



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

**DIVISION OF WATER RIGHTS**

**RIGHT TO DIVERT AND USE WATER**

APPLICATION 12716

PERMIT 10659

Right Holder:

U.S. Bureau of Reclamation  
Mid Pacific Region MP 460  
2800 Cottage Way  
Sacramento, CA 95825-1898

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 supercedes any previously issued right on **Application 12716**.

**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 point 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
<b>Putah Diversion Dam North 1,940,989 feet and East 6,559,557 feet</b>	<b>SE<sup>1</sup>/<sub>4</sub> of SE<sup>1</sup>/<sub>4</sub></b>	<b>31</b>	<b>8N</b>	<b>1W</b>	<b>MD</b>

3. Purpose of use	4. Place of use	Section (Projected)*	Township	Range	Base and Meridian	Acres
<b>Domestic, Municipal, Industrial, Irrigation, Frost Protection, Recreational</b>	<b>428,300 acres in Yolo and Solano Counties within T2N to T8N, R5W to R4E, MDB&amp;M.</b>					
<b>Fish and Wildlife Enhancement</b>	<b>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&amp;M</b>					
<b>Recreational</b>	<b>Lake Berryessa within T7N to T10N, R2W to R5W, MDB&amp;M</b>					

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 **116 cubic feet per second** to be diverted from **November 16 of each year to January 31 of the succeeding year**. The maximum amount diverted under this permit shall not exceed **17,717 acre-feet per year**.  
(000005A)
6. The total amount taken from the source (collection to storage plus direct diversion) under this permit and the water rights pursuant to Applications 11199 and 12578 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 Permit 10659, the license issued pursuant to Application 11199, and the license issued pursuant to Application 12578 shall not exceed **401,286 acre-feet per annum**.  
(0000114)
8. Construction work and complete application of the water to the authorized use shall be prosecuted with reasonable diligence and completed by **December 31, 2032**.  
(0000009)
9. The total quantity of water delivered for consumptive use under Permit 10659, together with that delivered under the license issued pursuant to Application 11199 and the license issued pursuant to Application 12578 shall not exceed 250,000 acre-feet in any one year.  
(0000114)
10. The Solano County Water Agency, et al. (SCWA) holds the senior rights for the Solano Project (rights under Applications 11199 and 12578). Upon licensing, SCWA will also hold the water right on Application 12716.

Under the water rights on Applications 11199 and 12578, SCWA is required to operate the Solano Project to comply with the release and instream flow requirements specified in Exhibits E-1, E-2, and E-3 (attached). Nothing herein authorizes diversions, except those diversions in compliance with the release and instream flow requirements specified in Exhibits E-1, E-2 and E-3. 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 permit requirement, the State Water Board shall not pursue an action or proceeding for enforcement of 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 Permittee 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 under (c) is timely submitted.

Permittee 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.

(0140499)

11. Permittee 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 permit 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)

12. All releases of water past the Putah Diversion Dam shall be made in such a manner as to maintain a permanent live stream at all times as far below the diversion dam as possible, consistent with the purpose of the project and the requirements of downstream users.  
(0540499)
  13. This permit 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.  
(0540899)
  14. If it is determined after permit issuance that the as-built conditions of the project are not correctly represented by the map(s) prepared to accompany the application, permittee 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)
  15. The right to divert and store water, and apply said water to beneficial use as provided in this permit is granted to the United States as Trustee for the benefit of the public agencies of the State together with the owners of land and water users within such public agencies as shall be supplied with the water appropriated under this permit.  
(0540699)
  16. Subject to compliance by the public agencies concerned with any and all present and future valid contractual obligations with the United States, such public agencies, on behalf of their landowners and other water users, shall, consistent with other terms of this permit, have the permanent right to the use of all water appropriated and beneficially used hereunder, which right, except where water is distributed to the general public by a private agency in charge of a public use, shall be appurtenant to the land to which said water shall be applied, subject to continued beneficial use and the right to change the point of diversion, place of use, and purpose of use, as provided in Chapter 10 of Part 1 of Division 2 of the Water Code of the State of California, and further subject to the right to dispose of temporary surplus.  
(0540699)
  17. Upon completion of the appropriation and beneficial use of water under this permit, any license or licenses which may be issued pursuant to Chapter 9 of Part 2 of Division 2 of the California Water Code shall be issued to the public agencies of the State within which the water shall have been found by inspection by the Board to have been applied to beneficial use.  
(0540699)
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**THIS PERMIT IS ALSO SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:**

- A. The amount authorized for appropriation may be reduced in the license if investigation warrants. (0000006)
- B. Progress reports shall be submitted promptly by right holder when requested by the State Water Board until a license is issued. (0000010)
- C. 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. (0000011)
- D. Pursuant to California Water Code sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, 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 requirements 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.

(0000012)

- E. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Board if, after notice to 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.

(0000013)

- F. This right does not authorize any act which results in the taking of a threatened or endangered 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 applicable Endangered Species Act for the project authorized under this right.

(0000014)

- G. Right holder shall maintain records of the amount of water diverted and used to enable the State Water Board to determine the amount of water that has been applied to beneficial use pursuant to Water Code section 1605.

(0000015)

- H. No water shall be diverted under this right, and no construction related to such diversion shall commence, until right holder obtains all necessary permits or other approvals required by other agencies. If an amended permit is issued, no new facilities shall be utilized, nor shall the amount of water diverted increase beyond the maximum amount diverted during the previously authorized development schedule, until right holder complies with the requirements of this term.

Within 90 days of the issuance of this permit or any subsequent amendment, right holder shall prepare and submit to the Division of Water Rights a list of, or provide information that shows proof of attempts to solicit information regarding the need for, permits or approvals that may be required for the project. At a minimum, right holder shall provide a list or other information pertaining to whether any of the following permits or approvals are required: (1) lake or streambed alteration agreement with the Department of Fish and Wildlife (Fish & G. Code, § 1600 et seq.); (2) Department of Water Resources, Division of Safety of Dams approval (Wat. Code, § 6002.); (3) Regional Water Quality Control Board Waste Discharge Requirements (Wat. Code, § 13260 et seq.); (4) U.S. Army Corps of Engineers Clean Water Act section 404 permit (33 U.S.C. § 1344.); or, (5) local grading permits.

Right holder shall, within 30 days of issuance of all permits, approvals or waivers, transmit copies to the Division of Water Rights.

(0000203)

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***This right is issued and right holder takes it subject to the following provisions of the Water Code:***

Section 1392. Every permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit 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 permittee 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 permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

STATE WATER RESOURCES CONTROL BOARD

ORIGINAL SIGNED BY  
JAMES W. KASSEL FOR:

*Barbara Evoy, Deputy Director  
Division of Water Rights*

Dated: MAY 28 2013

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**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 30<sup>th</sup> 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.

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## 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-1" 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 as 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 (1) 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 Quantifying 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)

$$2RRSF = 1RRSF - 1RD (\pm) 2RCL + 2RAG$$

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

$(ith)RRSF$  = 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.

STATE OF CALIFORNIA  
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Permitted  
Applications 11199, 12578, and  
12716,  
UNITED STATES BUREAU OF RECLAMATION,  
Permittee.

ORDER: WR 84-7  
SOURCE: Putah Creek  
COUNTY: Yolo, Solano,  
and Napa

ORDER AMENDING ORDER WR 81-11

BY THE BOARD:

Order dated April 16, 1970, having provided a fixed release schedule, including a dry-year relaxation, to protect prior rights and to maintain percolation from the stream channel of Putah Creek below the Solano Diversion Dam; Orders WR 79-14 and WR 81-11 having amended the schedule in the aforementioned order; a Peremptory Writ of Mandamus having been issued in Solano County Flood Control and Water Conservation District v. State Water Resources Control Board, Superior Court, County of Solano, No. 80284; the Writ having directed that portions of Order WR 81-11 be set aside in favor of the order of April 16, 1970, the Board finds as follows:

1.0 Background

1.1 In 1957, Decision 869 was adopted approving issuance of permits for Applications 11199, 12578 and 12716 to the U. S. Bureau of Reclamation (Bureau) for the Solano Project. The permits authorize the Bureau to directly divert up to 1016 cubic feet per second from Putah Creek and to divert to storage 1,600,000 acre-feet of water in Lake Berryessa at Monticello Dam. Water is bypassed or released from Monticello Dam and

flows into Lake Solano impounded by Putah Diversion Dam (also referred to as Solano Dam) where it is either diverted to Putah South Canal for Solano Project purposes or released downstream into Putah Creek.

Water diverted to Putah South Canal is distributed for municipal use in Fairfield, Vallejo and Vacaville and for irrigation of up to 80,000 acres in Solano County.

1.2 Condition 11 of Decision 869 required the Bureau to release water to Putah Creek below the Solano Diversion Dam to protect prior rights and maintain percolation to groundwater from the stream channel as it would occur from unregulated flow. Condition 12 of the Decision directed the Bureau to undertake an investigation to determine the amount of water that must be released to Putah Creek to comply with Condition 11. Condition 13 of the Decision reserved jurisdiction for the Board to adopt further orders concerning the proper amount of water to be released in accordance with Condition 11.

1.3 Following a hearing in 1969, the Board on April 16, 1970, adopted an interim fixed monthly release schedule for compliance with Condition 11 of Decision 869. More recently, the Board held a hearing in 1979, to determine whether that or some other schedule was adequate to be made a permanent requirement. As the result of the hearing and petition for reconsideration, Orders WR 79-14 and WR 81-11 adopted an amended fixed release schedule to replace the April 16, 1970, schedule.

1.4 Paragraph 11 of the 1970 Order required the Bureau to release or bypass water below the Putah Diversion Dam in accordance with the following schedule:

<u>PERIOD</u>	<u>NORMAL YEAR (cfs)*</u>	<u>DRY YEAR** (cfs)</u>
November through January	25	25
February	16	16
March	26	26
April	46	46
May through July	43	33
August	34	26
September and October	20	15

\* Cubic feet per second.

\*\* When inflow to Lake Berryessa is less than 150,000 acre-feet per annum.

The Board also reserved jurisdiction (1) to determine if that schedule provided adequate protection to downstream prior rights and resulted in percolation from the stream channel to the extent that water would have been available in the absence of the Solano Project, (2) to impose conditions providing for additional measurements and studies, and (3) to adopt further orders concerning the proper amount of water to be released (Condition 13).

1.5 Order WR 81-11 amended the 1970 schedule by providing the following schedule:

<u>MONTH</u>	<u>REQUIRED RELEASE (cfs)</u>
October	20
November	50
December	50
January	35
February	30
March	30
April	30
May	40
June	40
July	43
August	34
September	20

Further, the Bureau could reduce releases whenever both of the following conditions exist: (1) there is continuous surface flow between the Putah Diversion Dam and the Davis Gage (mile 7.2), and (2) there is a flow of not less than five cubic feet per second at the Davis Gage. (Order No. 2)

## 2.0 Peremptory Writ of Mandamus

The Peremptory Writ of Mandamus directs the Board to:

1. Set aside so much of Order WR 81-11 as imposes a new release schedule;
2. Reinstate the 1970 normal and dry year schedule; and
3. Allow the Bureau to reduce releases when continuous surface flow exists between the Putah Diversion Dam and the Davis Gage and at least five cubic feet per second is flowing at the Davis Gage.

Finally, the Writ expressly states that it does not limit the Board's discretion on remand including the exercise of reserved jurisdiction to amend the 1970 release schedule in the future. We note, however, that the Court in its Memorandum of Decision indicated the 1970 fixed release schedule should remain in place until evidence shows the requirements in Condition 11 are not being met.

## 3.0 Other Considerations

- 3.1 The Board has previously reserved jurisdiction to require additional studies to determine the quantity of water that must be released below the Putah Diversion Dam to protect prior rights and to maintain

percolation from the stream channel as it would occur from unregulated flow(Decision 869, Condition 13; Order of April 16, 1970, Condition 13).

3.2 The Bureau is not currently required to conduct additional investigations to determine the quantity of water that should be released below the Putah Diversion Dam (Order WR 79-14, order amending Condition 12). However, the Bureau has continued to submit data required by Condition 12(b) of the April 16, 1970 Order; that is, records of depth to groundwater and estimates of changes in groundwater storage in the area influenced by Putah Creek between mile 4.0 and mile 11.0.

3.3 Finding 1 of Order 79-14 states that the testimony concerning changes in groundwater storage and the relation between Putah Creek flows and groundwater recharge from percolation is contradictory and inconclusive and that the collection of additional data would also be inconclusive. Further, finding 12 of WR 81-11 states: (1) that collection of additional data would not appreciably assist the Board in further defining groundwater recharge requirements; (2) that if spills were to occur during the study period, monitoring would be of little value; and (3) therefore, the Board will not continue to reserve jurisdiction for the purpose of refining groundwater recharge requirements.

3.4 The record does not enable us to determine whether the 1970 fixed release schedule will or will not meet the percolation requirements set forth in Condition 11 of Decision 869, particularly if a prolonged drought similar to pre-project historical periods, such as 1916-1934, should reoccur. Therefore, we will continue to reserve jurisdiction

to protect downstream prior rights and maintain percolation to the stream channel to the extent that water would be available in the absence of the Solano Project. We will also continue to reserve jurisdiction to make such further orders that may be required concerning proper releases of water for such purpose, and to impose conditions providing for additional measurements or studies as may become necessary.

3.5 Although further measurement of groundwater levels will not assist in determining streambed percolation, measurement of depth to groundwater in the area of Putah creek between miles 4.0 and 11.0 can provide a useful indication of groundwater conditions. If measurements of depth to groundwater do not indicate a long term downward trend, it can be assumed that the requirements of Condition 11 of Decision 869 are being met. If the measurements show a lowering trend, specific studies could be initiated under the Board's reserved jurisdiction to determine if Condition 11 is being met. We will therefore continue to require that the Bureau measure and submit records of depth to groundwater in the spring of each year for the reach of the creek between miles 4.0 and 11.0. We will also require that the Bureau continue to submit daily records of diversion to Putah South Canal and flows past Putah Diversion Dam.

3.6 In order to enforce the five cubic feet per second flow criteria ordered by the court (see number 3. of Finding 2.0, above), it is necessary that Putah Creek streamflow data in the vicinity of the Davis gage be recorded on a daily basis. In the past, this measurement has been made by the U. S. Geological Survey, and more recently, by the California Department of Water Resources. We will

require that the Bureau operate and maintain such a gage if no other governmental agency continues such responsibility.

3.8 Order WR 79-14 added terms 22 and 23 to the Bureau's permits. These are standard permit terms that are included in all permits issued. It is the Board's policy to include current versions of these terms when taking action on existing permits. Therefore, the current version of these terms will be added to the Bureau's permits.

3.9 Order WR 79-14 also added term 21 to the Bureau's permits. This term was an adjunct to the revised release schedule set forth in that order, and is no longer applicable under the terms of the Writ of Mandamus.

3.8 Order WR 81-11 added term 24 to the Bureau's permits. This term required consultation with the Department of Fish and Game concerning releases of water to increase the fishery resource in Putah Creek below the Putah Diversion Dam. On January 27, 1982, the Department indicated that a fishery study of Putah Creek is not necessary. Therefore, condition 24 is moot and will not be a part of this order.

#### ORDER

NOW, THEREFORE, IT IS ORDERED that conditions 11, 12, and 13 of Decision 869 and the corresponding terms contained in Permits 10657, 10658, and 10659 issued pursuant to Applications 11199, 12578, and 12716 are amended to the following:

1. Amended condition 11:

11. Permittee shall release water into the Putah Creek channel from Monticello Dam and past the Putah Diversion Dam in accordance with the following schedule:

<u>PERIOD</u>	<u>NORMAL YEAR</u> <u>(cfs)*</u>	<u>DRY YEAR**</u> <u>(cfs)</u>
November through January	25	25
February	16	16
March	26	26
April	46	46
May through July	43	33
August	34	26
September and October	20	15

\* Cubic feet per second.

\*\* When inflow to Lake Berryessa is less than 150,000 acre-feet per annum.

Permittee may reduce the above releases whenever there is both a continuous surface flow between the Putah Diversion Dam and the Davis Gage (mile 7.2) and a flow of not less than five cubic feet per second at the Davis Gage.

2. Amended condition 12:

12. Permittee shall submit the following information to the Board with its annual progress reports, or at such other times as the Board may request:

(a) Daily records of diversions to Putah South Canal and flows past the Putah Diversion Dam.

(b) 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.

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

3. Amended condition 13:

13. The State Water Resources Control Board reserves jurisdiction over the permits to: (1) determine if the schedule of releases required by condition 11 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.

IT IS FURTHER ORDERED that the following terms be added to Permits 10657, 10658, and 10659:

19. A streamflow gage suitable to the State Water Resources Control Board, capable of measuring flows of five cubic feet per second, shall be located in Putah Creek in the vicinity of the Davis Gage (mile 7.2). Permittee shall, as necessary, install, operate, and maintain such a gage if a suitable facility is not being operated by another governmental agency.

20. Pursuant to California Water Code Sections 100 and 275 and the public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public

welfare to protect public trust uses, prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source.

Permittee may be required to implement such programs as:

- (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 permit and to determine accurately water use as against unreasonable water requirements for the authorized project.

No action will be taken pursuant to this paragraph unless the 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 Board also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action takes into account the public interest and is necessary to protect public trust uses. All such actions shall conform to the standard of reasonableness contained in Article X, Section 2 of the California Constitution.

21. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the 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 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.

#### CERTIFICATION

The undersigned, Executive Director of the State Water Resources Control Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on June 21, 1984.

Aye: Carole A. Onorato  
Warren D. Noteware  
Kenneth W. Willis  
Darlene E. Ruiz

No:

Absent:

Abstain:



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Michael A. Campos  
Executive Director

STATE OF CALIFORNIA  
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Permits 10657,  
16058, and 10659 (Applications  
11199, 12578, and 12716)

UNITED STATES BUREAU OF  
RECLAMATION

Permittee

HOWARD Y. KATO, DAVIS AUDUBON  
SOCIETY, PUTAH CREEK RIPARIAN  
OWNERS AND/OR WATER USERS  
ASSOCIATION, SOLANO COUNTY FLOOD  
CONTROL AND WATER CONSERVATION  
DISTRICT

Interested Parties

Order: WR 81-11  
Source: Putah Creek  
County: Yolo, Solano and  
Napa

ORDER AMENDING AND AFFIRMING  
AS AMENDED, ORDER 79-14

BY BOARD MEMBER MITCHELL:

Order No. 79-14 amending Decision 869 and Permits 10657, 10658, and 10659 having been adopted; five petitions for reconsideration of Order WR 79-14 having been filed; the Board having adopted Order WR 79-26, granting the petitions for reconsideration; the scope of reconsideration of Order WR 79-26 having been noticed, and the Board having reviewed the administrative record in the above entitled matter finds as follows:

1. Five petitions for reconsideration were filed on behalf of the following persons:

- (a) Permittee United States Bureau of Reclamation (Bureau)
- (b) Interested party Solano County Flood Control and Water Conservation District (District)
- (c) Interested party Putah Creek Riparian Owners and/or Water Users Association (Association)
- (d) Davis Audubon Society (Society)
- (e) Interested party Howard Y. Kato (Kato)

The State Department of Water Resources (Department), not a party, subsequently requested clarification of Decision 869, terms 12, 15, 16 and 17, and the effect of Water Rights Order 79-14 on these terms.

2. In 1957, Decision 869 was adopted approving issuance of Permits 10657, 10658 and 10659 to the Bureau.

3. The permits authorize the Bureau to divert and store 1,600,000 acre-feet of water in Lake Berryessa at Monticello Dam. Stored water is released downstream and flows into Lake Solano impounded by Putah Diversion Dam (also referred to as Solano Dam) where it is either diverted to Putah South Canal for Solano Project (Project) purposes or released downstream into Putah Creek. Water diverted to Putah South Canal is distributed for municipal use in Fairfield, Vallejo and Vacaville and for irrigation of up to 80,000 acres in Solano County.

4. Condition 11 of the Decision required the Bureau to release water to Putah Creek to protect prior rights and maintain groundwater recharge as it would occur from unregulated flow.

5. Condition 12 of the Decision directed the Bureau to undertake an investigation to determine the amount of water that must be released to Putah Creek to comply with Condition 11.

6. Condition 13 of the Decision provided that the Board could adopt further orders concerning the proper amount of water to be released in accordance with Condition 11.

7. Following a hearing in 1969 the Board on April 16, 1970, adopted an interim fixed monthly release schedule. More recently, the Board held a hearing on February 5, 1979, to determine whether this fixed release schedule was adequate to comply with Condition 11.

8. The Association appeared at the hearing and presented testimony in support of their contention that the existing schedule provides insufficient

flows for prior surface rights and groundwater recharge. The Association proposed a new release schedule which would correct alleged deficiencies in the current release schedule. Other parties presented additional testimony in favor of increased releases for fish and wildlife habitat. The Bureau and the District, beneficiary of the Solano Project, also appeared and presented testimony in favor of maintaining the existing schedule with some minor variations.

9. On June 21, 1979, the Board adopted Order WR 79-14 providing a modified schedule for releasing water to Putah Creek. After consideration of the issues raised by the petitioners, we conclude that, with minor changes, Order WR 79-14 is appropriate as adopted. In order to promote understanding of our conclusion, we will restate and augment our previous findings concerning this matter.

10. The petitions raise the following basic issues:
  - (a) Whether additional investigations should be conducted before the Board adopts a final release schedule to protect prior rights and to maintain groundwater recharge as it would occur from unregulated flow.
  - (b) Whether the Order provides for the release of sufficient water to protect prior rights and to recharge groundwater as it would occur from unregulated flow.
  - (c) Whether the quantity of water that the Order requires be released to Putah Creek is inconsistent with clear Congressional directives.
  - (d) Whether in Decision 869 the Board reserved jurisdiction to require the Bureau to release water to Putah Creek below Solano Dam to preserve aquatic habitat and aquatic life.

Other issues raised by the petitioners will be addressed while responding to these basic issues or at later points in the Order.

11. Petitioner Kato and the Association have requested that the Bureau be required to continue to investigate and report the effects of the revised release schedule on groundwater levels. Petitioner Kato has further requested that the Board reserve jurisdiction to make changes upon completion of additional investigations. The Society has requested an investigation to determine the amount of water necessary to maintain riparian vegetation, aquatic habitat and associated fish and wildlife populations as well as amounts of water necessary for local agriculture and recreation.

12. The Bureau has studied the effect of various release schedules on groundwater for 23 years. The current groundwater data collection program is designed to gather information on a regional<sup>1/</sup> basis and cannot assess the impact of project releases on groundwater users who may be pumping from the Putah Creek underflow or interconnected groundwater. Such underflow or interconnected groundwater could vary greatly in availability and depth without much variation in regional depth or availability. Collection of additional data by the Bureau or others (in accordance with Condition 12) would not appreciably assist the Board in further defining groundwater recharge requirements. Further, if Project spills were to occur in each of the next five years, the requested monitoring would be of little value. Thus, due to the limited value of monitoring, in relation to Permits 10657, 10658 and 10659, and the cost involved, the requirement for continued monitoring was deleted by Order WR 79-14. Since additional investigation will not further refine groundwater recharge requirements, the Board will not continue to reserve jurisdiction for that purpose.

13. The availability of underflow and interconnected groundwater is monitored best by persons who use the water. Such users offered evidence concerning the relationship between Project releases to Putah Creek and

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<sup>1/</sup>The general area between the Solano Diversion Dam, the City of Fairfield, the Yolo Bypass, and the Montezuma Hills.

the water level of underflow and interconnected groundwater. The testimony indicated that the quantity of water in the Creek directly affects the water level in wells near the Creek. No additional study is needed to confirm this relationship.

14. No study need be undertaken to determine the amount of water that should be released to Putah Creek to maintain groundwater at a constant level. Condition 11 of Decision 869 required only that the project be operated in such a manner as to "maintain percolation of water from the stream (Putah Creek) channel as such percolation would occur from unregulated flow". Condition 11 did not require that recharge be sufficient to maintain groundwater at a constant level. This is particularly important since the average groundwater extractions in the area have increased significantly since the project was built.

15. Studies to determine water requirements for maintaining native creek-side vegetation and wildlife are beyond the scope of the Board's reserved jurisdiction over these permits. The Bureau was required to "make periodic surveys of Putah Creek channel in order to determine consumptive use by native vegetation". (Term 12(h) of Decision 869) These surveys were to provide information necessary to account for all the flow of Putah Creek and did not imply that the Project was responsible for maintaining or enhancing such vegetation. This term was deleted in 1970 when term 12 was amended.

16. Studies to determine the need for flows - **over and above amounts released for prior rights - to enhance aquatic habitat and fishlife in Putah Creek below** Lake Solano are also beyond the scope of the Board's reserved jurisdiction over these permits. The requirement to maintain a "live stream" in Putah Creek below Lake Solano (Decision 869, Condition 16) and the requirement to prepare a fishery study (Decision 869, Condition 17) have been the subject of much confusion. This subject will be addressed more fully later in this Order.

17. A determination whether additional studies are needed to ascertain the amount of water needed to protect prior rights and maintain groundwater recharge as it would occur from unregulated flow must turn, in part, on the quality of existing data. By requesting more study and that the Board reserve jurisdiction, petitioners Kato and the Association implicitly suggest that more water should be released to Putah Creek to protect prior rights and to maintain groundwater recharge. More directly, the Bureau and the District assert that Order WR 79-14 directs the Bureau to release more water to Putah Creek (than under the preceding order of the Board) and that the record does not contain substantial evidence to support the claim that additional water should be released.

18. The protection of prior rights along Putah Creek is accomplished by assuring groundwater recharge as it would occur from unregulated flow. Prior to construction of the Project, large amounts of water flowed in Putah Creek during winter months. During late summer and early fall little or no water might flow in Putah Creek. A portion of the larger flows and most, if not all, of the summer flows recharged the underflow of Putah Creek and interconnected groundwater. The greater portion of winter flows passed out of Putah Creek and into the Yolo Bypass and the Sacramento and San Joaquin Delta. It is this quantity of water that the Project was constructed to capture and put to beneficial use.

19. Controversy over the amount of water Putah Creek contributes to groundwater began in the early 1950's when the project was being planned. Both the United States Geological Survey and the former State Division of Water Resources (DWR) estimated the average annual groundwater recharge under pre-project conditions from 15,000 to 30,000 acre-feet per annum (afa).

20. Twenty-three years of project operating experience and data collection have not produced a precise answer to the question of how much

water must be released to Putah Creek to assure groundwater recharge as it would occur from unregulated flow. Further, as previously indicated, collection of additional data would not appreciably assist the Board in refining groundwater recharge requirements. It is plainly time to make a decision.

21. While precise answers are not possible, there is substantial evidence to support the release schedule adopted by Order WR 79-14. The release schedule adopted by the Board in 1970 was based upon analysis of data from 12 years of releases to Putah Creek. With adjustments, it was assumed that the monthly release required to satisfy downstream surface and groundwater rights was taken as the difference between monthly releases to Putah Creek and the flow of the creek at the gaging station near Davis. Reductions were permitted during dry years. Under this schedule, normal year releases were reduced to 22,145 acre-feet per year (afa), and dry year releases were reduced to 19,223 afa. (Board Staff Report, October 1978)

22. The 1970 fixed release schedule did not allow for variation inherent in Putah Creek streamflow. During wet winters, the fixed release schedule caused excessive flow to reach the Yolo Bypass by requiring releases in excess of that needed for a live stream. During drought years the fixed release schedule may not have been sufficient to maintain a live stream to the Bypass. In the latter case groundwater users could have been deprived of recharge to which they would otherwise be entitled. (Board Staff Report, October 1978)

23. The release schedule adopted by Order WR 79-14 makes adjustments to correct for the defects in the 1970 release schedule. Under the 1979 schedule the Bureau will be required to release no more than about 27,000 afa during any year. However, this schedule is qualified by allowing the permittee the option of reducing releases so long as surface flow throughout Putah Creek is maintained and the flow at the Davis gaging station does not fall below 5 cubic feet per second.

This provision will enable the Bureau to significantly reduce the 27,000 afa maximum release requirement in normal years. Further, the new schedule provides for higher minimum flows during the months of November and December. These flows are more likely to have a beneficial impact on groundwater than would similar releases during summer months when water is subject to higher rates of evaporation, transpiration and surface diversion. (Engineering Staff Analysis of Record, May 3, 1979)<sup>2/</sup>

24. The Bureau contends that Order WR 79-14 "...reduces the firm yield of the Project contrary to its Congressional purposes." Although the Bureau's petition for reconsideration provided no supporting recitals or argument, the bare contention raises the specter of the New Melones controversy in California v. United States, 436 U. S. 32, 985 cr. 2985 (1978). In that case, the U. S. Supreme Court held that the Board may impose any condition in a water right entitlement issued to the Bureau for projects subject to Section 8 of the Reclamation Act of 1902, which is not inconsistent with clear Congressional directives. Section 8 provides that:

"... nothing in this Act shall be construed as affecting or intending to affect or to in any way interfere with the laws of any States...relating to the control, appropriation, or use, or distribution of water used in irrigation...and the Secretary of the Interior in carrying out the provision of this Act, shall proceed in conformity with such laws...."

25. Given the nature of this issue, the Bureau was requested to provide the Board additional information concerning this contention. The essence of the Bureau's response was that the revised release schedule is contrary to Congressional purposes because: (a) The construction of the Solano

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<sup>2/</sup> Persons wishing a fuller explanation of the Board's conclusions on this issue should consult (1) the Staff Analysis of Data Submitted by the Bureau of Reclamation in Conformance with the Terms of Decision 869 and Subsequent Amendments, October 1978; and (2) the Engineering Staff Analysis of Record, May 3, 1979, which more fully express the basis of our conclusions in Order WR 79-14 and this Order.

Project was authorized only if the Secretary of the Interior determined that the cost of the proposed project would be paid for in accordance with the cost-benefit assessment provided by the Reclamation Act of 1939; (b) that the Secretary made such a determination based on the estimated or projected firm water supply that would be developed; and (c) that an increase in releases to Putah Creek would reduce the Project's firm yield; (d) that the quantity of water delivered to the District and the revenues obtained therefrom would be reduced; and (e) the Secretary's determination that the Project would pay for itself within 50 years would be confounded.

26. The Board has previously concluded that a Congressional directive as used in the Supreme Court's decision means a prohibition or requirement contained in a law adopted by Congress.<sup>3/</sup> Clearly the foregoing circumstance cannot be qualified as a Congressional prohibition. Estimates of Project yield and amounts of water to satisfy prior rights and groundwater recharge as it would occur from unregulated flows are just estimates. That the Bureau does not view such estimates as Congressional directives is evidenced by the fact that the Bureau did not petition the Board to reduce releases to Putah Creek to 22,145 afa until 1969 after 12 years of operational releases exceeding the 15,000 afa estimate upon which the Secretary made his decision.

Further, as noted in paragraph 23, review of the new release schedule does not lead to the conclusion that the Project's firm yield will be reduced. We conclude this contention is without merit.

27. The Bureau also contends that any reduction in the firm yield will infringe upon the Bureau's contract to deliver water to the District.

28. The Bureau, in designing the Solano Project, estimated precipitation, runoff, streamflow, and made allowances for water needed for prior rights. The yield thus estimated is not a precise number but falls

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<sup>3/</sup> See Order WR 79-16.

within a normal range of accuracy inherent to planning studies. Jurisdiction was reserved for the purpose of obtaining actual operating experience and additional data so as to refine the estimates. Yield is not a precise amount.<sup>4/</sup> Any water project operator runs a risk of not being able to deliver the estimated yield. That risk is dependent upon the detail to which planning studies were done, the judgment of the planners and the degree to which historical hydrologic conditions accurately predict the future.

29. The record does not indicate that Order WR 79-14 will reduce the yield of the Project. During the period 1957-76, median flows past Solano Dam were 69,343 acre-feet. (See Table VI-1 of the October 1978 staff report.) The release schedule adopted in Order WR 79-14 and the reduction allowed in releases when flows at Davis exceed 5 cfs will probably result in lower releases than the old "live stream criteria" adopted by the Bureau after Decision 869.

30. The action taken by the Board in Order WR 79-14 represents a refinement of the release schedule imposed to protect prior rights, not a change.

31. The Association, the Society, and the Department raise the issue of whether the Board reserved jurisdiction in Decision 869 to require the Bureau to release water to Putah Creek below the Solano Dam to preserve aquatic habitat and aquatic life.

32. Testimony concerning the water needs for fishlife was received at the 1956, 1969 and 1979 hearings. The importance of the Putah Creek fishery was noted in Decision 869. The Board recognized that Putah Creek had been one of the most important Smallmouth Bass fishing streams in the State. It was noted that water to be released from Monticello Dam would be too cold for Smallmouth Bass. As a result, the State Department of Fish and Game

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<sup>4/</sup> The Bureau's 1975 contract with the District states that the contract was executed on the "assumption" that certain amounts of water would be produced.

proposed to stock trout in Putah Creek between Monticello Dam and the Solano Dam. It was understood that the Smallmouth Bass fishery would be replaced with a trout fishery above the Solano Dam.

33. Three conditions were included in Decision 869 for the protection of fishlife. All three conditions were adopted substantially as proposed by the Department of Fish and Game. The first condition required a minimum flow of 10 cfs between Monticello Dam and Lake Solano (Condition 15). The second condition required that the water released from Lake Solano to satisfy prior rights be released in a manner that would maintain a "live stream" as far downstream as possible, consistent with the purposes of the project and the requirements of downstream users (Condition 16). The third condition included the requirements of water for maintenance of fishlife in Putah Creek as one of the objectives in the study to determine proper releases for prior vested rights and groundwater recharge (Condition 17).

34. Condition 16 should be considered in conjunction with Condition 11 of Decision 869 requiring the Bureau to release water to Putah Creek to protect prior rights and to maintain groundwater recharge as it would occur from unregulated flow. In the absence of Condition 16, the Bureau would have been permitted to release a great deal of water during a few months of the year and little or no water for most of the year. During the early years of operation the Bureau chose to comply with Conditions 11 and 16 by releasing water from the Solano Dam at the same rate as inflow to Lake Berryessa and Lake Solano. Releases were reduced when flow at the lower gaging station at Davis was greater than 5 cfs. The record does not disclose that the Bureau ever undertook the study called for by Condition 17.<sup>5/</sup>

<sup>5/</sup> The record does show that the Department of Fish and Game conducted a study of the trout fishery requirements in Putah Creek above Solano Dam and presented a report on the subject to the Board at the 1969 hearing. A need for additional flows below Lake Berryessa during the late fall months was demonstrated. The deficiency was resolved in the Board order adopted in 1970 by increasing the flow requirement in those months in the fixed release schedule.

35. On April 16, 1970, the Board amended Condition 11. The new condition required the Bureau to release fixed amounts of water for each month to Putah Creek below Solano Dam. The requirement that the Bureau implement a live stream release program (Condition 16) was by implication rescinded by the adoption of the fixed release schedule. It does not follow, however, that the Board rescinded the objective of maintaining fishlife in Putah Creek consistent with project purposes and the rights of prior users or that the Board rescinded the study required by Condition 17.

36. During the proceeding to consider whether a fixed release schedule should be adopted (June 17, 1969), and the proceeding to consider whether the fixed release schedule should be amended (February 5, 1979) the Board did not receive evidence suggesting how releases from Solano Dam to protect prior rights might be made consistent with the objective of maintaining fishlife below Solano Dam as far as possible. Order WR 79-14 should be amended to reflect the Board's continued reserved jurisdiction over this matter to allow a study to be conducted if recommended by the California Department of Fish and Game.

37. It should be recognized, however, that Putah Creek has already been enhanced by releases from Solano Dam. More water now flows in Putah Creek immediately below Solano Dam during late summer and fall than was the case in most pre-project water years. The fixed release schedule adopted by the Board in 1970 required releases from Solano Dam to Putah Creek of only 25 cfs during November. Order WR 79-14 may further increase releases in November and other months. In addition, the provision for reduced releases during dry years was eliminated in Order WR 79-14. This change in the release schedule should aid fishlife and fish habitat by providing greater summer flows in dry years.

38. A careful reading of conditions 12 through 17 of Decision 869, leads us to conclude that releases of water below Putah Diversion Dam were to satisfy only prior rights and groundwater recharge. Jurisdiction was not reserved to require the Bureau to release additional quantities of water to Putah Creek below Putah Diversion Dam to preserve aquatic habitat and aquatic life. Jurisdiction was reserved to make prior rights releases as beneficial as possible to the fish life below Solano Dam.

39. Petitioner Kato and the District contend that the Board should have prepared and adopted environmental documents along with Order WR 79-14. The Board finds that the project is exempt as an ongoing project in accordance with Title 14, California Administrative Code, Section 15070(b) and Title 23, California Administrative Code, Section 2715(b). A Notice of Exemption was prepared and sent to the Secretary for Resources on August 1, 1979.

40. The Bureau contends that Order WR 79-14 requires that water be wasted and unreasonably used in violation of Water Code Sections 100 and 275. The Bureau cites no legal authority for this contention. The fact that prior rights are entitled to protection from the effects of the project hardly constitutes waste or unreasonable use. Further, that portion of Condition 11 authorizing the reduction of releases from Solano Dam when flows at the Davis Gage exceed 5 cfs enables the Bureau to conserve all practicable amounts of water while protecting prior rights to surface waters and interests in groundwater.

41. The Bureau contends that by adopting Condition 22 of Order WR 79-14, the Board is asserting that it has the authority to require operation of the Solano Project in a manner "inconsistent with Congressional directives".

42. Condition 22 in Order WR 79-14 is in part a restatement of Condition 10, Decision 869 which reads as follows:

"All rights and privileges under this permit including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion."

The State Water Resources Control Board is the successor agency to the State Water Rights Board. Water Code Sections 100 and 275 were and are the legal basis for the inclusion of this condition in permits for water rights.

43. Condition 10 is restated in Order WR 79-14 as Condition 22.

Condition 22 provides:

"Pursuant to California Water Code Sections 100 and 275, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement such programs as (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 permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the 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."

44. Plainly, the first paragraph of Condition 22 is merely a simple restatement of Condition 10. The second paragraph of Condition 22 makes no substantive addition to the first paragraph. Rather, the second paragraph contains language which is explanatory of the first paragraph.

45. Congress has provided that the Solano Project be subject to California law of water rights (see paragraph 24 above). Condition 10 as amplified by Condition 22 is part and parcel of California water law. **Stated most simply, the Bureau's objection appears to be that Congress has somewhere clearly directed that the project be operated free from California's Constitutional prohibitions of waste, unreasonable use, unreasonable method of use, and unreasonable method of diversion of water. That very general objection has no merit. However, at such time, if ever, that the Board may hold a hearing in accordance with Condition 22, the Bureau may raise specific objections to any measures the Board may consider imposing on the Bureau.**

46. The Bureau contends that Order WR 79-14 is vague and uncertain as to the Bureau's rights to have the release schedule modified during dry years.

47. Order WR 79-14 provides that the following Condition 21 be added to the Bureau's permits:

"Should a prolonged drought create an emergency by threatening the water supply to municipalities dependent on the Solano Project, the Board may, upon petition by permittee and opportunity for hearing, modify the release schedule set forth above for the duration of such emergency."

Order WR 79-14 does not define the conditions of a prolonged drought. At any time the Bureau believes that a prolonged drought which threatens municipal supply exists, it may petition the Board. At that time the particular hydrologic conditions of that period will be evaluated.

48. The Association has expressed concern regarding Condition 21. It contends that the condition will favor Solano Project beneficiaries with water that should be received by holders of prior water rights and users of groundwater along Putah Creek.

49. The release schedule provided by Order WR 79-14 is an averaging process. This schedule may result in higher releases during drought years and lower flows in wet years than would occur from unregulated flow. An extended drought could cause an emergency water shortage in municipalities dependent on the Solano Project for a water supply. During a drought, scheduled releases would provide more streamflow for prior rights along Putah Creek than would exist under pre-project conditions. In order to avoid this result, Condition 21 allows the Bureau to petition for a temporary reduction of the release schedule. In acting on such a petition, the Board would still be required to satisfy prior rights to the extent they would have been satisfied by unregulated stream flow. An alternative would be to eliminate Condition 21 and return to the live stream criteria which, during a drought, would reduce releases to practically nothing.\* None of the parties have advocated the return to the live stream requirement. Live stream releases would adversely affect both downstream and Project water users. Condition 21 does not favor irrigation interests who receive Project water. Cutbacks in irrigation deliveries would not cause term 21 to take effect. Severe irrigation cutbacks could be made before emergency level municipal cutbacks would be considered. We conclude that Condition 21 is appropriate.

50. Petitioner Kato objects to finding No. 2 of Decision 79-14 which states that "Project spills contribute much more to maintaining groundwater recharge than do controlled releases." We agree that the statement is not entirely accurate. Finding No. 2 of Order WR 79-14 should be changed to read as follows:

"The relationship between project releases and groundwater recharge is not easily quantified. Factors which influence groundwater recharge, other than project releases, include:  
underflow from other groundwater areas, tributary inflow below

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\*The live stream criteria permitted releases to be reduced to an amount equal to the unregulated flow of the creek.

Lake Solano, rising groundwater, sewage discharges, changes in groundwater extractions, availability of vacant groundwater storage space and deep percolation of rainfall and applied irrigation water in areas other than the Putah Creek stream channel.<sup>6/</sup> However, a qualitative relationship can be shown. That is, groundwater storage declines when releases approximate either the past live stream or fixed release schedule. During those years in which large spills occur, groundwater storage increases."

51. In addition to its contentions, the Association has requested that the Bureau not be allowed to reduce releases from Solano Dam to Putah Creek when a flow of 5 cfs is at the Davis Gage unless the Bureau installs and operates a gage to measure the flow at Stevenson Bridge to assure a flow of water at that point.

52. Term 11 of Order WR 79-14 requires that a live stream or continuous thread of water must exist at all points between Solano Dam and the Davis gage whenever releases are less than the scheduled rate. Measurement of a thread of streamflow by a flow recorder would be difficult and of questionable accuracy. Also, measurement at Stevenson Bridge would not guarantee the existence of a continuous thread of water downstream. The best method for observation of the continuous thread of water would be through visual observations by landowners adjacent to Putah Creek.

53. The Association further requests that the release schedule adopted by Order WR 79-14 be amended to assure that releases occur evenly over a monthly period.

54. The Association is concerned that the Bureau may release water in a fluctuating manner. The Association fears that large releases will be averaged with smaller releases in order to meet the flow requirements specified in Term 11, WR Order 79-14. The project record of operation shows that since the 1970 amendment to D 869 the Bureau has not released water in

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<sup>6/</sup> Project releases include scheduled and unscheduled (spills) amounts of water passing to Putah Creek from the Solano Dam.

this manner. Release rates are specified in cubic feet per second which is an instantaneous rate to be constantly maintained. If the Board had intended to allow averaging, then monthly release requirements would have been specified in acre-feet per month.

CONCLUSION

55. After consideration of the foregoing objections and requests, it is concluded that Order WR 79-14 be amended as provided below.

ORDER

NOW, THEREFORE, IT IS ORDERED that Order 79-14 be amended as follows:

1. Finding No. 2 shall be changed to read:

"The relationship between project releases<sup>7/</sup> and groundwater recharge is not easily quantified. Factors which influence groundwater recharge, other than project releases, include: underflow from other groundwater areas, tributary inflow below Lake Solano, rising groundwater, sewage discharges, changes in groundwater extractions, availability of vacant groundwater storage space and deep percolation of rainfall and applied irrigation water in areas other than the Putah Creek stream channel. However, a qualitative relationship can be shown. That is, groundwater storage declines when releases approximate either of the past live stream or fixed release schedules. During those years in which large spills occur, groundwater storage increases."

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<sup>7/</sup> Project releases include scheduled and unscheduled (spills) amounts of water passing to Putah Creek from Lake Solano.

2. Term 11. shall be changed to read as follows:

Permittee shall release water into the Putah Creek channel from Monticello Dam and past the Putah Diversion Dam in accordance with the following schedule:

<u>Month</u>	<u>Required Release (cfs)</u>
Oct.	20
Nov.	50
Dec.	50
Jan.	35
Feb.	30
Mar.	30
Apr.	30
May	40
Jun.	40
Jul.	43
Aug.	34
Sept.	20

Releases in excess of amounts in the above schedule are not required. However, permittee may reduce releases whenever both of the following conditions exist: (1) there is continuous surface flow between the Putah Diversion Dam and the Davis Gage (mile 7.2) and (2) there is a flow of not less than 5 cubic feet per second (cfs) at the Davis Gage. Flows must be gaged by suitable facilities capable of measuring flows of 5 cfs.

IT IS FURTHER ORDERED that Order WR 80-14 be amended by adding the following new condition:

24. The permittee shall consult with the California Department of Fish and Game (Department) to determine if the release rates required in Condition 2 above, could be adjusted to increase substantially the fishery resource in Putah Creek below the Solano Diversion Dam. If the Department determines that a substantial increase is possible, the permittee and the Department shall submit jointly to the Board by January 1, 1982, a plan for a fishery study as required by Term 17 of Decision 869. Upon approval by the Board, the Department or the permittee shall conduct the study. If the Department conducts the study, the permittee shall reimburse the Department for the cost of the study not in excess of \$5,000. The Board retains jurisdiction over subject permits to act on the results of the study after opportunity for hearing. However, jurisdiction on this matter will be terminated without further Board action if the Department determines that enhancement is not a reasonable expectation of a fishery study.

Dated: August 20, 1981

BY L. L. Mitchell  
L. L. Mitchell, Vice-Chairman

Carla M. Bard  
Carla M. Bard, Chairwoman

Jill B. Dunlap  
Jill B. Dunlap, Member

F. K. Aljibury  
F. K. Aljibury, Member

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.

23. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the 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 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 discharge.

Date: JUNE 21, 1979

We Concur:

/S/ W. DON MAUGHAN

W. Don Maughan, Chairman

/S/ L. L. MITCHELL

L. L. Mitchell, Member

/S/ WILLIAM J. MILLER

William J. Miller, Member

/S/ CARLA M. BARD

Carla M. Bard, Member

STATE OF CALIFORNIA  
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Permits 10657,  
16058, and 10659 (Applications  
11199, 12578, and 12716)

UNITED STATES BUREAU OF  
RECLAMATION

Permittee

HOWARD Y. KATO, DAVIS AUDUBON  
SOCIETY, PUTAH CREEK RIPARIAN  
OWNERS AND/OR WATER USERS  
ASSOCIATION, SOLANO COUNTY FLOOD  
CONTROL AND WATER CONSERVATION  
DISTRICT

Interested Parties)

Order: WR 81-11

Source: Putah Creek

County: Yolo, Solano and  
Napa

ORDER AMENDING AND AFFIRMING  
AS AMENDED, ORDER 79-14

BY BOARD MEMBER MITCHELL:

Order No. 79-14 amending Decision 869 and Permits 10657, 10658, and 10659 having been adopted; five petitions for reconsideration of Order WR 79-14 having been filed; the Board having adopted Order WR 79-26, granting the petitions for reconsideration; the scope of reconsideration of Order WR 79-26 having been noticed, and the Board having reviewed the administrative record in the above entitled matter finds as follows:

1. Five petitions for reconsideration were filed on behalf of the following persons:

- (a) Permittee United States Bureau of Reclamation (Bureau)
- (b) Interested party Solano County Flood Control and Water Conservation District (District)
- (c) Interested party Putah Creek Riparian Owners and/or Water Users Association (Association)
- (d) Davis Audubon Society (Society)
- (e) Interested party Howard Y. Kato (Kato)

The State Department of Water Resources (Department), not a party, subsequently requested clarification of Decision 869, terms 12, 15, 16 and 17, and the effect of Water Rights Order 79-14 on these terms.

2. In 1957, Decision 869 was adopted approving issuance of Permits 10657, 10658 and 10659 to the Bureau.

3. The permits authorize the Bureau to divert and store 1,600,000 acre-feet of water in Lake Berryessa at Monticello Dam. Stored water is released downstream and flows into Lake Solano impounded by Putah Diversion Dam (also referred to as Solano Dam) where it is either diverted to Putah South Canal for Solano Project (Project) purposes or released downstream into Putah Creek. Water diverted to Putah South Canal is distributed for municipal use in Fairfield, Vallejo and Vacaville and for irrigation of up to 80,000 acres in Solano County.

4. Condition 11 of the Decision required the Bureau to release water to Putah Creek to protect prior rights and maintain groundwater recharge as it would occur from unregulated flow.

5. Condition 12 of the Decision directed the Bureau to undertake an investigation to determine the amount of water that must be released to Putah Creek to comply with Condition 11.

6. Condition 13 of the Decision provided that the Board could adopt further orders concerning the proper amount of water to be released in accordance with Condition 11.

7. Following a hearing in 1969 the Board on April 16, 1970, adopted an interim fixed monthly release schedule. More recently, the Board held a hearing on February 5, 1979, to determine whether this fixed release schedule was adequate to comply with Condition 11.

8. The Association appeared at the hearing and presented testimony in support of their contention that the existing schedule provides insufficient

flows for prior surface rights and groundwater recharge. The Association proposed a new release schedule which would correct alleged deficiencies in the current release schedule. Other parties presented additional testimony in favor of increased releases for fish and wildlife habitat. The Bureau and the District, beneficiary of the Solano Project, also appeared and presented testimony in favor of maintaining the existing schedule with some minor variations.

9. On June 21, 1979, the Board adopted Order WR 79-14 providing a modified schedule for releasing water to Putah Creek. After consideration of the issues raised by the petitioners, we conclude that, with minor changes, Order WR 79-14 is appropriate as adopted. In order to promote understanding of our conclusion, we will restate and augment our previous findings concerning this matter.

10. The petitions raise the following basic issues:

- (a) Whether additional investigations should be conducted before the Board adopts a final release schedule to protect prior rights and to maintain groundwater recharge as it would occur from unregulated flow.
- (b) Whether the Order provides for the release of sufficient water to protect prior rights and to recharge groundwater as it would occur from unregulated flow.
- (c) Whether the quantity of water that the Order requires be released to Putah Creek is inconsistent with clear Congressional directives.
- (d) Whether in Decision 869 the Board reserved jurisdiction to require the Bureau to release water to Putah Creek below Solano Dam to preserve aquatic habitat and aquatic life.

Other issues raised by the petitioners will be addressed while responding to these basic issues or at later points in the Order.

11. Petitioner Kato and the Association have requested that the Bureau be required to continue to investigate and report the effects of the revised release schedule on groundwater levels. Petitioner Kato has further requested that the Board reserve jurisdiction to make changes upon completion of additional investigations. The Society has requested an investigation to determine the amount of water necessary to maintain riparian vegetation, aquatic habitat and associated fish and wildlife populations as well as amounts of water necessary for local agriculture and recreation.

12. The Bureau has studied the effect of various release schedules on groundwater for 23 years. The current groundwater data collection program is designed to gather information on a regional<sup>1/</sup> basis and cannot assess the impact of project releases on groundwater users who may be pumping from the Putah Creek underflow or interconnected groundwater. Such underflow or interconnected groundwater could vary greatly in availability and depth without much variation in regional depth or availability. Collection of additional data by the Bureau or others (in accordance with Condition 12) would not appreciably assist the Board in further defining groundwater recharge requirements. Further, if Project spills were to occur in each of the next five years, the requested monitoring would be of little value. Thus, due to the limited value of monitoring, in relation to Permits 10657, 10658 and 10659, and the cost involved, the requirement for continued monitoring was deleted by Order WR 79-14. Since additional investigation will not further refine groundwater recharge requirements, the Board will not continue to reserve jurisdiction for that purpose.

13. The availability of underflow and interconnected groundwater is monitored best by persons who use the water. Such users offered evidence concerning the relationship between Project releases to Putah Creek and

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<sup>1/</sup>The general area between the Solano Diversion Dam, the City of Fairfield, the Yolo Bypass, and the Montezuma Hills.

the water level of underflow and interconnected groundwater. The testimony indicated that the quantity of water in the Creek directly affects the water level in wells near the Creek. No additional study is needed to confirm this relationship.

14. No study need be undertaken to determine the amount of water that should be released to Putah Creek to maintain groundwater at a constant level. Condition 11 of Decision 869 required only that the project be operated in such a manner as to "maintain percolation of water from the stream (Putah Creek) channel as such percolation would occur from unregulated flow". Condition 11 did not require that recharge be sufficient to maintain groundwater at a constant level. This is particularly important since the average groundwater extractions in the area have increased significantly since the project was built.

15. Studies to determine water requirements for maintaining native creek-side vegetation and wildlife are beyond the scope of the Board's reserved jurisdiction over these permits. The Bureau was required to "make periodic surveys of Putah Creek channel in order to determine consumptive use by native vegetation". (Term 12(h) of Decision 869) These surveys were to provide information necessary to account for all the flow of Putah Creek and did not imply that the Project was responsible for maintaining or enhancing such vegetation. This term was deleted in 1970 when term 12 was amended.

16. Studies to determine the need for flows - **over and above amounts released for prior rights - to enhance aquatic habitat and fishlife in Putah Creek below** Lake Solano are also beyond the scope of the Board's reserved jurisdiction over these permits. The requirement to maintain a "live stream" in Putah Creek below Lake Solano (Decision 869, Condition 16) and the requirement to prepare a fishery study (Decision 869, Condition 17) have been the subject of much confusion. This subject will be addressed more fully later in this Order.

17. A determination whether additional studies are needed to ascertain the amount of water needed to protect prior rights and maintain groundwater recharge as it would occur from unregulated flow must turn, in part, on the quality of existing data. By requesting more study and that the Board reserve jurisdiction, petitioners Kato and the Association implicitly suggest that more water should be released to Putah Creek to protect prior rights and to maintain groundwater recharge. More directly, the Bureau and the District assert that Order WR 79-14 directs the Bureau to release more water to Putah Creek (than under the preceding order of the Board) and that the record does not contain substantial evidence to support the claim that additional water should be released.

18. The protection of prior rights along Putah Creek is accomplished by assuring groundwater recharge as it would occur from unregulated flow. Prior to construction of the Project, large amounts of water flowed in Putah Creek during winter months. During late summer and early fall little or no water might flow in Putah Creek. A portion of the larger flows and most, if not all, of the summer flows recharged the underflow of Putah Creek and interconnected groundwater. The greater portion of winter flows passed out of Putah Creek and into the Yolo Bypass and the Sacramento and San Joaquin Delta. It is this quantity of water that the Project was constructed to capture and put to beneficial use.

19. Controversy over the amount of water Putah Creek contributes to groundwater began in the early 1950's when the project was being planned. Both the United States Geological Survey and the former State Division of Water Resources (DWR) estimated the average annual groundwater recharge under pre-project conditions from 15,000 to 30,000 acre-feet per annum (afa).

20. Twenty-three years of project operating experience and data collection have not produced a precise answer to the question of how much

water must be released to Putah Creek to assure groundwater recharge as it would occur from unregulated flow. Further, as previously indicated, collection of additional data would not appreciably assist the Board in refining groundwater recharge requirements. It is plainly time to make a decision.

21. While precise answers are not possible, there is substantial evidence to support the release schedule adopted by Order WR 79-14. The release schedule adopted by the Board in 1970 was based upon analysis of data from 12 years of releases to Putah Creek. With adjustments, it was assumed that the monthly release required to satisfy downstream surface and groundwater rights was taken as the difference between monthly releases to Putah Creek and the flow of the creek at the gaging station near Davis. Reductions were permitted during dry years. Under this schedule, normal year releases were reduced to 22,145 acre-feet per year (afa), and dry year releases were reduced to 19,223 afa. (Board Staff Report, October 1978)

22. The 1970 fixed release schedule did not allow for variation inherent in Putah Creek streamflow. During wet winters, the fixed release schedule caused excessive flow to reach the Yolo Bypass by requiring releases in excess of that needed for a live stream. During drought years the fixed release schedule may not have been sufficient to maintain a live stream to the Bypass. In the latter case groundwater users could have been deprived of recharge to which they would otherwise be entitled. (Board Staff Report, October 1978)

23. The release schedule adopted by Order WR 79-14 makes adjustments to correct for the defects in the 1970 release schedule. Under the 1979 schedule the Bureau will be required to release no more than about 27,000 afa during any year. However, this schedule is qualified by allowing the permittee the option of reducing releases so long as surface flow throughout Putah Creek is maintained and the flow at the Davis gaging station does not fall below 5 cubic feet per second.

This provision will enable the Bureau to significantly reduce the 27,000 afa maximum release requirement in normal years. Further, the new schedule provides for higher minimum flows during the months of November and December. These flows are more likely to have a beneficial impact on groundwater than would similar releases during summer months when water is subject to higher rates of evaporation, transpiration and surface diversion. (Engineering Staff Analysis of Record, May 3, 1979)<sup>2/</sup>

24. The Bureau contends that Order WR 79-14 "...reduces the firm yield of the Project contrary to its Congressional purposes." Although the Bureau's petition for reconsideration provided no supporting recitals or argument, the bare contention raises the specter of the New Melones controversy in California v. United States, 436 U. S. 32, 985 cr. 2985 (1978). In that case, the U. S. Supreme Court held that the Board may impose any condition in a water right entitlement issued to the Bureau for projects subject to Section 8 of the Reclamation Act of 1902, which is not inconsistent with clear Congressional directives. Section 8 provides that:

"... nothing in this Act shall be construed as affecting or intending to affect or to in any way interfere with the laws of any States...relating to the control, appropriation, or use, or distribution of water used in irrigation...and the Secretary of the Interior in carrying out the provision of this Act, shall proceed in conformity with such laws...."

25. Given the nature of this issue, the Bureau was requested to provide the Board additional information concerning this contention. The essence of the Bureau's response was that the revised release schedule is contrary to Congressional purposes because: (a) The construction of the Solano

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<sup>2/</sup> Persons wishing a fuller explanation of the Board's conclusions on this issue should consult (1) the Staff Analysis of Data Submitted by the Bureau of Reclamation in Conformance with the Terms of Decision 869 and Subsequent Amendments, October 1978; and (2) the Engineering Staff Analysis of Record, May 3, 1979, which more fully express the basis of our conclusions in Order WR 79-14 and this Order.

Project was authorized only if the Secretary of the Interior determined that the cost of the proposed project would be paid for in accordance with the cost-benefit assessment provided by the Reclamation Act of 1939; (b) that the Secretary made such a determination based on the estimated or projected firm water supply that would be developed; and (c) that an increase in releases to Putah Creek would reduce the Project's firm yield; (d) that the quantity of water delivered to the District and the revenues obtained therefrom would be reduced; and (e) the Secretary's determination that the Project would pay for itself within 50 years would be confounded.

26. The Board has previously concluded that a Congressional directive as used in the Supreme Court's decision means a prohibition or requirement contained in a law adopted by Congress.<sup>3/</sup> Clearly the foregoing circumstance cannot be qualified as a Congressional prohibition. Estimates of Project yield and amounts of water to satisfy prior rights and groundwater recharge as it would occur from unregulated flows are just estimates. That the Bureau does not view such estimates as Congressional directives is evidenced by the fact that the Bureau did not petition the Board to reduce releases to Putah Creek to 22,145 afa until 1969 after 12 years of operational releases exceeding the 15,000 afa estimate upon which the Secretary made his decision.

Further, as noted in paragraph 23, review of the new release schedule does not lead to the conclusion that the Project's firm yield will be reduced. We conclude this contention is without merit.

27. The Bureau also contends that any reduction in the firm yield will infringe upon the Bureau's contract to deliver water to the District.

28. The Bureau, in designing the Solano Project, estimated precipitation, runoff, streamflow, and made allowances for water needed for prior rights. The yield thus estimated is not a precise number but falls

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<sup>3/</sup> See Order WR 79-16.

within a normal range of accuracy inherent to planning studies. Jurisdiction was reserved for the purpose of obtaining actual operating experience and additional data so as to refine the estimates. Yield is not a precise amount.<sup>4/</sup> Any water project operator runs a risk of not being able to deliver the estimated yield. That risk is dependent upon the detail to which planning studies were done, the judgment of the planners and the degree to which historical hydrologic conditions accurately predict the future.

29. The record does not indicate that Order WR 79-14 will reduce the yield of the Project. During the period 1957-76, median flows past Solano Dam were 69,343 acre-feet. (See Table VI-1 of the October 1978 staff report.) The release schedule adopted in Order WR 79-14 and the reduction allowed in releases when flows at Davis exceed 5 cfs will probably result in lower releases than the old "live stream criteria" adopted by the Bureau after Decision 869.

30. The action taken by the Board in Order WR 79-14 represents a refinement of the release schedule imposed to protect prior rights, not a change.

31. The Association, the Society, and the Department raise the issue of whether the Board reserved jurisdiction in Decision 869 to require the Bureau to release water to Putah Creek below the Solano Dam to preserve aquatic habitat and aquatic life.

32. Testimony concerning the water needs for fishlife was received at the 1956, 1969 and 1979 hearings. The importance of the Putah Creek fishery was noted in Decision 869. The Board recognized that Putah Creek had been one of the most important Smallmouth Bass fishing streams in the State. It was noted that water to be released from Monticello Dam would be too cold for Smallmouth Bass. As a result, the State Department of Fish and Game

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<sup>4/</sup> The Bureau's 1975 contract with the District states that the contract was executed on the "assumption" that certain amounts of water would be produced.

proposed to stock trout in Putah Creek between Monticello Dam and the Solano Dam. It was understood that the Smallmouth Bass fishery would be replaced with a trout fishery above the Solano Dam.

33. Three conditions were included in Decision 869 for the protection of fishlife. All three conditions were adopted substantially as proposed by the Department of Fish and Game. The first condition required a minimum flow of 10 cfs between Monticello Dam and Lake Solano (Condition 15). The second condition required that the water released from Lake Solano to satisfy prior rights be released in a manner that would maintain a "live stream" as far downstream as possible, consistent with the purposes of the project and the requirements of downstream users (Condition 16). The third condition included the requirements of water for maintenance of fishlife in Putah Creek as one of the objectives in the study to determine proper releases for prior vested rights and groundwater recharge (Condition 17).

34. Condition 16 should be considered in conjunction with Condition 11 of Decision 869 requiring the Bureau to release water to Putah Creek to protect prior rights and to maintain groundwater recharge as it would occur from unregulated flow. In the absence of Condition 16, the Bureau would have been permitted to release a great deal of water during a few months of the year and little or no water for most of the year. During the early years of operation the Bureau chose to comply with Conditions 11 and 16 by releasing water from the Solano Dam at the same rate as inflow to Lake Berryessa and Lake Solano. Releases were reduced when flow at the lower gaging station at Davis was greater than 5 cfs. The record does not disclose that the Bureau ever undertook the study called for by Condition 17.<sup>5/</sup>

<sup>5/</sup> The record does show that the Department of Fish and Game conducted a study of the trout fishery requirements in Putah Creek above Solano Dam and presented a report on the subject to the Board at the 1969 hearing. A need for additional flows below Lake Berryessa during the late fall months was demonstrated. The deficiency was resolved in the Board order adopted in 1970 by increasing the flow requirement in those months in the fixed release schedule.

35. On April 16, 1970, the Board amended Condition 11. The new condition required the Bureau to release fixed amounts of water for each month to Putah Creek below Solano Dam. The requirement that the Bureau implement a live stream release program (Condition 16) was by implication rescinded by the adoption of the fixed release schedule. It does not follow, however, that the Board rescinded the objective of maintaining fishlife in Putah Creek consistent with project purposes and the rights of prior users or that the Board rescinded the study required by Condition 17.

36. During the proceeding to consider whether a fixed release schedule should be adopted (June 17, 1969), and the proceeding to consider whether the fixed release schedule should be amended (February 5, 1979) the Board did not receive evidence suggesting how releases from Solano Dam to protect prior rights might be made consistent with the objective of maintaining fishlife below Solano Dam as far as possible. Order WR 79-14 should be amended to reflect the Board's continued reserved jurisdiction over this matter to allow a study to be conducted if recommended by the California Department of Fish and Game.

37. It should be recognized, however, that Putah Creek has already been enhanced by releases from Solano Dam. More water now flows in Putah Creek immediately below Solano Dam during late summer and fall than was the case in most pre-project water years. The fixed release schedule adopted by the Board in 1970 required releases from Solano Dam to Putah Creek of only 25 cfs during November. Order WR 79-14 may further increase releases in November and other months. In addition, the provision for reduced releases during dry years was eliminated in Order WR 79-14. This change in the release schedule should aid fishlife and fish habitat by providing greater summer flows in dry years.

38. A careful reading of conditions 12 through 17 of Decision 869, leads us to conclude that releases of water below Putah Diversion Dam were to satisfy only prior rights and groundwater recharge. Jurisdiction was not reserved to require the Bureau to release additional quantities of water to Putah Creek below Putah Diversion Dam to preserve aquatic habitat and aquatic life. Jurisdiction was reserved to make prior rights releases as beneficial as possible to the fish life below Solano Dam.

39. Petitioner Kato and the District contend that the Board should have prepared and adopted environmental documents along with Order WR 79-14. The Board finds that the project is exempt as an ongoing project in accordance with Title 14, California Administrative Code, Section 15070(b) and Title 23, California Administrative Code, Section 2715(b). A Notice of Exemption was prepared and sent to the Secretary for Resources on August 1, 1979.

40. The Bureau contends that Order WR 79-14 requires that water be wasted and unreasonably used in violation of Water Code Sections 100 and 275. The Bureau cites no legal authority for this contention. The fact that prior rights are entitled to protection from the effects of the project hardly constitutes waste or unreasonable use. Further, that portion of Condition 11 authorizing the reduction of releases from Solano Dam when flows at the Davis Gage exceed 5 cfs enables the Bureau to conserve all practicable amounts of water while protecting prior rights to surface waters and interests in groundwater.

41. The Bureau contends that by adopting Condition 22 of Order WR 79-14, the Board is asserting that it has the authority to require operation of the Solano Project in a manner "inconsistent with Congressional directives".

42. Condition 22 in Order WR 79-14 is in part a restatement of Condition 10, Decision 869 which reads as follows:

"All rights and privileges under this permit including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion."

The State Water Resources Control Board is the successor agency to the State Water Rights Board. Water Code Sections 100 and 275 were and are the legal basis for the inclusion of this condition in permits for water rights.

43. Condition 10 is restated in Order WR 79-14 as Condition 22.

Condition 22 provides:

"Pursuant to California Water Code Sections 100 and 275, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement such programs as (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 permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the 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."

44. Plainly, the first paragraph of Condition 22 is merely a simple restatement of Condition 10. The second paragraph of Condition 22 makes no substantive addition to the first paragraph. Rather, the second paragraph contains language which is explanatory of the first paragraph.

45. Congress has provided that the Solano Project be subject to California law of water rights (see paragraph 24 above). Condition 10 as amplified by Condition 22 is part and parcel of California water law. **Stated most simply, the Bureau's objection appears to be that Congress has somewhere clearly directed that the project be operated free from California's Constitutional prohibitions of waste, unreasonable use, unreasonable method of use, and unreasonable method of diversion of water. That very general objection has no merit. However, at such time, if ever, that the Board may hold a hearing in accordance with Condition 22, the Bureau may raise specific objections to any measures the Board may consider imposing on the Bureau.**

46. The Bureau contends that Order WR 79-14 is vague and uncertain as to the Bureau's rights to have the release schedule modified during dry years.

47. Order WR 79-14 provides that the following Condition 21 be added to the Bureau's permits:

"Should a prolonged drought create an emergency by threatening the water supply to municipalities dependent on the Solano Project, the Board may, upon petition by permittee and opportunity for hearing, modify the release schedule set forth above for the duration of such emergency."

Order WR 79-14 does not define the conditions of a prolonged drought. At any time the Bureau believes that a prolonged drought which threatens municipal supply exists, it may petition the Board. At that time the particular hydrologic conditions of that period will be evaluated.

48. The Association has expressed concern regarding Condition 21. It contends that the condition will favor Solano Project beneficiaries with water that should be received by holders of prior water rights and users of groundwater along Putah Creek.

49. The release schedule provided by Order WR 79-14 is an averaging process. This schedule may result in higher releases during drought years and lower flows in wet years than would occur from unregulated flow. An extended drought could cause an emergency water shortage in municipalities dependent on the Solano Project for a water supply. During a drought, scheduled releases would provide more streamflow for prior rights along Putah Creek than would exist under pre-project conditions. In order to avoid this result, Condition 21 allows the Bureau to petition for a temporary reduction of the release schedule. In acting on such a petition, the Board would still be required to satisfy prior rights to the extent they would have been satisfied by unregulated stream flow. An alternative would be to eliminate Condition 21 and return to the live stream criteria which, during a drought, would reduce releases to practically nothing.\* None of the parties have advocated the return to the live stream requirement. Live stream releases would adversely affect both downstream and Project water users. Condition 21 does not favor irrigation interests who receive Project water. Cutbacks in irrigation deliveries would not cause term 21 to take effect. Severe irrigation cutbacks could be made before emergency level municipal cutbacks would be considered. We conclude that Condition 21 is appropriate.

50. Petitioner Kato objects to finding No. 2 of Decision 79-14 which states that "Project spills contribute much more to maintaining groundwater recharge than do controlled releases." We agree that the statement is not entirely accurate. Finding No. 2 of Order WR 79-14 should be changed to read as follows:

"The relationship between project releases and groundwater recharge is not easily quantified. Factors which influence groundwater recharge, other than project releases, include:  
underflow from other groundwater areas, tributary inflow below

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\*The live stream criteria permitted releases to be reduced to an amount equal to the unregulated flow of the creek.

Lake Solano, rising groundwater, sewage discharges, changes in groundwater extractions, availability of vacant groundwater storage space and deep percolation of rainfall and applied irrigation water in areas other than the Putah Creek stream channel.<sup>6/</sup> However, a qualitative relationship can be shown. That is, groundwater storage declines when releases approximate either the past live stream or fixed release schedule. During those years in which large spills occur, groundwater storage increases."

51. In addition to its contentions, the Association has requested that the Bureau not be allowed to reduce releases from Solano Dam to Putah Creek when a flow of 5 cfs is at the Davis Gage unless the Bureau installs and operates a gage to measure the flow at Stevenson Bridge to assure a flow of water at that point.

52. Term 11 of Order WR 79-14 requires that a live stream or continuous thread of water must exist at all points between Solano Dam and the Davis gage whenever releases are less than the scheduled rate. Measurement of a thread of streamflow by a flow recorder would be difficult and of questionable accuracy. Also, measurement at Stevenson Bridge would not guarantee the existence of a continuous thread of water downstream. The best method for observation of the continuous thread of water would be through visual observations by landowners adjacent to Putah Creek.

53. The Association further requests that the release schedule adopted by Order WR 79-14 be amended to assure that releases occur evenly over a monthly period.

54. The Association is concerned that the Bureau may release water in a fluctuating manner. The Association fears that large releases will be averaged with smaller releases in order to meet the flow requirements specified in Term 11, WR Order 79-14. The project record of operation shows that since the 1970 amendment to D 869 the Bureau has not released water in

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<sup>6/</sup> Project releases include scheduled and unscheduled (spills) amounts of water passing to Putah Creek from the Solano Dam.

this manner. Release rates are specified in cubic feet per second which is an instantaneous rate to be constantly maintained. If the Board had intended to allow averaging, then monthly release requirements would have been specified in acre-feet per month.

CONCLUSION

55. After consideration of the foregoing objections and requests, it is concluded that Order WR 79-14 be amended as provided below.

ORDER

NOW, THEREFORE, IT IS ORDERED that Order 79-14 be amended as follows:

1. Finding No. 2 shall be changed to read:

"The relationship between project releases<sup>7/</sup> and groundwater recharge is not easily quantified. Factors which influence groundwater recharge, other than project releases, include: underflow from other groundwater areas, tributary inflow below Lake Solano, rising groundwater, sewage discharges, changes in groundwater extractions, availability of vacant groundwater storage space and deep percolation of rainfall and applied irrigation water in areas other than the Putah Creek stream channel. However, a qualitative relationship can be shown. That is, groundwater storage declines when releases approximate either of the past live stream or fixed release schedules. During those years in which large spills occur, groundwater storage increases."

---

<sup>7/</sup> Project releases include scheduled and unscheduled (spills) amounts of water passing to Putah Creek from Lake Solano.

2. Term 11. shall be changed to read as follows:

Permittee shall release water into the Putah Creek channel from Monticello Dam and past the Putah Diversion Dam in accordance with the following schedule:

<u>Month</u>	<u>Required Release (cfs)</u>
Oct.	20
Nov.	50
Dec.	50
Jan.	35
Feb.	30
Mar.	30
Apr.	30
May	40
Jun.	40
Jul.	43
Aug.	34
Sept.	20

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Releases in excess of amounts in the above schedule are not required. However, permittee may reduce releases whenever both of the following conditions exist: (1) there is continuous surface flow between the Putah Diversion Dam and the Davis Gage (mile 7.2) and (2) there is a flow of not less than 5 cubic feet per second (cfs) at the Davis Gage. Flows must be gaged by suitable facilities capable of measuring flows of 5 cfs.

IT IS FURTHER ORDERED that Order WR 80-14 be amended by adding the following new condition:

24. The permittee shall consult with the California Department of Fish and Game (Department) to determine if the release rates required in Condition 2 above, could be adjusted to increase substantially the fishery resource in Putah Creek below the Solano Diversion Dam. If the Department determines that a substantial increase is possible, the permittee and the Department shall submit jointly to the Board by January 1, 1982, a plan for a fishery study as required by Term 17 of Decision 869. Upon approval by the Board, the Department or the permittee shall conduct the study. If the Department conducts the study, the permittee shall reimburse the Department for the cost of the study not in excess of \$5,000. The Board retains jurisdiction over subject permits to act on the results of the study after opportunity for hearing. However, jurisdiction on this matter will be terminated without further Board action if the Department determines that enhancement is not a reasonable expectation of a fishery study.

Dated: August 20, 1981

BY L. L. Mitchell  
L. L. Mitchell, Vice-Chairman

C. M. Bard  
C. M. Bard, Chairwoman

J. B. Dunlap  
J. B. Dunlap, Member

F. K. Aljibury  
F. K. Aljibury, Member

STATE OF CALIFORNIA  
STATE WATER RESORUCES CONTROL BOARD

In the Matter of Permits 10657, 10658, and  
10659 Issued on Applications 11199, 12578,  
and 12716

U. S. BUREAU OF RECLAMATION; HOWARD Y. KATO;  
PUTAH CREEK RIPARIAN OWNERS AND/OR WATER  
USERS ASSOCIATION; SOLANO COUNTY FLOOD  
CONTROL AND WATER CONSERVATION DISTRICT;  
AND THE DAVIS AUDUBON SOCIETY

Petitioners

Order : WR 79-26

Source : Putah Creek

Counties: Napa, Yolo, and  
Solano

ORDER GRANTING RECONSIDERATION

BY THE BOARD:

Petitions for reconsideration of Order WR 79-14 have been filed by:

- (a) U. S. Bureau of Reclamation;
- (b) Howard Y. Kato;
- (c) Putah Creek Riparian Owners and/or Water Users Association;
- (d) Solano County Flood Control and Water Conservation District; and
- (e) The Davis Audubon Society

1. The petitions raise substantial issues which provide a basis for reconsideration as set forth in Section 737.1, Title 23, California Administrative Code.

2. The petitions for reconsideration should be granted on the grounds that substantial issues are raised.

3. This order to grant reconsideration does not imply any decision of the Board on the merits of the issues raised. It is solely a decision that the issues raised are sufficiently substantial to merit reconsideration.

ORDER

1. Order WR 79-14 shall be reconsidered.
2. Petitioners and interested parties shall, prior to the Board's taking final action, be notified of the scope of reconsideration as provided in Section 737.4, Title 23, California Administrative Code.

Dated: August 16, 1979

/S/ W. DON MAUGHAN  
W. Don Maughan, Chairman

/S/ L. L. MITCHELL  
L. L. Mitchell, Member

/S/ WILLIAM J. MILLER  
William J. Miller, Vice Chairman

/S/ CARLA M. BARD  
Carla M. Bard, Member

P10659

STATE OF CALIFORNIA  
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Permits 10657, 10658, )  
and 10659 Issued on Applications 11199, )  
12578, and 12716, )  
UNITED STATES BUREAU OF RECLAMATION, )  
Permittee )

Order : WR 79-14  
Source : Putah Creek  
Counties: Yolo, Solano, and Napa

ORDER AMENDING DECISION 869  
AND PERMITS 10657, 10658, AND 10659

BY BOARD MEMBERS MAUGHAN AND MITCHELL:

On February 7, 1957, the State Water Rights Board, predecessor of the State Water Resources Control Board (Board), adopted Decision 869 approving Applications 11199, 12578, and 12716 of the United States Bureau of Reclamation (Bureau) and ordering that permits be issued subject to certain terms and conditions. Paragraphs 11, 12, and 13 of the order provided for releases of water into the channel of Putah Creek, for the Bureau to gather certain information and report to the Board, and that the Board, prior to the expiration of a 15-year trial period, may make further orders concerning proper releases of water from the Monticello Reservoir and past Putah Diversion Dam for downstream use and recharge of groundwater and concerning investigations, measurements, and studies to be made by the Bureau.

On March 2, 1969, the Bureau filed a petition to set aside Conditions 11, 12, and 13, along with the corresponding conditions incorporated in Permits 10657, 10658, and 10659, and replace them with a monthly schedule of releases past the Putah Diversion Dam. The Bureau's petition was the subject of a public hearing, and on April 16, 1970, the Board issued a decision and an order amending Decision 869. The amended decision adopted the proposed fixed monthly release schedule and extended the Board's reserved jurisdiction to December 31, 1974. The continuing jurisdiction was extended by three subsequent Board orders to June 30, 1979.

Exercising this continuing jurisdiction, the Board held a hearing on February 5, 1979 to determine if the fixed release schedule was adequate to provide water for prior surface water rights and recharge of groundwater to the extent that water would have been available for such purposes from unregulated flow.

The Putah Creek Riparian Owners and/or Water Users Association (Association) appeared at this hearing and presented testimony in support of their contention that the existing schedule provides insufficient flows for surface rights and groundwater recharge. The Association proposed a new release schedule which would correct alleged deficiencies in the current release schedule. Other parties presented additional testimony in favor of increased releases for fish and wildlife habitat.

The Bureau and the Solano County Flood Control and Water Conservation District, beneficiary of the Solano Project, also appeared and presented testimony in favor of maintaining the existing schedule with some minor exceptions.

Flows in excess of five cubic feet per second at the Davis Gage (Mile 7.2) are surplus to the needs within the Putah Creek watershed. To reduce the occurrence of surplus flows, the staff proposed that the Bureau be allowed to reduce releases at any time that flows exceeded five cubic feet per second at the Davis Gage (Mile 7.2). No objections to this proposal were made at the hearing.

The evidence taken at the hearing having been duly considered, the Board finds as follows:

1. Testimony and exhibits concerning changes in groundwater storage and the relation between Putah Creek flows and groundwater recharge are contradictory and inconclusive. The collection of additional data to monitor the effects of any release schedule will be inconclusive due to the effect of project spills.

2. Project spills contribute much more to maintaining groundwater recharge than do controlled releases.

3. Both the existing fixed release schedule developed by the Bureau and the proposed schedule developed by the Association are based on different assumptions which affect the respective release schedule. The Bureau's use of flow data during periods of project spill causes the minimum required flows to be underestimated while the Association's disregard of the unimpaired inflow to the project causes the Association's schedule to overestimate required dry season flows. Assumptions made by both the Bureau and the Association indicate that a new schedule using elements of both the Association proposal and the current fixed release schedule will best serve to supply water for groundwater recharge and prior surface diversion rights to the extent that water would have been available without the Solano Project.

4. Flow in excess of five cubic feet per second in Putah Creek at the Davis Gaging Station does not percolate to groundwater but flows into the Delta as surface water.

5. Solano Project yield is used to supply municipal needs in Vallejo, Fairfield, Suisun, and Vacaville. Shortages in deliveries to these municipalities could result in a hazard to public health. Should a prolonged drought occur, provision should be made to weigh the effects of reduced flows in Putah Creek against the possible health hazards which may occur in those municipalities who may be unable to supply necessary municipal needs from other sources.

6. Applications 11199, 12578, and 12716 were approved by the State Water Rights Board on February 28, 1957 and Permits 10657, 10658, and 10659 were issued shortly thereafter. The amendments to these permits set forth in this order

constitute an ongoing project in accordance with the provision of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) and the State Guidelines because the governmental approvals after April 5, 1973, do not involve a greater degree of responsibility or control over such permits than the governmental approvals received prior to that date.

NOW, THEREFORE, IT IS ORDERED, THAT:

Conditions 11 and 12 of Decision 869 and the correspondence conditions contained in Permits 10657, 10658, and 10659 are amended as follows:

11. Permittee shall release water into the Putah Creek channel from Monticello Reservoir and past the Putah Diversion Dam in accordance with the following schedule:

<u>Month</u>	<u>Required Release (cfs)</u>
Oct.	20
Nov.	50
Dec.	50
Jan.	35
Feb.	30
Mar.	30
Apr.	30
May	40
Jun.	40
Jul.	43
Aug.	34
Sept.	20

To the extent uncontrolled runoff to Putah Creek downstream from the Putah Diversion Dam is sufficient to sustain, in whole or in part, a flow of five cubic feet per second at the Davis Gage, the required release from storage may be reduced accordingly, provided, however, a live stream is maintained between Putah Diversion Dam and the gaging station Putah Creek near Davis (Mile 7.2) with a minimum flow of five cubic feet per second at the Davis Gage.

12. Permittee shall submit to the Board with its annual progress reports or at such other times as the Board may request: daily records of diversions to Putah South Canal and flows past the Putah Diversion Dam.

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

IT IS FURTHER ORDERED, THAT:

The following permit terms be added to Permits 10657, 10658, and 10659:

21. Should a prolonged drought create an emergency by threatening the water supply to municipalities dependent on the Solano Project, the Board may, upon petition by permittee and opportunity for hearing, modify the release schedule set forth above for the duration of such emergency.

22. Pursuant to California Water Code Sections 100 and 275, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement such programs as (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 permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the

STATE OF CALIFORNIA  
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Permits 10657,	)	
10658, and 10659 (Applications	)	Order: WR 76-13
11199, 12578, and 12716)	)	
	)	Source: Putah Creek
UNITED STATES BUREAU OF	)	
RECLAMATION	)	Counties: Napa, Solano,
	)	and Yolo
Permittee	)	
	)	

ORDER EXTENDING RESERVED JURISDICTION

BY THE BOARD:

On April 16, 1970, the Board adopted a decision and order amending Decision 869 and Permits 10657, 10658, and 10659 pursuant to jurisdiction reserved to make further order concerning proper releases of water from Monticello Reservoir past Putah Diversion Dam for downstream use and recharge of groundwater and concerning investigations, measurements, and studies to be made by the permittee.

The order in amending conditions 11, 12, and 13 of Decision 869 and the corresponding conditions in the permits, adopted a schedule of releases proposed by the permittee, but continued the reserved jurisdiction over the permits until December 31, 1974, or such additional time as then seemed necessary to determine if the release schedule afforded adequate protection to downstream prior rights and for the recharge of groundwater to the extent that water would have been available in the absence of the Solano Project.

Studies by the Board's staff prior to December 31, 1974, indicated that all of the data needed to complete these studies had not yet been received. Order WR 74-38 was adopted by the Board on December 19, 1974 to extend the period of reserved jurisdiction until December 31, 1976. Additional information has been submitted

by the permittee and analyzed during the past two years; also, a study by the Board's staff was undertaken to determine the extent to which releases past Putah Diversion Dam are being diverted as surface flow by other than holders of prior rights, and the effect of such diversions on the releases necessary to meet the requirements of Decision 869. The staff concluded that illegal diverters, if any, have no substantial effect on project operations. However, data to adequately describe all of the factors which affect the groundwater recharge has not been collected and analyzed. NOW, THEREFORE, IT IS ORDERED:

Condition 13 of Decision 869 and the corresponding conditions contained in Permits 10657, 10658, and 10659 are amended to continue the jurisdiction reserved therein until December 31, 1978, or for such additional time as then seems necessary.

We Concur:

Dated: December 16, 1976

s/JOHN E. BRYSON  
John E. Bryson, Chairman

s/W. DON MAUGHAN  
W. Don Maughan, Vice Chairman

s/W. W. ADAMS  
W. W. Adams, Member

s/JEAN AUER  
Jean Auer, Member

s/ROY E. DODSON  
Roy E. Dodson, Member

14. All releases of water past the Putah Diversion Dam shall be made in such a manner as to maintain a permanent live stream at all times as far below the diversion dam as possible, consistent with the purpose of the project and the requirements of downstream users.

15. The requirements of water for maintenance of fish life in Putah Creek below Monticello Dam shall be included as one of the objectives of the investigations and studies provided in condition No. 10 of this permit.

16. The right to divert and store water, and apply said water to beneficial use as provided in this permit is granted to the United States as Trustee for the benefit of the public agencies of the State together with the owners of land and water users within such public agencies as shall be supplied with the water appropriated under this permit.

17. Subject to compliance by the public agencies concerned with any and all present and future valid contractual obligations with the United States, such public agencies, on behalf of their landowners and other water users, shall, consistent with other terms of this permit, have the permanent right to the use of all water appropriated and beneficially used hereunder, which right, except where water is distributed to the general public by a private agency in charge of a public use, shall be appurtenant to the land to which said water shall be applied, subject to continued beneficial use and the right to change the point of diversion, place of use, and purpose of use, as provided in Chapter 10 of Part 2 of Division 2 of the Water Code of the State of California, and further subject to the right to dispose of temporary surplus.

18. Upon completion of the appropriation and beneficial use of water under this permit, any license or licenses which may be issued pursuant to Chapter 9 of Part 2 of Division 2 of the California Water Code shall be issued to the public agencies of the State within which the water shall have been found by inspection by the Board to have been applied to beneficial use.

[For full information concerning the filling out of this form refer to Article 4 of Rules and Regulations Pertaining to Appropriation of Water]

STATE OF CALIFORNIA—STATE WATER RIGHTS BOARD

1957 FEB 15 PM 3:19

STATE WATER RIGHTS BOARD  
SACRAMENTO

Application No. 12716 Filed September 27, 1948 at 2:11 P. M.

AMENDED APPLICATION RECEIVED 9-26-52 (Applicant must not fill in the above blanks)

APPLICATION TO APPROPRIATE UNAPPROPRIATED WATER

I, The United States of America, by the Department of the Interior,  
Name of applicant Bureau of Reclamation,  
of City of Sacramento County of Sacramento  
Address  
State of California does  
hereby make application for a permit to appropriate the

following described unappropriated waters of the State of California, *SUBJECT TO VESTED RIGHTS:*

Source, Amount, Use and Location of Diversion Works

1. The source of the proposed appropriation is Putah Creek  
Give name of stream, lake, etc., if named; if unnamed state nature of source and that it is unnamed  
located in Solano and Yolo County, tributary to Yolo By-Pass

2. The amount of water which applicant desires to appropriate under this application is as follows:

(a) For diversion to be directly applied to beneficial use 116 cubic feet per  
1 cubic foot per second equals 40 statute miner's inches or 646,317 gallons per day  
second, to be diverted from January 1 to December 31, inclusive, of each year.  
Beginning date Closing date

(b) For diversion to be stored and later applied to beneficial use 320,000 acre-feet  
1 acre-foot equals 325,851 gallons  
per annum, to be collected between November 1 and May 31, inclusive of each season.  
Beginning date Closing date

NOTE.—Answer (a) or (b) or both (a) and (b) as may be necessary. If amount under (a) is less than .025 cubic foot per second, state in gallons per day. Neither the amount nor the season may be increased after application is filed. If underground storage is proposed a special supplemental form will be supplied by the State Water Rights Board upon request.

3. The use to which the water is to be applied is municipal, industrial, domestic, and  
Domestic, irrigation, power, municipal, mining, industrial, recreational  
recreational (see supplement) purposes.

4. The point/of diversion ~~is~~ to be located Monticello Dam and Putah Diversion Dam  
State bearing and distance or coordinate distances from section or quarter section corner  
(see supplement)

being within the \_\_\_\_\_  
State 40-acre subdivision of public land survey or projection thereof

of Section \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_, B. & M., in the County of \_\_\_\_\_  
(see supplement)

5. The main conduit terminates in \_\_\_\_\_ of Sec. \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_, B. & M.  
State 40-acre subdivision of U. S. Government survey or projection thereof

Description of Diversion Works

NOTE.—An application cannot be approved for an amount grossly in excess of the estimated capacity of the diversion works.

6. Intake or Headworks (fill only those blanks which apply)

(a) Diversion will be made by pumping from \_\_\_\_\_  
Sump, offset well, unobstructed channel, etc.  
for Putah South Canal

(b) Diversion/will be by gravity, the diverting dam being 26 feet in height (stream bed to  
(see accompanying Dwg. No. 413-212-5  
level of overflow); 650 feet long on top; and constructed of concrete and earth fill  
Concrete, earth, brush, etc.

(c) The storage dam will be 258 feet in height (stream bed to overflow level); 1,017 feet  
Normal 18' (see accompanying Dwg. No. 413-212-4)  
long on top; have a freeboard of Minimum 2.2 feet, and be constructed of concrete  
Concrete, earth, etc.

7. Storage Reservoir Monticello Reservoir (see supplement)  
Name Napa, Yolo, and Solano Counties in land sections as  
The storage reservoir will flood lands in/shown on accompanying maps Nos. 413-212-2 & 413-212-3.  
Indicate section or sections, also 40-acre subdivisions unless shown upon map

It will have a surface area of 19,290 acres, and a capacity of 1,600,000 acre-feet, at normal max. W.S.

In case of insufficient space for answers in form, attach extra sheets at top of page 3 and cross reference. El. 440

8. Conduit System (describe main conduits only) (see supplement)

(a) Canal, ditch, flume: Width on top (at water line) \_\_\_\_\_ feet; width at bottom \_\_\_\_\_ feet; depth of water \_\_\_\_\_ feet; length \_\_\_\_\_ feet; grade \_\_\_\_\_ feet per 1,000 feet; materials of construction \_\_\_\_\_  
Cross out two not used  
Earth, rock, timber, etc.

(b) Pipe line: Diameter \_\_\_\_\_ inches; length \_\_\_\_\_ feet; grade \_\_\_\_\_ feet per 1,000 feet; total fall from intake to outlet \_\_\_\_\_ feet; kind \_\_\_\_\_  
Riveted steel, concrete, wood-stave, etc.

NOTE.—If a combination of different sizes or kinds of conduit is to be used, attach extra sheets with complete description, also show location of each clearly on map. Putah South Canal, 920 cfs

9. The estimated capacity of the diversion conduit or pumping plant proposed is Vallejo Conduit, 31.5 cfs  
State cubic feet per second or gallons per minute

The estimated cost of the diversion works proposed is \$13,109,000 (see supplement)  
Give only cost of intake, or headworks, pumps, storage reservoirs and main conduits described herein

### Completion Schedule

10. Construction work will begin on or before 1953

Construction work will be completed on or before 1957

The water will be completely applied to the proposed use on or before 1990

### Description of Proposed Use

11. Place of Use. Within the potential service area delineated on Map No. 413-212-1,  
State 40-acre subdivisions of the public land survey. If area is unsurveyed indicate the location as if lines of the public land survey were projected. In the case of irrigation use state the number of acres to be irrigated in each 40-acre tract, if space permits. If space does not permit listing of all 40-acre tracts, describe area in a general way and show detail upon map.  
which accompanies this application and Applications 11199 and 12578 (see supplement)

Do(es) applicant(s) own the land whereon use of water will be made? No Jointly? \_\_\_\_\_  
Yes or No Yes or No

Contracts will be negotiated with representatives of owners

If applicant does not own land whereon use of water will be made, give name and address of owner and state what arrangements have been made with him.

12. Other Rights. Describe all rights except those on file with the State Water Rights Board under which water is served to the above named lands.

Nature of Right (riparian, purchased water, etc.)	Year of First Use	Use made in recent years including amount if known	Season of Use	Source of Other Supply
1.				
2.				
3.				
4.				

Attach supplement at top of page 3 if necessary.

13. Irrigation Use. The area to be irrigated is \_\_\_\_\_ acres.  
State net acreage to be irrigated

The segregation of acreage as to crops is as follows: Rice \_\_\_\_\_ acres; alfalfa \_\_\_\_\_ acres;  
 orchard \_\_\_\_\_ acres; general crops \_\_\_\_\_ acres; pasture \_\_\_\_\_ acres.

NOTE.—Care should be taken that the various statements as to acreage are consistent with each other, with the statement in Paragraph 11, and with the map.

The irrigation season will begin about \_\_\_\_\_ and end about \_\_\_\_\_  
Beginning date Closing date

14. Power Use. The total fall to be utilized is \_\_\_\_\_ feet.  
Difference between nozzle or draft tube water level and first free water surface above

The maximum amount of water to be used through the penstock is \_\_\_\_\_ cubic feet per second.

The maximum theoretical horsepower capable of being generated by the works is \_\_\_\_\_ horsepower.  
Second feet X fall ÷ 8.8

The use to which the power is to be applied is \_\_\_\_\_  
For distribution and sale or private use, etc.

The nature of the works by means of which power is to be developed is \_\_\_\_\_  
Turbine, Pelton wheel, etc.

The size of the nozzle to be used is \_\_\_\_\_ inches.

The water will be returned to \_\_\_\_\_ in \_\_\_\_\_ of \_\_\_\_\_  
will not Name stream State 40-acre subdivision

Se \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_, B. & M. \_\_\_\_\_

SUPPLEMENTS TO APPLICATION 12716

Paragraph 3. USE:

This application covers the use of the same storage facilities as for Application 11199 covering storage for irrigation, domestic, municipal, industrial, and other purposes, and Application 12578 for irrigation purposes. The three applications combined file for a nominal total storage of 1,920,000 acre-feet annually. However, the maximum storage under these applications, for all purposes applied for, will not exceed 1,600,000 acre-feet in any one year, since the maximum irrigation and municipal uses are not expected to occur in the same years. Initially almost all of this storage will be used for irrigation purposes, but as the municipal needs increase, the irrigation use will decrease until by 1990 approximately 20 percent of the water applied for under these applications may be used for municipal, industrial, and military uses.

The water applied for in this application is primarily for use within the potential service area, designated on the Potential Service Area map No. 413-212-1 accompanying this application. However, during early stages of the Solano Project operation, surplus project water is expected to be available which may be used within the service areas of the Delta-Mendota and Contra Costa Canals of the Central Valley Project within the places of use designated on maps Nos. 214-212-62 and 614-212-2, previously submitted with applications 9368, and 9366 and 9367, respectively. In addition, some of such surplus water may be permitted to flow into Suisun Bay in order to maintain the quality of water in the delta channels at a level suitable for use along the Delta-Mendota and Contra Costa Canals.

Paragraph 4. POINTS OF DIVERSION:

Monticello Dam: To be located on Putah Creek; S. 47° 30' W., 2,640 feet from the NE corner of Section 29, T. 8 N., R. 2 W., M.D.B. & M., being within the SW $\frac{1}{4}$  of NE $\frac{1}{4}$  of said Section 29 in Yolo and Solano Counties.

Putah Diversion Dam for Putah South Canal: To be located on Putah Creek; S. 52° 30' E., 7,550 feet from the NW corner of the Rio De Los Puntos land grant and being within the SE $\frac{1}{4}$  of SE $\frac{1}{4}$  of Projected Section 31, T. 8 N., R. 1 W., M.D.B. & M., in Yolo and Solano Counties.

Rediversion Point at Vallejo Pumping Plant for Vallejo Conduit: To be located at a point on Main Prairie Slough; S. 28° 00' 40" E., 1,158 feet from the NW corner of projected Section 10, T. 5 N., R. 2 E., M.D.B. & M., being within the NW $\frac{1}{4}$  of NW $\frac{1}{4}$  of said Section 10 in Solano County. (Vallejo Pumping Plant and Conduit are under construction by the City of Vallejo and this diversion point may be used, under this application.)

Paragraph 5. THE MAIN CONDUITS TERMINATE IN:

The Putah South Canal: Terminal Reservoir near town of Cordelia in NW $\frac{1}{4}$  of SE $\frac{1}{4}$ , of Section 2, T. 4 N., R. 3 W., MDB&M.

The Vallejo Conduit: Fleming Hill Reservoir near City of Vallejo, in SW $\frac{1}{4}$  of NW $\frac{1}{4}$  of Section 6, T. 3 N., R. 3 W., MDB&M.

Paragraph 7. REGULATORY RESERVOIR:

Terminal Reservoir, Cordelia Reservoir, Fleming Hill Reservoir, and a small reservoir on Vacaville wasteway are offstream balancing reservoirs of small capacity to be utilized under this application to facilitate the distribution of the water applied for.

Paragraph 8. CONDUIT SYSTEMS:

Putah South Canal: Width on top (at water line), 40 feet; width at bottom, 12 feet; depth of water, 9.17 feet; length, 35 miles; grade, 0.15 feet per 1,000 feet; material of construction, concrete. (Canal cross-section dimensions decrease toward the end.)

Vallejo Conduit: The Vallejo Conduit is a pressure system of pumping plants and pipe lines under construction by the City of Vallejo. It is expected that part of the water applied for in this application will be diverted through these facilities for the City's use.

The initial section of pipe line from the Vallejo Pumping Plant on Maine Prairie Slough to the inlet of Cordelia Reservoir is: Diameter, 36 inches; length, approximately 12 miles; hydraulic gradient, approximately 1.3 feet per 1,000 feet; friction head loss, 85 feet; materials of construction, concrete steel-cylinder.

The last section of pipe line from Cordelia Reservoir to the Fleming Hill Reservoir is: Diameter, 27 inches; length, approximately 7 miles; hydraulic gradient, approximately 1.6 feet per 1,000 feet; friction head loss, 60 feet; materials of construction, concrete steel-cylinder.

The hydraulic gradient of the pipe line diminishes from elevation 207 at Maine Prairie Slough to elevation 122 at the inlet to Cordelia Reservoir where two pumps raise the gradient to elevation 445. The hydraulic gradient then diminishes to elevation 385 at Fleming Hill Reservoir.

Paragraph 9. ESTIMATED COST:

Storage, diversion works, and Putah South Canal \$30,010,000

Irrigation distribution and drainage system 13,099,000  
Total \$43,109,000

The Vallejo Conduit, estimated to cost \$6,000,000 and at present under construction by the City of Vallejo, is not included in the above total cost.

Paragraph 11. PLACE OF USE:

The place of use will be within the boundaries of the potential service area as shown on Map No. 413-212-1, accompanying this application, except for small quantities of water used for construction, maintenance, and domestic uses around the dams and reservoirs.

The water will be used within the service areas of districts, municipalities, water companies, corporations, and other legal entities either as a primary or supplemental supply, provided that the delivery of the water is conditioned upon the execution of valid contracts, for such deliveries, with the United States of America, or with districts having contracts with the United States, or other authorization which may be made or given by authority of and pursuant to law.

Paragraphs 15 and 17. MUNICIPAL AND INDUSTRIAL USE:

Water demands for municipal and industrial uses will be supplied as required to cities, towns, and other municipalities presently in existence, or as may be created within the place of use. Some municipalities are, or will be, adequately served with water by appropriations under lawful rights acquired and used independently of the United States. Other municipalities are, or will be partially so served, but will require a supplemental water supply which will be furnished through rights acquired by the United States.

The estimates of water requirements for municipal and industrial uses within the service area were based on individual estimates of the future needs of imported water supplies for the principle municipalities within the area. The combined need for such imported water for municipal, industrial and military uses by 1990 was estimated to average 66 million gallons per day during the month of maximum use. Of this quantity, 18 million gallons is estimated to be needed immediately for the needs of the 1950 population, while 48 million gallons per day is estimated to be needed for the expected increase of 95,000 persons in population by 1990, and for the higher per capita consumption of the existing population by 1990. The future increase averages about 440 gallons per person per day for the increase in population expected by 1990. The expected growth of water use along with the Solano County population growth, almost all of which is within the place of use under this application, is tabulated as follows:

Year	: Estimated Solano County population (a)	: Estimated municipal, industrial, and military use of imported water from Putah Creek (c)			
		: Total annual use	: Monthly mean use for maximum month	Cubic feet per second	Million gallons per day
		Acre-feet	Acre-feet		
1950	105,000 (b)	11,000	1,700	28	18
1955	125,000	15,000	2,200	36	23
1960	145,000	18,000	2,700	44	28
1965	158,000	22,000	3,300	54	35
1970	170,000	26,000	3,900	63	41
1975	180,000	30,000	4,500	73	47
1980	190,000	34,000	5,100	83	54
1985	195,000	38,000	5,700	93	60
1990	200,000	42,000	6,300	102(c)	66

(a) From unpublished population projections prepared by Julian C. Riley, California State Reconstruction and Reemployment Commission, 1947, adjusted by California State Department of Finance, May 23, 1952, on the basis of the 1950 U. S. Census, and furnished the U. S. Bureau of Reclamation on May 26, 1952.

(b) U. S. Census of April 1, 1950.

(c) Does not include a transportation loss estimated at 12%. A gross diversion of 116 c.f.s. will be required in 1990 to supply the estimated use of 102 c.f.s.

The principal towns within the service area along with their 1950 population (1950 U. S. Census) are as follows:

Vallejo	26,038	Fairfield	3,118
Suisun	946	Benicia	7,284
Vacaville	3,169	Dixon	1,714

8. The total amount of water to be appropriated by storage for all purposes under permits issued pursuant to Applications 11199, 12578, and 12716 shall not exceed 1,600,000 acre-feet between November 1 of each year and May 31 of the succeeding year.

9. Permittee shall release water into Putah Creek channel from Monticello Reservoir and past the Putah Diversion Dam in such amounts and 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 ground water from Putah Creek.

10. Until further order of the Board permittee shall make or cause to be made suitable field investigations, measurements, and studies, and shall install necessary measuring facilities, to determine the amount, timing and rate of releases of water into the natural channel of Putah Creek that are required of permittee in order to fully comply with the provisions of condition No. 9 in this permit. Permittee shall submit to the Board with the annual progress reports, or at such other times as the Board may require, a report of such investigations, measurements, and studies and the results thereof, including but not limited to the following information:

(a) Compute daily inflow to Monticello (Berryessa) Reservoir by proper computations of change in storage.

(b) Establish and measure daily evaporation, wind movement and temperatures of two stations at or near Monticello Reservoir.

(c) Measure daily discharge through and over Monticello Dam.

(d) Install proper gaging stations and obtain daily records of discharge of:

Putah Creek near Guenoce

Putah Creek at Monticello Dam outlets and spillway (R.M. 29.3)

Putah Creek near Winters (R. M. 27.6)

Putah South Canal at Diversion Dam (R.M. 22.6)

Putah Creek below Diversion Dam (R.M. 22.6)

Putah Creek about 3 miles below Winters (R.M. 17.0)

Putah Creek at Stevenson Bridge (R.M. 12.8)

Putah Creek near Davis (R.M. 9.0)

Putah Creek above Yolo By-pass (R.M. 3.8)

(e) Make sufficient spot measurements of Ross Creek and Pleasant Creek, and all river diversions to enable determination of monthly records of inflow and diversions.

(f) Continue State and Bureau ground water studies of Putah Creek Cone with spring and fall observations of all wells and monthly observations of wells within three miles of Putah Creek channel.

(g) Install four continuous water stage recorders and maintain record on two wells on each side of and within one-half mile of Putah Creek channel.

(h) Make periodic surveys of Putah Creek channel in order to determine consumptive use by native vegetation.

(i) Make biennial crop surveys of service area served from Putah Creek to enable determination of changes in crop pattern.

(j) Quarterly water quality analyses of surface and ground water downstream from Monticello Dam at locations approved by the Board.

(k) Estimate of augmentation each water year from Putah Creek to underground supply below Monticello Dam, together with supporting data.

Permittee shall make its records of such investigations and measurements available for inspection by the Board and shall allow authorized representatives of the Board reasonable access to its project works and properties for the purpose of gathering information and data, to the extent not inconsistent with national defense.

11. The Board may, either upon the request of any party or on its own motion, and shall, prior to the expiration of a 15-year trial period, hear, review, and make such further orders as may be required concerning proper releases of water for downstream use and recharge of ground water, and concerning the investigations, measurements, and studies to be conducted by permittee, until a final determination and order can be made concerning the amounts, timing and rates of releases of water past the diversion dam in satisfaction of downstream rights, and the Board retains continuing jurisdiction for such purposes during said 15-year trial period.

12. This permit and all rights acquired or to be acquired thereunder are and shall remain subject to depletion of stream flow above Monticello Reservoir, not to exceed 33,000 acre-feet of water annually, by future appropriations of water for reasonable beneficial use within the watershed of Putah Creek above said reservoir; provided such future appropriations shall be initiated and consummated pursuant to law prior to full beneficial use of water within the project service area under this permit.

13. Permittee shall at all times release, for the purpose of maintaining fish life between Monticello Dam and Putah Diversion Dam, into the natural stream bed of Putah Creek immediately below Monticello Dam a minimum flow of 10 c.f.s. of water.

P10659

2-6-80 name chgd to U S Water + Power Resources  
Service

15. Municipal Use. This application is made for the purpose of serving (see supplement)  
Name city or cities, town or towns. Urban areas only  
having a present population of \_\_\_\_\_

The estimated average daily consumption during the month of maximum use at the end of each five-year period until the full amount applied for is put to beneficial use is as follows:

(see supplement)

16. Mining Use. The name of the mining property to be served is \_\_\_\_\_  
Name of claim  
and the nature of the mines is \_\_\_\_\_  
Gold placer, quartz, etc.

The method of utilizing the water is \_\_\_\_\_

It is estimated that the ultimate water requirement for this project will be \_\_\_\_\_  
Cubic feet per second, gallons per minute. State basis of estimate

The water will be polluted by chemicals or otherwise. \_\_\_\_\_  
will not Explain nature of pollution, if any

and it will be returned to \_\_\_\_\_ in \_\_\_\_\_ of  
will not Name stream State 40-acre subdivision  
Sec. \_\_\_\_\_, T. \_\_\_\_\_, R. \_\_\_\_\_, B. & M. \_\_\_\_\_

17. Other Uses. The nature of the use proposed is (see supplement) domestic, industrial and  
Industrial, recreational, domestic, stockwatering, fish culture, etc.

recreational. Recreational Use. Water will be used incidentally for boating, fishing, etc., on reservoirs.

State basis of determination of amount needed. (see supplement) No water to be used for  
Number of persons, residences, area of domestic lawns and gardens, number and kind of stock, type

recreation except as required for other higher uses.

industrial use, and unit requirements.

municipal, industrial, domestic, and recreational

### General

18. Are the maps as required by the Rules and Regulations filed with Application? Yes If not, state specifically the time required for filing same. \_\_\_\_\_  
Yes or No

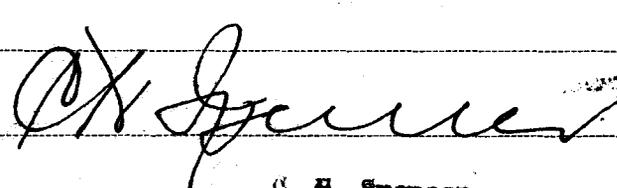
19. Does the applicant own the land at the proposed point of diversion? No. If not, give name and address of owner and state what steps have been taken to secure right of access thereto. will be acquired by purchase or agreements with owners.  
Yes or No

20. What is the name of the post office most used by those living near the proposed point of diversion?

Winters, California and Davis, California

21. What are the names and addresses of claimants of water from the source of supply below the proposed point of diversion? University of California and unknown owners of private lands along Putah Creek below Monticello Dam site.

[SIGNATURE OF APPLICANT]



C. H. Spence  
Regional Director

APPLICANT MUST NOT FILL IN BLANKS BELOW

PERMIT No. 10659

This is to certify that the application of which the foregoing is a true and correct copy has been considered and is hereby approved SUBJECT TO VESTED RIGHTS and the following limitations and conditions:

1. The amount of water appropriated shall be limited to the amount which can be beneficially used, and shall not exceed

one hundred sixteen (116) cubic feet per second by direct diversion to be diverted from January 1 to December 31 of each year, and three hundred twenty thousand (320,000) acre-feet per annum by storage, to be collected from about November 1 of each year to about May 31 of the succeeding year.

2. The maximum amount herein stated may be reduced in the license if investigation so warrants.

~~3. The construction work shall be completed on or before September 1, 1957. Thereafter, the permittee shall file annual reports of progress and construction of this project by December 1.~~

4. Said construction work shall be completed on or before December 1, 1958.

5. Complete application of the water to the proposed use shall be made on or before December 1, 1993.

6. Progress reports shall be filed promptly by permittee on forms which will be provided annually by the State Water Rights Board until license is issued.

7. All rights and privileges under this permit including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

8. See attached sheets for terms 8 thru 18.

This permit is issued and permittee takes it subject to the following provisions of the Water Code:

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

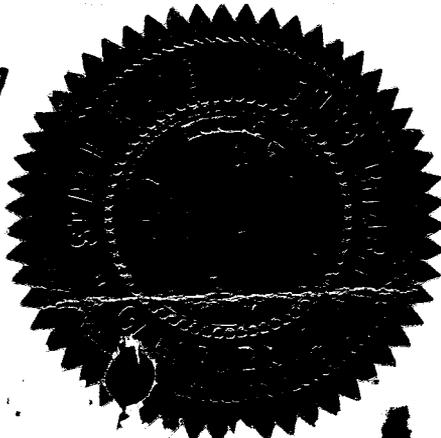
Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit 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 permittee 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 permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Dated: FEB 28 1957

STATE WATER RIGHTS BOARD

By Leslie C. Jopson  
LESLIE C. JOPSON  
Chief Engineer



10659

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