

# Water Transfers in California: Types, Recent History, and General Regulatory Setting

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## 1E.1 Introduction

The purpose of this Appendix is to provide a basic understanding of water transfers in California with an emphasis on transfers that move water through the Sacramento-San Joaquin Delta (Delta). This Appendix provides an overview of various types of water transfers, their recent history, and the regulatory setting that governs transfers.

In its 1976 report, the Governor’s Commission on Water Rights recognized the importance of water transfers to the future of California’s water supply and made recommendations regarding the need for specific changes to the Water Code to facilitate the transfer of water. Many of these changes were accomplished in the following years and are reflected in the discussions below.

Water transfers involve a change in the place of water use, from the water’s historic point of diversion and use, to a new location either within or outside the watershed of origin. Water may be transferred from one user to another for a variety of purposes, including agricultural, municipal and industrial uses. It may also be transferred for environmental purposes such as in-stream flow augmentation and wildlife refuges. Water transfers and exchanges can be temporary - either short-term (up to 1 year) or long-term (more than one year but not permanent) or permanent.

Water transfers can be an effective water management tool providing much-needed flexibility in the allocation and use of water in California. Transfers in California are primarily executed to meet dry-year demands rather than to obtain a primary water supply for either agricultural or municipal development. Transfers are particularly useful for meeting critical needs during drought periods. Transfers, however, must be carried out in a responsible manner in order to assure that they do not result in adverse impacts to other water users or third parties.

A key component of a water transfer is a determination of the quantity of water available for transfer. This quantity is calculated by determining the amount of new water the surface water system will realize as a result of the actions taken by the individual or agency proposing the transfer. This is known as a “real water determination”. The baseline for purposes of the analysis is the amount that would have been available downstream of the historic point of diversion or return flow in the absence of the transfer. In other words, the amount of water available for transfer cannot exceed the amount of demonstrated reduction in consumptive use or augmentation of the streamflow by the transferor.

An active transfer market has existed in California for a number of years. The most common through-Delta transfers to date have been short-term (up to 1 year) transfers from agricultural users within the Sacramento Valley to agricultural and urban users south of the Delta to meet critical dry year demands. The primary facilities used in exporting through-Delta transfer water are the State Water Project (SWP) Harvey O. Banks Pumping Plant (Banks) and the Central Valley Project (CVP) Jones Pumping Plant (Jones). This appendix will discuss the key role the SWP and CVP

1 (collectively Projects) play in facilitating through Delta water transfers, as well as the limitations  
2 resulting from regulatory restrictions governing Project operations.

3 Access to pumping plants in the Sacramento/San Joaquin Delta and canal capacities is essential to  
4 accomplishing water transfers from the northern portions of the State to the central and southern  
5 areas of California. (Transfers south of the Delta and transfers and exchanges among state and  
6 federal contractors also occur but are not discussed in this Appendix since they do not result in  
7 increased water exported from the Delta. Water transfers are common among agencies in the San  
8 Joaquin Valley and are discussed in Appendix 5C.) Water Code Section 1810 et seq. encourages  
9 water transfers by requiring any state, regional or local agency to allow bona fide transferors<sup>1</sup> the  
10 use of available conveyance capacity provided the prospective transferor can show that the transfer  
11 will not injure any legal user of water or unreasonably affect fish, wildlife, or other instream  
12 beneficial uses or unreasonably affect the economy or environment of the county from which the  
13 water is diverted.

## 14 1E.2 Types of Water Transfers

15 Water transfers can be structured as temporary - either short-term transfers (one year or less) or  
16 long-term transfers (two years or more), or as permanent transfers. There are also transfers based  
17 on water exchanges, in which water is transferred in one year and returned, either in full (even  
18 exchange) or in part (uneven exchange), at a later time. Transfers involve a one-way movement of  
19 water, while exchanges involve a commitment to return a negotiated amount of water at a later date,  
20 and may include some monetary compensation as well.

21 The most common types of water transfers are based on reservoir storage releases, substitution of  
22 groundwater for surface water diversions, and crop idling. Other methods can be used to make  
23 water available for transfer; however, these three methods represent the bulk of water transfers  
24 within California to date. Crop shifting and water conservation measures can also be used to develop  
25 water for transfer. However, crop shifting and water conservation based transfers are not common.

26 A basic tenet underlying all water transfers is that they must be based upon the availability of “real  
27 water”, that is, water that would not be in the watercourse absent the transfer. Each transfer is  
28 unique and must be evaluated individually to determine the quantity and timing of real water made  
29 available. Unless a transfer is based upon “real water”, the water conveyed to the buyer will come at  
30 the expense of other water users or the environment. A more in depth discussion on the issue of  
31 developing responsible transfers is provided on California Department of Water Resources’ (DWR’s)  
32 website, “Responsible Water Transfers”, at <http://www.water.ca.gov/watertransfers/>.

33 A key element in evaluating whether a transfer generates real water is establishing what would  
34 occur in the absence of the transfer or, the baseline conditions. Establishing the baseline conditions  
35 can be difficult and the method for doing so varies with the type of transfer proposed, but is critical  
36 in assuring responsible transfers. More detailed information on how DWR and the U.S. Bureau of  
37 Reclamation (Reclamation) evaluate water transfers and assess real water is provided in the Draft

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<sup>1</sup> Section 1811 of the Water Code defines “bona fide transferor “ to mean “ a person or public agency, as defined in Section 20009 of the Government Code with a contract for sale of water that may be conditioned upon the acquisition of conveyance facility capacity to convey the water that is the subject of the contract.”

1 Technical Information for Preparing Water Transfer Proposals prepared by DWR and Reclamation  
2 and available at <http://www.water.ca.gov/watertransfers/>.

### 3 **1E.2.1 Reservoir Reregulation**

4 Reservoir reregulation involves an increased release of water from a reservoir compared to normal  
5 operations. The transfer water is conveyed downstream to a new point of diversion either within or  
6 outside the watershed. It is important that storage releases are coordinated with the agency  
7 conveying the water to assure that the additional flows can be rediverted at the new downstream  
8 diversion point.

9 The release of additional water from the reservoir for transfer creates a lower “end of season”  
10 storage in the reservoir than would have existed absent the transfer. Consequently, more water  
11 must be captured the following year to refill the reservoir. If the reservoir operator refills the  
12 additional vacated storage at a time when those flows would also have been available to other legal  
13 users downstream of the reservoir, the transfer would result in an injury to other downstream legal  
14 users in the year(s) following the transfer. To avoid injuring downstream users, sellers must refill  
15 the vacated reservoir storage at a time when downstream users would not have otherwise been able  
16 to capture the water, either in downstream reservoirs or direct diversion facilities. If refill causes an  
17 injury due to its timing, additional water must be released to compensate for the injury. This means  
18 that the storage capacity vacated due to the transfer can only be refilled at times when the Delta is in  
19 excess conditions or, if there is another reservoir downstream of the transfer reservoir, the storage  
20 space can only be refilled after the downstream reservoir fills or reaches its flood control elevations.  
21 Reservoir refill criteria are typically included in any reservoir reoperation transfer to assure that no  
22 other legal users of water are injured by the transfer.

### 23 **1E.2.2 Groundwater Substitution**

24 In a groundwater substitution transfer, a water user with a right to divert surface water forgoes this  
25 right and pumps groundwater for the period of the transfer, thereby making the forgone surface  
26 diversions available to a user downstream. The quantity of surface water available is based on the  
27 quantity of groundwater actually pumped less any streamflow depletion losses.

28 Additional groundwater pumping will, to some extent, have an effect on the surface water supply,  
29 referred to as streamflow depletion. The impacts of the transfer on streamflow can continue to  
30 occur long after the transfer has been completed. If the additional streamflow depletion occurs at a  
31 time when excess flow is available, downstream users are not affected. However, if the depletion  
32 occurs at a time when other downstream users could divert that water, the transfer could have an  
33 impact on other legal users.

34 Accounting for the impact of the transfer on streamflow is essential to determining the amount of  
35 real water available for transfer and to avoid injury to downstream water users. The amount and  
36 timing of the impacts, however, cannot be directly measured but can be estimated through the use of  
37 mathematical models. Although the work required to accurately assess the appropriate streamflow  
38 depletion factor for a particular transfer can be time-consuming and costly, the assessment of an  
39 appropriate streamflow depletion factor is necessary to protect other legal users of water.

40 An increase in groundwater pumping has the potential to affect not only the streamflow, but other  
41 groundwater users and water quality as well. DWR and Reclamation require that the transferor

1 implement a monitoring program to assess potential groundwater level and water quality impacts.  
2 For transfers conveyed through either the SWP or the CVP, the Seller is required to develop and  
3 implement a monitoring and mitigation plan to address any concerns raised by the monitoring data  
4 or other potentially affected parties.

### 5 **1E.2.3 Crop Idling**

6 Water can also be made available for transfer through crop idling. In crop idling-based transfers,  
7 sellers are paid to idle fields that would have been planted during the transfer season absent the  
8 transfer. The amount of water made available for transfer is based on the reduction in consumptive  
9 use, which is calculated as the evapotranspiration of applied water (ETAW). ETAW is the portion of  
10 applied water that is evaporated from the soil and plant surfaces and actually used by the crop.  
11 ETAW does not include the portion of the applied water that is lost as deep percolation to  
12 groundwater or conveyance losses without project specific documentation supporting an alternate  
13 method. Unless the acreage overlies an unusable groundwater basin or discharges to a saline sink,  
14 these depletions contribute to the overall water supply and are excluded from the calculation of  
15 transferable water.

16 Actual crop water requirements vary by crop, region and growing season. It is not feasible to  
17 determine the actual ETAW for the specific conditions of each individual transfer; therefore, average  
18 ETAW values are used to estimate transfer water. Historic cropping patterns are used to establish  
19 baseline crop acreage. Baseline acreage is important to establish what would have been planted in  
20 the absence of the transfer.

21 Idling agricultural acreage can result in impacts to parties not directly involved in the transfer, such  
22 as agricultural workers and seed or equipment suppliers. In order to minimize such potential “third  
23 party impacts” resulting from crop idling transfers, crop idling is typically limited to no more than  
24 twenty percent of the irrigated acreage within the agency transferring water or the within the  
25 county from which the water is transferred.

26 Water made available by crop idling is made available on the seasonal ETAW pattern. Unless storage  
27 is available, export capacity must coincide with the pattern of availability to allow export of the  
28 transfer water. The existing window for transfer capacity at the SWP and CVP export facilities in the  
29 Delta is currently limited to July through September (discussed below in Regulatory Framework).  
30 Depending on the crop, transfer water from crop idling is typically made available May through  
31 September. Unless storage capacity upstream of the export location is available, any water made  
32 available from crop idling outside the transfer window cannot be exported by either the SWP or CVP  
33 Delta pumps. Crop idling water made available from May through June ETAW can represent a  
34 significant portion of the transfer water, and the loss of this portion can make crop idling transfers  
35 that lack access to storage infeasible. A change in the seasonal restriction on export of transfer water  
36 could affect the feasibility of crop idling transfers in areas within the Delta watershed.

### 37 **1E.2.4 Crop Shifting**

38 Water Transfers based on crop shifting involve a change in crops planted by a grower, substituting a  
39 lower water using-crop (one with a lower ETAW) for a more water intensive crop. A cropping  
40 history is required to establish baseline cropping patterns. The water available for transfer as a  
41 result of crop shifting is the difference between the ETAW of the historic crop type and the alternate  
42 lower water intensive crop. Crop shifting transfers are only practical in regions where the

1 agricultural land is suited to multiple crop types, allowing a shift to an alternate crop. The  
2 restrictions on export of transfer water noted above under crop idling apply to crop shifting as well.

### 3 **1E.2.5 Water Conservation**

4 Implementation of water conservation measures can result in numerous benefits for an agricultural  
5 or municipal user, such as reduction in the discharge of poor quality agricultural drainage, or  
6 improved availability of limited supplies within the user's service area. However, only those  
7 conservation measures that result in a reduction in the consumptive use of water or prevent water  
8 from discharging to an unusable water supply make water available for transfer. Conservation  
9 measures such as lining or replacing an unlined ditch may generate water for transfer to the extent  
10 that riparian vegetation is reduced or surface or groundwater discharges to an unusable basin are  
11 eliminated. Documentation of the conditions, including water diversion and use, before and after the  
12 conservation measures were implemented is necessary to demonstrate the amount of transferrable  
13 water. Transfers based on implementation of water conservation measures have been limited  
14 because most conservation programs do not meet the above tests.

## 15 **1E.3 Regulatory Framework**

16 As discussed above, water transfers can involve both surface and groundwater rights. A basic  
17 understanding of both types of water rights is important to understand the legal and regulatory  
18 constraints that affect water transfers and their implementation.

19 One of the primary tests that each prospective transferor must meet is to show that there will be no  
20 injury to any other legal user of water from the transfer. This "no injury rule" applies to any  
21 proposed change in the historic exercise of a water right regardless of the priority date of the right.  
22 The no injury rule is codified in various sections of the Water Code, including Sections 1702, 1706  
23 and 1810.

24 The no injury rule protects senior water users (those with the oldest water rights) from junior  
25 diverters while protecting junior water right holders from the expansion of senior water rights.  
26 Junior water right holders would be harmed if seniors could increase the amount of water they  
27 divert under their senior priority by expanding their service area or transferring water that was  
28 historically available to other downstream users. Likewise, juniors could be hurt if seniors could  
29 change their point of diversion, place of use or purpose of use in a manner that reduces the quantity  
30 or quality of water relied upon by juniors for their diversion. A more comprehensive discussion of  
31 the no injury rule and assuring responsible transfers is provided in "Responsible Water Transfers"  
32 posted on DWR's Water Transfers website at <http://www.water.ca.gov/watertransfers/>.

### 33 **1E.3.1 Surface Water**

34 California recognizes a dual system of water rights comprised of both riparian and appropriative  
35 rights. Riparian rights attach to the land abutting a watercourse and are limited to the direct  
36 diversion of available natural flow. Riparian rights are generally not transferrable, with the  
37 exception of petitions to transfer water for instream flow filed with the State Water Resources  
38 Control Board (SWRCB) under Water Code Section 1707. Appropriative rights allow a water user to  
39 divert and use water in areas not abutting the stream, including areas outside the watershed.  
40 Appropriative rights can also be obtained to store water. The priority of appropriative rights is

1 based on the date when the user first initiated efforts to put the water to beneficial use. This  
2 principle is sometimes referred to as “first in time, first in right”. More specific information on water  
3 rights, water transfers and the SWRCB process is available on the SWRCB Division of Water Rights  
4 website at [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/water\\_transfers/](http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/).

### 5 **1E.3.1.1 Pre-1914 Appropriative Rights**

6 Prior to 1914, there was no permitting authority responsible for issuing water rights. Water users  
7 established a water right by simply putting water to beneficial use. In some cases, notice was posted  
8 at the proposed point of diversion or with the county. Water rights initiated before 1914 are  
9 referred to as pre-1914 appropriative rights. The priority date for pre-1914 water rights is based on  
10 the date the notice was posted or the date water was first put to beneficial use. In times of water  
11 shortage, users with the most senior priority date may divert up to the full quantity of their right  
12 before more junior appropriators can begin diverting. Pre-1914 water rights are not within the  
13 jurisdiction of the SWRCB, the current water rights permitting agency. However, the extent of the  
14 pre-1914 appropriative right is limited to the quantities historically put to beneficial use within the  
15 historic place of use. Pre-1914 appropriators are also prevented from wasting or unreasonably  
16 using water consistent with Article 10, Section 2, of the California Constitution.

17 Pre-1914 rights holders can change the purpose of use, place of use or points of diversion without  
18 notifying the SWRCB; however, the “no injury rule” applies to pre-1914 water rights (Water Code  
19 Section 1706). The change cannot result in an increase in the amount of water used under the water  
20 right, including changes in timing of the diversions if the changes will result in a reduction in the  
21 amount of water that would be available at that time to other legal users.

22 Pre-1914 water rights holders must also comply with the requirements of the California  
23 Environmental Quality Act (CEQA) prior to implementing a water transfer. The lead agency, typically  
24 the selling agency, normally prepares an Initial Study, and then either a Negative Declaration or an  
25 Environmental Impact Report (EIR) disclosing the potential environmental effects of the water  
26 transfer. Unlike post-1914 transfers, there is no statutory exemption from these requirements under  
27 the Water Code. If the transfer involves any federal action, including use of federal facilities or  
28 Federal approval of the transfer, compliance with the National Environmental Policy Act (NEPA) is  
29 required as well. Assuring compliance with Water Code Section 1706, CEQA and/or NEPA is  
30 generally the responsibility of the water right holder or the federal approving agency.

31 If the transfer involves a dedication of water for instream purposes, the water right holder should  
32 seek to protect this water right by filing for a water right change under Section 1707 of the Water  
33 Code. This section allows water users, including pre-1914 water right holders, to make changes to  
34 their water rights for “preserving or enhancing wetlands habitat, fish and wildlife resources or  
35 recreation in or on the water”. The benefit in seeking such a change is the protection of this water  
36 from forfeiture and the protection of the additional flow from the historic point of diversion to the  
37 most downstream point of the transfer for instream enhancement purposes.

38 The SWRCB may approve an instream flow petition, provided that the specific findings set forth in  
39 the appropriative processing provisions of the Water Code can be made and the SWRCB finds that  
40 the change “will not increase the amount the party is entitled to use, will not unreasonably affect any  
41 legal user of water, and otherwise meets the requirements” of the Water Code.

### 1E.3.1.2 Post-1914 Appropriative Rights

The Water Commission Act of 1913, which went into effect on December 19, 1914, established an administrative process for the permitting of water rights. Those wanting to obtain a water right after 1914 are required to file an application and obtain a permit from the SWRCB prior to diverting water. The permit establishes a quantity of water that may be directly diverted or stored, as well as the authorized place, purpose and season of use. The priority of the water right is based on the date the application was filed. A post-1914 water rights holder proposing to transfer water must file a petition for change with the SWRCB, and receive approval prior to implementing the transfer. As with pre-1914 water rights, these changes are not allowed if they would injure "any legal user of water" (see Water Code Section 1702).

Appropriative water rights can be lost through non-use. Specific changes to the Water Code were enacted to protect water rights from forfeiture as a result of transferring water either short-term or long term. Water Code Sections 1010, 1011, 1011.5, 1244, 1440, 1731, and 1737, 1745.07 were specifically added to provide protection to water right holders who transfer water.

#### 1E.3.1.2.1 Short Term Transfers – Water Code Section 1725 et seq.

Water Code Sections 1725-1729 provide an expedited process for post-1914 transfers of up to one year in duration. Water Code Section 1729 exempts short term transfers from the requirements of CEQA. The seller must demonstrate that the transfer water would have been consumptively used or stored in the absence of the transfer. The Board must find that the transfer would not injure any legal user of water or unreasonably impact fish, wildlife or other instream beneficial uses. The water user must file a petition for change with the SWRCB. The Board issues a notice of the petition and there is a 30 day public review period during which time potentially affected parties can file a protest of the proposed change. Following a review of the petition and the resolution of any valid protests, the Board may issue an order approving the change, provided the Board can make the required findings. No transfer water can move until an order approving the transfer is issued.

#### 1E.3.1.2.2 Long Term Transfers – Water Code Section 1735 et seq.

There is no expedited SWRCB process for long-term transfers. Analysis of a long-term transfer proposal is required to determine if approval of the transfer will result in impacts to other legal users or the environment over the entire term of the transfer. Transfer proponents must comply with CEQA; and if federal action or facilities are involved, compliance with NEPA is also required. A more rigorous analysis than what might be required for a temporary change may be necessary to assess potential accumulation of impacts associated with the transfer over the life of the transfer.

Long-term transfers also must comply with the SWRCB's standard noticing and protest processes. If valid protests to the proposed change cannot be resolved through negotiation between the parties, then a hearing must be held prior to the approval or denial of the requested transfer. The same findings related to no substantial injury to legal users of water and no unreasonable effects on fish and wildlife or other instream beneficial uses are necessary before the SWRCB can approve a long-term transfer.

## 1 1E.3.2 Groundwater

2 There is no administrative process for permitting extraction of groundwater in California except in  
3 the few basins that have been adjudicated. The majority of the adjudicated groundwater basins are  
4 located in southern California. Groundwater use in California is analogous to riparian rights.  
5 Overlying users have the ability to install a well and use the naturally occurring groundwater for  
6 beneficial use on their overlying land. The overlying users share equally in the resource. Users  
7 overlying a basin may import water to a basin and retain a right to the imported water, less any  
8 losses and, other users within the basin cannot claim a right to imported water.

9 Groundwater pumping in excess of natural recharge is a significant problem in a number of areas in  
10 the state. If the condition persists over a long period of time, areas of overdraft can develop and may  
11 affect groundwater pumpers within the basin. Managing groundwater extraction in an overdrafted  
12 basin can present significant challenges, and solutions to the issue of overdraft are as varied as the  
13 regions within the state.

14 Extractions of groundwater for transfer must comply with any applicable groundwater management  
15 plans, other local plans, and any groundwater ordinances. Compliance with local requirements  
16 (including ordinances relating to well drilling, well spacing, and groundwater extraction) and local  
17 groundwater management plans, as well as compliance with Water Code Section 1745 et seq., is  
18 required depending on the source of any groundwater substitution transfers. Compliance is usually  
19 the responsibility of the entity proposing the groundwater substitution transfer, and would be  
20 confirmed by the project that would be asked to export the water from the Delta.

21 The approval process associated with a proposed groundwater transfer varies by county. Table 1E-1  
22 provides brief descriptions of the water transfer requirements for those counties in the region north  
23 of the Delta that currently have such requirements, in geographic order from north to south.

24 More information on local groundwater management and evaluation of groundwater substitution  
25 transfers is provided in the Draft Technical Information for Preparing Water Transfer Proposals  
26 prepared by DWR and Reclamation and available at <http://www.water.ca.gov/watertransfers/>.

27 Precipitation and streamflow are the source of recharge for groundwater basins. A change in the  
28 amount of groundwater pumping affects both the groundwater and surface water resources. The  
29 timing and magnitude of the impacts to the surface water supply varies from place to place  
30 depending on a number of factors, including geology, hydrology, regional groundwater use, and  
31 depth and construction of the wells among others. Groundwater pumping will result in some level of  
32 streamflow depletion, the effect of which may extend well beyond the area from which transfer is  
33 made, depending on the specifics of the transfer. It is important that the impacts to streamflow from  
34 increased groundwater pumping are accounted for in the transfer to prevent injury to other legal  
35 users of water. Streamflow depletion cannot be directly measured and must be estimated using a  
36 technical analysis including groundwater modeling considering the specific conditions of the  
37 transfer and hydrogeology.



1 **Table 1E-1. Description of County Ordinances Related to Groundwater Transfers**

County	Description	Sources for more information
Shasta	Ordinance pertaining to the Redding Groundwater Basin portion of Shasta County requires a permit for extraction and export of groundwater, either directly or indirectly, for use outside the county. Application for a transfer permit should be submitted to the chief engineer of the Shasta County Water Agency.	Shasta County Water Agency (530) 225-5181 <a href="http://www.co.shasta.ca.us/index/pw_index/engineering/water_agency.aspx">http://www.co.shasta.ca.us/index/pw_index/engineering/water_agency.aspx</a>
Tehama	Ordinance requires a permit to extract groundwater for off-parcel use, prohibits mining of groundwater, and restricts the radius of influence associated with the operation of a well participating in transfer operations to the parcel on which the well is located, among other requirements.	Tehama County Health Agency, Environmental Health Division (530) 527-8020 <a href="http://www.tehamacountypublicworks.ca.gov/Flood/">http://www.tehamacountypublicworks.ca.gov/Flood/</a>
Butte	Ordinance requires permits for groundwater extraction for use outside the county, and requires a permit for groundwater substitution pumping. Butte County also has a well spacing ordinance. The Butte County Water Commission advises the Board of Supervisors with technical information from the Butte County Water Advisory Committee and Technical Advisory Committee.	Butte County Department of Water and Resource Conservation (530) 538-4343 <a href="http://www.buttecounty.net/Water and Resource Conservation.aspx">http://www.buttecounty.net/Water and Resource Conservation.aspx</a>
Glenn	Ordinance uses basin management objectives of groundwater levels, groundwater quality, and land subsidence to help define safe yield and overdraft of the basin. The ordinance is enforced by the Glenn County Board of Supervisors.	Glenn County Department of Agriculture (530) 934-6501 <a href="http://www.glenncountywater.org/about_us.aspx">http://www.glenncountywater.org/about_us.aspx</a>
Colusa	Ordinance requires a permit for extraction and export of groundwater, either directly or indirectly, for use outside the county. Application for a transfer permit is filed with Colusa County Groundwater Commission, through the director of the Planning and Building Department.	County Director of Planning and Building (530) 458-0480 <a href="http://www.codepublishing.com/CA/colusacounty/">http://www.codepublishing.com/CA/colusacounty/</a> <a href="http://colusagroundwater.ucdavis.edu/index.htm">http://colusagroundwater.ucdavis.edu/index.htm</a>
Yolo	Ordinance (Title 10, Chapter 7, Groundwater) requires a permit for extraction and export of groundwater, including the extraction of groundwater to replace a surface water supply. Application for a permit should be filed with the Director of Community Development.	Director of Planning and Public Works (530) 666-8775 <a href="http://www.yolocounty.org/Modules/ShowDocument.aspx?documentid=1899">http://www.yolocounty.org/Modules/ShowDocument.aspx?documentid=1899</a>
Sacramento	Ordinance (Title 3 section 3.40.090, Ground and Surface Water Export) requires a permit for groundwater or surface water to be transported in any manner outside the county. Application for a permit must be filed with the director of the Sacramento County Department of Water Resources.	Sacramento County Department of Water Resources (916) 874-6851 <a href="http://www.countycounsel.sacounty.net/Documents/sac_017441.pdf">http://www.countycounsel.sacounty.net/Documents/sac_017441.pdf</a>

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1 Transfers involving groundwater may involve groundwater substitution (in lieu pumping described  
2 earlier), transfer of groundwater from a banking program or direct transfer of groundwater. Each  
3 type of groundwater based transfer presents a unique set of issues and concerns.

### 4 **1E.3.2.1 Groundwater Substitution**

5 The most common type of groundwater based transfer is groundwater substitution. Groundwater  
6 substitution transfers are an option for water users that have access to both surface water and  
7 groundwater supplies. In a groundwater substitution transfer, a water user that typically uses  
8 surface water switches to groundwater pumping for all or a portion of its demand and allows the  
9 surface supply to be delivered to the buyer's service area. The groundwater is used within the  
10 existing place of use, and therefore there is no export of groundwater from the basin. Transfer of the  
11 surface water must comply with the applicable water rights requirements depending on whether it  
12 is diverted under claim of a pre or post-1914 water right.

13 The amount of water available for transfer is determined by metering the quantity of water pumped  
14 and applying a streamflow depletion factor based on an analysis of the specific wells and geology of  
15 the groundwater basin.

16 As noted above, more information on local groundwater management and evaluation of  
17 groundwater substitution transfers is provided in the Draft Technical Information for Preparing  
18 Water Transfer Proposals prepared by DWR and Reclamation and available at  
19 <http://www.water.ca.gov/watertransfers/>.

### 20 **1E.3.2.2 Groundwater Banking Transfer**

21 Groundwater banking involves the conjunctive use of surface and groundwater resources in which  
22 surface water supplies in excess of current demands are delivered to groundwater recharge  
23 facilities. Groundwater may be recovered directly through groundwater recovery pumping or  
24 through in lieu recovery. In lieu recovery can be accomplished where the agency operating the  
25 groundwater banking program also has access to surface water supplies which can be delivered in  
26 exchange for the previously stored groundwater. In an in lieu exchange, the ownership of the  
27 previously stored groundwater changes from the bank depositor to the groundwater banking  
28 authority. The amount of water available for recovery may be reduced by the amount of natural  
29 losses and in some cases an additional assessment is imposed on the banking operation.

30 From a water rights perspective, the surface water stored in a groundwater banking program is  
31 treated like water stored in a surface reservoir. It retains the water rights limitations specified  
32 under the water right, including its place of use. When water is extracted from groundwater storage,  
33 it must be used within the authorized place of use specified in the surface water permits. Just as  
34 directly diverted or stored surface water may be transferred, surface water stored in a groundwater  
35 banking facility may be transferred. Transfers to an area outside the authorized place of use of the  
36 water right must comply with the requirements discussed above, depending on whether the stored  
37 water was diverted under claim of pre or post-1914 water rights.

### 38 **1E.3.2.3 Direct Export of Groundwater**

39 As noted earlier, for the most part, appropriation of groundwater is not regulated by the State. Some  
40 groundwater basins have been adjudicated and any transfer or change in groundwater use from an  
41 adjudicated basin must be in conformance with the adjudication or be approved by the court.

1 Water users proposing to export groundwater from Delta-Central Sierra Basins must comply with  
2 the provisions of Water Code 1220 where the groundwater pumping was initiated after January 1,  
3 1985 (see Water Code Section 1215). Water Code Section 1220 prohibits the export of groundwater  
4 from the Delta-watershed unless: (1) the pumping is in compliance with an adopted groundwater  
5 management plan, and (2) the plan is approved by a vote in the county or portions of counties that  
6 overlie the groundwater basin.

7 Concern over the potential effects of the export of direct groundwater pumping and the  
8 requirements enacted for local approval of groundwater extraction transfers have effectively limited  
9 the implementation of direct groundwater transfers, particularly from the Delta watershed.

## 10 **1E.4 Conveyance through Project Facilities**

### 11 **1E.4.1 Water Code Section 1810 Requirements**

12 Export of transfer water from the Delta is primarily accomplished using SWP or CVP facilities,  
13 including the North Bay Aqueduct (NBA), Banks, and Jones. The majority of the available export  
14 capacity for transfers is at Banks. DWR and Reclamation provide capacity for transfers when the  
15 export can be done without impacting Project operations, including all regulatory requirements and,  
16 in the case of SWP facilities, after making the specific written findings required under Water Code  
17 Section 1810(d).

18 Water Code Section 1810 et seq. provides that a public entity may not deny a bona fide transferor of  
19 water access to available conveyance capacity if the conveyance of transfer water will not adversely  
20 affect the beneficial uses or quality of water in the facility and the conveyance can be provided  
21 without injuring any other legal user of water, without unreasonably affecting fish, wildlife, or other  
22 instream beneficial uses and without unreasonably affecting the overall economy or the  
23 environment of the county from which the water is being transferred. The agency's approval must  
24 be supported by written findings.

25 Complying with Water Code Section 1810 requires that DWR evaluate each individual request for  
26 conveyance. That review includes an analysis of the specific transfer proposal and a real water  
27 determination. The real water determination is required to support a finding that the transfer will  
28 not injure any other legal user of water including the Projects. The methods used by DWR and  
29 Reclamation to calculate the real water made available for transfer are detailed in the "Draft  
30 Technical Information for Preparing Water Transfer Proposals" prepared by DWR and Reclamation  
31 and available at <http://www.water.ca.gov/watertransfers/>.

32 Information sufficient for DWR to make the findings required under Water Code Section 1810 must  
33 be provided with the request for conveyance. The methods detailed in the Draft Technical Document  
34 noted above are designed to limit the transfer to only the amount of real water developed by the  
35 transfer proposal. Compliance with those methods assists DWR in making the required findings. In  
36 the case of a transfer of pre-1914 water, the environmental document prepared by the lead agency  
37 can be used to support the required environmental findings if the document is sufficiently detailed  
38 to address potential areas of concern. In the case of post-1914 based transfers, the information  
39 contained in the SWRCB order approving the transfer can be used to support some of the required  
40 findings. An analysis of potential economic impacts to the area from which the water is being  
41 transferred required by Section 1810(d) is not necessarily addressed in the environmental

1 document and is not one of the findings required of the SWRCB. The request for conveyance should  
2 include sufficient information for DWR to determine that there will be no unreasonable impacts to  
3 the economy of the transfer area.

## 4 **1E.4.2 Operational Considerations**

5 In determining the availability of excess capacity within the SWP or CVP, Project operators analyze  
6 annual hydrology, project operations, contractor requests, and regulatory and operational  
7 restrictions among other things to determine whether transfers can be conveyed without affecting  
8 the Projects.

9 Project operations are governed by the requirements contained in Water Right Decision 1641  
10 (D1641). A copy of D 1641 may be viewed at [http://waterboards.ca.gov/waterrights/  
11 board\\_decisions/adopted\\_orders/decisions/d1600\\_d1649.shtml](http://waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649.shtml). D1641 contains flow and water  
12 quality objectives. D1641 also contains specific provisions relating to the use of Project facilities for  
13 conveyance of transfer water including water level and water quality response plans.

14 Other regulatory requirements (in addition to those described above) affect Project operations and  
15 the ability of DWR and Reclamation to convey transfer water. On December 15, 2008, the U.S. Fish &  
16 Wildlife Service (FWS) issued a biological opinion (BO) on the Long-Term Operational Criteria and  
17 Plan (OCAP) for coordination of the CVP and SWP ([http://www.fws.gov/sfbaydelta/cvp-swp/cvp-  
18 swp.cfm](http://www.fws.gov/sfbaydelta/cvp-swp/cvp-swp.cfm)). The OCAP project description includes conveyance of water transfers of up to 360,000 A  
19 in most years (the wettest 80 percent of years) and up to 600,000 AF in Critical and some Dry years  
20 (approximately the driest 20 percent years). Under the FWS BO, transfer water may be conveyed  
21 through project facilities only in the months of July through September without further consultation  
22 with the agency.

23 On June 4, 2009, the National Marine Fisheries Service (NMFS) released its final BO on the long-term  
24 operations of the CVP and SWP for the protection of anadromous fisheries, green sturgeon and  
25 marine mammal species (<http://swr.nmfs.noaa.gov/ocap.htm>). The NMFS BO deals with transfers in  
26 the same manner as the USFWS BO on delta smelt, namely, allowing transfers during the July  
27 through September summer transfer window and requiring additional consultation should transfers  
28 be proposed for export during other times of the year.

29 The maximum daily pumping rate at Banks is controlled by a combination of D-1641, the adaptive  
30 management process outlined in the BOs, and permits issued by the U.S. Army Corps of Engineers  
31 (COE) that regulate the rate of diversion of water into Clifton Court Forebay (CCF) for pumping at  
32 Banks. This diversion rate is normally restricted to 6,680 cubic feet per second (cfs) as a three-day  
33 average inflow to CCF and 6,993 cfs as a one-day average inflow to CCF. Additionally, under the COE  
34 permit, the SWP can export an additional 500 cfs between July 1 and September 30, which can be  
35 used for the purpose of replacing Project export pumping foregone for the benefit of Delta fish  
36 species, making the summer limit effectively 7,180 cfs. The 500 cfs has been used to move a portion  
37 of the water provided under the Lower Yuba River Accord (Yuba Accord, discussed below) in most  
38 years.

39 Another operational consideration important for transfers moving through the Delta is carriage  
40 water. Carriage water is the additional flow necessary to move transfer water across the Delta for  
41 export so as not to exceed the objectives contained in D1641. DWR and Reclamation estimate  
42 carriage water based on annual hydrology, Project operations and regulatory restrictions among  
43 other operational considerations. Carriage water losses are applied to the quantity of transfer water

1 made available above the Delta. This reduces the quantity of water that is actually exported from the  
2 Delta. The amount of carriage water required to export transfer water can vary significantly from  
3 year to year and can exceed 20% in dryer years. In 2012, carriage water losses for cross Delta  
4 transfers were 30%.

5 In addition to carriage water losses, transfers through Project facilities may also be assessed  
6 aqueduct conveyances losses depending on the delivery point.

## 7 **1E.5 Historic Transfer Programs**

8 This section provides a brief overview of recent water transfer programs in California. Appendix 5C  
9 provides additional details on both federal and state water purchase programs, including the  
10 programs outlined below.

### 11 **1E.5.1 DWR Water Purchase Programs**

12 The first large scale water transfer program in California was the 1991 Emergency Drought Water  
13 Bank (1991 DWB). The 1991 DWB was established in response to projected critical water supply  
14 shortages following 4 years of drought conditions. The 1991 DWB team purchased water from  
15 willing sellers in the Delta, Sacramento Valley and Feather River basin areas. Water was made  
16 available through crop idling, groundwater substitution and reservoir storage release. The 1991  
17 DWB team executed over 300 contracts with water agencies and individuals to purchase water for  
18 critical statewide needs. Water from the 1991 DWB was allocated to 12 municipal and agricultural  
19 water users. Drought water banks were implemented again in 1992 and 1994, acquiring water  
20 primarily from groundwater substitution.

21 DWR implemented Dry Year Purchase Programs in 2001 and 2002 in response to dry conditions  
22 and reduced SWP and CVP allocations. In 2001 DWR purchased water from willing sellers in  
23 Northern California from a combination of crop idling, groundwater substitution and reservoir  
24 storage release, for delivery to eight water agencies throughout the State to help offset water  
25 shortages. In 2002, DWR acquired water made available through groundwater substitution from  
26 Yuba County Water Agency (YCWA) and provided it to four SWP contractors.

27 DWR implemented a drought water bank in 2009 after a series of three dry years, acquiring about  
28 76,600 acre-feet of transfer water from a combination of crop idling, groundwater substitution and  
29 reservoir storage release. An additional 200,000 acre-feet of cross-Delta transfers were executed  
30 independently by water agencies and exported through Project facilities. Since 2009, DWR has  
31 facilitated water transfer by conveying transfer water through SWP facilities; however, it has not  
32 acted as a purchaser or broker.

### 33 **1E.5.2 Federal Water Acquisition Programs**

34 The Central Valley Project Improvement Act of 1992 (CVPIA) amended previous authorizations of  
35 the CVP to include fish and wildlife protection, restoration, and enhancement as project purposes  
36 having equal priority with agriculture, municipal and industrial, and power purposes. A major  
37 feature of CVPIA is that it requires acquisition of water for protecting, restoring, and enhancing fish  
38 and wildlife populations. To meet water acquisition needs under CVPIA, the U.S. Department of the  
39 Interior (Interior) has developed a Water Acquisition Program (WAP), a joint effort by Reclamation

1 and the FWS. The major purposes of the WAP are acquisition of water to meet optimal refuge  
2 demands and support instream flows. Additional information on Reclamation's water transfer  
3 programs is contained in the CVP Water Transfer Program Fact Sheet which can be accessed at  
4 <http://www.usbr.gov/mp/PA/water/> and the CVPIA Water Acquisition Program Background  
5 Information Sheet, November 2003 USDOJ which can be accessed at  
6 [http://www.usbr.gov/mp/cvpia/3406b3\\_wap/info/index.html](http://www.usbr.gov/mp/cvpia/3406b3_wap/info/index.html).

### 7 **1E.5.3 Environmental Water Account**

8 The Environmental Water Account (EWA) was established in 2000. The purpose of the EWA  
9 program was to provide protection to at-risk native fish species of the Bay-Delta estuary by  
10 supporting environmentally beneficial changes in SWP and CVP operations. EWA funds were used to  
11 acquire alternative sources of water, called the "EWA assets," which the EWA agencies used to  
12 replace the Project water that was not exported from the Delta because of the voluntary fish actions.  
13 The EWA program ended in December 2007.

### 14 **1E.5.4 Yuba River Accord Transfers**

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

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

26 After the issuance of Revised Decision 1644, the parties involved in the SWRCB proceedings  
27 expressed a desire to further negotiate the instream flow, flow fluctuation, and water temperature  
28 issues on the lower Yuba River. The parties engaged in a collaborative, interest-based negotiation  
29 with numerous stakeholders, reaching a series of agreements now known as the Lower Yuba River  
30 Accord (Accord). These negotiations resulted in the agreements outlined below and the SWRCB  
31 approval of the flow schedules and water transfer aspects of the Accord on March 18, 2008 with  
32 Water Right Order 2008-0014. Several technical revisions to the Order were adopted as part of  
33 Water Right Order 2008-0025 on May 20, 2008.

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

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

6 Detailed information on the Accord can be obtained from YCWA's website including the Final  
 7 Environmental Impact Report/Environmental Impact Statement [http://www.hdrprojects.com/  
 8 engineering/ProposedLowerYubaRiverAccord/](http://www.hdrprojects.com/engineering/ProposedLowerYubaRiverAccord/) and "The Lower Yuba River Accord, From  
 9 Controversy to Consensus" published by the Water Education Foundation at  
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## 11 1E.6 References

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