The Draft GSP asserts that:

> "The California Department of Fish and Game reported that riparian vegetation adjacent to the river may have historically supported large populations of wildlife, but no records of fish and wildlife existing in the river prior to construction of Henshaw Dam (in 1922) were found in the Department of Fish and Game files (Case Study Report #76)." p. 0-13.

Additionally, the Draft GSP asserts that:

> "Since the construction of the [Henshaw] dam, flows between the dam and Escondido Canal are unlikely sufficient to support fishery habitat."

Neither of these characterizations of the fish and wildlife resources of the San Luis Rey river watershed is supported by reliable field studies (only a limited desktop search). Further, the general characterization ignores the potential for other types of aquatic

species, including invertebrates, which are an important food source for fish, including steelhead, and amphibians.

The identification and depiction of GDE should be based on both historic and contemporary field investigations employing standard surveying techniques for different types of aquatic and riparian species. See, for example, the CDFW's *O. mykiss* survey for Pauma Creek (Barabe 2021), and the CDFW's letter of January 6, 2022 to Amy Reeh for a description of the fish and wildlife species supported by the San Luis Rey River. Steelhead and native trout have been documented in the San Luis Rey River watershed and vicinity since at least the 1870s (Cooper 1874, Suckley 1874, Jordan and Gilbert 1880, 1881, Eigenmann 1890, Eigenmann and Eigenmann 1890); *see,* Swift *et al*. (1993), and Spence (2019) for a discussion of these early observations. In 1946, Hubbs reported native trout abundant in streams near Smith Mountain (now Palomar Mountain) and Pala Creek in the headwaters of the San Luis Rey watershed, and anglers reporting steelhead catches in the San Luis Rey River (Hubbs 1946).

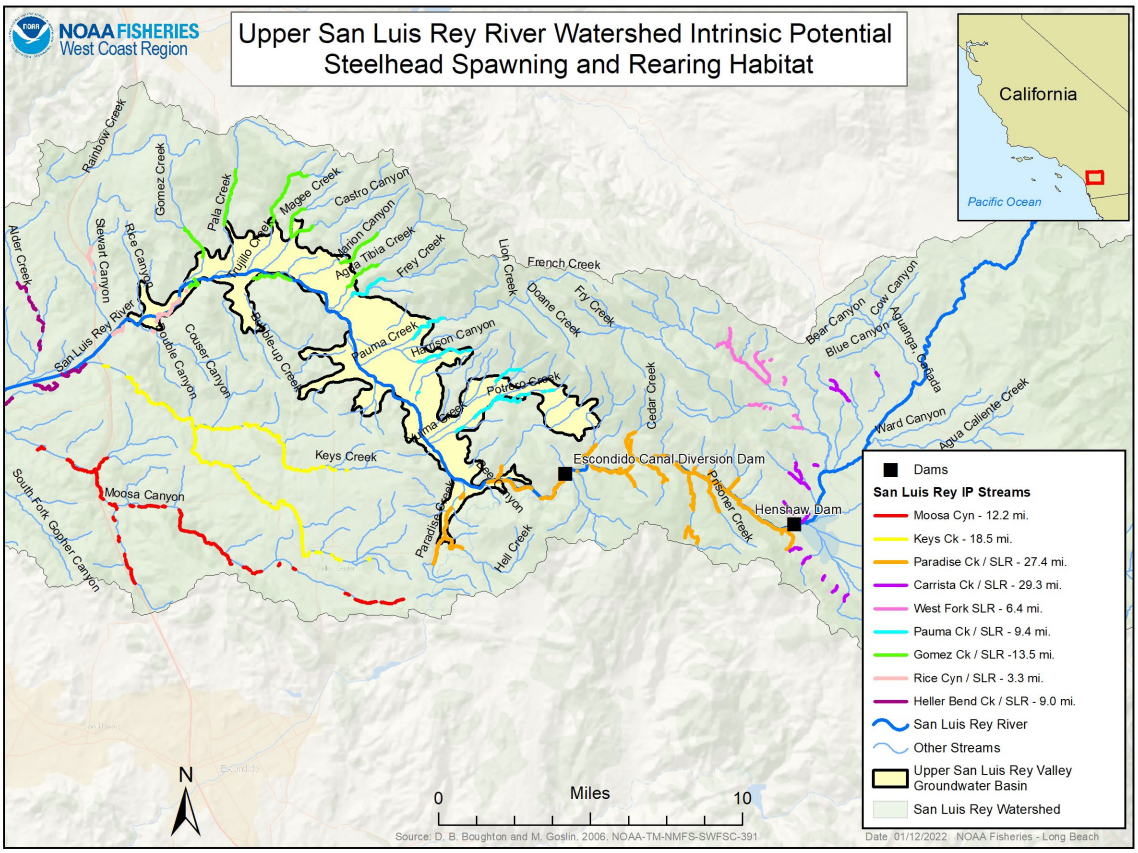

Figure 2. Intrinsic Potential Steelhead Spawning and Rearing Habitat with the boundaries of the Upper San Luis Rey Valley Groundwater Basin. Black line depicts the boundaries of the Upper San Luis Rey River Valley Groundwater Basin.

In 2007, the CDFW personnel reported an adult steelhead in the lower section of the San Luis Rey River (Kajtaniak *et al.* 2007) documenting the continued use of the San Luis Rey River watershed by the federally listed endangered southern California steelhead.

Additionally, two populations of rainbow trout (*Oncorhynchus mykiss*) - Pauma Creek and West Fork - persist within the San Luis Rey River watershed (Barabe 2019, 2020). Significantly, the population in the West Fork is one of the few remaining *O. mykiss* populations at the extreme southern end of California that contains significant native coastal steelhead ancestry (Abadia- Cardozo *et al.* 2016). All of these populations could be impacted by groundwater extraction, as well as related surface water impoundments and diversions from the San Luis Rey River watershed. Furthermore, the drawdown of groundwater may affect the retention of sufficient flows for fish movement between the tributaries and mainstem of the San Luis Rey River, as well as steelhead migration into and through the San Luis Rey River; for a detailed discussion of the San Luis Rey River watershed and its steelhead habitats, *see,* Kajtaniak and Downie (2010), also, Bottroff (N.d.), CDFW 1997.

Regarding the use of the San Luis Rey River by the federally listed southern California steelhead, we would note that the NMFS' 2012 Southern California Steelhead Recovery Plan (NMFS 2012) identifies the San Luis Rey River as a Core 1 steelhead recovery population. Core 1 populations are assigned the highest priority for recovery actions based on a variety of factors, including: the intrinsic potential of the population in an unimpaired condition; the role of the population in meeting the spatial and/or redundancy viability criteria; the current condition of the populations; the severity of the threats facing the populations; the potential ecological or genetic diversity the watershed and population could provide to the species; and the capacity of the watershed and population to respond to the critical recovery actions needed to abate those threats (NMFS 2012; *see* also, attached San Luis Rey River Steelhead Watershed briefing memo, Capelli 2010).

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.

Section 3.3.5.5 Water Budget Information

Pages 3-22 – 37.

The SGMA regulations require that the historical surface water and groundwater budget be based on a minimum of 10 years of historical data. The Draft GSP notes that:

> "Land and water use will remain predominantly agricultural and projected residential increase are expected to have negligible effect on overall water demand. Therefore, the projected water budges was evaluated using the average pumping and associated return flows from the past 5 years (2016 through 2020, and average hydrological conditions using historical precipitation from 1991 through 2020, repeated twice to provide a 60-year projection" p. 3-29.

This time-period encompasses an historic drought and its use as a baseline unavoidably skews the assessment of groundwater conditions to lower groundwater levels, and related characterization of GDE within the San Luis Rey River (Seager *et al*. 2015, Luo *et al.*

2017, Ulrich *et al*. 2018). If this time-period is used, it should therefore be accompanied by a discussion of the drought conditions and their effects on groundwater conditions, as well as GDE, including but not limited to steelhead spawning and rearing habitat, and other aquatic species dependent on interconnected surface water.

Additionally, the Draft GSP does not refer to or account for the effects of the operation of the operation of the Henshaw Dam or the downstream Escondido Diversion on the upper San Luis Rey River. This storage and diversion operation affects recharge to the Basin, as well downstream groundwater basins of the San Luis Rey River. These operations have the potential to affect endangered adult and juvenile steelhead in the San Luis Rey River watershed and estuary (NMFS 2012).

The Draft GSP should therefore include as part of its water-budget analysis the operations of the Henshaw dam and Escondido Diversion and their relation to the groundwater extraction program in the Basin. Specifically, the relationship of groundwater management activities (including both recharge and groundwater extraction activities) and the effects of the related Escondido Diversion on surface flows below the impoundment and diversion and the maintenance of surface flows supported by groundwater and related GDE, including steelhead spawning and rearing habitat, should be explicitly addressed in the revised Draft GSP.

4.0 Sustainable Management Criteria

Pages 4-1 – 13.

4.2 Sustainability Goal

The Draft GSP states that:

> "The result of the water balance analysis (from 1991 through 2020) indicates that the sustainable yield for the USLR Subbasin is approximately 12,700 acre-ft/yr." p. 4-2.

The Draft GSP further indicates that:

> "The sustainability goal for the USLR Subbasin is to manage and preserve its groundwater resource as a sustainable *water supply*." (emphasis added) p. 4-2

This analysis and conclusion only addresses the out-of-stream, consumptive uses of the groundwater resources of the Basin, and does not explicitly take into account the instream beneficial uses or GDE of the San Luis Rey River, including the federally listed endangered southern California steelhead or other aquatic species.
The Draft GSP does not adequately recognize the important relationship between groundwater levels and the surface flows (particularly base flows) or water quality parameters (such as water temperature, dissolved oxygen, *etc*.) that contribute to the

maintenance of GDE within the Basin (including the lower San Luis Rey River and estuary). The revised Draft GSP should include a specific analysis that addresses these other instream beneficial uses and GDE.

4.3.3. Degradation of Water Quality

Page 4-7 – 8.

The Draft GSP recognizes that:

> "Degraded water quality can impair water supply and affect human health and the environment." p. 4-7.

However, the Draft GSP does not adequately recognize the important relationship between groundwater levels and the surface flows (particularly base flows) or water quality parameters (such as water temperature, dissolved oxygen, *etc*.) that contribute to the maintenance of GDE within the Basin (including the lower San Luis Rey River and the estuary).

4.4 Minimum Thresholds

4.4.1 Chronic Lowering of Groundwater Levels

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 (2015) 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 principally 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.

The revised Draft GSP should identify minimum thresholds that would effectively protect identified GDE, including potential steelhead rearing habitat within the San Luis Rey River watershed. See additional comments below under Section 4.5, "Measurable Objectives".

4.5 Measurable Objectives

Pages 4-11 – 13.

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 width, 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.

Monitoring Networks

Page 5-1 – 2.

The existing monitoring network is aimed primarily at addressing out-of-stream consumptive beneficial uses of groundwater within Basin.

There is little in the monitoring program that specifically addresses the potential effects of groundwater extractions on GDE within the San Luis Rey River or estuary. This limited monitoring appears to reflect the lack of recognition of GDE within the Basin used by the endangered southern California steelhead or other aquatic species, that may affected by groundwater extractions from the Basin. One of the most significant data gaps is the rate of surface flow under base-flow conditions, including diurnal changes in flow. Because of their relatively small size and dependence on hyporheic flows and groundwater levels, these flows should be measured in a way that records their seasonal and diurnal fluctuations, and should be a major focus of current and future modeling efforts.

The groundwater-monitoring plan only expressly 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 would 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.

Finally, 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.

In addition to the recommended changes to the monitoring network identified in the Draft GSP, the Draft GSP should incorporate the best available GDE-related monitoring techniques, *e.g.*, the TNC's shallow groundwater estimation tool (TNC 2021), the U.S. Geological Survey data on mapped springs/seeps (USGS 2019), and a comparison of recent groundwater level contours to vegetation root zones (2019) to support GDE such s riparian and instream vegetation associated with surface waters.

6.0 Projects and Management Actions

Pages 6-1 – 11.

None of the project and management action specifically deal with the protection of instream beneficial uses associated with the GDE of the Basin; the term steelhead or reference to any specific species of fish does not appear in this or any of the section of the Draft GSP. However, as noted above, the Basin contains interconnected surface water and GDE, including spawning and rearing habitat for the federally listed endangered southern California steelhead, as well as other aquatic species. See comments above, and Figures 1 and 2, regarding the extent of steelhead habitat within the San Luis Rey River watershed, including within the boundaries of the Basin.

7.0 Plan Implementation

Page 7-1 -6.

The Draft GSP describes the Plan Implementation as a:

> "conceptual road map to start implementing the GSP over the first five years". p. 7-1.

The Implementation Plan largely provides basic administrative guidance (*e.g.*, projected costs, periodic 5-year evaluations, sustainability evaluation, largely expressed in groundwater elevations, periodic reconsideration of GSP elements, *etc*.). There are no specific provision for addressing on-going and projected adverse impacts on GDE stemming from groundwater extractions from the Basin, or the related water impoundments and diversions by the Vista Irrigation District facilities on the San Luis Rey River. This deficiency is rooted in the failure to adequately characterize GDE, including, but not limited to, potential steelhead spawning and rearing habitat as well as habitat for other aquatic species.

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April 14, 2010

TO: File

From: Mark H. Capelli, South-Central/Southern California Steelhead Recovery Coordinator

Re: **San Luis Rey River**

San Luis Rey River contains a significant amount of steelhead spawning habitat.

NOAA Fisheries' TRT assessed the *intrinsic potential* of each of the watersheds in the Southern California Steelhead DPS to support an independently viable population of steelhead.

This habitat assessment was based principally on the amount of over-summering habitat (in an unimpaired state), using a suite of physical, hydrological, and biological characteristics (e.g., mean annual summer flow, stream gradient, mean annual summer temperature, valley width, etc.) which were correlated with the presence of native *O. mykiss*.

Based on this assessment, the San Luis Rey River ranked 6th out of a total of 46 watersheds within the Southern California DPS. The assessment has been confirmed by a recently completed "San Luis Rey Watershed Assessment" by the California Department of Fish and Game.

San Luis Rey River currently supports native steelhead.

There are historic and contemporary records of anadromous steelhead occurring in the San Luis Rey River, There are contemporary records of rearing *O. mykiss* in the lower tributaries of the San Luis Rey River (below the Escondido Diversion and rock waterfall in the upper San Luis Rey River gorge), and in the West Fork of the upper San Luis Rey River (above Henshaw Dam). As with most southern California watersheds there are no systematic on-going fish monitoring surveys, though they would likely document additional occurrences of anadromous and non-anadromous *O. mykiss* in the San Luis Rey River watershed.

A majority of the over-summering steelhead habitat in the San Luis Rey River exists *downstream* of the rock waterfall in the upper San Luis Rey River gorge.

The upper San Luis Rey River gorge and a number of tributaries draining Palomar Mountain maintain perennial flows which provide spawning and over-summering habitat for both native anadromous and non-anadromous *O. mykiss*. The presence of native *O. mykiss* in the upper watershed, above the rock waterfall, Escondido Diversion, and Henshaw Dam suggests that the upper portions of the watershed were also periodically accessible to anadromous *O. mykiss*.

San Luis Rey River is essential for the recovery of the Southern California Steelhead DPS.

The San Luis Rey River is one of the southernmost major watersheds in the Southern California Steelhead DPS, and contributes significantly to the ecological diversity (not replicated in more northern watersheds, including the Santa Margarita River) necessary for the long term viability of the Southern California Steelhead DPS.

There are only a limited number of watersheds in the southern portion of the DPS capable of meeting the DPS-wide viability criteria for the Southern California Steelhead DPS, and none of them exhibit the combination of size and ecological diversity of the San Luis Rey River.

Designation of the San Luis Rey River as a Core 1 Population within the Santa Catalina Coast Biogeographic Population Group is consistent with similar designations of other Population Groups of the DPS.

The designation of Core 1, 2, and 3, populations is intended to provide general guidance to stakeholders on where to focus recovery efforts (not rank the absolute value of the watershed). The Core 1 designation of the San Luis Rey River is based on a number of considerations, including the size of the watershed (which is reflected in its ecological diversity, amount of habitat, and overall intrinsic potential), the role of the population in the overall recovery strategy, and the threats to the watershed.

Restoration of Core 1, 2, and 3 Populations are necessary to fully meet the recovery goals, including de-listing, of the Southern California Steelhead DPS. Changing its rank would not be consistent with its intrinsic potential ranking, or change its role in meeting the DPS-wide viability criteria of the Southern California Steelhead Recovery Plan.

Challenges to the recovery of San Luis Rey River's anadromous steelhead are not unique, or insuperable.

Re-establishing volitional passage (at some level) between the ocean and headwater spawning and rearing tributaries is a challenge in virtually every major watershed within the Southern California Steelhead DPS (as well as the South-Central and Central Valley Steelhead DPSs).

Successfully addressing this central issue is closely allied with other challenges to manage coastal watersheds to meet a variety of environmental and social objectives, including restoring water quality, preserving open space, and protecting other federally and state listed species.

Recovery actions in the Southern California Steelhead Recovery Plan are general, and not mandatory or prescriptive.

All the recovery actions dealing with fish passage barriers and flows are intentionally couched in broad terms. Each major recovery action will require extensive discussions with stakeholders (and site-specific field investigations) to identify the most appropriate design and strategy, prior to implementation of the recovery action. This approach provides stakeholders significant additional opportunity to participate in the crafting of watershed and site specific recovery actions, including those for the San Luis Rey River.

NOAA Fisheries is only in the initial phases of steelhead recovery in California.

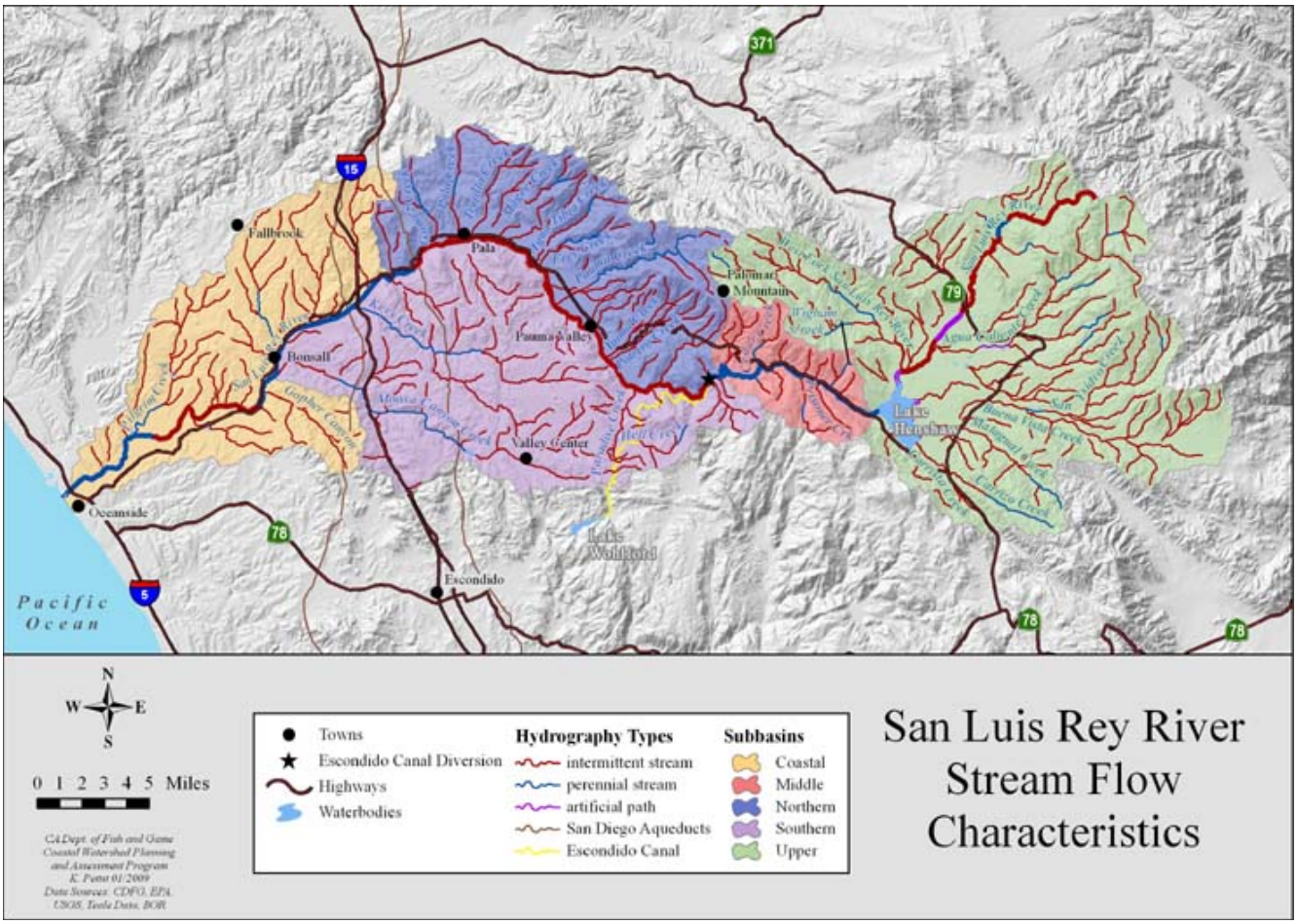
The Southern California Steelhead Recovery Plan identifies the basic biological objectives, and indicates where and what types of recovery actions need to be undertaken to recover the species to the point where it is no longer endangered or threatened, and may be down or delisted. The Recovery Plan provides the first comprehensive, though not the final, direction on recovery of the Southern California Steelhead DPS.

Recovery Plans must be based on the best available scientific and commercial data concerning the species.

The Southern California Steelhead Recovery Plan has utilized the best scientific information (there is no relevant commercial data) developed

or assembled by NOAA Fisheries' TRT, staff, and consultants. Through this process the Recovery Plan identifies the threats to the species, the species' basic biological needs, and the general types of recovery actions that will provide the most likely chance of recovery, and ultimately de-listing of the Southern California Steelhead DPS.

The ESA does not generally provide for the consideration of economic factors in the *development* of Recovery Plans. However, the voluntary *implementation* of recovery actions may well reflect a variety of considerations, and refinement of the broad recovery actions identified in the Recovery Plan can be expected to identify the most feasible and cost-effective recovery actions necessary to achieve the biological goals and objectives of the Recovery Plan.



San Luis Rey River Watershed

West Fork San Luis Rey River above Henshaw Dam 4-14-08

West Fork San Luis Rey River *O. mykiss* (c. 6") above Henshaw Dam 4-14-08

San Luis Rey River immediately above Henshaw Dam and Reservoir 8-26-09

Henshaw Dam and Reservoir on San Luis Rey River 8-26-09

San Luis Rey River below Henshaw Dam, above Escondido Diversion 8-27-09

Escondido Diversion on the San Luis Rey River 8-27-09

San Luis Rey River between Escondido Diversion and rock waterfall 8-27-09

San Luis Rey River rock waterfall (note flow through crevasse on right) 8-27-09

San Luis Rey River gorge below rock waterfall and Escondido Diversion 8-27-09

Pauma Creek, tributary to lower San Luis Rey River 1-18-08

Gomez Creek *O. mykiss* (c. 15") 9-18-05

Lower San Luis Rey River at Benet Bridge (note setback levee on right) 8-26-09

Lower San Luis Rey levee trail at Douglas Bridge 8-26-09

San Luis Rey River Trail at North River Toll Bridge 8-26-09

San Luis Rey River Parkway Project at North River Toll Bridge 8-26-09

San Luis Rey River Estuary before removal of road culvert 4-12-07

San Luis Rey River Estuary after installation of vehicular bridge 8-26-09

San Luis Rey River adult steelhead (c. 21-24”) 6.7 miles above the mouth 5-2-07