

Attachment No. 1

To Application to Appropriate Water

Yolo County Flood Control & Water Conservation District's Proposal for a Temporary Water Right Permit to Divert Winter Flows to Groundwater Recharge

Background on Cache Creek Watershed

As background, Cache Creek begins at the outlet of Clear Lake and has two main tributaries: North Fork Cache Creek and Bear Creek. The District owns the Cache Creek Dam, which is located on Cache Creek approximately five miles downstream of the outlet from Clear Lake; the Dam is operated by the District in accordance with the Solano and Gopcevic Decrees. The District also owns and operates the Indian Valley Dam on the North Fork Cache Creek, which forms the Indian Valley Reservoir. Bear Creek drains the area to the east of the North Fork Cache Creek and flows into the main stem of Cache Creek at the border of Colusa and Yolo Counties.

Cache Creek flows easterly from Clear Lake into Yolo County, and it continues through the Capay Valley until it reaches the Capay Diversion Dam, where some flows may be diverted into the District's irrigation system. Cache Creek continues easterly from the Capay Diversion Dam, until it reaches in an area known as the Cache Creek Settling Basin, just west of the Yolo Bypass. The Cache Creek Settling Basin is the Cache Creek terminus point (see Map 1 on page 2).

The Cache Creek Settling Basin was originally built in 1938 to control sediment deposition and protect sediment loading to the Yolo Bypass. In 1993, the Settling Basin was enlarged to its current sediment management capacity of 30,000 cfs; the Basin is bound by levees on all sides and encompasses roughly 3,600 acres. The current weir release elevation is 32.5 feet; the length and height of the weir are 1,740 feet and 12 feet, respectively.

Winter runoff from rainstorms results in flows in Cache Creek. Peak flows usually pass through the basin within a day or two while recessionary flows can last for many days or months following a significant runoff event.

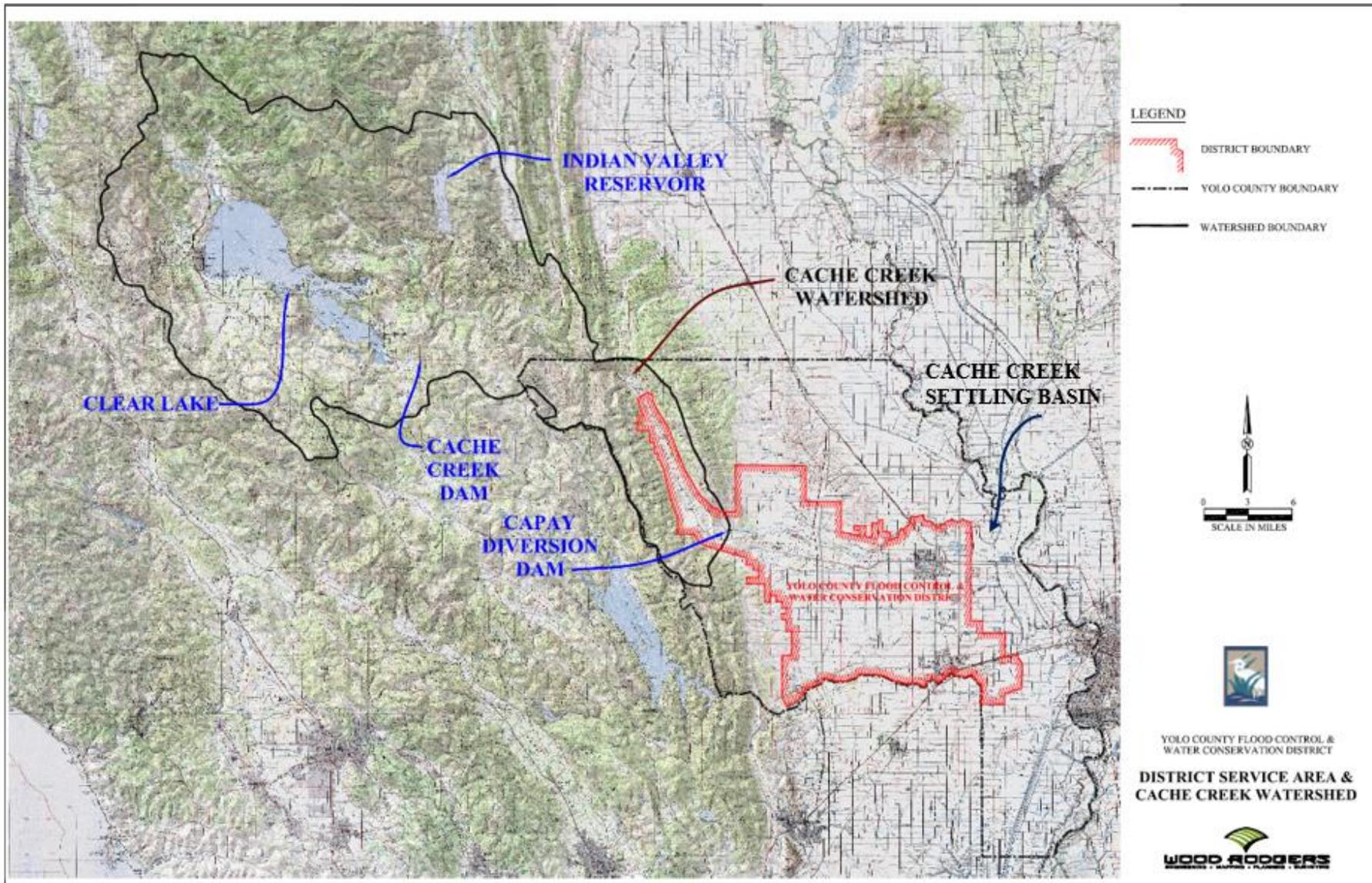
Cache Creek is considered an intermittent stream; prior to development of dams within the watershed there was no hydraulic continuity to the Sacramento River during the summer months. Approximately 40% of the watershed is uncontrolled.

3. Project Description

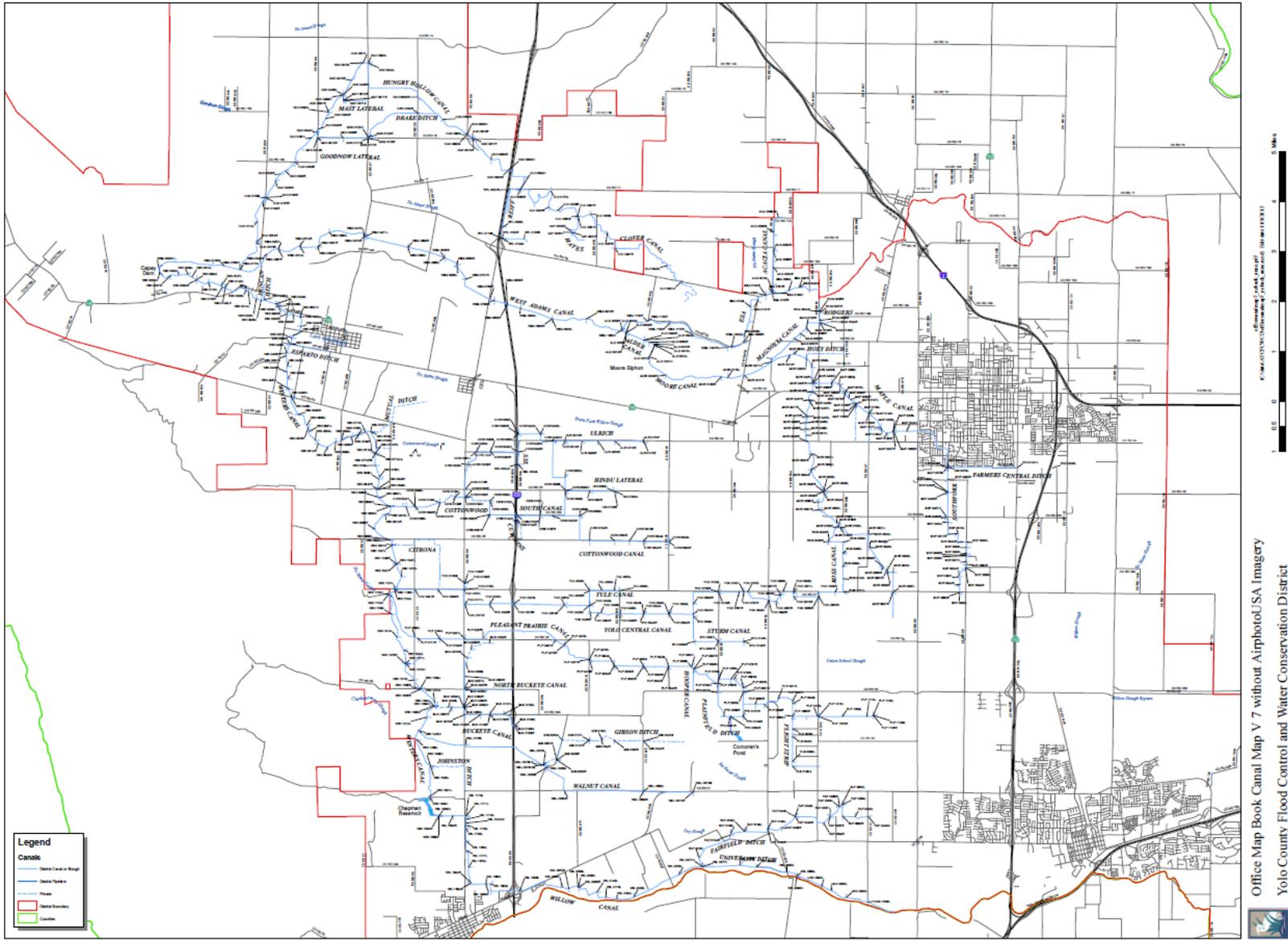
The Yolo County Flood Control & Water Conservation District (District) is filing this application for a temporary water right permit with the State Water Board's Division of Water Rights to request temporary diversion of available high flows on Cache Creek. The purpose of the proposed temporary permit is to provide for the diversion of surface water at the Capay Diversion Dam for groundwater recharge within the District's service area.

The District proposes to utilize its existing 160-mile unlined canal system for the diversion and percolation of surface water from Cache Creek for underground storage and later recovery for irrigation purposes. The District proposes to divert up to 40,000 acre-feet of high water flows for groundwater recharge through the District's unlined canal system. In addition to the District's 160-mile unlined canal system up to 50,000 acres of agricultural lands may be used for surface groundwater recharge. The ultimate beneficial use of the recovered underground storage water will be irrigation.

Up to 200 cubic feet per second (cfs) of surface flow will be diverted from Cache Creek at the existing Capay Diversion Dam structure through the headgates of the Winters Canal and West Adams Canal. Groundwater recharge will include seepage through the unlined canals associated with conveyance of surface flows, and once conveyed, spreading on agricultural land. The District will notify existing landowners of the intent to divert available high surface water flows to agricultural lands and will request those interested in participating to contact the District. The Winters Canal system will be used to convey water to lands within the District south of Cache Creek. The West Adams Canal system will be used to convey water to lands within the District primarily along the north side of Cache Creek (see Map 2 on page 3). The District's supervisory control and data acquisition (SCADA) system will be used to monitor and report water diversions and groundwater levels will be monitored as part of the District's ongoing program. Diversions and groundwater recharge will



Map 1. Cache Creek Watershed and District Boundaries



Map 2. District Canal System

begin as soon as the permit is issued and will continue for up to 180 days. Groundwater extraction and crop irrigation will occur at the start of the irrigation season.

The District intends to allow peak sediment-laden flows to pass through before diverting available recessionary surface water flows for groundwater recharge.

Potential Impacts to Downstream Users

Diversions will only occur at times when, absent the District's diversions under the temporary permit, there is no hydraulic continuity between Cache Creek and the Yolo Bypass or when hydraulic continuity does exist and the Delta is in Excess.

No Hydraulic Continuity

When there is no hydraulic continuity, the downstream users between the Capay Diversion Dam and the Cache Creek Settling Basin could potentially be impacted. To ensure that the District's diversion of high water flows will not result in injury to any lawful water user from the point of diversion to the Cache Creek Settling Basin, the District will at all times bypass a minimum of 20 cfs at the Capay Diversion Dam. This bypass flow is based on the USGS records for flows in Cache Creek at the Rumsey gage located approximately 16 miles upstream of the Capay Diversion Dam. The average daily flow at the Rumsey gage for the month of November 2015 was approximately 18 cfs. Bypassing flows at the Capay Dam will assure continuous flow between Rumsey and the Yolo gauge when the District is diverting water under the Temporary Permit.

Hydraulic Continuity

When there is hydraulic continuity and Cache Creek flows are overtopping the Settling Basin weir, the Yolo Bypass downstream users could potentially be impacted. There are several operational variabilities that must be considered when investigating the nature of flows at the Cache Creek Settling Basin; these include the existing capacity of and water levels in the Settling Basin, how the contiguous gates are controlled by Conaway, and whether or not the nearby storm drain is causing backwater into the Settling Basin flow gages. Since there is considerable uncertainty, the District plans to learn more during this temporary permit process by monitoring flows on a real-time basis, maintaining direct communication with Conaway, frequently visiting gage locations, and operating accordingly. This exercise will afford additional data and information on the behavior of Cache Creek flows through the Settling Basin and the impact of diversions on water right holders, and ultimately, the Yolo Bypass in times of hydraulic continuity.

The Yolo Bypass near Woodland gage (YBY) is located upstream of the point at which inflow from Cache Creek would enter Tule Canal (the main source of supply to the Delta when flood flows from the Sacramento River are not spilling into the Yolo Bypass at the Fremont Weir). Records for the Yolo Bypass gage show flows from the Colusa Drain provide significant contribution to the flow in the Tule Canal following storm events.

Cache Creek flows are insignificant in comparison to the flows observed at the YBY gage, the recent storm event that occurred January 17 – January 20 supports this claim. As shown in Figure, the red and green lines (or Settling Basin spill gages) are much smaller relative to the blue line (YBY gage). Therefore, the flows observed at the Settling Basin outflow are inconsequential relative to the Yolo Bypass gage flows during this storm.

**USGS 11452800 CACHE C OVERFLOW WEIR FROM SETTLING BAS NR WOOD'LD
USGS 11452900 CACHE C OUTFLOW FROM SETTLING BASIN NR WOODLAND CA
USGS 11453000 YOLO BYPASS NR WOODLAND CA**

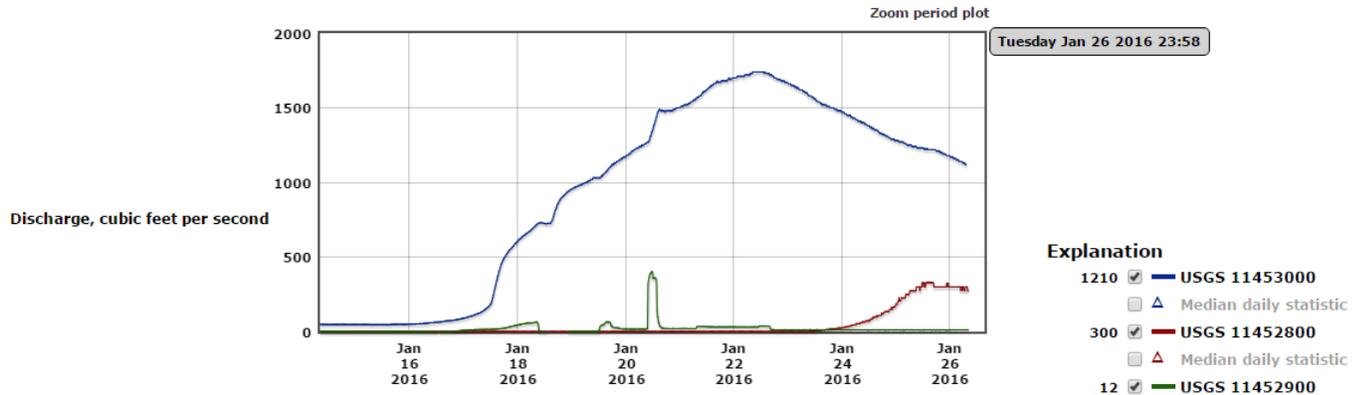


Figure 1. Yolo Bypass near Woodland Gage and Outflow and Overflow Weir at Settling Basin Gages (January 14 – January 26, 2016)

When examining historical daily average data at the YBY and Cache Creek Settling Basin gages, Cache Creek flows appear to contribute approximately 20% of the total flow found in the Yolo Bypass. The District examined the daily average gage data from January 1, 2012 to January 25, 2016 at the YBY (USGS 11453000) gage and the Cache Creek Overflow and Outflow at the Settling Basin (USGS 11452800 and 11452900) gages. After QA/QC of the data, 461 days were determined adequate for estimating the contributions of Cache Creek inflows to the Yolo Bypass. Of the 461 days, 34% of the time (or 156 days) the flows at the Settling Basin Weir were observed to be overtopping the weir. Of those 156 days, Cache Creek flows accounted for, on average, approximately 20% of the flows that would be in the Bypass directly below the convergence of the flows from the YBY and Cache Creek Settling Basin gages.

Based on the data currently available the District proposes to initially protect the downstream water users in the Yolo Bypass based on the estimated 20% Cache Creek flow contribution until more data is available. The District proposes to monitor flow conditions in real-time using the Cache Creek Settling Basin gages and the YBY gage and will visit gage locations recurrently to ground truth data output and to observe the aforementioned uncertainties. The District will adjust operations as necessary to ensure the downstream users in the Yolo Bypass are not impacted during the period of diversions when hydraulic continuity exists and the Delta is not in Excess Condition.

The District intends to use this temporary permit process to learn more about the District's conjunctive management system, along with the relationship between Cache Creek and the Yolo Bypass. The District will be responsive to any claims of impact brought forward by downstream water users and will modify operations and diversions at Capay Dam as needed.

To determine whether the diversion under the Temporary Permit is the reason for lack of connectivity with the Tule Canal, the District will monitor the flows at the Rumsey gage, the Yolo gage, and the Cache Creek Settling Basin gages. The District will work with DWR in using the Settling Basin rating curve to estimate what the water level at the Settling Basin would have been given the amount of water diverted at the Capay Diversion Dam (diversions up to 200 cfs). The proposed operation conditions for the permit terms are discussed in further detail below.

Proposed Operation Conditions / Permit Terms

There are times when Cache Creek is not hydraulically connected to the Tule Canal and the Sacramento-San Joaquin River Delta. Therefore, the Yolo County Flood Control and Water Conservation District (District) proposes two potential operation scenarios under the Temporary Permit:

- 1) the first, for periods when there is no hydraulic continuity between Cache Creek and the Tule Canal, and

- 2) the second, for periods when hydraulic continuity does exist.

Scenario 1 – No Hydraulic Continuity

At times when, absent diversion by the District at the Capay Diversion Dam, flows from Cache Creek would not reach the Tule Canal, diversions under the Temporary Permit would have no impact on water users downstream of where Cache Creek enters the Tule Canal. In order to address concerns regarding potential impacts to water users and instream flows between Capay Dam and the Settling Basin (as measured at the USGS Yolo gage), the District reviewed the SWRCB's eWRIMs database to water right water right holders within this reach. Three holders of water rights were identified and contacted by the District to discuss the Temporary Permit. In order to address potential impacts to instream uses the District proposes the following when diversions are being made under the Temporary Permit:

- Bypass a minimum of 20 cfs at the Capay Diversion Dam
- District will monitor the reach from Capay Dam to the Yolo gage to assure a live stream exists within this reach
- Bypass flows will be increased by reducing diversions under the Temporary Permit if necessary to maintain a live stream and a minimum flow of 20 cfs at the Yolo gage
- The District will monitor the flows at the Rumsey gage and the Yolo gage, and the flow and water levels at the Cache Creek Settling Basin Spill to determine whether hydraulic continuity exists or would exist absent diversions under the Temporary Permit. The determination will be based on the following
 - ✓ existing water levels in the Settling Basin;
 - ✓ expected water level in the Settling Basin absent diversions under the Temporary Permit, which will be based on the existing water level prior to diversions under the Temporary Permit; and
 - ✓ the assumption that all of the water diverted under the Temporary Permit at Capay Dam would reach the Settling Basin (this assumption provides a conservative estimate of the impacts of the diversions under the Temporary Permit due to the losses between Capay Dam and the Settling Basin).
- If the increase would result in spill at the Settling Basin, the District will evaluate whether the spill would be sufficient to reach the Tule Canal and thence the Delta. If yes, continuity would exist and Scenario 2 would transpire.

Scenario 2 – Hydraulic Continuity Exists

At times when hydraulic continuity between Cache Creek and the Tule Canal would exist absent the diversions under the Temporary Permit, the District's requested diversion has the potential to impact water users downstream of the Cache Creek Settling Basin in the Yolo Bypass and the Delta. Therefore, SWRCB staff have indicated a need for bypass flow requirements when hydraulic continuity between Cache Creek and the Yolo Bypass exists.

Fremont Weir Spilling

- At times the Fremont Weir is spilling and the Delta is in Excess Condition sufficient flows exist to satisfy the water rights in the Yolo Bypass and there would be no impact to the Projects or other water users in the Delta.

Fremont Weir Not Spilling

- The Delta is *not* in Excess Condition:

The Tule Canal is the main source of supply when flood flows from the Sacramento River are not spilling into the Yolo Bypass at the Fremont Weir. The Tule Canal is hydraulically connected to the Colusa Basin Drain (Colusa Drain) via the Knights Landing Ridge Cut. DWR maintains a stream gage on the Knights Landing Ridge Cut near Knights Landing: Ridge Cut Slough at Knights Landing (RCS). Records for RCS and the Yolo Bypass near Woodland Gage (YBY) show flows from the Colusa Drain provide significant contribution to the flow in the Tule Canal following storm events. The YBY gage is located upstream of the point at which inflow from Cache Creek would enter the Tule Canal. Any bypass flow requirement should be limited to Cache Creek's contribution to the

flow in the Tule Canal below the Yolo Bypass gage. The District will bypass flows at Capay Diversion Dam to ensure that an amount equal to 20% of the flow allotments of water users in the Yolo Bypass downstream of the Cache Creek Settling Basin reaches the Yolo Bypass. This bypass flow may be adjusted as more information becomes available concerning the contribution of Cache Creek flows to the total flow available for meeting the Yolo Bypass water users' allotments.

- The Delta is in Excess Condition, diversions under the Temporary Permit following storm events would have no impact on water users in the Yolo Bypass or the Delta

Criteria for Approving Temporary Water Right Permit Request

Water Code §1425(b) requires that the State Water Board make the following findings before issuing a temporary permit:

1. Applicant has an urgent need for the water proposed to be diverted and used.
2. Water may be diverted and used without injury to any lawful water user.
3. Water may be diverted and used without unreasonable effect on fish, wildlife, and other instream resources.
4. Proposed diversion and use are in the public trust.

The District's proposed temporary permit addresses each of these required findings as identified below:

1. The applicant has an urgent need for the water proposed to be diverted and used.

On November 13, 2015, the Governor signed Executive Order B-36-15 that called for additional actions to continue the state's drought response efforts. In E.O.B-36-15, the State Water Board is directed to prioritize temporary water rights permits to accelerate approvals for projects that enhance the ability of local agencies to capture high precipitation events for local storage or recharge and later beneficial uses.

Water Code §1425(c) provides that an "urgent need" exists when the Board may, in its judgment, conclude that the proposed temporary diversion and use is necessary to further the constitutional policy that the water resources of the state be put to beneficial use to the fullest extent of which they are capable and that waste of water be prevented. An urgent need for the requested temporary permit exists in order to increase the yield of available water supplies and enhance water reliability during the drought conditions that are facing the State of California, and in particular the Cache Creek watershed, as a result of the recent and ongoing drought. Flows in Cache Creek have a large seasonal and annual variability: flood flows in the basin are primarily caused by runoff during high intensity rainstorms during winter and spring. Climatologists have predicted a strong El Nino for the first few months of 2016 and the intent of E.O.-B-36-15 was to facilitate efforts to capture the high-intensity storm and flood flows that El Nino is forecasted to bring to California.

During normal water years, the District is responsible for delivering annually, on average, 225,000 acre-feet of surface water supplies from Clear Lake and Indian Valley Reservoir to about 100,000 acres of agriculture in its service area. In 2014, the District had no water to release from its reservoirs and the Board of Directors declared a drought emergency. When surface water deliveries are curtailed, many of the District's water customers pump groundwater instead. This increased pumping when combined with low recharge exacerbates falling groundwater levels. Declines in groundwater levels of more than 10 feet can be seen from 2014 to 2015. The difference in annual groundwater levels is directly related to the difference in annual surface water deliveries. There have been a number of agricultural and rural domestic wells that have ran dry and required drilling deeper into the aquifer because of the current drought. The proposed temporary permit is intended to increase groundwater levels and alleviate impacts of the drought in the area of the District.

Bulletin 118 identifies four groundwater basins within Yolo County: Colusa, Capay Valley, Solano, and Yolo. DWR has identified the Yolo subbasin as a high priority basin, and the Colusa and Solano subbasins as medium priority basins. The proposed recharge areas would overlie the Yolo and Colusa subbasins.

For many years, the District has worked towards modernizing the water canal delivery system to better prepare for and respond to drought and flood conditions, and to increase water supply reliability through improved conjunctive water use management. To optimize beneficial use of water, particularly following precipitation events that may occur in the first quarter of 2016, the District proposes to divert up to 200 cfs at the Capay Diversion Dam for conveyance through the District's canal system and spreading on lands of existing customers for groundwater recharge.

2. Water may be diverted and used without injury to any lawful water user.

In order to assure the proposed temporary permit for groundwater recharge will not result in injury to any other lawful user of water, the diversions of high flows at Capay Diversion Dam will occur when one of the following conditions exists 1) there is no hydraulic continuity between Cache Creek and the Yolo Bypass, Sacramento-San Joaquin River Delta, or 2) when there is hydraulic continuity and the Delta is in Excess Condition. These conditions are described further below.

Due to the configuration of the Cache Creek Settling Basin, there are times when there is no connectivity between Cache Creek and Sacramento-San Joaquin River Delta. Based on a review of eWRIMS, there are two riparian claims and one permitted point of diversion between Capay Diversion Dam and the Cache Creek Settling Basin during the season of this proposed temporary permit; Howald Farms (S015676), Payne Farms (S015943), and Conaway Preservation Group (A026695). According to eWRIMS, the irrigation season for Howald Farms, Payne Farms, and Conaway Preservation Group begins April 1, May 1, and April 15, respectively. The District has discussed the project with two of three¹ downstream users that may be impacted during the proposed diversion period, and the District has received their consent for moving forward with the project. Also, the District plans to bypass a minimum of 20 cfs at the Capay Diversion Dam. Therefore, diversions under the proposed temporary permit at times when the flow in Cache Creek would not reach the Sacramento-San Joaquin Delta, absent diversion by the District, would not injure any other legal user of water.

There are also times when the flow at Capay Diversion Dam, absent the District's proposed diversion, results in hydraulic continuity between Cache Creek and the Sacramento-San Joaquin Delta. Under this condition there is potential that the District's diversion under the proposed temporary permit could impact legal water users downstream. Therefore, when the flow in Cache Creek is sufficient that hydraulic continuity exists with the Sacramento-San Joaquin Delta, the District would only divert water at times when the Delta is in Excess Condition.

The District has discussed the proposed operation under the temporary permit with the representatives of the Department of Water Resources (DWR) and the United States Bureau of Reclamation (USBR) as well as representatives of the State Water Contractors and they have identified no issue if there is no connectivity with the Delta or if there is connectivity and the Delta is in Excess Condition. **As of January 27, 2016, the Delta is in Excess Condition, and given the predicted El Nino storm events, will likely continue to be in Excess Condition through the end of March.**

Based on the above, there will be no adverse downstream effects and there will be no injury to other legal water users.

3. Water may be diverted and used without unreasonable effect upon fish, wildlife, or other instream beneficial uses.

The District has met with MaryLisa Lynch at the California Department of Fish and Wildlife (CDFW) and has provided information on the proposed project. The District has not heard back on CDFW's concerns or what term conditions they will propose; however, the District understands that CDFW is okay with the temporary permit moving forward.

A benefit of the project will be the strategic winter flooding of crop fields for feeding waterfowl and shorebirds during migration, preserving habitat along the Pacific Flyway.

4. Proposed diversion and use are in the public interest.

The proposed temporary permit will improve efficiencies within the District's water management program by capturing surface water flows for groundwater recharge. Yolo County is mainly dependent on groundwater (with the exception of the City of West Sacramento), which demonstrates the competing rural interests. This project will ensure sustainable groundwater management by maximizing the available groundwater storage capacity and increasing the safe yield available to existing and future groundwater users. The proposed diversion will optimize beneficial uses of water for irrigation, and therefore, the proposed diversion is in the public interest to preserve the water supply under the present drought conditions.

¹ The District was unable to get in touch with Howald Farms (S015676). Contact information used for the three water right holders between the Capay Diversion Dam and the Cache Creek Settling Basin are 1.) Payne Farms (Bill Payne) (530) 681-1437; 2.) Howald Farms (Frank Howald) (530) 662-6571; and 3.) Bob Thomas (Conaway Preservation Group, LLC): (916) 812-6627.

The District's conjunctive water use program has been vetted by the Westside Integrated Regional Water Management Plan and is aligned with Action Items 2, 5, 6, 8, and 9 of the Governor's California Water Action Plan.

The District intends to use this temporary permit process to learn more about the District's conjunctive management system, specifically, the recharge capability of the canals and the operational limitations of the system during the winter season. The District plans to enhance or improve operations during this project to maximize the available groundwater to constituents and to ensure sustainable groundwater management, overall. Additionally, the District and farmers will collaborate during this project and will cooperatively learn what the timing and crop restrictions are associated with flooding of agricultural lands for groundwater recharge purposes.

Based on the above, the proposed temporary water right permit meets the criteria for approving temporary permit requests. In addition, the temporary diversion of water from the Capay Diversion Dam will optimize the beneficial use of water within the Cache Creek watershed by strengthening the District's conjunctive water use program and implementing sustainable groundwater management practices within Yolo County.

6. Water Availability

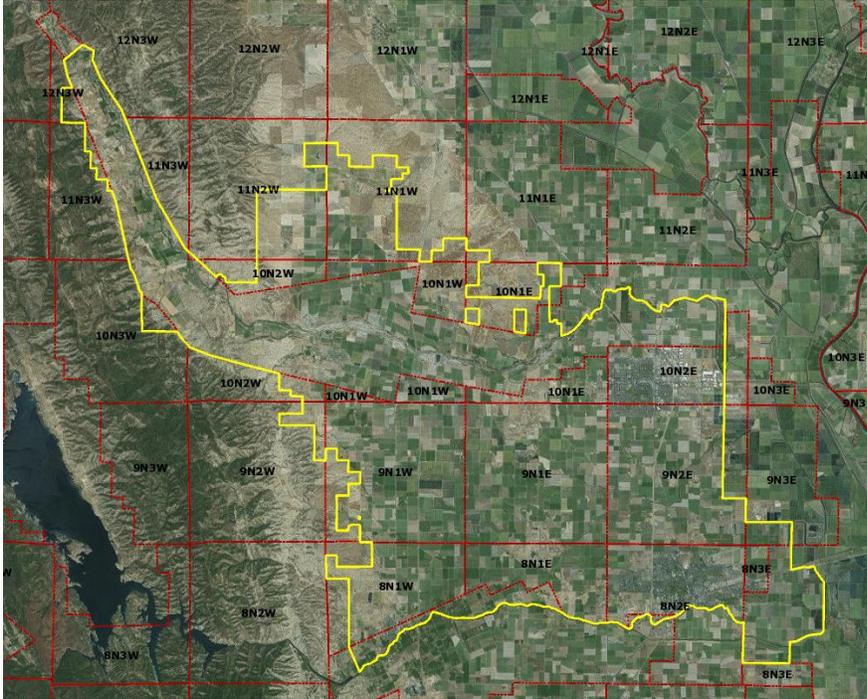
There is reasonable likelihood that unappropriated water is available for the proposed appropriation since diversion of water would only occur during high flow events in the Cache Creek watershed. The District intends to allow early sediment-laden flows to pass through before capturing available surface water for groundwater recharge. Forty percent of the runoff within the Cache Creek watershed occurs below the existing dams and is unregulated flow. Historical water investigations for water projects within the Cache Creek watershed below the existing dams have determined a firm yield of 100,000 acre-feet as available water for storage (Borcalli et al., 1984). The proposed diversion would be less than half of that estimated firm yield and would potentially minimize problems of flooding, bank erosion, and sedimentation. The maximum diversion capacity at Capay Diversion Dam is 800 cubic feet per second.

References

- Borcalli, Ensign, & Buckley, Consulting Engineers. *Cache Creek Watershed, Investigations for Water Project Development*. November 1984.
- Conant, Roger N. *Preliminary Report on the Storage Possibilities of the Waters of Cache Creek Basin, California*. May 1921.
- Flynn, Hugh Francis. *A Report upon the Possible Water Supply of Cache Creek for Irrigation*. April 1942.
- U.S.A.C.E. *Cache Creek Basin, Data for Technical Conference*. July 1975.
- Wales Jr., Thomas E. *Determination of the Availability of Water*. July 1967.
- Wallace, L.T. *An Analysis of Selected Alternatives for Supplemental Water to the Yolo County Flood Control and Water Conservation District*. May 1968.

7. Place of Use

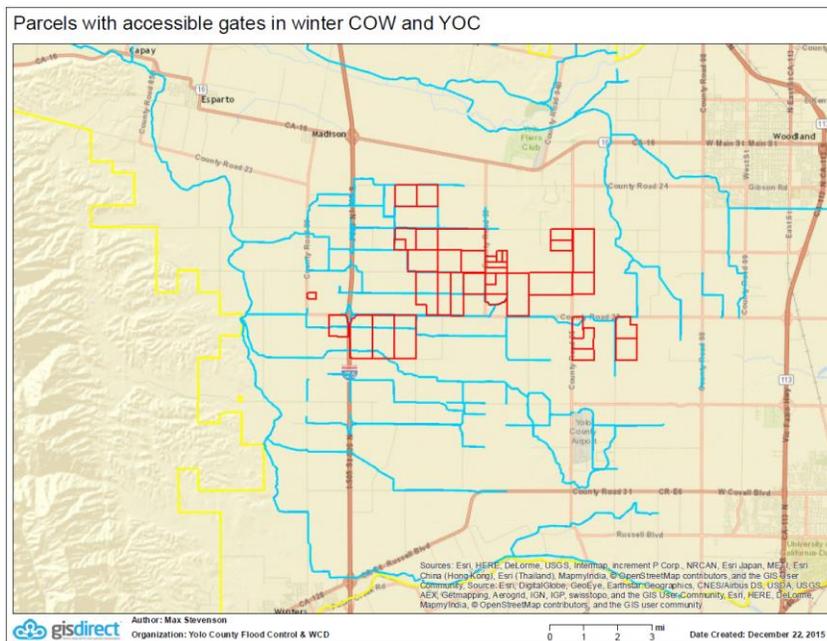
The ultimate place of use for groundwater stored under the proposed temporary permit are the lands within the District's boundaries as shown on the map below and on the maps on file with the SWRCB under Applications A011389 and A015975.



Map 3. Place of Use: Section Township Range

Applied Surface Water for Groundwater Recharge – List of Potential APNs

The District plans to send out a notice soliciting interested landowners to contact the District for applying surface water flows onto agricultural lands for groundwater recharge. The map below would also be submitted in the reporting to spatially display the place of use.



Map 4. Potential Parcels for Surface Water Application (parcels shown in red and canals shown in blue)

9. Justification of Amounts Requested: Crops to be Irrigated

As previously identified, on an average annual basis the District provides approximately 225,000 acre-feet of surface water to approximately 100,000 of mixed crop types within its boundaries. The 40,000 AF of recharge water requested under this temporary permit will augment the District's available surface water deliveries in 2016. The District will use the existing groundwater monitoring system to ensure that the first 40,000 acre-feet of groundwater pumped on agricultural lands within District boundaries is the surface water that percolated into the aquifer below the Yolo and Colusa subbasins.

12. Right of Access: Potential List of Affected Landowner Names and Addresses

The District has easements that define its responsibilities for operations and maintenance of the canals. The District intends to solicit landowners interested in applying surface water flows onto agricultural lands for groundwater recharge to contact the District. Agreements will be entered into with those landowners expressing interest in participating in the temporary groundwater recharge program. A list of the participating landowners will be provided to the State Water Board.

18. Environmental Document

E.O. B-36-15 suspended CEQA for temporary permits diverting high precipitation events for groundwater recharge. An NOE has been filed with the County Clerk's Office for the County of Yolo and a copy of the NOE and proof of payment will be provided to the State Water Board.

21. Environmental Setting

Complete sets of photographs will be provided once the District has identified landowners that will be participating in the 2016 groundwater recharge program. The aerial view of the proposed point of diversion is shown below.



Photograph 1. Aerial View of the Capay Diversion Dam