Appendix 5C

Historical Background of Cross-Delta Water Transfers and Potential Source Regions

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5C.1 Introduction

This Appendix to Chapter 5 provides some background information on historical cross-Delta water transfer programs and the source regions of the water to provide the reader with a context for understanding the relationship of the proposed action alternatives to cross-Delta water transfers that might occur in the future.

The appendix contains three main sections: a brief history of the major cross-Delta water transfer programs in California; a discussion of the primary source areas for those transfers based on the past activity of willing buyers and sellers within the regions tributary to the Delta; and a discussion of the amount of transfer water that might be available in an exceptionally dry year if sellers of all currently identified sources were willing to make their water available.

In addition, a brief discussion of statewide water transfer activity is included to help present the cross-Delta transfers, which are only one aspect of California water transfer activity, in the proper context with statewide transfers.

5C.2 Historical Background of Water Transfers

Water transfers permit the temporary, long-term, or permanent transfer of rights to use water between willing buyers and sellers, usually for some financial consideration, for a variety of purposes. Temporary transfers may allow users suffering reduced supplies in dry or drought conditions to maintain adequate supplies, provide for more efficient allocation among users to address cropping pattern changes, and provide greater flexibility in the management of water resources.

Transfers are supported and encouraged by California and federal law and policies. Appendix 1E provides background on the various types of transfers and the regulatory structure that requires protections for other water users and the environment prior to a transfer occurring.

5C.2.1 Statewide Transfer Activity

There are no complete state or federal compilations of water transfer data, although some state and federal data have been compiled at various times, primarily focused on cross-Delta transfers where either the SWP or CVP facilities are used to convey the transfer water from the willing sellers in the source areas to the buyers south of the Delta. Transfers among the SWP contractors are tracked by DWR and transfers among CVP contractors are tracked by Reclamation. But many other transfers occur in California.

The historical data presented here reflects past trends and events, and may not necessarily be predictive of future trends, given a growing population, projected increases in water demand, climate change, environmental changes, and evolution of agricultural practices in response to multiple influences. The data do show trends to increasing water transfer volumes in California. It must also be recognized that cross-Delta transfers have historically been limited by export pump capacity, regulatory constraints, and by the availability of water for transfer from willing sellers upstream of the Delta.

The Public Policy Institute of California has researched water transfers in California and published several documents with the most complete record of transfers that is currently available in its publication "California's Water Market, By the Numbers: Update 2012." The document and its accompanying Technical Appendices is available at http://www.ppic.org/main/publication.asp?i=1041.

Two tables in the document provide an excellent context for statewide water transfer activity, and are reproduced here. The first, Table 5C-1 from the PPIC main document, shows the development of transfer activity between 1987 and 2011, providing a comparison between three approximately equal time periods (two of seven years, one of eight years) illustrating the increase in transfer activity and illustrating the dramatic increase in San Joaquin Valley water transfers and the more stable Sacramento Valley sales, a portion of which are cross-Delta exports and the remainder transfers among in-basin users.

The second table, from Technical Appendix B to the document, shows total statewide transfer volumes, with noticeable increases in transfer activity associated with the 1987-1994 drought period and the 2001–2002 dry years. Tables 5C-1 and 5C-2 in the technical appendix to the report indicate that transfer volumes have grown significantly since 1982, from the 63,000 to 142,000 acre-foot per year range to the 1,200,000 to 1,700,000 acre-foot per year range in the last decade. Figures 5C-A and 5C-B in the main body of the report also show the beneficiaries of the transfer water, illustrating an increase in the amount and proportion of water acquired for environmental purposes over that same period. Once that transfer activity has increased, the data show that sustained transfer activity continues for some period thereafter.

The PPIC data do not differentiate cross-Delta transfers within the tables. The next sections of this appendix look specifically at cross-Delta transfers.

5C.3 Historical Cross-Delta Transfer Programs

This section of the Appendix describes a range of transfer programs that include cross-Delta transfers as an integral part. Some of the programs also involve transfers that occur solely within the San Joaquin Valley. In addition, some transfer programs that occur primarily or even exclusively within the San Joaquin Valley are included to provide a greater context for understanding the sources of supplemental supplies that are tapped by south-of-Delta CVP agricultural users during times of contract reductions. Such reductions have become more severe in recent years as a consequence of regulatory constraints on Delta exports of project water to protect listed fish species.

Table 5C-1. Regional Market Flows

Total Sales	1987–94 (taf/yr)	1995–02 (taf/yr)	2003–11 (taf/yr)	Total (taf)
Sacramento Valley	258	159	238	5,475
San Joaquin Valley	131	655	777	13,286
Southern California	136	186	343	5,663
S.F. Bay Area	19	14	24	480
Central Coast	0	18	1	157
Total	**543**	**1,033**	**1,383**	**25,060**
Net Internal Non-Environmental Sales				
Sacramento Valley	18	73	80	1,443
San Joaquin Valley	95	400	484	8,316
Southern California	134	116	304	4,738
S.F. Bay Area	4	2	3	78
Central Coast	0	0	1	8
Total	**251**	**590**	**872**	**14,583**
Net Non-Environmental Imports (Exports)				
Sacramento Valley	(227)	(43)	(82)	(2,898)
San Joaquin Valley	38	26	(84)	(244)
Southern California	27	14	134	1,527
S.F. Bay Area	25	8	32	558
Central Coast	0	(18)	0	(143)
Total	**(137)**	**(12)**	**(1)**	**(1,201)**
Environmental Sales				
Sacramento Valley	13	43	74	1,118
San Joaquin Valley	14	173	170	3,026
Southern California	0	0	24	220
S.F. Bay Area	5	4	7	143
Central Coast	0	0	0	0
Total	**32**	**220**	**276**	**4,506**

SOURCE: Data collected by the authors (For details, including region-to-region patterns of trade for each period, see Technical Appendices Tables B6a–c. For details within the San Joaquin Valley, see Technical Appendices Tables B7a–c).

NOTES: The table reports actual flows, and excludes additional volumes committed but not transferred under permanent and long-term transfers. The table also excludes a small share of transfers for which region of origin or destination could not be determined and 4,400 af of environmental transfers in the Far North in 2010–2011 (see Technical Appendices Table B5). The non-zero balance of net imports/exports results because of these omissions, the presence of surplus drought purchases by DWR, and some smaller discrepancies in user pools in some years. For the Sacramento Valley, total sales are slightly lower than those reported in Technical Appendices Table B4a because of user pool discrepancies, particularly in the first period (see notes to Technical Appendices Table B6).

Table 5C-2. Statewide Water Transfer Volumes

	Column								
	1	2	3	4	5	6	7		
Year	Total Commitments	Total Volume Traded	Short-term Flows	Long-term Flows	Permanent Flows	Additional Committed under Long-term Transfers	Additional Committed under Permanent Transfers	Sacramento Valley 40–30–30 Index	Year Type
1982	129,851	142,314	117,157	25,157	0	-12,463*	0	12.76	Wet
1983	141,604	128,830	128,225	605	0	12,774	0	15.29	Wet
1984	68,442	63,848	55,063	8,785	0	4,594	0	10	Wet
1985	74,045	71,238	61,351	9,887	0	2,807	0	6.47	Dry
1986	135,851	131,526	125,279	6,247	0	4,325	0	9.96	Wet
1987	282,544	278,143	161,972	116,171	0	4,401	0	5.86	Dry
1988	320,872	320,872	210,872	110,000	0	0	0	4.65	Critical
1989	519,122	519,122	409,122	110,000	0	0	0	6.13	Dry
1990	529,564	529,564	419,564	110,000	0	0	0	4.81	Critical
1991	1,106,213	1,106,213	996,213	110,000	0	0	0	4.21	Critical
1992	596,351	531,652	393,351	138,301	0	64,699	0	4.06	Critical
1993	509,607	509,596	306,607	202,989	0	11	0	8.54	Above Normal
1994	755,595	727,283	552,595	174,688	0	28,312	0	5.02	Critical
1995	568,654	520,121	389,454	130,667	0	48,533	0	12.89	Wet
1996	877,058	828,525	697,858	130,667	0	48,533	0	10.26	Wet
1997	1,050,665	994,132	860,596	132,667	869	56,533	0	10.82	Wet
1998	779,725	724,525	533,356	159,000	32,169	55,200	0	13.31	Wet
1999	1,422,162	1,326,200	997,033	296,998	32,169	95,962	0	9.8	Wet
2000	1,423,515	1,292,512	893,386	309,157	89,969	121,803	9,200	8.94	Above Normal
2001	1,689,258	1,451,608	1,054,375	296,270	100,963	162,690	74,960	5.76	Dry
2002	1,377,956	1,123,903	662,502	318,955	142,446	217,505	36,548	6.35	Dry
2003	2,075,631	1,311,641	813,851	305,510	192,280	748,257	15,733	8.21	Above Normal
2004	2,005,480	1,268,152	719,875	385,976	162,301	681,716	55,612	7.51	Below Normal

	Column								
	1	2	3	4	5	6	7		
Year	Total Commitments	Total Volume Traded	Short-term Flows	Long-term Flows	Permanent Flows	Additional Committed under Long-term Transfers	Additional Committed under Permanent Transfers	Sacramento Valley 40–30–30 Index	Year Type
2005	2,037,878	1,375,813	723,746	425,156	226,911	642,663	19,402	8.49	Above Normal
2006	1,905,903	1,282,195	483,865	524,111	274,219	623,708	0	13.2	Wet
2007	1,995,490	1,348,992	581,202	582,907	184,882	556,987	89,512	6.19	Dry
2008	2,086,382	1,292,347	426,128	720,898	145,321	639,809	154,226	5.16	Critical
2009	2,221,663	1,500,154	547,292	805,126	147,735	555,581	165,929	5.75	Dry
2010	2,223,907	1,711,877	564,000	958,431	189,446	385,499	126,531	7.08	Below Normal
2011	2,107,580	1,429,139	465,635	696,379	26,7125	628,688	49,753	10.52	Wet
Total	**33,018,568**	**25,842,037**	**15,351,525**	**8,301,705**	**2,188,805**	**6,379,127**	**797,406**		

SOURCES: Calculations based on author-collected data. For details see Technical Appendix A.

NOTES: "Total volumes traded" (column 2) is the sum of actual and estimated flows under short-term transfers (column 3), long-term transfers (column 4), and permanent transfers (column 5). "Total commitments" (column 1) equals the sum of total volumes traded (column 2) plus additional commitments under long-term (column 6) and permanent (column 7) contracts that were committed but not sold in that year. The table includes purchases by state-run water banks and by various CVP and SWP user pools. *The negative amount under "Additional committed under long-term transfers" in 1982 occurs because committed flows under a 1979 long-term agreement between the MWDSC and Kern County Water Agency were carried over from 1980 and 1981 and delivered all at once in 1982.

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5C.4 State of California Water Purchase Programs

One of the most prominent and earliest organized water transfer program was initiated in 1991 in response to consecutive drought years. The 1991 State Water Bank was established by DWR and purchased rights to use 821,000 acre-feet of water from willing suppliers to sell to entities with critical needs. A number of these purchases were from in-Delta crop idling and other sources that are now understood to provide less water than what was assumed in 1991 and would no longer be considered within a water bank program. The actual yield of that water bank has not been documented; there was concern at the time and following the water bank that DWR paid for more water than the actual yield of new water to the system.

Additional water banks were implemented in 1992 (193,246 acre-feet acquired) and 1994 (221,754 acre-feet acquired).

In 2001 and 2002, some areas of California experienced water deficiencies. DWR responded by implementing the 2001 and 2002 Dry Year Water Purchase Programs. In 2001 DWR secured 138,800 acre-feet of water from willing sellers in Northern California, and provided it to eight water agencies throughout the State to help offset their water shortage conditions. In 2002, DWR secured 22,000 acre-feet of water from willing sellers in Northern California and provided it to four water agencies throughout the State.

In the 2007–2009 drought, DWR implemented a drought water bank in 2009, acquiring about 76,600 acre-feet of transfer water to supplement an additional 200,000 acre-feet of cross-Delta transfers arranged independently by water agencies in the export service area.

5C.5 Federal Water Purchase Programs in California

This section of the appendix discusses federal water transfers that include both cross-Delta and exclusively San Joaquin Valley transfers. The discussion of the exclusively San Joaquin Valley transfers is included to provide added information on supplemental water sources tapped by the CVP south-of-Delta agricultural contractors in low allocation years, and to support the assumption that the San Luis & Delta-Mendota Water Authority (Authority) would seek only half of supplemental supplies in low allocation years from upstream of Delta sources, as discussed in Chapter 5.

Section 3405(a) of the Central Valley Project Improvement Act of 1992 (CVPIA) authorizes the transfer of all or a portion of a CVP contractor's contracted water supply to any other California water user or water agency, State or Federal agency, Indian Tribe, or private non-profit organization for project purposes or any purpose recognized as beneficial under State law.

The Accelerated Water Transfer Program allows water transfer and/or exchange agreements between CVP contractors that had historically occurred before enactment of the 1992 Central Valley Project Improvement Act (CVPIA) to be acknowledged by Reclamation. Actions under this program have occurred since 1996. As of 2011, Reclamation had in place required environmental documentation for the transfer and exchange of up to 500,000 acre-feet of water covering the following areas: (1) Sacramento Valley; (2) Friant Division contractors, (3) South of Delta CVP contractors, including those in the Delta Division, San Felipe Division and San Luis Unit. The

program also allows Cross Valley contractors to transfer to south-of-Delta contractors and the Friant Division contractors to transfer to Cross Valley contractors.

Environmental Assessments (EA) are in place covering water transfers of 80,000 acre-feet per year from the San Joaquin River Exchange Contractors (SJREC) to the Authority contractors, federal and private wildlife refuges and Friant Division contractors. Distribution of this water depends on the CVP's annual water supply allocation, with more water going to west side Authority contractors in lower allocation years.

EAs are also in place for the transfer of up to 50,000 acre-feet of additional water from the SJREC to Authority contractors and the wildlife refuges; however, this water would be made available through crop idling by the SJREC. Programmatic approval also exists for an annual transfer of up to 20,000 acre-feet available by groundwater pumping, water conservation and fallowing to Authority contractors. EAs are also in place for individual members of the SJREC, specifically the Central California Irrigation District for 20,500 acre-feet and the Firebaugh Canal Water District for 5,000 acre-feet, to annually transfer water made available by groundwater substitution to various Authority contractors.

In 2008, regional federal policy was revised to allow East to West transfers to occur as a "transfer facilitated by an exchange." The San Joaquin River Restoration Settlement Act (SJRRSA) allows for the exchange or transfer of San Joaquin River water recaptured in San Luis Reservoir to reduce or avoid impacts to deliveries to Friant Division contractors caused by the SJRRSA Interim Flows and Restoration Flows. In 2010, P.L. 111-85, Energy and Water Development and Related Agencies Appropriations Act, provided for the transfer of CVP water between Friant Division contractors and SOD CVP agricultural water contractors.

Environmental documentation has recently been completed to provide for the transfer and/or exchange of up to 150,000 acre-feet of substitute Central Valley Project (CVP) water from the Exchange Contractors to several potential users from 2014–2038. The Exchange Contractors propose to make water available through tailwater recovery, water conservation, and temporary land fallowing for transfer and/or exchange of substitute water to either Reclamation for the state and Federal wildlife refuges in the San Joaquin Valley, to Central Valley Project (CVP) contractors for existing municipal and industrial (M&I) and/or agricultural areas, and to other potential SWP contractors for agricultural and/or M&I uses, or to some combination of these users.

In 2011, Reclamation completed an EA for the federal 2011–2012 Water Transfer Program to allow for the transfer of water from willing sellers upstream of the Delta to buyers that export water from the Delta.

The CVPIA also amended previous authorizations of the CVP to include fish and wildlife protection, restoration, and enhancement as project purposes having equal priority with agriculture, municipal and industrial, and power purposes. A major feature of CVPIA is that it requires acquisition of water for protecting, restoring, and enhancing fish and wildlife populations. To meet water acquisition needs under CVPIA, the U.S. Department of the Interior (Interior) has developed a Water Acquisition Program, a joint effort by the Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (FWS). The Water Acquisition Program acquires water to meet two purposes: (1) Level 4 refuge water supplies and (2) instream flows.

There are four levels of water supplies to the federal refuges: Level 1 is the existing firm supply (no action, meaning no acquisitions of water for the refuges); Level 2 is the current average annual

water supply (over 400,000 acre-feet including acquisitions); Level 3 is the supply for full use of existing development; and Level 4 is the supply for optimum habitat management, about 570,000 acre-feet.

CVPIA requires Interior to acquire additional water supplies to meet optimal waterfowl habitat management needs at national wildlife refuges in California's Central Valley, certain State wildlife management areas, and the Grassland Resource Conservation District (collectively known as refuges). Some of these purchases may be delivered as cross-Delta transfers. The optimum refuge water supply levels are referred to as Level 4. The goal is to secure additional long-term water supplies, up to 163,000 acre-feet of water, needed to provide optimum waterfowl habitat management at the refuges. Typical annual water acquisition needs are somewhat less since refuge water supplies are partially met in most years by rainfall, runoff, and/or local supplies. Also, some refuges have not historically been able to receive full Level 4 supplies due to a lack of water delivery systems.

The refuges comprise 19 CVPIA Units:

- -12 Federal National Wildlife Refuges/Units
- -6 State Wildlife Areas/Units
- -1 Privately-managed complex within the Grassland Resource Conservation District

Five of the CVPIA refuge units are in the Sacramento Valley; 14 are in the San Joaquin Valley.

5C.6 The CALFED Environmental Water Account Program

The Environmental Water Account (EWA) was formulated in 2000 and implemented beginning in December 2000 as part of the CALFED ROD. The purpose of the EWA program was to provide protection to at-risk native fish species of the Bay-Delta estuary through environmentally beneficial changes in SWP/CVP operations at no uncompensated cost to the CVP and SWP water users beyond that provided by the projects' water users as their contribution towards the EWA. This approach to fish protection involved taking actions to benefit fish and acquiring alternative sources of water, called the "EWA assets," which the EWA agencies used to replace the Project water that was not exported from the Delta because of fish actions. Many of these acquisitions were provided as cross-Delta transfers.

Actions designed to protect fish included pumping reductions at the SWP and CVP export pumping plants in the Delta. Project export pumping varies by season and hydrologic year and can adversely affect fish at times when fish are near the pumps or are moving through the Delta. Pumping reductions can reduce water supply reliability for Project water users, causing conflicts between fishery and water supply interests. A key feature of the EWA was use of water assets to replace Project supplies that were interrupted during pumping reductions. The EWA assets could also provide other benefits, such as augmenting instream flows and Delta outflows, and providing cold water releases from reservoirs through bypassing power generation outlets.

The EWA was administered by five federal and State of California agencies through a multi-agency Operating Principles Agreement as a cooperative management program. The California Department of Water Resources (DWR) and the Bureau of Reclamation (Reclamation), or the "Project Agencies,"

were responsible for acquiring water assets and for storing and conveying the assets through use of the SWP and CVP facilities. The "Management Agencies," which included the State and Federal fishery agencies (National Marine Fishery Service, U.S. Fish and Wildlife Service, and the California Department of Fish and Game, now the Department of Fish and Wildlife), used the EWA to protect and restore fish in the Sacramento-San Joaquin Delta. All five EWA agencies were responsible for the day-to-day program management of actions taken to protect and benefit fish (e.g., pumping reductions to protect fish) and instream flow enhancements to help facilitate fish population recovery.

The EWA Operating Principles Agreement was originally executed between the five state and federal agencies in 2000, and in 2004 it was extended through December 31, 2007. The agreement was not extended past 2007, although federal authorization continues through 2014. DWR has not purchased any water for the EWA since 2007, although prepaid annual deliveries of 60,000 acre-feet of water to DWR will continue through 2015 under the Lower Yuba River Accord and its accompanying EIS/EIR.

The asset acquisition aspect of the EWA comprised a water transfer component that provided water to export service area water agencies to offset water supply reductions to benefit fish. The water assets were water transfer supplies purchased from willing sellers both upstream of the Delta and from the export service area. The demands of the EWA for water were related to hydrologic year type, but with a different demand pattern than that associated with dry year water transfer supplies. The biggest demand for EWA actions, and the consequential acquisition of replacement assets, occurred in the above normal hydrologic year types when more fish were likely to be threatened by Delta export pumping and greater export cuts were required to provide protection from entrainment at the export pumps. In very wet years, fewer assets were required as high flows and reduced export demands reduced the need for water acquisitions. In the very dry years, exports were less and consequently the export reductions were not as great as in some wetter year types. Therefore the historical export reductions that were then offset by EWA acquisitions of transfer water are not related to hydrologic conditions in the same manner that dry years stimulate an increase in transfers.

Table 5C-3 presents the historical asset acquisitions of the EWA Program, indicating those transfers originating upstream of the Delta separate from those acquisitions originating in the export service area that did not move through the Delta.

Table 5C-3. Summary of EWA's Actual Water Purchases (2001–2007)

	Water Purchased (AF)							
Seller	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**Total**
Upstream of the Delta								
Butte Water District	0	0	0	0	0	0	0	0
Merced Irrigation District	25,000	0	0	0	0	0	25,000	50,000
South Feather Water & Power Agency (Formerly Oroville-Wyandotte Irrigation District)	10,000	0	4,914	0	0	0	0	14,914
Placer County Water Agency	20,000	0	0	18,700	0	0	0	38,700
Sacramento Groundwater Authority	0	7,143	0	0	0	0	0	7,143
						1	2	
Yuba County Water Agency	50,000	135,000	65,000	100,000	6,044	62,000	63,000	481,044
Sub-total	105,000	142,143	69,914	118,700	6,044	62,000	88,000	591,801
Export Service Area (South of the Delta)								
Arvin Edison Water District	10,000	0	0	0	0	0	0	10,000
Buena Vista Water Service District, West Kern Water District, Rosedale-Rio Bravo Water Storage District	23,718	0	0	0	0	0	0	23,718
Cawelo Water District	5,000	0	0	0	0	0	0	5,000
Kern County Water Agency	20,000	97,400	125,000	35,000	89,712	0	125,000	492,112
Rosedale-Rio Bravo Water Storage District	19,036	0	0	0	0	0	0	19,036
Santa Clara Valley Water District	30,000	0	20,000	0	8,804	0	0	58,804
Semitropic Water Storage District, Tulare Irrigation District	15,000	0	0	0	0	0	0	15,000
Westside Mutual Water District	15,000	0	0	0	0	0	0	15,000
Dudley Ridge Water District, Westside Mutual Water District, Tejon-Castec Water District	21,000	0	0	0	0	0	0	21,000
Sub-total	158,754	97,400	145,000	35,000	98,516	0	125,000	659,670
Total by Year	263,754	239,543	214,914	153,700	104,560	62,000	213,000	1,251,471
Source Shift								
Metropolitan Water District of Southern California	50,000	0	0	0	0	0	0	50,000
Exchanges								
Metropolitan Water District of Southern California	0	0	0	0	50,000	0	0	50,000
Grand Total	**313,754**	**239,543**	**214,914**	**153,700**	**154,560**	**62,000**	**213,000**	**1,351,471**

[1] Although 62,000 acre-feet was purchased in 2006, none of the water could be delivered by YCWA because of excess conditions in the Delta. The water was delivered in 2007.

[2] In 2007, 60,000 acre-feet was purchased from YCWA, and all except 8,400 acre-feet was delivered to EWA in 2007. An additional 3,000 acre-feet was requested from YCWA as well. A total of 11,400 acre-feet of water released by YCWA was in storage in Oroville Reservoir from 2007 until it was delivered in the summer of 2008. The additional 3,000 acre-feet was also delivered in 2008 for a total of 63,000 acre-feet.

5C.7 The Yuba Accord Water Transfer Program

The Lower Yuba River Accord was developed between 2004 and 2008 to settle long-standing litigation over instream flows in the Yuba River in relation to fisheries. The purpose of the Accord is to resolve instream flow issues associated with the operation of the Yuba River Development Project in a way that protects and enhances lower Yuba River fisheries and local water-supply reliability. The Accord also provides revenues for local flood control and water supply projects, transfer water to enhance SWP and CVP water supply reliability by offsetting Delta export reductions to benefit Sacramento-San Joaquin Delta fish, and dry year transfer water supplies for participating SWP and CVP contractors. The transfer water generated under the Yuba Accord is exported at the Delta pumps.

In 1989, the State Water Resources Control Board received a complaint regarding fishery protection and water right issues on the lower Yuba River. The SWRCB held hearings on the issues raised in this complaint, and in 1999, issued a draft decision. At the request of YCWA and DFG, subsequent hearings were postponed in order to provide the parties an opportunity to reach a proposed settlement regarding instream flows and further studies. The parties failed to reach agreement on a settlement and the SWRCB held additional hearings in the spring of 2000. A draft decision was issued in the fall of 2000 and was adopted as Decision 1644 on March 1, 2001.

Subsequent litigation led to withdrawal of Decision 1644 and issuance of Revised Decision 1644 (RD-1644) in July, 2003. These decisions established revised instream flow requirements for the lower Yuba River and required actions to provide suitable water temperatures and habitat for Chinook salmon and steelhead and to reduce fish losses at water diversion facilities.

After the issuance of Decision 1644, the parties involved in the SWRCB proceedings expressed a desire to further negotiate the instream flow, flow fluctuation, and water temperature issues on the lower Yuba River. The parties engaged in a collaborative, interest-based negotiation with numerous stakeholders, reaching a series of agreements now known as the Lower Yuba River Accord (Accord). These negotiations resulted in the agreements outlined below and the SWRCB approval of the flow schedules and water transfer aspects of the Accord on March 18, 2008 with Water Right Order 2008-0014. Several technical revisions to the Order were adopted as part of Water Right Order 2008-0025 on May 20, 2008. The SWRCB approved transfers up to 200,000 acre-feet in any one year.

5C.8 Yuba River Water Availability

Surface water releases are made available for transfer under the Accord based on the difference between a baseline release rate (the interim flow schedules defined in RD-1644 and in Water Right Order 2008-0014) and the Fisheries Agreement flow schedules. The baseline releases (interim flow schedule in RD-1644) are based on the Yuba River Index as defined in RD-1644. The flow schedules in the Fisheries Agreement are determined based on the North Yuba River Index independent from the Yuba River Index. (There are also some conditions when the YCWD-DFG agreement or the current FERC license control the baseline flows.) As a result, there can be a wide range of possible transfer amounts under the various hydrologic conditions that can occur in the Yuba River watershed in any year.

Groundwater substitution water is made available by individual landowners within seven of the eight YCWA member units that are signatory to the Accord (Cordua Irrigation District has not signed the Accord as of this writing). YCWA reduces its surface diversions to those member units from the Yuba River and regulates storage in Bullards Bar Reservoir to accrue and release the groundwater substitution water on a schedule to allow the releases to be exported in the Delta.

5C.9 Overview of Yuba Accord Implementing Agreements

There are multiple agreements implementing the Yuba Accord. They are outlined below together with a brief description of their coverage. The Accord includes three major elements:

1. the **Fisheries Agreement**: an agreement between YCWA, DFG, and several environmental groups, with USFWS and NOAA Fisheries signing a letter of support (but not signatory to the Agreement), under which YCWA has revised the operation of the Yuba Project to provide higher flows in the lower Yuba River to protect and enhance fisheries and to increase downstream water supplies;
2. the **Conjunctive Use Agreements**: a set of agreements between YCWA and seven of its eight member units (independent irrigation and water districts) for the implementation of a comprehensive program of conjunctive use and water use efficiency (groundwater management), and particularly the provision of groundwater substitution water for Yuba Accord purposes. The agreements do not require the member agencies to offer water except in extremely dry conditions; the wells that would be pumped are owned by the individual landowners in the participating member units; and
3. the **Water Purchase Agreements**: an agreement between YCWA and DWR for the period 2008 through 2025 for purchase and transfer of certain YCWA Yuba River releases by DWR to benefit the CVP and SWP contractors and the Environmental Water Account, and 22 Participation Agreements between DWR and 21 SWP contractors and the Authority for dry year water supplies.

All of these agreements, plus the other required agreements and approvals, are executed and have been in effect since 2008. Reclamation was originally intending to sign the Water Purchase Agreements, but was unable to do so, although it remains a member of the Management and Technical Committees under the terms of the agreements. The SWRCB adopted the flow standards of the Fisheries Agreement for the Yuba River and approved the transfer of up to 200,000 acre-feet of water per year.

The following table illustrates the water transfers to date under the Yuba Accord, beginning in 2008. In addition, there were several pilot years of the Accord (2006 and 2007) during which YCWA operated to the fisheries agreement flow schedules and water was transferred to the Environmental Water Account water purchase program to help offset Delta export reductions to benefit fish. Component 1 water was purchased by DWR to benefit the Delta fish, initially for the EWA, then to continue offsetting Delta export cuts under the Biological Opinions on Chinook salmon and Delta smelt, and has been funded through 2015. Components 2, 3, and 4 water are dry year supplies that are triggered either by hydrology, CVP and SWP allocations, or requests from the participating

contractors. Components 2, 3, and 4 carry various pricing provisions and are made available for purchase by the 22 Participating Contractors in the drier year types.

Table 5C-4. Summary of Yuba Accord Water Transfers

Year	Component Number	Component Quantity, AF	Total Annual AF
2008	Component 1	60,000	
	Component 2	30,000	
	Component 3	40,000	
	Component 4	36,086	
			166,086
2009	Component 1	60,000	
	Component 2	15,000	
	Component 3	16,100	
	Component 4	88,900	
			180,000
2010	Component 1	60,000	
	Component 2	0	
	Component 3	15,645	
	Component 4	66,211	
			141,856
2011	Component 1	0 [1]	
	Component 2	0	
	Component 3	0	
	Component 4	0	
			0
2012	Component 1	60,000	
	Component 2	0	
	Component 3	21,681	
	Component 4	0	
			81,681
Totals		**700,667**	**700,667**

[1] Component 1 water could not be moved across the Delta in 2011, and is owed by YCWA in a future year.

5C.10 Potential Sources of Upstream-of-Delta Water Transfers and Potential Impacts

The sections below list the geographic areas from which agencies could acquire transfer water from willing sellers, present a list of potential sellers based on past transfer activity, and describe the ways in which sellers would make water available to purchasing agencies. These potential sellers are not necessarily expected to be able or willing to make water available to purchasing agencies. No acquisition method is contemplated other than by purchase from a willing seller.

5C.10.1 Stored Reservoir Water

Agencies could acquire water by purchasing surface water stored in reservoirs owned by non-Project entities (those that are not part of the CVP or SWP). To ensure that purchasing this water would not affect downstream users, purchasing agencies must limit acquisitions to water that would not have otherwise been released downstream.

When a local agency releases stored reservoir water for transfer, its reservoir is drawn down to levels lower than without the transfer. To refill the reservoir, a seller must prevent some flow from being released downstream. Sellers must refill the reservoir storage at a time when downstream users would not have otherwise captured the water, either in downstream Project reservoirs or with Project pumps in the Delta. Typically, refill can only occur during Delta excess conditions; otherwise added transfer water must be released to repay the refill impact during balanced conditions in the Delta. Refill criteria have been established for non-Project reservoirs to prevent transfers from adversely affecting downstream users. Stored reservoir water is released in addition to reservoir water that would be released without the transfer, thereby increasing flows in downstream waterways.

Past sellers of stored reservoir water include South Feather Water and Power Agency (Sly Creek and Little Grass Valley Reservoirs), Yuba County WA (New Bullards Bar Reservoir), Browns Valley Irrigation District (Browns Valley ID, Collins Lake), Placer County Water Agency (Placer County WA, French Meadows and Hell Hole Reservoirs), and Merced Irrigation District (Merced ID, Lake McClure). The sections below describe operations associated with each of these potential acquisitions.

5C.10.1.1 Feather River

South Feather Water and Power Agency has multiple reservoirs as part of its South Fork Project and could sell water out of Little Grass Valley and Sly Creek Reservoirs. Water from Little Grass Valley Reservoir would flow through the South Fork Diversion tunnel into Sly Creek Reservoir. Sly Creek Reservoir also receives water from upstream tributaries, Little Grass Valley, and Slate Creek (a tributary to the Yuba River). The water from Sly Creek Reservoir would pass into Lost Creek Reservoir, where it would enter a series of tunnels to generate power between Lost Creek and Ponderosa Reservoirs. Thus, the water released from these reservoirs would not typically enter the South Fork of the Feather River or Lost Creek as it flows downstream to Lake Oroville.

South Feather Water and Power Agency's water is available for release from October to December, prior to the typical summer transfer season and the time when the assets would be used, so it would be stored in Lake Oroville through the winter and into the following summer when the Delta pumps have available capacity.

As a result of an acquisition from South Feather Water and Power Agency, water levels in Sly Creek and Little Grass Valley Reservoirs would be lower than without the transfer from the time when the transfer occurred until the reservoirs refill. Lake Oroville would store the releases until the following summer, increasing Oroville water elevations (relative to conditions without the transfer) from October until September. The acquisition water would be released from Lake Oroville in mid-June through September, increasing downstream flows over without-transfer flows.

Operators would refill Sly Creek and Little Grass Valley Reservoirs as excess water was available, decreasing releases from these reservoirs during the refill period. Without the transfer, releases

from Sly Creek and Little Grass Valley Reservoirs (beyond that needed to meet instream flow requirements) would be diverted into power generation facilities. The power generation facilities discharge into Ponderosa Reservoir. During refill, the minimum instream flow requirements would still be met, but the amount of water diverted into power generation facilities would decrease. Because only the flows through the power generation facilities would be affected during refill, refilling the reservoirs would not reduce flows between Little Grass Valley/Sly Creek Reservoirs and Lake Oroville. Reservoir refill might reduce flows downstream of Lake Oroville when Sly Creek or Little Grass Valley refilled. (Flows downstream of Lake Oroville would not be reduced below instream flow requirements.) Because Sly Creek Reservoir also receives some water from Slate Creek, a tributary of the Yuba River, refill might also affect the Yuba River.

The October-to-December releases from South Feather Water and Power Agency would result in transfer water stored in Lake Oroville through the wet season, but as stored transfer water has the lowest priority for storage, the transfer would be the first to convert to Project water if the reservoir storage reached flood storage capacity levels. This option carries the risk that the transfer might not be available in the spring. As part of the purchase contract, an agency could include a "spill protection term" to ensure that if the water spills from Lake Oroville, it would not have to pay South Feather Water and Power Agency for any portion of the purchase that spills from Lake Oroville.

5C.10.1.2 Yuba River

Acquiring stored reservoir assets on the Yuba River would involve either Yuba County WA selling water from New Bullards Bar Reservoir or Browns Valley ID selling water from Collins Lake. At present, this water is committed to DWR and 22 Participating Contractors through 2025 under the Yuba Accord Water Purchase Agreement, with a re-pricing requirement in 2015. YCWA expects to receive a new FERC license on its Yuba River Development Project, including Bullards Bar Reservoir, in 2016 or later, a regulatory action that could affect river flows and transferable water quantities. The following discussion provides information on the transfer consistent with other discussions in this section.

Yuba County WA releases water from New Bullards Bar Reservoir, on the North Fork of the Yuba River, in accordance with agreed flow standards approved by the SWRCB for fish needs along the Yuba River. Once released from New Bullards Bar Reservoir, the water passes through a power generation plant and then enters the upstream end of Englebright Lake to be released according to the agreed flow schedules.

Operations under the Yuba Accord lower the water surface elevation in New Bullards Bar Reservoir relative to existing conditions during some months of the year until the reservoir is refilled. As water is released pursuant to the Accord agreements, flows increase in the Yuba River downstream from Englebright Dam during some months of the year. New Bullards Bar Reservoir refills as water is available in the Yuba River, which can decrease flows downstream from New Bullards Bar Reservoir during some months of the year, but not below required minimum flows.

Yuba County WA releases water to meet instream flow requirements and the terms of the Accord agreements; the pattern of releases varies annually based on hydrologic conditions and fish needs as reflected in the flow agreements. Releases under the Yuba Accord occur year around. The difference between an agreed baseline flow and Accord releases defined in the Fisheries Agreement represents water available for transfer. Generally, most of the water available for transfer is available between June and October, but transferable water can be available all months of the year depending on flow

schedules and Delta conditions. If water is available for transfer during a time that the Projects do not have pumping capacity in the Delta, or are not permitted to export transfer water, the water can often be backed into Lake Oroville. If neither pumping capacity nor storage in Lake Oroville is available, the water would become Delta outflow and would not become transfer water. The Yuba Accord Water Purchase Agreement expires in 2025.

Browns Valley ID stores 3,100 acre-feet of conserved water each year in Collins Lake or New Bullards Bar Reservoir for transfer until the Delta pumps have available export capacity. If the water is stored in Collins Lake, Browns Valley ID would release the water into Dry Creek, which enters the lower Yuba River. This water would usually not flow into the Yuba River, so this release would increase flows in this portion of the river relative to conditions without the transfer. The transfer would decrease reservoir levels in Collins Lake relative to conditions without a transfer from mid-June until the reservoir is refilled. During refill, flows in Dry Creek and the lower Yuba River would decrease relative to conditions without the transfer.

5C.10.1.3 American River

Acquiring stored reservoir assets on the American River would involve Placer County WA selling water to purchasing agencies from Hell Hole and French Meadows Reservoirs, on the Middle Fork of the American River. The agency would release the water from its reservoirs to Folsom Lake over a 2-3 month period, where the water could be held until the purchasing agencies are ready for it to be released for export. Water from both French Meadows and Hell Hole Reservoirs would enter a series of tunnels through power generation facilities, and these tunnels would release the water at Ralston Afterbay. While water was being released, the Middle Fork of the American would convey the increased flows from Ralston Afterbay downstream to Folsom Lake.

The water would be released from Hell Hole and French Meadow Reservoirs as early as June and until as late as November. Hell Hole and French Meadows would have lower surface water elevations than they would without the transfer from June until the reservoirs refill. Refilling the reservoirs would decrease flows downstream from the Ralston Afterbay during the refill period.

Placer County WA could release water from Hell Hole and French Meadows any time from June through November, but these times might not correlate with the times that the purchasing agencies would need the water (typically July through September). If Placer County WA released water before it was needed by the acquiring agencies, then the purchaser would contract for storage in Folsom Lake to hold the water. Folsom Lake elevations would be higher with the transfer water than they would be without the water. As the water was released, the Folsom Lake level would be restored to the levels that would occur without the transfer. If Placer County WA released water after it was needed for the acquiring agencies, then the agencies would borrow water from Folsom Lake (i.e., Reclamation could release water from Folsom Lake prior to receipt of water from upstream) that would be repaid by November. Folsom Lake elevations under this scenario would be lower than they would be without the transfer.

On the American River, the agencies might elect to use the transfer water to accomplish instream flow objectives and would move water to users downstream from the Delta on a fish-friendly schedule. During the summer (mid-May to mid-October), water could be released to help meet steelhead temperature requirements. Additional instream flow increases are needed in October to December for Chinook salmon and steelhead spawning. The agencies could also release the water from Folsom Lake to meet these multiple objectives, resulting in release periods from June through

December. If the Delta were in excess conditions when water was released to increase instream flows, the Projects would not be credited with the transfer water.

5C.10.1.4 Merced River

Water acquisition on the Merced River would be from Merced ID, which would sell stored reservoir water from Lake McClure on the Merced River. The agencies would convey the water transfer through the Merced and San Joaquin Rivers. The agencies could cooperate to schedule these transfers for periods when the temperature would be acceptable for fish migration. Assets could be transferred via the rivers in October and November, increasing flow relative to without-transfer flows during those times and providing an attraction flow for spawning salmon. Transfer of the water in the fall, compared to July – September, has an increased likelihood of reaching the Delta without significant channel losses (most likely in the summer months), but also has a higher risk of not being credited as transfer water at the Delta pumps because early fall storms or Project releases to create flood storage space in reservoirs could trigger excess conditions in the Delta.

Water elevations in Lake McClure would be lower than they would be without the transfer from October through refill. River flows would increase downstream of Lake McClure during the October and November release of the assets from storage. Lake McClure would refill as water was available in the Merced River, which would decrease flows downstream from the reservoir relative to flows without the transfer.

5C.10.2 Groundwater Substitution

Groundwater substitution transfers occur when users forego their surface water supplies and pump an equivalent amount of groundwater as an alternative supply, allowing their normal surface supply to flow to the Delta for transfer when Delta capacity is available and the transfer can be credited. Because potential groundwater substitution transfers are primarily from agricultural users, the water from this acquisition method would be made available during the irrigation season of April through October.

Groundwater substitution transfers would withdraw more water from the groundwater basin below the participating users than without the transfer, so this option is generally only used in basins that are well-managed and not in a state of significant groundwater overdraft, or in areas where the water supplier determines that the water transfer would not contribute to groundwater overdraft.

5C.10.2.1 Groundwater Substitution Upstream from the Delta

Typically, surface water made available through groundwater substitution is stored upstream until the Delta pumps have the capacity available for the transfer (except on the Sacramento River, as described later).

The Delta pumps are currently unlikely to have available capacity for transfers at the start of the irrigation season under conditions imposed by the Biological Opinions. This constraint may be removed, however, if the transfer water is moved in the proposed water conveyance facilities. Under the existing conditions and no action alternatives, transfer water made available by crop idling that would have been released for irrigation would instead be held in upstream reservoirs until later in the season, which would cause reservoir levels to be slightly higher than without the transfer while the water was held back (except on the Sacramento River). The reservoir levels would not reverse their typical summer declines because the crop idling would not add new water to the reservoir;

rather, the levels would decrease more slowly than without the transfer. Under the existing conditions and no action alternatives, transfer water acquired through groundwater substitution would be released later in the irrigation season, typically July through September, at times when Delta pumping capacity was available. The change in reservoir elevations as the water was released would depend on the Delta conveyance capacity.

Under the action alternatives, if export conveyance capacity were available constantly throughout the period of April through October, then the reservoir elevations would remain at their without-Transfer levels.

Agencies could engage in groundwater substitution transfers with Anderson Cottonwood Irrigation District (Anderson Cottonwood ID), Glenn-Colusa Irrigation District (Glenn-Colusa ID), Maxwell Irrigation District (Maxwell ID), Natomas Central Mutual Water Company (Natomas Central Mutual WC), River Garden Farms, Reclamation District 108, other Sacramento River Settlement Contractors, Butte Water District (Butte WD), Garden Highway Water District (Garden Highway WD), Sutter Extension Water District (Sutter Extension WD), Western Canal Water District (Western Canal WD), Yuba County WA, and Merced ID. Several of these agencies would need to obtain permits pursuant to local groundwater regulations. The sections below describe operations associated with each of these potential acquisitions.

5C.10.2.1.1 Sacramento River

Sacramento River agencies (Anderson Cottonwood ID, Corning WD, Glenn-Colusa ID, Maxwell ID, Natomas Central Mutual WC, River Garden Farms, Reclamation District 108, and other Sacramento River Settlement Contractors) divert "base supply" water that is water they take free of charge under their claims of water rights and "Project Water" that is CVP water diverted when their claims of water right water is deficient. Such quantities and timing of "base and Project" water were negotiated in their settlement contracts. CVP water is stored upstream from their service areas in Lake Shasta, a CVP facility. While theoretically possible, Reclamation generally cannot reduce releases from Lake Shasta to store water until Delta pumps are available because all of the flow released from Lake Shasta is typically needed to meet downstream temperature requirements or the flow requirement at Wilkins Slough.

The possibility exists that transfer water could be held back in Lake Shasta during certain years (usually wet years) when releases would not be needed to meet downstream requirements. In most years, however, most agencies would only transfer water when the Delta pumps have available capacity (irrigators would continue to use their surface water supply until about June, and then switch to groundwater). Under current conditions, these limitations mean that less water would be available with this strategy in the Sacramento basin than with others, but the water would have a higher likelihood of being usable transfer water. It would be possible for each scenario to occur in different year types.

If water were held back in Lake Shasta, the water surface elevations during the holdback period (April through June) would be slightly higher than they would be without the transfer. As the water was released, the reservoir levels would be higher or lower than the without-transfer levels and would slowly return to the without-transfer levels by the end of September. The river between Lake Shasta and the water agencies' usual diversion point would convey less water than it would without the transfer during the hold-back period (April through June) because the water would be held in Lake Shasta. Flows would not decrease below those needed for flow or temperature requirements.

The river would then carry more water than it would without the transfer in the July through September period, when the Delta pumps have availability for transfer water.

If users shifted from surface water to groundwater after the Delta pumps were available, the river flows would not decrease because no water would be held back in Shasta. Compared to flows without the transfer, river flows would increase from the water agencies' usual diversion point downstream to the Delta pumps.

If the proposed water conveyance facilities are used for groundwater substitution transfers from the Sacramento River, these constraints would not affect transfers, and the transfer water could be exported as it was developed, assuming Delta export capacity were available.

5C.10.2.1.2 Feather River

The Feather River water agencies, including the Butte WD, Garden Highway WD, Sutter Extension WD, and Western Canal WD, receive SWP water stored in Lake Oroville (an SWP facility). As a result of a groundwater substitution transfer and under existing conditions, water levels in Lake Oroville would be higher than without the transfer from April through June, while water would be held back because of Delta pump unavailability. The water levels in Lake Oroville might be lower or higher than without the transfer from July to September, depending upon the availability of cross-Delta conveyance. These districts (except for Garden Highway WD) do not divert from the river, but rather divert water that is released from Lake Oroville directly into the Thermalito Afterbay. This water does not flow through the river in the absence of the transfer, so an acquisition would not change river flows if the SWP held transfer water in Lake Oroville early in the season. The water would be conveyed through the river later in the season (from July through September), when the Delta pumps are available, increasing flows over the conditions without the transfer.

Garden Highway WD does divert water from the Feather River. Groundwater substitution transfers from Garden Highway WD would affect water levels in Lake Oroville in the same way as transfers for agencies that divert out of Thermalito Afterbay. These transfers, however, could alter Feather River flows differently. Under existing conditions, from April through June, when water is held in Lake Oroville, flows in the Feather River could decrease compared to those without the transfer between the point where flows enter the Feather River from the Thermalito system and Garden Highway WD's diversion point. From July through October, when the water is released from storage, the flows could increase compared to flows without the transfer.

If the proposed water conveyance facilities are used for groundwater substitution transfers from the Feather River, these constraints would not affect transfers, and the transfer water could be exported as it was developed, assuming Delta export capacity were available.

5C.10.2.1.3 Yuba River

Yuba County WA uses groundwater substitution water as part of the Yuba Accord. Like stored reservoir water assets, the groundwater substitution assets would be released on a pattern that has been negotiated as part of the Yuba Accord so as to be beneficial to fish. If farmers began using groundwater instead of receiving their surface water allocation prior to the need for Yuba County WA to release water for instream flow requirements, water elevations in New Bullards Bar Reservoir could be slightly higher than under existing conditions. Many of the Yuba County WA customers divert at Daguerre Point Dam, which is downstream from New Bullards Bar Reservoir. If water were held in New Bullards Bar Reservoir, flows between New Bullards Bar Dam and Daguerre

Point Dam would decrease relative to the existing conditions. Flows downstream from New Bullards Bar Dam would increase relative to existing conditions when water was released to meet instream flow requirements.

5C.10.2.1.4 Merced River

The Merced ID is on the Merced River and would store water in its reservoir, Lake McClure, until release into the Merced and San Joaquin Rivers. With groundwater substitution, surface water flows that would have been released for downstream users' irrigation needs would be held in the reservoir for release in October and November. Farmers would instead use groundwater for irrigation. Water elevations in Lake McClure would be slightly higher from April through November than they would be without the transfer. River flows would therefore be lower than without the transfer on a short stretch of the Merced River between New Exchequer Dam and Lake McSwain (the typical point of diversion).

Flows on the Merced River below the point of diversion would be the same with or without the transfer because return flows would not vary. The amount of water leaving the fields that have been irrigated with groundwater would be the same as the amount that would leave the fields if irrigated with surface water. As with stored reservoir water purchases, agencies can coordinate to schedule these transfers during October and November when the transfer would reach the Delta with minimal losses and the temperature would be acceptable for fish migration.

5C.10.2.2 Crop Idling or Crop Shifting

Crop idling and shifting transfers come from water that would otherwise have been used for agricultural production. Agencies would participate in two types of transfers to acquire water that would have been used for crop irrigation: crop idling transfers and general crop shifting transfers, explained below.

Crop idling transfers. For crop idling water acquisitions, agencies would pay farmers to idle land that they would otherwise have placed in production. The acquiring agencies would receive the assigned crop Evapotranspiration of Applied Water (ETAW) value for each acre idled. Crop ETAW values are subject to change as the related science and data are further developed.

General crop shifting transfers. For crop shifting acquisitions, agencies would acquire water when farmers shift from growing a higher water use crop to a lower water use crop. The acquiring agencies would receive the difference in ETAW between the higher water need crop to the lower water need crop.

Crop shifting transfers could cause some difficulties in accounting for the amount of water available. Farmers generally rotate between several crops, and crop type the farmer intended to plant in the year of the transfer may be unknown. To calculate water available from the transfer, the agencies would compare a change in acreage of crops during the transfer year to a 5-year baseline period.

5C.10.2.2.1 Crop Idling/Shifting Upstream from the Delta

Selling water agencies could only participate in crop idling/shifting if they used surface water to irrigate their crops and the surface water was regulated via an upstream reservoir. Water from crop idling/shifting acquisitions would be retained in reservoirs upstream from the selling water agencies until it could be transferred through the Delta and pumped south. (Water cannot usually be

held in Lake Shasta for Sacramento River transfers, as discussed above. Payment by the acquiring agencies for water transferred would be computed based on pre-agreed consumptive use values, which may be refined as the science for generating these values improves.

In the Upstream from the Delta Region, the acquiring agencies could purchase water from both crop idling and shifting transfers. Not all crops are eligible for participation. Perennial hay and pasture (all types) would be ineligible, because it is generally not possible to quantify the amount of water received from hay and pasture crops. All tree and nut crops would be ineligible, because farmers could not idle tree and nut crops for a year without damage or loss to the trees.

Agencies that might provide water through crop idling/shifting transfers could include Corning WD, Glenn-Colusa ID, Natomas Central Mutual WC, River Garden Farms, Reclamation District 108, other Sacramento River settlement contractors, Butte WD, Richvale Irrigation District (Richvale ID), Sutter Extension WD, and Western Canal WD.

The mechanisms for transferring water from crop idling would be very similar to those described above for groundwater substitution. The transferred water may be held in reservoirs during months when it could not be pumped through the Delta export pumps under existing conditions, then released during the months when the Delta pumps had availability.

If the proposed water conveyance facilities are used for conveying crop idling/crop shifting transfers from upstream of the Delta, the transfer water could be exported as it was developed, assuming Delta export capacity were available.

5C.10.2.2.2 Sacramento River Crop Idling Transfers

Water agencies in the Sacramento River that could potentially provide transfer water from crop idling include Corning WD, Glenn-Colusa ID, Natomas Central Mutual WC, River Garden Farms, Reclamation District 108, and other Sacramento River settlement contractors on the Sacramento River. As described above for groundwater substitution transfers, releases from Lake Shasta would probably need to be maintained during April and May to meet downstream temperature and flow requirements. Therefore, under existing conditions, water acquired from sellers on the Sacramento River could not be backed up into Lake Shasta and could not be transferred until the Delta pumps were available for transfers in the July-September period. Unlike groundwater substitution, farmers could not postpone crop idling until June. Crop idling water would be available at the beginning of the season, as soon as time for planting that crop had passed.

Under existing conditions, purchasing agencies would likely receive less water from crop idling transfers along the Sacramento River than from crop idling transfers along other rivers because pumping capacity might not be available for the water made available along the Sacramento River in April, May, and possibly June. The purchasing agencies would miss 30-50 percent of potential Sacramento River crop idling water.

If the proposed water conveyance facilities are used for conveying crop idling/crop shifting transfers from upstream of the Delta, these limitations would not apply, and the transfer water could be exported as it was developed, assuming Delta export capacity were available. With the water conveyance facilities in place, all of the water developed though crop idling could be exported, provided sufficient export capacity is available.

5C.10.2.2.3 Feather River Crop Idling Transfers

Crop idling transfers from Butte WD, Richvale ID, Sutter Extension WD, and Western Canal WD on the Feather River would function in the same way as transfers from groundwater substitution. Water elevations in Lake Oroville would be higher than they would be without a transfer during the April through June holdback period. From July to September, the levels would be higher or lower than they would be without the transfer, depending on the through-Delta conveyance capacity. The participating districts do not divert water directly from the Feather River, but instead divert water that is released from Lake Oroville directly into the Thermalito Afterbay. This water would not flow through the river without the transfer, so an acquisition would not change river flows if assets were held in Lake Oroville early in the season. River flows would increase when the Delta pumps had availability, typically during July through September.

If the proposed water conveyance facilities are used for conveying Feather River crop idling transfers from upstream of the Delta, these limitations would not apply, and the transfer water could be released to the Feather River as it was developed, and also exported as it was developed, assuming Delta export capacity were available. With the proposed facilities in place, all of the water developed though crop idling could be exported, provided sufficient export capacity is available.

5C.11 Potential Quantities of Upstream-of-Delta Water for Transfer

This section of the appendix provides a discussion of the quantity of water that might be available from willing sellers in the region upstream of the Delta in an extremely dry year. The estimate is based on currently-identified sources, cropping data provided by US Department of Agriculture, an inventory of potential transfer water that has historically been available from reservoir reregulation by past transferors, and an estimate of groundwater substitution transfer potential based on a review of prior transferors.

Water Code Section 1745.05 (b) provides that if the amount of water made available by land fallowing (crop idling) exceeds 20 percent of the water that would have been applied absent the proposed water transfer, a public hearing by the water supply agency is required. In the past, cropland idling programs have stayed well below the 20 percent water delivery threshold for a hearing. This analysis assumes that sufficient willing sellers of transfer water made available by crop idling would reach, but not exceed, 20 percent in each affected water supply agency.

The primary source of crop idling water would be from rice crop idling, as has been the case in past transfers. Based on statewide rice crop acreage of 555,000 acres and an allowable ETAW of 3.3 feet of water, idling 20 percent of the rice crop in California could generate about 366,000 acre-feet of transfer water. Idling 20 percent of all other eligible crops combined would add about another 141,000 acre-feet for a total of about 507,000 acre-feet of crop idling transfer water.

Surface supplies are limited to a few reservoirs that can provide transfer water. YCWA and PCWA are the primary sources for such water, with some other agencies also capable of transferring surface supplies. Total YCWA transfers are limited to 200,000 acre-feet per year, and surface supplies greater than 140,000 acre-feet are unlikely under current flow schedules. Total cross-Delta transfers available from surface flows as a result of reregulation of reservoirs are likely to be less than 250,000 acre-feet in any year.

Groundwater substitution transfers could approach as much as 400,000 acre-feet in any given year prior to allowance for impacts on streamflows. Groundwater substitution supplies are generally subject to a correction factor to adjust for streamflow depletion effects of water transfers in the current year. As the groundwater basins of the Sacramento Valley are pumped, there will be gradual effects on streamflow as the basins recharge over time. In the past few years, an allowance of 12 percent has been assumed as the amount of impact on Delta inflow in the current year.

If all of these sources could be contracted with willing sellers in the same year, about 1,000,000 acre-feet of cross-Delta transfer water might be generated. This estimate is approximately the same as that referenced in Reclamation's Biological Assessment of the OCAP at Page 12-39: Water transfers would increase Delta exports from about 0 to 500,000 acre-feet (af) in the wettest 80 percent of years and potentially more in the driest 20 percent years, and up to 1,000,000 af in the most adverse Critical year water supply conditions."

As noted in Chapter 5, it may be difficult to transfer amounts greater than 600,000 acre-feet in any single year due to a number of practical factors, such as the ability to contract for 20 percent of all eligible crop acreage in a timely manner without triggering public hearings as well as comply with required avoidance and mitigation measures to protect the giant garter snake; the willingness of potential sellers to engage in a transfer in any single year; the low probability that more than 600,000 acre-feet would be sought in the initial year of a series of low allocation years, considering banking programs, other transfers agreements, and other sources available to contractors; and the effects of local shortages in the water transfer source areas on the availability of surplus water to transfer in the subsequent years of extended dry periods.

As noted elsewhere, the availability of cross-Delta transfer capacity is frequently an issue under existing conditions. The potential cross-Delta transfer volume may be limited by the capacity of the export facilities, by regulatory constraints, and by the availability of water for transfer from willing sellers upstream of the Delta. The provision of added capacity to the export pumps through the proposped water conveyance facilities would ease the through-Delta and timing constraints of moving the transfer water. There would still need to be remaining capacity in the export pumps beyond that required for project water to move the transfer water south from that point, capacity that would generally be available in the dry year types but problematic in other year types.