Appendix B2

State Water Resources Control Board,
documents regarding
Water Rights License 13877

STATE OF CALIFORNIA
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

RIGHT TO DIVERT AND USE WATER

APPLICATION 12578 PERMIT 10658 LICENSE 13877

Right Holder:

Solano County Water Agency
Solano Irrigation District
Maine Prairie Water District
City of Vacaville
City of Fairfield
City of Vallejo
City of Suisun
California Department of Corrections
Regents of the University of California
c/o 810 Vaca Valley Parkway, Suite203
Vacaville, CA 95688

The State Water Resources Control Board (State Water Board) authorizes the diversion and use of water by the right holder in accordance with the limitations and conditions herein SUBJECT TO PRIOR RIGHTS. The priority of this right dates from **September 27, 1948**. This right is issued in accordance with the State Water Board delegation of authority to the Deputy Director for Water Rights (Resolution 2012-0029) and the Deputy Director for Water Rights redelegation of authority dated July 6, 2012. This right supercedes any previously issued right on **Application 12578**. The right holder has made proof, to the satisfaction of the State Water Board, of the quantities of water put to beneficial use during the authorized development schedule.

The Deputy Director for Water Rights finds that: (a) the change will not operate to the injury of any lawful user of water; (b) good cause has been shown for the change; (c) the petition does not constitute the initiation of a new right; and (d) the State Water Board has made the required findings pursuant to the California Environmental Quality Act (CEQA) or the project is exempt from CEQA.

The State Water Board has complied with its independent obligation to consider the effect of the proposed project on public trust resources and to protect those resources where feasible. (National Audubon Society v. Superior Court (1983) 33 Cal.3d 419 [189 Cal.Rptr. 346, 658 P.2d 709].)

Right holder is hereby granted a right to divert and use water as follows:

1. Source of water: **Putah Creek**

   Tributary to: **Yolo By-Pass**

Within the Counties of **Solano and Yolo**

2. Location of points of diversion

By California Coordinate System of 1983 in Zone 2	40-acre subdivision of public land survey or projection thereof	Section (Projected)*	Township	Range	Base and Meridian
Monticello Dam **North 1,948,789 feet and East 6,532,057 feet**	**SW¼ of NE¼**	**29**	**8N**	**2W**	**MD**
Putah Diversion Dam **North 1,940,989 feet and East 6,559,557 feet**	**SW¼ of SE¼**	**31**	**8N**	**1W**	**MD**

3. Purpose of use	4. Place of use					
	40-acre subdivision of public land survey or projection thereof	Section (Projected)*	Township	Range	Base and Meridian	Acres
Domestic, Municipal, Industrial, Irrigation, Frost Protection, Recreational	**428,300 acres in Yolo and Solano Counties within T2N to T8N, R5W to R4E, MDB&M.**					
Fish and Wildlife Enhancement	**29-miles of Putah Creek stream channel between Monticello Dam and the Sacramento River Deep Water Ship Toe Drain within T8N, R2W to R2E, MDB&M**					
Recreational	**Lake Berryessa within T7N to T10N, R2W to R5W, MDB&M**					

The place of use is shown on map 413-208-1484A dated February 9, 2009, filed with the State Water Board.

5. The water appropriated shall be limited to the quantity which can be beneficially used and shall not exceed **450 cubic feet or foot per second by direct diversion to be diverted from February 1 to November 15 of each year. The maximum amount diverted under this right shall not exceed 58,899 acre-feet per annum.**

(0000005A)

6. The total amount taken from the source (collection to storage plus direct diversion) under this license, and the water rights pursuant to Applications 11199 and 12716 shall not exceed **999,031 acre-feet per annum.**

(000005Q)

7. The maximum amount placed to beneficial use (withdrawal from storage plus direct diversion) under this license, and the water rights pursuant to Applications 11199 and 12716 shall not exceed **401,286 acre-feet per annum.**

(0000114)

8. The total maximum quantity of water delivered for consumptive use under this license (withdrawal from storage plus direct diversion), together with that delivered under the water rights pursuant to Applications 11199 and 12716 shall not exceed **250,000 acre-feet** in any one year.

(0000114)

9. Licensee shall operate the Solano Project to comply with the release and instream flow requirements specified in Exhibits E-1, E-2, and E-3 (attached). These requirements are the same as the release and instream-flow requirements specified in the Second Amended Judgments in the Putah Creek Water Cases, Judicial Council Coordination Proceeding No. 2565, Sacramento County Superior Court.

Notwithstanding the above license requirement, the State Water Board shall not pursue an action or proceeding for enforcement or violation of this condition based on a violation or violations of one or more of the minimum mean daily flow requirements established in Exhibit E-1 section A.(2), B.(2), C.(1), C.(2), C.(3), C.(4), and D.(3), or one or more of the minimum instantaneous flow requirements established in Exhibit E-1 sections A.(2), B.(2), C.(1), C.(2), C.(3) and C.(4), provided that:

1. The Solano Project was being operated to comply with the release and instream flow requirements in Exhibits E-1, E-2, and E-3; and

2. The violation of the minimum mean daily flow requirement in Exhibit E-1, section A.(2), B.(2), C.(1), C.(2), C.(3), C.(4) or D.(3), or the minimum instantaneous flow requirement in Exhibit E-1, section A.(2), B.(2), C.(1), C.(2), C.(3) or C.(4) was solely the result of an unanticipated and unforeseeable increase in a diversion or diversions from, or reduction in an inflow or inflows into, Putah Creek downstream of the Putah Diversion Dam, by some person or entity besides U..S. Bureau of Reclamation, the Solano County Water Agency or the Solano Irrigation District, and the increase or reduction occurred so rapidly that the Solano Project could not reasonably maintain compliance by increasing the releases from the Putah Diversion Dam in Lower Putah Creek; and

3. The 4-day running mean flow at the relevant compliance point equaled or exceeded the applicable minimum mean daily flow; and

4. The instantaneous flow at the relevant compliance point was not more than 5 cubic feet per second less than the applicable minimum mean daily flow if the violation occurred during the period from January through July, and was not more than 3 cubic feet per second less than the applicable minimum mean daily flow if the violation occurred during the period from August through December.

The dedication of water to instream flow is not intended to affect any obligation imposed pursuant to the existing water rights for the Solano Project to provide protection to downstream prior rights and to provide percolation from the stream channel of Putah Creek to the extent that would occur in the absence of the Solano Project. Water required pursuant to the flow regime set forth in Attachment E-1 over and above the amounts of water required to meet existing obligations for percolation and downstream prior rights is dedicated to instream flows pursuant to Water Code section 1707. Water dedicated to the environment pursuant to Water Code section 1707 is not available for appropriation.

The Licensee shall electronically report to the State Water Board: (a) daily records of diversions to Putah South Canal, (b) daily records of flows past the Putah Diversion Dam, (c) daily records of the quantity dedicated to the environment, pursuant to the 1707 petition, and (d) records of depth to groundwater in the spring of each year for the area influenced by Putah Creek between mile 4.0 and mile 11.0. The requirement to record depth to groundwater may be discontinued upon a showing, to the satisfaction of the Deputy Director for Water Rights, that further groundwater elevation monitoring is not needed.

No credit shall be given for the 1707 petition flows unless the required documentation is timely submitted.

Licensee shall allow authorized representatives of the State Water Board reasonable access to the project works and properties for the purpose of gathering information and data.

(0510900)

10. Licensee shall release water into Putah Creek channel from Monticello Reservoir and past the Putah Diversion Dam in such amounts at such times and rates as will be sufficient, together with inflow from downstream tributary sources, to supply downstream diversions of the surface flow under vested prior rights to the extent water would have been available for such diversions from unregulated flow, and sufficient to maintain percolation of water from the stream channel as such percolation would occur from unregulated flow, in order that operation of the project shall not reduce natural recharge of groundwater from Putah Creek.

The State Water Board reserves continuing authority over the license to: (1) determine if the schedule of releases required herein provides adequate protection to downstream prior rights and provides percolation from the stream channel of Putah Creek to the extent that would occur in the absence of the Solano Project, (2) make further orders that may be necessary concerning proper releases of water, and (3) impose conditions providing for additional measurements or studies that may be necessary for a final determination to be made.

(0500300)

11. This license is subject to post-October 29, 1945 appropriative water rights in the Putah Creek watershed above Monticello Dam which (1) are licensed for the use of water perfected as of December 31, 1995, pursuant to the March 10, 1995, Condition 12 Settlement Agreement, or (2) are perfected after December 31, 1995, provided the holders of such rights have subscribed, subscribe, or are otherwise subject to the provisions of the March 10, 1995, Condition 12 Settlement Agreement.

(0500300)

12. If it is determined after license issuance that the as-built conditions of the project are not correctly represented by the map(s) prepared to accompany the application, licensee shall, at his expense have the subject map(s) updated or replaced with equivalent as-built map(s). Said revision(s) or new map(s) shall be prepared by a civil engineer or land surveyor registered or licensed in the State of California and shall meet the requirements prescribed in section 715 and sections 717 through 723 of the California Code of Regulations, Title 23. Said revision(s) or map(s) shall be furnished upon request of the Chief, Division of Water Rights.

(0000030)

THIS LICENSE IS ALSO SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

Reports shall be filed promptly by the right holder on the appropriate forms which will be provided for the purpose from time to time by the State Water Board.

Right holder shall allow representatives of the State Water Board and other parties, as may be authorized from time to time by the State Water Board, reasonable access to project works to determine compliance with the terms of this right.

Pursuant to Water Code sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this right, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the State Water Board may be exercised by imposing specific requirements over and above those contained in this right with a view to eliminating waste of water and to meeting the reasonable water requirements of right holder without unreasonable draft on the source. Right holder may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this right and to determine accurately water use as against reasonable water requirement for the authorized project. No action will be taken pursuant to this paragraph unless the State Water Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the State Water Board also may be exercised by imposing further limitations on the diversion and use of water by right holder in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the State Water Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution article X, section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust.

The quantity of water diverted under this right is subject to modification by the State Water Board if, after notice to the right holder and an opportunity for hearing, the State Water Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the State Water Board finds that: (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges.

This right does not authorize any act which results in the taking of a threatened or endangered species or candidate species or any act which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a "take" will result from any act authorized under this water right, right holder shall obtain authorization for an incidental take prior to

construction or operation of the project. Right holder shall be responsible for meeting all requirements of the state or federal Endangered Species Acts for the project authorized under this right.

If construction or rehabilitation work is required for the diversion works covered by this right within the bed, channel, or bank of the affected water body, right holder shall enter into a streambed or lake alteration agreement with the State Department of Fish and Wildlife. Right holder shall submit a copy of the agreement, or waiver thereof, to the Division of Water Rights prior to commencement of work. Compliance with the terms and conditions of the agreement is the responsibility of the right holder.

Water Code section 1629. Every licensee, if he accepts a license, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefore shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Water Code section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Water Code section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

STATE WATER RESOURCES CONTROL BOARD

James W. Kassel

for *Barbara Evoy, Deputy Director*
Division of Water Rights

Dated: MAY 28 2013

Attachments: Exhibits E-1, E-2 and E-3

Exhibit "E-1"

Solano Project Releases and Instream Flows for Lower Putah Creek

Diversions under the rights issued pursuant to Applications 11199, 12578 and 12716 are not authorized unless the flows set forth in this exhibit are met.

A. Rearing Flows ((1), (2) & (3) all shall be maintained)

(1) Licensee/Permittee shall, for each month as set forth below, maintain mean daily releases from the Putah Diversion Dam to Creek downstream of the Putah Diversion Dam (hereinafter "lower Putah Creek") that are equal to or in excess of the following rates, expressed in cubic feet per second ("cfs"):

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean Daily release (cfs)	20	25	25	25	16	26	46	43	43	43	34	20

These mean daily releases shall be measured at the Putah Diversion Dam and made from the Putah Diversion Dam into lower Putah Creek immediately downstream of the Putah Diversion Dam. The instantaneous releases at the Putah Diversion Dam shall at all times equal or exceed ninety percent (90%) of the applicable mean daily release requirement.

(2) Licensee/Permittee shall, for each month as set forth below, release sufficient water from the Putah Diversion Dam into lower Putah Creek immediately downstream of the Putah Diversion Dam to maintain mean daily flows in lower Putah Creek that are equal to or in excess of the following rates, expressed in cubic feet per second ("cfs"):

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean Daily Flows (cfs)	5	10	10	15	15	25	30	20	15	15	10	5

These mean daily flows shall be maintained and measured at or in the near vicinity of the

Interstate 80 Bridge. The instantaneous flow at the Interstate 80 Bridge shall at all times equal or exceed ninety percent (90%) of the applicable mean daily flow requirement.

(3) Licensee/Permittee shall at all times of the year release sufficient water from Putah Diversion Dam to lower Putah Creek to maintain a continuous flow of surface water in Putah Creek from the Old Davis Road Bridge to the western boundary of the Yolo Bypass, identified as River Mile 0.0 on trial exhibit number 41 in the *Putah Creek Water Cases,* Judicial Council Coordination Proceeding No. 2565.

B. Spawning Flows ((1), (2) & (3) all shall be maintained)

(1) At a time between February 15 and March 31 of every calendar year, Licensee/Permittee shall release a three-consecutive-day pulse of water from the Putah Diversion Dam into lower Putah Creek equal to or in excess of the following rates:

(a) 150 cfs for the first 24 hours;

(b) 100 cfs for the second 24 hours; and

(c) 80 cfs for the third 24 hours.

Licensee/Permittee may, in its discretion, time this pulse so as to utilize any uncontrolled flows that may provide some or all of the water needed to comply with this requirement.

(2) In every year, for the 30 days that follow the three-day pulse release described in paragraph B.(1), Licensee/Permittee shall release sufficient water from the Putah Diversion Dam into lower Putah Creek to maintain a mean daily flow equal to or in excess of 50 cfs at the Interstate 80 Bridge. During this period, the instantaneous flows at the Interstate 80 Bridge shall at all times equal or exceed 45 cfs.

(3) In every year, at the conclusion of the 30th day of the 50 cfs spawning flows described in subsection B.(2), Licensee/Permittee then shall ramp down the controlled release from the Putah Diversion Dam gradually over a seven-day period until the flows are in compliance with the applicable requirements set forth in subsections A.(2), A.(3), C.(3) and C.(4) of this Exhibit "E-1".

C. Supplemental Flows ((1), (2), (3) & (4) all shall be maintained)

The requirements set forth thus far herein are intended to protect the aquatic and related resources found in lower Putah Creek. In addition to maintaining these resources, Licensee/Permittee shall provide supplemental flows in an attempt to enhance the aquatic and related resources of lower Putah Creek above that baseline. Accordingly:

(1) Licensee/Permittee shall, during the period from November 1 through December 15 of each calendar year, release sufficient water from Putah Diversion Dam to lower Putah Creek to maintain a mean daily flow of at least 5 cfs, and an instantaneous flow of at least 2 cfs, at the point where Putah Creek discharges into the Toe Drain on the eastern side of the Yolo Bypass (the "East Toe Drain").

(2) Beginning sometime between November 15 and December 15 of each calendar year, Licensee/Permittee shall release sufficient water from Putah Diversion Dam to lower Putah Creek to maintain a mean daily flow of at least 50 cfs, and an instantaneous flow of at least 45 cfs, for five consecutive days at the point where Putah Creek discharges into the East Toe Drain. If a flash board dam is present on Putah Creek near the East Toe Drain during that period, and if the flash boards are removed during that period, then to the extent feasible the first day of the 50 cfs pulse flow at the East Toe Drain shall follow the removal of the flash boards. The precise timing of the initiation of the 50 cfs pulse flow shall be set each year by the

Lower Putah Creek Coordinating Committee (the "LPCCC") established in accordance with section III of the Second Amended Judgments in the *Putah Creek Water Cases*, Judicial Council Coordination Proceeding No. 2565. The objective of the LPCCC shall be to time the release so as to maximize the potential for such flows to attract anadromous fish into Putah Creek. If the exact date of releases has not been established or agreed upon by the LPCCC, then the releases dealt with in this subparagraph shall commence on December 1 of the affected calendar year.

(3) Beginning on the sixth day after initiation of the above described 50 cfs pulse flow, and continuing each day thereafter through March 31, Licensee/Permittee shall release sufficient water from Putah Diversion Dam to lower Putah Creek to maintain a mean daily flow of at least 19 cfs, and an instantaneous flow of at least 14 cfs, at I-80.

(4) Beginning on April 1 of each calendar year, and continuing each day thereafter through May 31, Licensee/Permittee shall release sufficient water from Putah Diversion Dam to lower Putah Creek to maintain a mean daily flow of at least 5 cfs, and an instantaneous flow of at least 2 cfs, at the point where Putah Creek discharges into the East Toe Drain.

D. Drought Year Flows

(1) During years when total storage in Lake Berryessa is less than 750,000 acre feet ("af") as of April 1 (a "Drought Year"), the release and instream flow requirements set forth in sections D.(2), D.(3) and D.(4) below ("Drought Year Requirements") shall apply instead of the release and instream flow requirements set forth in sections A., B. and C. above ("Non-Drought Year Requirements"). Provided, however that if after April 1 the total storage in Lake Berryessa rises to 750,000 af or more, then the Non-Drought Year Requirements shall immediately take effect.

(2) During a Drought Year, releases of water from the Putah Diversion Dam into Lower Putah Creek shall equal or exceed the following amounts (mean daily values, in cfs, with instantaneous releases always equal to or exceeding 90% of the listed values):

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
15	25	25	25	16	26	46	33	33	33	26	15

(3) During a Drought Year, Licensee/Permittee shall release sufficient water from the Putah Diversion Dam to maintain a continuous flow of surface water in Putah Creek from Putah Diversion Dam to the Interstate 80 Bridge, and further shall release sufficient water from the Putah Diversion Dam to maintain a minimum mean daily instream flow of 2 cfs at the Interstate 80 Bridge, with instantaneous flows always equal to or exceed 1 cfs. Under these conditions, Licensee/Permittee shall not be required to maintain a continuous flow of surface water in the reach of Putah Creek below the Interstate 80 Bridge.

(4) Whenever the release and instream flow requirements set forth in sections D.(2) and D.(3) are in effect for two consecutive years, then during the next year thereafter the Non-Drought Year Requirements shall apply and shall remain in effect for an entire period from April 1 through March 31, unless total storage in Lake Berryessa on April 1 is less than 400,000 af. If the Drought Year Requirements are ever in effect for three or more consecutive years, then the Non-Drought Year Requirements shall apply and remain in effect for an entire period from April 1 through March 31 in the first subsequent year during which total storage in Lake Berryessa on April 1 exceeds 400,000 af.

(5) For the purposes of this section D, "total storage in Lake Berryessa" shall be the actual amount of water that physically is stored in Lake Berryessa (including all carryover storage) plus a Storage Adjustment. As of the date of entry of the Amended Judgment, the Storage Adjustment shall be zero. Thereafter, the amount

of any controlled release of water from Lake Berryessa that is not for the purpose of (i) Solano Project Diversions, or (ii) maintaining the flows in lower Putah Creek that are required by the Second Amended Judgment, shall be added to the Storage Adjustment. When Lake Berryessa spills, and all carryover storage has been spilled or otherwise eliminated, the Storage Adjustment shall be re-set to zero. The Storage Adjustment shall never be less than zero. "Solano Project Diversions," for the purpose of this paragraph, means water delivered to Solano Project Participating Agencies and Putah South Canal Conveyance losses (Canal inflows minus deliveries from canals).

(6) If Solano Project Water that is not within the scope of Solano Project Contract Allocations, as is defined in Section IV of the Second Amended Judgments in the *Putah Creek Water Cases,* Judicial Council Coordination Proceeding No. 2565, ever is stored in an offstream reservoir or reservoirs or underground storage, and, as a result, Lake Berryessa storage levels are reduced below the levels that would occur in the absence of such storage, then the 750,000 af amount in paragraph D.(l) and the 400,000 af amount in paragraph D.(4) shall be adjusted so that Drought Year Requirements will continue to occur at the same frequencies as they would have occurred in the absence of such storage.

E. Illegal Diversion Account

If there is any risk that illegal diversions may take place from lower Putah Creek to a degree that water released by the Solano Project for the purposes of maintaining the minimum flows set forth herein will be significantly depleted, then the procedures set forth in the attached Exhibit "E-2" shall be implemented.

F. Monitoring Requirements ((1), (2), (3), & (4) all shall be satisfied)

(1) Licensee/Permittee shall continuously measure and record releases from the Putah Diversion Dam to lower Putah Creek, and shall determine and record each day's mean daily release.

(2) Licensee/Permittee shall forthwith install and maintain flow measurement gauges capable of measuring instream flows on a continuous basis at the Interstate 80 Bridge and near the East Toe Drain. Licensee/Permittee shall collect and maintain the data recorded by each of these gauges as is necessary to demonstrate their compliance with the flow requirements imposed by the Second Amended Judgment. In addition, Licensee/Permittee shall make regular measurements of instream flows at Stevenson Road Bridge, Pedrick Road Bridge and Old Davis Road Bridge. If the instream flow measured at Stevenson Road Bridge, Pedrick Road Bridge, or at Old Davis Road Bridge, is less than the minimum instream flow requirements in section A.(2) above on more than an infrequent basis, then the paragraph A.(2) flow requirements shall start to apply at such measurement point or points, in addition to still applying at the Interstate 80 Bridge. Licensee/Permittee shall install, maintain, repair, calibrate and operate gauging equipment at such compliance points as may be necessary to ensure and demonstrate their compliance with the provisions of this Exhibit "E-1". Gaging equipment shall be installed to provide a range of measurement from 0 cfs to at least 200 cfs.

(3) Licensee/Permittee shall monitor flows in the entire reach of lower Putah Creek from Old Davis Road Bridge to River Mile 0.0 with sufficient frequency and by sufficient means to ensure compliance with the requirement in part A.(3) of the Second Amended Judgment that continuous flow of surface water be maintained in this reach at all times of the year. All measurements and observations of this reach

made for purposes of compliance with this requirement shall be recorded.

(4) Licensee/Permittee shall maintain records, in both paper and electronic format, of all release and flow measurements, all calculated mean daily releases and flows, and all observations required by the Second Amended Judgment. Promptly upon request, these records shall be made available for review and copying by any person during normal business hours at the offices of Licensee/Permittee or its designee.

Exhibit "E-2"

Effects of Illegal Diversions of Water from Lower Putah Creek on Obligations under the Water Rights on Applications 11199, 12578 and 12716 to Maintain Exhibit E-1 Instream Flow Requirements

1. The right holders under the rights issued pursuant to Applications 11199, 12578 and 12716 shall satisfy all of the release and instream flow requirements that are specified in Exhibit "E-I" at all times, whether or not any illegal diversions of water from lower Putah Creek are occurring, except to the extent that exceptions to the instream flow requirements are authorized by this Exhibit "E-2". These exceptions shall only be authorized during the irrigation season. "Irrigation season" shall mean the period from March 1 through October 31 of each year.

2. To determine the obligations under the rights issued pursuant to Applications 11199, 12578 and 12716 to satisfy the instream flow requirements specified in Exhibit "E-1" during times when illegal diversions from lower Putah Creek are occurring, an Illegal Diversion Account shall be established. Starting at the beginning of the sixth irrigation season during which this Illegal Diversion Account is drawn upon, the balance in this account shall be set to 1,000 acre feet at the beginning of each irrigation season, regardless of the account's balance at the end of the prior irrigation season. Prior to the sixth irrigation season in which the Illegal Diversion Account is drawn upon, the balance in the Illegal Diversion Account at the beginning of each irrigation season shall be set to 2,000 acre feet. Any credits made pursuant to Paragraph 9 of this Exhibit "E-2" for any irrigation season shall be in addition to the initial balance. The holders of the water rights issued pursuant to Applications 11199, 12578 and 12715 shall maintain an accurate accounting of all credits to and deductions from this account. In any year that U.S. Bureau of Reclamation does not maintain the required accounting, Solano County Water Agency (as holder of the water rights under Applications 11199 and 12578) is

required to do so and may not waive, defer or delay this requirement. Hereafter, the entity maintaining the required accounting is referred to as the "Accounting Entity".

3. At the beginning of each irrigation season, the Accounting Entity shall provide written notice to all riparian landowners of the Accounting Entity's projections of the time period during which such landowners legally may divert from each reach of lower Putah Creek during the irrigation season. This notice shall encourage each riparian landowner to provide the Accounting Entity with the dates and amounts of the landowner's planned diversions of water from lower Putah Creek during the irrigation season. The Accounting Entity may, in its discretion, provide additional notices, making updated projections of the amounts of water that such landowners legally may divert from lower Putah Creek, to these landowners at the irrigation season progresses. The calculations in these notices shall be based on the formulas and procedures described in Exhibit "E-3".

4. The term "illegal diversion" in this Exhibit "E-2" means a diversion that is illegal based on the formulas and procedures described in Exhibit "E-3". The sole purpose of this definition is for implementing the provisions of this Exhibit "E-2" regarding deductions from the Illegal Diversion Account pursuant to this paragraph 4 and modifying the Solano Project's release requirements pursuant to paragraph 6 of this Exhibit "E-2". If the Accounting Entity has filed, and is diligently pursuing, a court action against a landowner with an illegal diversion, and if the Accounting Entity has complied with all of the provisions of paragraph 3 of this Exhibit "E-2", then deductions shall be made from the Illegal Diversion Account for any amounts of water that the Solano Project releases from the Putah Diversion Dam into lower Putah Creek during the irrigation season solely for the purpose of compensating for that illegal diversion while maintaining the instream flows specified in Exhibit "E-1". "Diligently pursuing" means seeking, at the earliest possible opportunities, a temporary restraining order, a preliminary injunction and a

permanent injunction stopping the illegal diversion, and a declaratory judgment regarding the illegality of the diversion. If there is more than one illegal diversion, then all of the provisions of this paragraph shall apply to each illegal diversion.

5. During any period during which deductions are being made from the Illegal Diversion Account, the Accounting Entity shall make streamflow measurements on a continuous basis at sufficient locations along lower Putah Creek to make the calculations and determinations described in Exhibit "E-3". During such periods, the Accounting Entity shall post all such data, calculations and determination on its Internet website, or make such information available to members of the public by similar electronic means, and shall update such posted information at least once each day.

6. If the balance in the Illegal Diversion Account ever reaches zero, then during the remainder of the irrigation season during which the Account balance reached zero and while the Accounting Entity continues to diligently pursue the court action described in the paragraph 4 above and continues to make available the data, calculations, determinations and reports described in paragraph 5 above, and while the court action is pending, the holders of the water rights issued pursuant to Applications 11199, 12578 and 12716 shall not be required to fully comply with any instream flow requirement that is specified in Exhibit "E-1" for a point that is located downstream of any illegal diversion that is subject to the court action and that occurs after the Illegal Diversion Account balance reaches zero. Instead, under these conditions, the holders of the water rights issued pursuant to Applications 11199, 12578 and 12716 shall release from the Putah Diversion Dam into lower Putah Creek at least the amounts of water that would be sufficient to satisfy all of the instream flow requirements in Exhibit "E-1", if the illegal diversion that is subject to the court action were not occurring. Under these circumstances, the holders of the water rights issued pursuant to Applications 11199,

12578 and 12716 release obligations shall be adjusted as frequently as necessary to reflect changes in hydrological conditions or changes in the rate of the illegal diversion. Immediately upon the cessation of such illegal diversion, the conclusion, dismissal or cessation of diligent pursuit of the court action, or the end of the irrigation season, whichever occurs first, the holders of the water rights issued pursuant to Applications 11199, 12578 and 12716 shall satisfy all of the instream flow requirements in Exhibit "E-1". If court actions regarding more than one illegal diversion are pending, then the provisions of this paragraph shall apply to all such illegal diversions.

7. Deductions from the Illegal Diversion Account for an illegal diversion may be made only for a maximum of two years after the court action described in paragraph 4 above is filed against the landowner with the illegal diversion. Even if a final judgment is not issued in such court action within two years after the action is filed, and even if such court action is dismissed for any reason, the holders of the water rights issued pursuant to Applications 11199, 12578 and 12716 nevertheless thereafter shall be required to maintain all of the instream flows described in Exhibit "E-1", and no further deductions shall ever be made from the Illegal Diversion Account for any illegal diversion that is or was the subject of the court action. However, if a new illegal diversion with neither a point of diversion nor a place of use that is within the scope of the court action described in paragraph 4 above occurs, then the provisions of paragraphs 4, 5 and 6 above, and this paragraph, shall apply to the new illegal diversion. If there is more than one such new illegal diversion, then the provisions of paragraphs 4, 5 and 6 above, and this paragraph, shall apply to each such new illegal diversion.

8. If a court of competent jurisdiction issues a final judgment specifying the legality or illegality of any particular diversion from lower Putah Creek, then the Accounting Entity shall adjust the formulas and calculations in Exhibit "E-3" to be consistent with the

court's judgment and the adjusted formulas and calculations shall be applied thereafter. If any interested party to the Second Amended Judgment disagrees with the Accounting Entity's adjustment, then that party may ask the court or State Water Board, by noticed motion, to determine what the appropriate adjustment should be. The State Water Board shall be timely informed of any court determination.

9. If any adjustments to the formulas or calculations in Exhibit "E-3" are made pursuant to paragraph 8 of this Exhibit "E-2", then appropriate adjustments shall be made to the Illegal Diversion Account, for example, credits shall be made for the total amount of all debits that previously were made from the Account for diversions that were treated by the Accounting Entity as illegal, but which would have been legal under the adjusted formulas and calculations. If the Accounting Entity ceases to diligently pursue any court action described in paragraph 4 of this Exhibit "E-2" before a final judgment is entered, then credits shall be made to the Illegal Diversion Account for the total amount of all debits that previously were made from the Account for the diversion that was the subject of the court action. The credits described in this paragraph shall be spread equally over the same number of irrigation seasons as the number of irrigation seasons during which debits from the Account were made. If the court issues its final judgment during an irrigation season, then the first year of such credits shall be made immediately to the Account. If the court issues its final judgment not during an irrigation season, then the first year of such credits shall be made during the next irrigation season. Subsequent credits shall be made during the immediately following irrigation seasons.

Exhibit "E-3"

METHODOLOGY FOR MONITORING AND QUANTIFYING THE AVAILABILITY AND USE OF RIPARIAN WATER IN LOWER PUTAH CREEK

This document provides U.S. Bureau of Reclamation's (Reclamation) explanation and basis for the methodology for monitoring and quantifying the availability and use of riparian water in Putah Creek, downstream of the Putah Diversion Dam. The methodology, hereafter referred to as the Lower Putah Creek Riparian Water Program ("PRWP"), will be used by the holders of the water rights issued pursuant to Applications 11199, 12578 and 12716, to (I) differentiate between and quantify the availability of riparian versus non-riparian waters in Putah Creek, downstream of the Putah Diversion Dam, and (2) identify and quantify illegal water diversions, downstream of the Putah Diversion Dam. Reclamation anticipates that implementation of the PRWP will increase the efficiency with which the instream flow requirements of the Solano Project are satisfied, and facilitate the lawful diversion of riparian water downstream of the Putah Diversion Dam.

As holders of the water rights issued pursuant to Applications 11199, 12578 and 12716, either Reclamation or the Solano County Water Agency (SCWA) may use the above methodology to determine riparian water in Putah Creek downstream of the Putah Diversion Dam. In any year that Reclamation does not perform the calculations, SCWA (as holder of the water rights under Applications 11199 and 12578) is required to do so and may not waive, defer or delay this requirement.

1.0 OVERVIEW

1.1 Key Elements of Lower Putah Creek Riparian Water Program

The PRWP consists of two components: Pre-irrigation season water availability forecasts, and real-time stream flow monitoring during the irrigation season, where "irrigation season" is defined as March 1 through October 31. Annual water availability forecasts will be provided to riparian water users prior to the irrigation season, so they and other interested parties can plan and, if necessary, make other arrangements for obtaining irrigation water, before significant time and financial resources are committed to the cultivation of a given crop. Real-time monitoring will be conducted to: (1) determine, on a daily basis, the quantities of riparian water that are available to water users in Lower Putah Creek, and (2) differentiate and quantify, on a daily basis, legal versus illegal riparian diversions.

1.2 Definition of Riparian Water

For the purposes of the PRWP, riparian stream flows are defined as any surface water derived from precipitation or rising groundwater that, given prevailing hydrologic conditions, would occur in Lower Putah Creek in the absence of the Solano Project. Non-riparian water, such as treated wastewater and agricultural return flows originating from a non-riparian source (e.g., pumped groundwater that would not otherwise be tributary to the creek) cannot, by definition, be diverted by riparian water right claimants and, therefore, is not included as a source of riparian water from Lower Putah Creek.

2.0 WATER AVAILABILITY FORECASTS

Riparian water availability forecasts for Lower Putah Creek will be based on stream flow conditions observed in the Putah Creek drainage, upstream of the Putah Diversion Dam, in the

prior (i.e., antecedent conditions) and current water year. Forecasts will be made on January 1, March 1 and May 1. The January 1 and March 1 forecasts, which will be made before the current rainy season is over, will be based in part on projected stream flow conditions for the balance of the rainy season, while the May 1 forecast, the final forecast for the water year, will be based on actual runoff measured to date. Both the January 1 and March 1 forecasts will include three scenarios, based on the assumption that the balance of the rainy season will either be "wet" (25% exceedance), "normal" (50% exceedance) or "dry" (75% exceedance).

In order to address the differing sources and durations of riparian stream flows (surface stream flows from Putah Creek and/or tributaries to Putah Creek, or rising groundwater), Lower Putah Creek has been divided into five reaches. Water availability forecasts will be made for each reach. Stream reach designations and the analytic framework for making water availability forecasts are presented in "Attachment 1".

3.0 REAL-TIME MONITORING

3.1 Quantifying Available Riparian Water Supply

Stream flows and the associated stream flow gains and losses will be monitored by reach, on a continuous basis, and the availability of riparian water and extent of illegal diversions will be determined daily, using a series of water mass balance equations to track the quantities of both riparian and non-riparian water entering and leaving each stream reach.

A summary of the equations used to define riparian water availability, by stream reach, is presented in Attachment 1.

Although the determination of net riparian flow is based on real-time stream flow measurements, there are situations where real-time stream flow measurements are not

practical and therefore simplifying assumptions must be used, much as they are in the Condition 12 Settlement Agreement for the Upper Putah Creek drainage. For example, under existing conditions it is difficult to measure accurately real-time stream flow losses in the stream reach now inundated by Lake Solano. Consequently, a "fixed" loss figure previously adopted by the United States Bureau of Reclamation may be used in the water mass balance calculation for this reach. In all cases, the simplifying assumptions used to quantify the availability of riparian water are purposely conservative in the sense that they tend to overstate the availability of riparian stream flows. Overstating riparian water availability is preferred, since it presumably increases the enforceability of the PRWP and its acceptability to riparian water users.

3.1.1 Data Collection

3.1.1.1 Measurement of Riparian Diversions

Riparian diversions will either be measured directly, using an appropriate meter and assuming landowner/operator permission is obtained, or indirectly, via measurement of creek stream flows in the vicinity of the diversion. Riparian diversions typically constitute a readily measurable fraction of the total stream flow in any given reach (500-2,000 gallons per minute, or about 1-5 cubic feet per second), and are therefore easily detected by continuously measuring stream flows entering and leaving a given stream segment.

3.1.1.2 Measurement of Agricultural Return Flows and Wastewater Discharges

The agricultural return flows entering Lower Putah Creek are for the most part non riparian water sources, as are the treated wastewater discharges from the University of California -Davis (U.C. Davis) water treatment facility, which enter Lower Putah Creek near Old Davis Road. Nevertheless, these water sources must be quantified for water mass balance accounting purposes. The University's treated wastewater discharges are measured and recorded by the

treatment plant operators. Most of the agricultural return flows are too small and/or sporadic to warrant direct measurement, and will therefore be estimated, or if insignificant relative to the total creek stream flow, ignored. However, one notable exception is the Willow Canal, which discharges into Lower Putah Creek just upstream of Pedrick Road. Discharges from the Willow Canal, which is operated by the Yolo County Flood Control and Water Conservation District (YCFC&WCD), will be measured as necessary.

3.1.1.3 Measurement of Groundwater Seepage and Evapotranspiration

The amounts of groundwater seepage (into or out of the creek) and water lost to open- water evaporation and transpiration by riparian vegetation vary gradually over time, in comparison to the fluctuating gains and losses associated with water diversions and agricultural return flows. For the purposes of the PRWP, the net flow gain or loss from these factors (groundwater seepage, evaporation and transpiration) are combined into a single term that represents the natural or "background" net stream flow gain or loss rate within a given reach. Background gains and losses are most easily quantified as the difference in stream flow over a given reach ("top of reach" stream flow versus "bottom of reach" stream flow), in the absence of any diversions or "intra reach inflows."

Groundwater seepage along the reach from 1-505 to Stevenson Bridge typically transitions from net loss (seepage out of the creek) to net gain (seepage into the creek). The location of the transition point and the total amount of influent seepage along the gaining stretch depend on the regional groundwater levels in the underlying groundwater basin. This reach will be subdivided into two sub-reaches when necessary to calculate riparian water availability. The upstream end of the gaining segment will be detected by periodic stream flow measurements and/or temperature changes in the creek.

3.1.1.4 Special Situations

Pumping from Riparian Wells

There is no clear boundary between wells that induce additional seepage from the creek and wells that pump regional groundwater; the percentage of pumped water that consists of induced seepage decreases gradually with depth and horizontal distance from the creek. A pragmatic approach adequate for the purpose of the PRWP is to include in the accounting the effects of a well if its effect on stream flow can be detected by the stream flow monitoring program. The philosophy behind this approach is that well pumping does not matter if its effects on stream flow are not measurable; and if the effects are measurable, then the evidence and justification for including the well as a riparian diverter are already at hand. In practice, it is unlikely that wells more than about 500 feet from the creek or more than 100 feet deep will measurably affect stream flow.

Impoundments Below Mace Boulevard

Riparian water accounting is slightly more complicated at the downstream end of Putah Creek, between Mace Boulevard and the Toe Drain in the Yolo Bypass. Two impoundments are created in the creek channel each year to provide pumping pools for irrigation operations. The lower impoundment is a flashboard dam operated jointly by Los Rios Farms and the California Department of Fish and Game. Frequently, some of the water impounded behind this dam is water that is diverted from the Toe Drain of the Yolo Bypass at a pumping station about 1 mile north of the dam and conveyed to the impoundment by a canal. It may be necessary to gage the inflows from this canal into Putah Creek to determine the availability of Putah Creek riparian water in the impoundment. The issue may be moot, however, because the downstream

compliance point for resident native fish flows is at river mile 0, which is upstream of the impoundment.

The upper impoundment is a temporary dirt berm across the channel that provides a crossing for farm vehicles in addition to creating a pumping pool. The berm is at about river mile 1.0 (aligned with country road 106B), and the impounded water derives entirely from Putah Creek. Irrigation return flows from adjacent fields may include water that originated from Toe Drain diversions, and these return flows will be measured or estimated in the same manner as for return flows in other reaches of the creek.

Riparian Diversions from Pools in the Creekbed

Prior to construction of the Solano Project, landowners in a few locations were able to pump water from natural or constructed pools in the creekbed after live flow in the creek had ceased in summer. These pools were separate from the well-documented gaining reach above Stevenson Bridge, where groundwater seepage into the creekbed can create surface water stream flows in the absence of surface water inflows from upstream reaches. The accounting methodology described here does not encompass the water in isolated pools that would have been present in the absence of the Solano Project. The historical number of pools is thought to be small, and the pumping rates they could sustain also were probably small.

The possible availability of riparian water from isolated pools will be dealt with on a case-by-case basis. If a landowner can provide evidence that persistent pools existed on his or her property during periods of discontinuous streamflow prior to the Solano Project construction, then the sustained pumping yield of those pools will be estimated to quantify the amount of riparian water presently available to the landowner from that source. The yield will be estimated

from the pool volume and the permeability of the surrounding streambed materials, which may release shallow groundwater when the pool level is lowered by pumping.

New Diversions and Return Flows

As parcels change ownership or existing landowners modify their farming operations, some diversions and return flows may be added and others discontinued. Word of mouth and the annual riparian water forecast mailing should be sufficient to inform any newcomers that riparian diversions from Lower Putah Creek are monitored and regulated. The new users will be encouraged to join the cooperative effort to manage and utilize riparian water supplies. Any changes in discharges by U.C. Davis, YCFC&WCD, and other agencies or industries hopefully will also be communicated to the SCWA to facilitate a smooth transition. Any unreported changes will eventually be detected by the stream flow monitoring program, periodic field surveys, neighboring landowners, or the stream keeper.

Uncooperative Riparian Diverters

It is hoped that all riparian diverters will cooperate with each other and with the SCWA to make efficient use of the available riparian water supply without any illegal diversions. However, it is possible that some landowners will attempt to conceal their diversions or refuse to provide information about when and how much water they are diverting, or when and where return flows occur. Fortunately, all of this information can be obtained anyway. It would be impossible to conceal a significant diversion for very long because the pumping equipment and power supplies are large, visible, and make sound and because the effects of the diversion will be detected by the stream flow monitoring program. The pumping rate at any diversion can be measured fairly accurately by gaging the stream flow immediately upstream and downstream of the diversion. Return flows can similarly be estimated by surveys of the field drainage patterns and the direct observation of the return flows.

3.2 Quantifying Illegal Diversions

Any diversion in excess of the calculated net riparian flow is considered illegal. Illegal diversions, like net riparian flow, will be monitored and quantified by reach, and to the extent possible, by individual diverters. A summary of the equations used to quantify illegal diversions is presented in Attachment 1.

If total riparian diversions in any given reach exceed the available riparian supply and the diverters are unwilling to voluntarily reduce their total diversions to match the available supply, and these actions adversely affect the SCWA, then the Agency may sue some or all of the active diverters and seek court orders addressing the illegal diversions. It is hoped that this type of enforcement action will not be necessary. The PRWP will provide all of the data needed on a real-time basis to enable the active riparian diverters to manage their activities and restrict the locations and rates of their diversions so that they remain within the legally available supply.

3.3 Public Access to Riparian Water Accounting Data and Calculations

The SCWA will conduct the data collection activities and complete the calculations necessary to generate the pre-irrigation season water availability forecasts and the real-time riparian water availability determinations. All data collected for these purposes and all formulas and computer programs used in the calculations will be available on request to any interested agency, group or individual. The SCWA will publish the data and results on its website and update the information approximately daily during the irrigation season.

The SCWA will deliver the first (January) pre-season water availability forecast by mail to all riparian landowners along Lower Putah Creek. Landowners may at that time request that

the subsequent forecasts (March and May) also be sent by mail if the landowner is unable to access the information by Internet. It would not be practical to disseminate the real-time monitoring data by mail because it will be updated daily during the irrigation season. Active diverters who need the daily information will be able to view it on the SCWA's website or call the Agency to obtain the information by telephone.

ATTACHMENT 1 TO EXHIBIT "E-3"

1.0 Pre Irrigation Season Predictions

A) Objective:

To estimate future availability of riparian stream flows, based on projected and/or prior hydrologic conditions in the Putah Creek drainage. For pre irrigation season prediction purposes, assume riparian stream flows consist of surface runoff from precipitation and rising groundwater.

B) Analytic Approach:

i) Divide Lower Putah Creek into the following reaches:

a. Putah Diversion Dam to Highway 505 Bridge (a "losing reach")
b. Highway 505 Bridge to Stevenson Bridge (a "gaining reach")
c. Stevenson Bridge to I-80 Bridge (a "losing reach")
d. I-80 Bridge to Mace Boulevard (a "losing reach")
e. Mace Boulevard to Yolo Bypass (a "losing reach")

(Reach designations based on hydrogeologic features, proximity of suitable stream flow gaging sites and existing riparian diversions. When necessary, reach "b" will be subdivided into two sub-reaches.)

ii) Predict average monthly flow and date of zero flow for each of the above riparian water sources, in each of the five reaches:

a) Surface runoff: calculate using statistical relationships derived from historical data.

- Stream flow recession curves derived from stream flow gaging data for "At Winters", "Near Winters" and "Near Davis" stream flow gaging stations
- Stream reach percolation/evapotranspiration loss estimating algorithms Developed for the SCWA's Lower Putah Creek stream flow model

b) Rising groundwater: calculate using statistical relationships derived from historical data.

- Stream reach groundwater gain/loss estimating algorithms developed for the Solano County Water Agency's Lower Putah Creek streamflow model

C) Timing of Pre Irrigation Season Predictions:

i) January 1 – Predictions based on hydrology of water year to date and three scenarios for the remainder of the year's rainy season: "wet year" (25% Lake Berryessa inflow exceedance), "normal year" (50% Lake Berryessa inflow exceedance) and "dry year" (75% Lake Berryessa inflow exceedance)

ii) March 1 - Predictions based on hydrology of water year to date and projected

25%, 50% and 75% exceedance runoff rates for the remainder of the year's rainy season

iii) May 1 - Final prediction based on hydrology of the water year through April

2.0 Methodology for Quantifving Riparian Streamflows During Irrigation Season

Note:

(1) Riparian stream flows are defined here as any surface water derived from precipitation or rising groundwater that, given prevailing hydrologic conditions, would occur in Lower Putah Creek in the absence of the Solano Project. Non riparian water, such as treated wastewater and agricultural return flows originating from a non-riparian source (e.g., pumped groundwater) cannot, by definition, be diverted by riparian water right claimants and therefore, are not included as a source of riparian water from Lower Putah Creek.

A) Overview:

i) Calculate, on a daily basis, pre-Solano Project stream flows (i.e., stream flow that would occur if there were no dams -no Solano Project) at the Putah Diversion Dam site

ii) Compare computed daily pre-Solano Project stream flow (i.e., stream flow that would occur if there were no dams -no Solano Project) with current Putah Diversion Dam release -determine what fraction of the current release is stored water or any other non-riparian water source, versus riparian stream flows

iii) Using real-time stream flow monitoring data to quantify prevailing percolation/evapotranspiration losses and any non-riparian water sources, calculate riparian flows by stream reach. The total quantity of riparian water in any given reach is defined here as the sum of all riparian water sources less percolation/evapotranspiration losses.

B) Analytical Approach:

i) Riparian stream flows at Putah Diversion Dam site

USRSF = LBI + IDTI –IDCL

Where: USRSF = Riparian stream flow at Putah Diversion Dam

LBI = Computed/measured Lake Berryessa inflow
(less any associated non riparian flow)

IDTI = Inter Dam Reach tributary inflow
(less any associated non riparian flow)

IDCL = channel percolation/evapotranspiration losses that would occur in the Inter Dam Reach in the absence of Lake Solano

(A stream gage will be placed on Pleasants Creek to facilitate real-time estimation of inflow from inter-dam tributaries. For accounting purposes, seepage and evaporation losses from Lake Solano are assumed to be constant and will therefore be characterized by a fixed continuous loss rate term).

ii) Riparian stream flows in first reach downstream of Putah Diversion Dam (Putah Diversion Dam to 505 Bridge)

1RRSF =USRSF + TRSF + IRAG -1RCL

Where: 1RRSF = Computed riparian stream flow in Reach 1
USFSF = Computed riparian stream flow at Putah Diversion Dam
TRSF = Measured stream flow from tributaries (Dry Creek, McCune aka Pleasant Creek), less any associated non riparian flow
1RAG = Ag return flow water originating from a riparian source in reach 1
1RCL = Measured channel percolation/evapotranspiration losses in reach 1

Notes:

(1) Agricultural return flow water that originates from a riparian water source (riparian water diverted from Putah Creek or associated tributaries) is classified as riparian water and therefore can be lawfully diverted by other riparian water right claimants.

iii) Riparian stream flows in second reach downstream of Putah Diversion Dam (505 Bridge to Stevenson Bridge)

2RRSF = 1RRSF -1RD (±) 2RCL + 2RAG

Where: 2RRSF = Computed riparian stream flow in Reach 2
1RRSF = Computed riparian stream flow in Reach 1
2RCL = Combined sum of groundwater "gains", channel percolation/evapotranspiration losses in reach 2
2RAG = Ag return flow water in reach 2 originating from a riparian source
1RD = Riparian diversion in Reach 1

Notes:

(1) There are no significant tributaries entering Putah Creek in this Reach

(2) Due to the spatial and temporal variability of rising groundwater, portions of the so called "gaining reach" (generally the upstream most third of the reach) frequently lose rather than gain water. Accordingly, there are instances when some of the riparian diverters within Reach 2 have access to rising groundwater, while others do not. When necessary, Reach 2 will be broken into two sub reaches for the purpose of quantifying riparian stream flows.

iv) Riparian stream flows in third reach downstream of Putah Diversion Dam (Stevenson Bridge to 1-80)

3RRSF = 2RRSF -2RD -3RCL +3RAG

Where: 3RRSF = Computed riparian stream flow in Reach 3
2RRSF = Computed riparian stream flow in Reach 2
2RD = Riparian diversions in Reach 2
3RCL = Measured channel percolation/evapotranspiration losses in reach 3
3RAG = Ag return flow water in reach 3 originating from a riparian source

v) Riparian stream flows in fourth reach downstream of Putah Diversion Dam (1-80 to Mace Boulevard)

4RRSF = 3RRSF- 3RD -4RCL + 4RAG

Where: 4RRSF = Computed riparian stream flow in Reach 4
3RRSF = Computed riparian stream flow in Reach 3
3RD = Riparian diversion in Reach 3
4RCL = Measured channel percolation/evapotranspiration losses in reach 4
4RAG = Ag return flow water in reach 4 originating from a riparian source

vi) Riparian stream flows in fifth reach downstream of Putah Diversion Dam (Mace Boulevard to RM 0.0 aka Yolo Bypass)

5RRSF = 4RRSF- 4RD -5RCL + 5RAG

Where: 5RRSF = Computed riparian stream flows in Reach 5
4RRSF = Computed riparian stream flows in Reach 4
4RD = Riparian diversions in Reach 4
5RCL = Measured channel percolation/evapotranspiration losses in reach 5
5RAG = Ag return flow water in reach 5 originating from a riparian source

Note:

(1) The above formulas will be adjusted as necessary to reflect changing conditions such as new or terminated diversions or discharges.

3.0 Methodology for Quantifying Illegal Riparian Diversion During Irrigation Season

Note:

(1) Diversions in excess of the available riparian stream flow (i.e., diversion of water released from storage or other non-riparian flow) are considered illegal

A) Overview:

i) For each reach, calculate difference between daily riparian diversions and computed riparian streamflow. If riparian diversions exceed computed riparian streamflow, the difference is considered to be the result of illegal diversions.

B) Analytical Approach:

i) Illegal riparian diversions in first through fifth reaches downstream of Putah Diversion Dam

If: (ith)RD>(ith)RRSF
Then: (ithIRD) = (ithRD) -(ithRRSF)

Where: (ith)RD = Riparian diversions in Reach 1,2,3,4 or 5
(ithRRSF) = Computed riparian streamflow in Reach 1,2,3,4 or 5
(ithIRD) = Computed illegal diversions in Reach 1,2,3,4 or 5

The SCWA is under no obligation to enforce against any illegal riparian diverters whose actions do not adversely affect the Agency's ability to comply with any contractual or legal obligation.

KMrowka:ds 3/13 and 3/16/2009.GHernandez 03/05/2013.
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