



# Water Rights Arrangements in Australia and Overseas

## Annex H *California*

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# Abbreviations

Bay–Delta	San Francisco Bay and Sacramento–San Joaquin Delta
BDPAC	Bay–Delta Public Advisory Committee
CALFED	Californian and US federal government
CBDA	California Bay–Delta Authority
CEQA 1970	California Environmental Quality Act 1970
CPUC	California Public Utilities Commission
CRBC	Colorado River Board of California
CVP	Central Valley Project
CVPIA 1992	Central Valley Project Improvement Act 1992
DoI	US Department of the Interior
DWR	Department of Water Resources
EIA	Environmental impact assessment
ERP	Ecosystem Restoration Program
EWA	Environmental Water Account
GL	Gigalitres
NEPA 1969	National Environmental Policy Act 1969
OCO	Operations Control Office
PEIS	Programmatic environmental impact study
RWQCB	Regional Water Quality Control Board
SWP	State Water Project
SWRCB	State Water Resources Control Board

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# Preface

*Water Rights Arrangements in Australia and Overseas* is a study that forms part of the Commission's program of benchmarking the performance of economic infrastructure industries. It continues previous work undertaken into the arrangements for setting drinking water quality standards. The study compares the legal, organisational and regulatory arrangements for managing water rights, against accepted best practice principles.

This annex is one of twelve case studies prepared to assist readers understand the complex legal, organisational and management arrangements of the jurisdictions studied. Case studies were prepared for the Murray–Darling Basin, NSW, Victoria, Queensland, South Australia, the ACT, the Colorado River Basin, California, Colorado, Chile, Mexico and South Africa.

Research for the study and each of the annexes was undertaken by the Economic Infrastructure Branch, with Dr Neil Byron as mentoring Commissioner.

Many persons and organisations have assisted in the preparation of this case study. The authors would like to thank especially the staff of the Californian State Water Resources Control Board. Further feedback from readers would also be welcome.

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# 1 The water sector

California's annual rainfall runoff averages around 87 000 Gigalitres (GL) each year, although this increases to around 96 000 GL when out-of-state supplies from the Colorado and Klamath rivers are included (DWR 1998).

Rainfall patterns are highly seasonal. Around 75 per cent (or 65 000 GL) of the state's annual rainfall occurs between November and March, with half of this (around 33 000 GL) occurring between December and February (DWR 1998).

Rainfall is also variable on an annual basis with frequent flooding and droughts. In 1977, average annual runoff declined to around 18 500 GL, while the floods of 1983 resulted from an average annual runoff of around 166 500 GL (DWR 1998).

Most use does not occur where surface waters are naturally available. More than 70 per cent of rainfall occurs in the north of state (north of San Francisco), in the Klamath Mountains and Cascade Ranges (DWR 1998). But, around 75 per cent of urban and agricultural use occurs to the south of San Francisco. The largest urban use occurs in the south coast region (which incorporates the City of Los Angeles and its surrounding suburbs), while the largest agricultural use occurs within the Central Valley in the centre of the state (DWR 1998).<sup>1</sup>

Large-scale infrastructure has been constructed in response to the variability of rainfall patterns and the geographical distribution of surface water supplies. The drought of 1929 to 1934 triggered the construction of many reservoirs sized to maintain a reliable level of supply should a large-scale drought re-occur (DWR 1998). In an average precipitation year, around half of the state's surface waters (approximately 43 000 GL) are collected in over 1300 local, state and federal reservoirs (WEF 2000a).

Large-scale canals and aqueducts have also been constructed to transport water from the north to the south of the state. The largest developments include the

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<sup>1</sup> The Central Valley is an alluvial basin that stretches from the north to the south of the state, concluding just north of Los Angeles. It is bounded by the Coast Range on the west and the Sierra Nevada on the east. Rivers draining the Sierra Nevada flow onto the valley floor, join the Sacramento and San Joaquin Rivers, and flow through a gap in the Coast Range to San Francisco Bay.

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Central Valley Project (CVP) and the State Water Project (SWP). Canal systems also transport water from the Colorado River into southern areas of the state (see box 1.1).

**Box 1.1 California's three major water projects**

**Central Valley Project**

The Central Valley Project (CVP) is owned by the US Government and operated by the US Bureau of Reclamation (a division of the Department of the Interior).

The CVP is the largest water storage and delivery system in California, covering 29 of the state's 58 counties. It transports water south from the Sacramento River, north of San Francisco, into the Corning, Tehama, Contra-Costa and Delta-Mendola canals. A portion of the water in the Delta-Mendola is returned to the San Joaquin River, to serve water users with long-standing historical rights to the San Joaquin River. This diversion facilitated the construction of the Friant-Kern and Madera Canals, enabling the transportation of water the full length of the Central Valley.

The CVP is under a long-term contract to supply around 11 500 GL per year to 250 water users. Of this, around 6000 GL is classified as project water and around 5500 GL is classified as water right settlement water. The water right to the project water is held by the CVPt and water supply contracts are issued to users. Settlement water meets the demands of those who held water rights prior to the project's construction. Project reservoirs altered natural river flow upon which pre-project diverters had relied, so contracts were negotiated to agree on the quantities of diversions that could be made without any payment to the US Government.

**State Water Project**

The State Water Project (SWP) is owned by the Californian Government and operated by the Department of Water Resources. The SWP transports water from Lake Oroville, the second-largest reservoir in California, along the Feather and Sacramento Rivers to the San Francisco Delta. At this point, some of the water is allowed to flow to the ocean to improve water quality in the Bay-Delta. The rest is delivered via the North Bay and South Bay aqueducts, the San Luis Canal and California Aqueduct to the San Francisco Bay area, the Central Coast, the San Joaquin Valley and Southern California.

The SWP is contracted to deliver around 5000 GL annually to 29 water agencies. In an average rainfall year, use in the San Joaquin Valley is close to full contracted entitlements, while Southern California has only reached about 60 per cent of full entitlement.

*Source:* DWR (1998).



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**Box 1.1 (continued)**

**Colorado River facilities**

The four large structures along the Colorado River divert water to California to supply six water customers are the:

- Parker Dam, which supplies water to the Colorado River Aqueduct;
- Palo Verde Diversion Dam, which supplies water to the Palo Verde Irrigation District's canal system in eastern California,
- Imperial Dam, which diverts water to the All American Canal that runs near the California–Mexico border; and
- Senator Wash Reservoir, which is an off-stream reservoir used to adjust releases from Parker Dam and to meet downstream demands.

*Source: DWR (California) 1998*

Groundwater use is estimated at 30 per cent of total water use (or around 15 500 GL), although this figure can rise to two-thirds of total use in drought years. Many communities rely on groundwater as their only source of supplies, including major city centres such as Fresno and Bakersfield.

Much of California's groundwater use is self-supplied and remains unmanaged or unquantified (DWR 1998). The Californian Department of Water Resources (DWR) estimated that groundwater supplies were over-drafted by 1.6 GL per year (WEF 2000a).

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## 2 Legal framework

### 2.1 Evolution of water law

Californian water law has evolved from several legal traditions: Spanish colonial law (as it applies to Pueblo rights), English common law (as it particularly applies to riparian rights) and the common law Doctrine of Prior Appropriation.

#### Doctrine of Prior Appropriation

California's population expanded rapidly after 1848 following the signing of the Treaty of Guadalupe Hidalgo and the subsequent gold rush. The US federal government exercised little authority in the management of federal public land. For the miners, riparian rights were not considered applicable because most of the mining was being undertaken at a distance from any naturally occurring water sources. Instead, a number of rules and regulations established by miners were adopted to regulate water sharing.<sup>2</sup>

While the rules varied between the mining districts, they were all similar in intent:

They all recognised discovery, followed by appropriation, as the foundation of the possessor's title, and development by working as the condition of its retention. ... the first appropriator of water to be conveyed to such localities for mining or other beneficial purposes, was recognised as having, to the extent of actual use, the better right (US Supreme Court in *Jennison v. Kirk* quoted in Hutchins 1956, p. 42-43).

The rules formed the basis of the Doctrine of Prior Appropriation. In short, the elements of a valid appropriation of water are:

- the public intent to apply water to a beneficial use;
- actual diversion of water from a natural source; and
- application of water to beneficial use within a reasonable time.<sup>3</sup>

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<sup>2</sup> Water was essential in the hydraulic or placer mining processes used at that time to extract gold from the ground.

<sup>3</sup> These elements are known as the Colorado Doctrine.

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Continued application of water to a beneficial use was a requirement to maintain the right to water ('use-it or lose-it').

The date of an appropriation determined each user's priority to use water, with the earliest user having a superior right. A user whose appropriation is first-in-time has the highest priority and therefore a superior right to make beneficial use of water.

Unlike riparian rights, an appropriator does not require to use the water adjacent to the source. The deed to a water right is separate from land title (Getches 1997).

### **English common law doctrines**

The English common law riparian doctrine was adopted by the Californian legislature when it achieved statehood in 1850 and adopted the English common law tradition.

Under the doctrine, ownership of (or legal access to) land adjoining a water body conferred on a person a number of rights, such as the right to:

- take sufficient water for reasonable use;
- the natural flow of a river; access the water;
- fish;
- prevent erosion of the banks; and
- water quality (Getches 1997).

In addition, riparian land-owners also faced a number of duties: namely, that their 'reasonable use' did not injure the 'reasonable use' of other riparian land-owners.

Whereas certain groundwaters were treated under surface water law (underflow of surface streams and definable underground flows), the English common law doctrine of absolute ownership was adopted in relation to percolating groundwater underlying private land. This conferred on land owners an unlimited right to take any percolating groundwater under their land for use on that land (see box 3.1).

But the Doctrine of Absolute Ownership of groundwater permitted unregulated pumping of groundwater and in *Katz v. Walkinshaw* (1903) the California Supreme Court rejected the doctrine. In its place, the court adopted the rule of 'reasonable use' of the percolating water.

Under this rule, land owners have the right to take water from overlying land but are required to make reasonable use of the water. Such a right is correlative and prevents the unlimited use of groundwater by a single person. Groundwater can also

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be appropriated and therefore used on non-overlying lands — but this is limited to water surplus to the reasonable needs of overlying owners.

### Box 3.1 **Determining the legal classification of groundwater**

In determining the legal classification of groundwater, the State Water Resources Control Board (SWRCB) and its predecessors have relied on the California Supreme Court's decision in *Los Angeles v. Pomeroy* (*Pomeroy*) (1899) 124 Cal. 597 [57 P. 585], which established the distinction between subterranean streams and percolating groundwater. In *Pomeroy*, the court noted that proof of the existence of a subterranean stream is shown by evidence that the water flows through a known and defined channel. (*Pomeroy, supra*, 124 Cal.3d. at 633-634 [57 P. at 598].) The court stated:

'Defined' means a contracted and bounded channel, though the course of the stream may be undefined by human knowledge; and the word 'known' refers to knowledge of the course of the stream by reasonable inference. (*Id.* at 633 [57 P. at 598].)

The SWRCB has interpreted *Pomeroy* and other applicable precedents to require that the following physical conditions exist for groundwater to be classified as a subterranean stream flowing through a known and definite channel:

1. A sub-surface channel must be present.
2. The channel must have relatively impermeable bed and banks.
3. The course of the channel must be known or capable of being determined by reasonable inference.
4. Groundwater must be flowing in the channel.

Source: SWRCB (2000a).

## California Doctrine

The California Doctrine emerged in the 1870s as a solution to the water sharing conflicts that arose between riparian and appropriative right holders. The California Doctrine effectively recognises the existence of both types of rights.

In *Lux v. Haggins* (1886), the California Supreme Court affirmed riparian rights noting that, by adopting English common law, the Californian legislature had also adopted the notion of riparian water rights. The Supreme Court found that riparian rights were generally superior to appropriative rights except in cases where the water had been appropriated:

- before the riparian acquired the patent to his land; and
- after the passage of the federal *Mining Act 1866* which recognized the doctrine of prior appropriation.

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Under this doctrine, it is possible for riparian land owners to originate new uses of water that are superior to prior appropriators under certain circumstances (Getches 1997).

## **Public Trust Doctrine**

A corollary to the common law riparian doctrine is that the public has a right to access water in the public domain. Riparian rights are further limited by public's right to use the surface of waterways. At common law, all persons have a right to travel, hunt and fish along a navigable river.

Under Californian law, the public's right of access is expressed in the Public Trust Doctrine. According to the doctrine, certain resources are of such high public value that private rights of ownership to those resources should be limited and subject to continuing supervision by the state. In effect, the doctrine states that rights acquired in public trust cannot be placed entirely beyond the direction and control of the state.

Originally, the doctrine related to commerce, navigation and fisheries, but over time has been extended to include recreational and ecological values. However, as with extractive uses, public trust values are subject to the reasonable and beneficial use provisions of the Californian Constitution.

In 1983, the California Supreme Court merged the Public Trust Doctrine with the Californian water rights system. The court ruled that the State Water Resources Control Board (SWRCB) must balance the potential value of a proposed or existing water diversion with the impact it may have upon the public trust. All appropriations may become subject to review if changing circumstances warrant their reconsideration and reallocation.

## **Pueblo rights**

When California was ceded by Mexico to the United States in 1848, the Treaty of Guadalupe Hidalgo confirmed property rights then existing under Mexican law (Getches 1997). Under Mexican law, water rights were held by municipalities (pueblos) on behalf of their inhabitants. Generally, these pueblos have rights:

- to use naturally occurring water sources within their boundaries to meet their needs; and
- that are paramount to all other claims.

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Pueblo rights extend to surface and groundwater, from the source to the sea and to any amount of water reasonably required by the municipality's inhabitants — even if an entirely new source is required.

## **Federal Reserve Rights Doctrine**

Federal reserve rights pertain to land reserved by the US Government for uses such as Indian reservations, military sites, national parks and forests (see PC 2003). When the US Government reserves land, it also implicitly reserves land with sufficient water to satisfy the purposes for which the reservation was created (WEF 2000b).

The Federal Reserve Rights Doctrine was established by the US Supreme Court in 1908. In *Winters v. United States*, the US Supreme Court held that concurrent with the establishment of the Fort Belknap Indian Reservation in Montana, the US Government had secured sufficient water to fulfill the purposes for which the reservation was created (WEF 2000b).

In 1963, the US Supreme Court extended the application of the doctrine to other types of federal reserves. In 1978, the US Supreme Court ruled that the doctrine applied only to the extent necessary to accomplish the primary purpose for which the land reservation was made (WEF 2000b).

## **2.2 Current legislative framework**

The current legislative framework governing water rights is a combination of common law, constitutional and statutory provisions and court decisions. There are also laws and programs in operation that aim to restore or preserve the ecological riverine health.

Californian water rights are also subject to the various laws and agreements that govern the Colorado River. These are discussed in PC (2003).

### **Constitution of California**

The Constitution of California requires that all waters in the state be used both beneficially and reasonably. This condition limits the exercise and retention of water rights, and does not allow water to remain unused by private interests. The condition prohibits waste, unreasonable use, unreasonable methods of use and unreasonable methods of diverting water. A right to the use of water can be

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curtailed or lost if private interests engage in practices if they are not beneficial or reasonable.

What is reasonable and beneficial depends upon the facts and circumstances of each case, and has largely been determined in the courts. Originally, beneficial uses included municipal and industrial uses, irrigation, hydro-electric generation and livestock watering. More recently, the concept has broadened to include recreational use, fish and wildlife protection and enhancement and aesthetic enjoyment.

What constitutes reasonable use is less concrete. The California Supreme Court ruled that reasonable use depends upon the circumstances of use, and that the definition of the term can vary over time as the situation changes (WEF 2000b).

## **California Water Code**

The Water Code is the primary statute governing water resources and water rights. Divisions 1 and 2 of the Water Code are the most relevant to the definition, administration and enforcement of water rights. These divisions set out the state's powers over water resources, including the powers and administrative procedures of the various state water agencies. The divisions establish procedures for the granting of water rights. They also specify policy and procedures relating to the enforcement of water rights, and establish procedures for the statutory adjudication of water rights.

The rest of the Water Code sets out provisions relating to:

- dams and reservoirs;
- wells, pumping plans, conduits and streams;
- flood control;
- conservation, development and utilisation of state water resources;
- water quality;
- financial supervision of districts;
- irrigation districts, county water districts, municipal water districts, California water districts; and
- safe, clean water supply.

### *Area of origin statutes*

The area of origin statutes (such as the *Feigenbaum Act 1927*, the *Watershed Protection Act 1959* and the *Delta Protection Act 1959*) are a collection of laws in

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the Water Code intended to provide the ‘area of origin’ (the county or watershed from which a water supply originates) protection against the possible future loss of water supplies (such as through the sale of water rights).

The statutes confer on water right holders within the area of origin a higher priority than water right holders outside the area. In effect, water right applicants within the area are guaranteed that new water right applications from within the area will not be rejected on the basis that water was not available by virtue of another right holder temporarily selling water from the area.

Originally, the area of origin statutes aimed to protect local North Californian supplies from being depleted as a result of the CVP and the SWP. However, in 1984, their application was expanded to include the Sacramento, Mokelumne, Calaveras and San Joaquin Rivers, the Truckee, Carson and Walker Rivers, and the Mono Lakes.

### **Federal *Central Valley Project Improvement Act 1992***

The Californian *Central Valley Project Act 1933* (CVP 1933) and federal *Rivers and Harbors Act 1937* (RHA 1937) established the CVP. The federal *Central Valley Project Improvement Act 1992* (CVPIA 1992) is an addendum to the CVP 1933 and the RHA 1937. The CVPIA 1992 made significant changes to the CVP’s operation. These changes included raising the project’s objectives to conserve and restore fish and wildlife on par with its objectives to supply water and generating power.

The purposes of the CVPIA are to:

- protect, restore, and enhance fish, wildlife and associated habitats in the Central Valley and Trinity River basins of California;
- address the impacts of the CVP on fish, wildlife, and associated habitats;
- improve the operational flexibility of the CVP;
- encourage voluntary water transfers and improved water conservation;
- contribute to the protection of the San Francisco Bay and Sacramento-San Joaquin Delta Estuary (the ‘Bay–Delta’); and
- achieve a reasonable balance among competing demands for use of CVP water, including the requirements of fish and wildlife, agriculture, and municipal, industrial, and power contractors (CVPIA, s. 3402).

The CVPIA prohibits execution of new CVP water supply contracts for purposes other than fish and wildlife until all environmental restoration actions specified in the Act are completed. Though, existing long-term water supply contracts have been



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renewed for a further 25 years, subsequent renewals will depend upon the outcome of an environmental impact assessment.

The CVPIA 1992 reallocates around 1000 GL annually (700 GL in dry years) of CVP water to the restoration of valley fisheries. The Department of the Interior (DoI) is charged with doubling fish numbers in the Central Valley by 2002, and it may acquire more water for this purpose than is provided under the Act by purchasing from agreeing sellers.

Implementing the CVPIA 1992 requirements has been the subject of litigation. The dispute has centred on the DoI's plans for implementing the requirements of the Act, and whether the 1000 GL of 'yield' called for in the Act translates into an automatic reduction of entitlements specified in water supply contracts.

Water users contend that the DoI's implementation plans would dedicate more than the [1000 GL] of yield, impose water losses on the State Water Project in contravention of earlier agreements, and place a disproportionate share of the reallocation on south-of-Delta water users (ACWA 2000).

At April 2002, the dispute remained unresolved.

The CVPIA 1992 also secures increases in in-stream flows of between 450 GL in dry years and 1000 GL in wet years for the Trinity River and Central Valley wildlife refuges. Following completion of the Trinity River Diversion to the CVP, fish populations in the Trinity River Basin declined dramatically (DWR 1998). Trinity River flows are provided for by releases from the Lewiston Dam.

## **CALFED Bay–Delta Program**

The CALFED Bay–Delta Program is a joint Californian and US federal government policy initiative aimed at restoring the ecological health and improving the management of water in the San Francisco Bay and the Sacramento–San Joaquin Delta Estuary (the 'Bay–Delta').

The program was established in 1994 following a framework agreement between state and federal government agencies that had management and regulatory responsibility of the Bay–Delta. In 2000, the program issued a record of decision that set forth a 30-year plan for the management of water supply and ecosystem health.<sup>4</sup> Since 2003, the California Bay–Delta Authority (CBDA) has had legislative responsibility to oversee the implementation of the program.

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<sup>4</sup> A record of decision is a statement of the decision and the reasons for that decision. It is a statutory requirement pursuant to section 102(2)c of the *National Environmental Policy Act* (1969) and Council of Environmental Quality regulations.

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The program has four primary objectives:

- water quality — provide good water quality for all beneficial uses;
- environment — improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay–Delta to support sustainable populations of diverse and valuable plant and animal species;
- water supply — reduce the mismatch between Bay–Delta water supplies and current and projected beneficial uses dependent on the Bay–Delta system; and
- levee protection — reduce the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic breaching of the delta’s levees (CBDA 2001a).

The program consists of 11 sub-programs. The two sub-programs with most relevance to water rights are the Ecosystem Restoration Program (ERP) and the Environmental Water Account (EWA). Each sub-program in turn comprises a number of smaller plans, programs and implementation strategies.

The ERP is intended to address a wide variety of environmental issues within the Bay–Delta area. The goals of the ERP are to:

- recover 19 at-risk native species and contribute to the recovery of 25 additional species;
- rehabilitate natural processes related to hydrology, stream channels, sediment, floodplains and ecosystem water quality;
- maintain and enhance fish populations critical to commercial, sport and recreational fisheries;
- protect and restore functional habitats, including aquatic, upland and riparian, to allow species to thrive;
- reduce the negative impacts of invasive species and prevent additional introductions that compete with and destroy native species; and
- improve and maintain water and sediment quality to better support ecosystem health and allow species to flourish (CBDA 2001b).

The ERP outlines environmental flow objectives to support sustainable populations of plant and animal species in the Bay–Delta. The ERP identifies the monthly and 10-day flow event targets for the delta’s outflow, and for many of the river basins within the Bay–Delta watershed.

The EWA is an annual bank of water that can be used for the protection of species by providing an environmental flow of water as required. For example, pumping on the SWP could be temporarily curtailed to protect the out-migration of salmon

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along the Sacramento River. Water banked in the EWA in a reservoir south of the Delta could be used to replace the water not pumped.

The account is maintained through acquisitions of water from willing sellers or it can be obtained through financing conservation or recycling projects.

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## 3 Organisations

### 3.1 State Water Resources Control Board

The SWRCB issues, monitors and enforces surface water rights in California. It also has a role in monitoring and enforcing water quality requirements and has several programs that assist local agencies or individuals prevent or clean up water pollution.

The SWRCB's jurisdiction to issue appropriative water rights is limited to surface water, water that forms sub-surface flow to surface water sources and subterranean streams. The SWRCB's does not have jurisdiction over ground water sources and water from springs or standing pools contained within the bounds of an individual property.

The SWRCB's mission is to:

... preserve, enhance and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations (SWRCB 2000b).

The SWRCB consists of five full-time salaried members, each filling a different specialty position — attorney, professional engineer, water quality member, civil engineer, and one who is not required to have specialised experience.

Members are appointed for four years by the California Governor. Appointments must be confirmed by the California Senate.

### Regional Water Quality Control Boards

Within the SWRCB are nine Regional Water Quality Control Boards (RWQCBs), each operating within a defined territory. Their mission is:

... to develop and enforce water quality objectives and implementation plans that will best protect the beneficial uses of the State's waters, recognising local differences in climate, topography, geology and hydrology (SWRCB 2000b).

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Each RWQCB consists of nine part-time members appointed by the Governor and confirmed by the Senate. The RWQCBs develop basin plans for their hydrologic area, issue waste discharge requirements, take enforcement action against violators, and monitor water quality.

## **3.2 Department of Water Resources**

The DWR is a California state department responsible for the planning of infrastructure and strategies to meet the water needs of California. It also operates and maintains bulk water systems, including the SWP.

The DWR develops and publishes the California Water Plan that addresses urban and rural water needs and management options. The plan assesses the availability of water resources and matches that against future needs and options to meet those needs.

The DWR's mission is:

To manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments (DWR undated).

The DWR's goals and responsibilities are to:

- prepare and update the California Water Plan;
- supply water to users and fish and wildlife (by planning, designing, constructing, operating, and maintaining storages, canals, pumps and electricity generators);
- protect and restore the environment of the Sacramento–San Joaquin Delta (by planning, controlling salinity, providing water to the delta's water users, and administering levee maintenance reimbursements and special flood control projects);
- prevent and minimise the effects of floods (by supervising the design, construction, operation, and maintenance of dams, encouraging preventative floodplain practices, maintaining and operating Sacramento Valley flood control facilities, planning for flood control management, and providing advice on flood control);
- explore the conjunctive use of ground and surface water, facilitate water trading, and when needed, operate a state drought water bank; and
- educate the public about the importance of water and its proper use, provide water-related information to the public, and provide technical assistance to local agencies in a range of water-related and environmental matters (DWR undated).

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## Public Advisory Committee

The DWR and a 65-person Public Advisory Committee are collaborating on the preparation of the 2003 update of the California Water Plan, scheduled for release in December 2003 (DWR 2002).

The Public Advisory Committee consists of urban, environmental and agricultural water interests and government agencies at the federal, state, and local levels. Members meet every six to eight weeks until the 2003 update is completed (DWR 2002). Members are appointed by the DWR on the basis of geographic and cross-sectional representation.

To help ensure that all interested persons and agencies have an opportunity to take part in the development of the update, several Extended Review Forums have been held at locations throughout the State for persons other than members of the Public Advisory Committee (DWR 2002).

The Public Advisory Committee has no decision-making ability. The committee reports to the DWR.

## 3.3 California Bay–Delta Authority

The CBDA is responsible for overseeing the implementation of the Bay–Delta Program. It was established under the California *Bay–Delta Authority Act 2003*.

The CBDA is responsible for:

...ensuring balanced implementation of the Bay–Delta Program, providing accountability to the Legislature, Congress and the public, and ensuring the use of sound science across all areas of the CALFED Bay Delta Program (CBDA 2002a).

The CBDA is composed of representatives from six state agencies and six federal agencies, one public member from each of the Bay–Delta Program’s five regions, two public members from other areas, a representative from the Bay–Delta Public Advisory Committee, and the chairs and vice-chairs of the California Senate and Assembly water committees (CBDA 2002a).

Prior to the California *Bay–Delta Authority Act 2003*, the CALFED consortium comprised 23 Californian and US government agencies. Under the new arrangements, these agencies remain the program’s implementing agencies.

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## **Bay–Delta Public Advisory Committee**

The Bay–Delta Public Advisory Committee (BDPAC) is a federal public advisory committee chartered by the DoI to advise the CBDA on the development and implementation of the Bay–Delta Program.

The BDPAC consists of 20 to 30 members, each appointed by the federal Secretary of the Interior (SoI) in consultation with the California Governor. Membership is made up of qualified representatives of Indian tribes and stakeholder groups, including environmental justice representatives (DoI 2001).

Members are selected on the basis of experience and expertise in relevant fields, such as ecosystem restoration, agriculture, hydrology, urban water management, fishery biology, water quality, flood management, water conservation and recycling, and economics. Members are also selected to reflect the geographic diversity of interests affected by the health of the Bay–Delta. Appointments aim to assure that the BDPAC is both balanced and diverse (DoI 2001).

The purpose of the BDPAC is to assist and recommend to the SoI and the Governor of California on ways to implement the Bay–Delta Program. The Public Advisory Committee provides recommendations on implementation of each element of the program (DoI 2001).

The duties of the BDPAC are solely advisory and include:

- liaising with the BDPAC’s workgroups, subcommittees, state and federal agencies, and the public;
- recommending program actions based on feedback from the BDPAC’s workgroups and subcommittees;
- recommending annual priorities and coordinating the program’s activities to achieve balanced implementation of the program elements;
- recommending strategies to integrate the program’s elements for the continuous and balanced improvement of each of the program’s objectives;
- evaluating the program’s actions and assessing the program’s performance against its objectives; and
- providing comments on annual reports on the implementation of the program’s activities (DoI 2001).

The BDPAC reports to the SoI and Governor through the CBDA. The US Bureau of Reclamation (BoR) and the California Resources Agency fund the BDPAC (DoI 2001).

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## **Ecosystem Restoration Subcommittee**

The purpose of the Ecosystem Restoration Subcommittee is to advise the BDPAC on the:

- overall adequacy of the CBDA's implementation of the ERP;
- development and implementation of local and regional ecosystem restoration plans and implementation strategies;
- promotion of partnerships with local and regional interests;
- adequacy of the ERP's budgets, staffing, and project management activities;
- performance of the CBDA's efforts to develop and refine the ERP's adaptive management processes (ecosystem performance metrics and processes for science-based decision-making);
- implementation and oversight of the CBDA's environmental water management activities (such as the ERP's Environmental Water Program and the Central Valley Project Improvement Act's Water Acquisition Program);
- coordination with the CBDA's Environmental Water Account Program; and
- integration and coordination of the ERP with other Bay-Delta programs and non-Bay-Delta programs (BDPAC 2001).

The Ecosystem Restoration Subcommittee also exchanges information, investigates and analyses issues relating to the management and implementation of the ERP and related activities (BDPAC 2001).

The objectives of the Ecosystem Restoration Subcommittee's activities include:

- an ERP that can demonstrate adequate progress toward meeting performance goals and objectives;
- an ERP that is responsive to regional needs; and
- building local support for the ERP, including the acquisition of water and land for environmental purposes (BDPAC 2001).

The Ecosystem Restoration Subcommittee uses a collaborative approach during its discussions. A summary of action items and major outcomes from each Ecosystem Restoration Subcommittee meeting is prepared by the Ecosystem Restoration Subcommittee co-chairs and the Ecosystem Restoration Program Manager and presented to the BDPAC (BDPAC 2001).



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### 3.4 Colorado River Board of California

The Colorado River Board of California (CRBC) is an umbrella organisation for the seven Californian water supply agencies that take water from the Colorado River. These agencies are the Coachella Valley Water District, Imperial Irrigation District, Los Angeles Department of Power and Water, Palo Verde Irrigation District, San Diego County Water Authority and the Metropolitan Water District of Southern California.

The CRBC's mission is to:

... protect the interests and rights of the State of California, its agencies and citizens in the water and power resources of the Colorado River system (CRBC 2000a).

The CRBC's objectives are to:

- maintain or increase the quantity of California's Colorado River water resources;
- represent California in discussions among the Colorado River basin states, Indian tribes, the federal government and others in implementing joint cooperative programs, to increase California's use of Colorado River water and to address environmental and endangered species issues;
- maintain Colorado River water salinity at or below the basin states' adopted and federally approved salinity standards, through continual review, improvement, and implementation of the basinwide federal–state salinity control program; and
- maintain California's Colorado River resources affected by the *Utilisation of Waters of the Colorado and Tijuana Rivers and of the Rio Grande Treaty 1944* through cooperative efforts with the U.S. International Boundary and Water Commission and other states (CRBC 2000b).

Information on the *Utilisation of Waters of the Colorado and Tijuana Rivers and of the Rio Grande Treaty 1944* is presented in PC (2003).

The CRBC is comprised of representatives from the DWR, the Department of Fish and Game, the Attorney–General's office and the water supply agencies that draw from the Colorado River. A public member and the Executive Director of the CRBC also sit on the board (CRBC 2000c).

### 3.5 US Bureau of Reclamation

The US BoR is a federal government agency that operates as a distributor and water wholesaler within California. It operates the CVP and supplies water to water right holders and water supply contract holders.

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Further information on the operation of the US BoR more generally is provided in PC (2003).

### **3.6 Irrigation and water districts**

A variety of irrigation and water districts are created under specific legislation in the California Water Code. In general, the legislation permits the creation of locally managed not-for-profit organisations for the collection and distribution of water to their taxpaying electors.

#### **Irrigation districts**

Irrigation districts were first constituted under the *Wright Act* 1887, and later by the *Irrigation District Law* 1897. Their principal role is to provide water for irrigation purposes. However, many also supply residents and businesses within their area. Many irrigation districts now serve predominantly urban areas (ACWA 1977).

Freeholders that wish to form an irrigation district, must first petition the board of supervisors of the county in which most of the land is situated. Residents of the proposed district then vote upon the proposal and, if a majority support the formation of the district, then approval is given. Any registered voter living in the district is eligible to vote in any district election (Water Code, Div. 11).

Although only the approval of a majority of residents is required for the formation of an irrigation district, the costs of its activities are borne in equal proportion by all those who benefit (ACWA 1977).

Irrigation districts are spread throughout the farming areas of California, but most are concentrated in the eastern San Joaquin and Sacramento Valleys. The Imperial Irrigation District, near the Mexican border, is the largest irrigation district and serves more than 550 000 acres of farmland (ACWA 1977).

#### **County water districts**

County water districts are constituted under the *County Water District Law* 1913. County water districts are authorised to undertake any activity necessary to furnish sufficient water in the district for any present or future beneficial use (Water Code, s. 31020). They may:

- store water for the benefit of the district, conserve water for future use, and appropriate, acquire, and conserve water and water rights for any useful purpose;

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- operate water rights, works, property, rights, and privileges useful or necessary to convey, supply, store, or make use of water;
  - sell water or the use thereof for any useful purpose and whenever there is a surplus, dispose of the surplus to municipalities, public agencies, or consumers located outside the district; and
  - establish rules and regulations for the sale, distribution, and use of water and withhold water from those in arrears in their water rates (Water Code, ss. 31021 to 31024).

A county water district is formed by a majority vote by residents of the proposed district, following a petition to board of supervisors of the county in which the greater part of the district will be located. A board of five elected directors, each of whom must be registered voters and residents within the district, but need not be landowners, governs each county water district .

### **Municipal water districts**

Municipal water districts are public corporations constituted under the *Municipal Water District Law 1911*. They principally function as water wholesalers for the metropolitan areas of southern California (ACWA 1977).

Municipal water districts may:

... acquire, control, distribute, store, spread, sink, treat, purify, recycle, recapture, and salvage any water, including sewage and storm waters, for the beneficial use or uses of the district, its inhabitants, or the owners of rights to water in the district (Water Code, s. 71610).

A municipal water district may sell water to cities, other public corporations and agencies, and persons within the district for use within the district. If the district finds that it has water surplus to the needs of the district, it may sell that water to any persons, public corporations or agencies, or other consumers outside the district (Water Code, s. 71611).

A municipal water district may also be involved the construction and operation of recreational facilities, the provision of fire, ambulance and paramedic services, the collection and disposal of waste and the production and distribution of hydroelectric power (Water Code, s. 71612).

A municipal water district is formed by a petition of registered voters in the proposed district to the board of supervisors of the principal county. A majority of registered voters within the proposed district is needed for the formation of the district (Water Code, Div. 20).

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Municipal water districts are governed by a board of five directors who are elected to their positions by the residents within the district (ACWA 1977).

### **California water districts**

California water districts are constituted under California *Water District Law 1913*. They serve areas that are predominantly rural, although some also supply urban and suburban areas (ACWA 1977).

California water districts have the power to acquire, plan, construct, maintain, improve, operate, and keep in repair the necessary works for the production, storage, transmission, and distribution of water for irrigation, domestic, industrial and municipal purposes, and any drainage or reclamation works (Water Code, Div. 13).

California water districts are spread fairly evenly across the rural areas of California. Many have been formed to receive water from the CVP and SWP (ACWA 1977).

## **3.7 Utility districts**

A number of districts are also created under legislation to provide a range of utility services, such as electricity, water and communications. Most notably, these include public utility districts and community service districts.

### **Public utility districts**

Public utility districts are publicly-owned corporations authorised to provide a range of utility services to their residents (electricity, water, heat, transportation, communications, garbage collection, sewage disposal, emergency services and recreational activities) (ACWA 1977).

They are formed by a majority of votes cast in the proposed district, following the petitioning of board of supervisors for the county. A board of between three to five directors is elected to govern the public utility district, although the board may comprise more members if the district includes area in two or more counties (ACWA 1977).

Most of the public utility districts were formed prior to 1950, and they are predominantly spread throughout the rural counties of California (ACWA 1977).

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## **Community service districts**

Community service districts are authorised under the *Community Services District Law 1951*. They are similar to public utility districts and many provide a range of community services including the supply of water (ACWA 1977).

Community service districts are formed following an election by residents in the proposed district, although an election is not required if 80 per cent of the residents sign the formation petition. Between three and five directors, elected to their positions, form the board of each district (ACWA 1977).

Community service districts are found throughout California, although they are most prevalent in the rural counties of the San Joaquin and Sacramento Valleys, and in the extreme north of the State (ACWA 1977).

## **3.8 Investor-owned utilities**

Investor-owned water utilities supply drinking water to both urban and rural areas, and compete with districts, municipalities and other governmental entities in the supply of water (ACWA 1977).

Some companies have their own water rights. Other companies contract with wholesalers for the supply of water (ACWA 1977).

The California Public Utilities Commission (CPUC) regulates investor-owned water utilities. The CPUC monitors the operations and services of the utilities, sets water rates, and enforces water quality standards set by state and federal regulators (ACWA 1977).

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## 4 Definition of water rights

There are six types of water rights in California:

- Federal reserve rights — created when land is reserved by the US Government.
- Riparian rights — accorded to the owner of land adjoining a watercourse the right to the use of water on the riparian land.
- Appropriative licences to surface water — issued by the SWRCB for taking water from a surface water source, the sub-surface flow of surface water and a subterranean stream.
- Correlative rights — accorded to the owner of land overlying percolating groundwater.
- Appropriative licences to groundwater — issued by the SWRCB for taking surplus groundwater and using it on land not overlying the groundwater source.
- Pueblo rights — accorded to the City of Los Angeles for access to the Los Angeles and San Diego rivers. These rights do not extend to the waters brought into these rivers from other non-tributary watersheds and are not significant elsewhere in the state.

### 4.1 Coverage

A universal system of water rights exists when all potential uses of available water resources are effectively controlled by a water right system. California's water rights system is not universal, because large quantities of groundwater extraction remain uncontrolled — despite being subject to the correlative rights doctrine.

The correlative rights doctrine has allowed uncontrolled access to groundwater and a serious depletion of some sources. The DWR estimated that, in 1995, groundwater sources were over-extracted by around 2 GL. Problems that have arisen as a consequence have included falling water tables, land subsidence, dry wells, contamination from sea water intrusion or toxic contaminants and a reduction in the storage capacity of some basins (WEF 2000a).

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Groundwater extraction has only been brought under effective management either through a court adjudication of the existing rights or the adoption of groundwater management plans.

In adjudicated groundwater sources, a court determines the volume of groundwater that each party can extract, and a court-appointed watermaster monitors and enforces the extractions. In adjudicating rights, the court may refer to the SWRCB to provide information to the court on the water source or to provide an opinion on the adjudication.

Any local agency that provides water supply services may adopt and implement a groundwater management plan for the groundwater basin, or portion of the basin, within its jurisdiction. Groundwater management may seek to achieve a variety of objectives, including limiting groundwater overdraft, preventing seawater intrusion or controlling land subsidence.

Around 150 local agencies have adopted groundwater management plans. These plans differ in purpose and scope, but typically incorporate strategies for monitoring groundwater levels and extractions, cooperative arrangements among pumpers to minimise or eliminate problem conditions and the facilitation of conjunctive use.

California requires users of overland flows to obtain an appropriative licence if they intend to impound 10 acre-feet (AF) (~12 ML) or more (Californian Farm Water Coalition, pers. com., 7 January 2003).

## **4.2 Specification**

Only appropriative licences to surface water are expressly quantified when they are granted. Appropriative licences to surface water are specified as a volume (net of any return flows) required to fulfill the reasonable and beneficial needs of the applicant.

A party who first diverts water has priority over all subsequent users, with the date of appropriation determined by the date of acceptance by the SWRCB of the party's application for appropriation. However, a prior appropriator cannot enforce a right against a subsequent appropriator if the water would not be put to beneficial use by the prior appropriator.

Federal reserve rights, riparian rights, correlative rights and appropriative licences to groundwater are not quantified when they are created.

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The volume of water that can be taken under a federal reserve right is limited to the volume necessary to achieve the primary purpose for which the land reservation was established. The McCarran amendment requires that the activation of such rights be subject to the administrative provisions of each state — and thus require specifying the volume of the reserved right in accordance with that state’s laws (see PC 2003). The extent to which this occurs in California may be tempered by a 1988 Californian Supreme Court ruling that riparian rights exist on federal reserve lands abutting state waterways (WEF 2000a, p. 9).

The volume of water that can be taken by riparian rights, correlative rights and appropriative licences to groundwater are limited by the requirement for beneficial and reasonable use. However, these rights are expressly quantified where rights to a source have been adjudicated by a court (groundwater sources) or the SWRCB (surface water sources).

Pueblo rights are superior to all other rights. Riparian rights have priority over appropriative licences, but all riparian rights are equal. If there is insufficient water for the reasonable and beneficial requirements of all riparian owners, they must share the available supply. Apportionment is governed by various factors, including each owner’s reasonable requirements and uses. In the absence of mutual agreement, users may seek judicial determination.

### **4.3 Record of title**

A record of appropriative licences to surface water is held and administered by the SWRCB. All other users must file *statements of diversion and use* with the SWRCB. Statements must be completed during the calendar year in which use begins, and supplemental statements are required every three years thereafter.

Failure to lodge a statement is equivalent to non-use in that year. Non-use could lead to loss of the right if the SWRCB or the courts adjudicated upon the rights to a source.

### **4.4 Duration**

Once established, all rights are held in perpetuity. However, there are a number of methods by which a right may be lost.



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## **Appropriative licences to surface water**

Appropriative licences to surface water may be lost through abandonment or non-use. Abandonment occurs where there is:

... concurrence of act and intent, the relinquishment of possession, and the intent not to resume it for a beneficial use, so that abandonment is always voluntary, and a question of fact (SWRCB 1990).

Non-use is distinguished from abandonment, and means the failure to put water to beneficial use for a period of years (SWRCB 1990). The Water Code provides for the loss of appropriative licences after five-years of non-use (Water Code, s. 1241).

In the event of abandonment or non-use, the water attached to an appropriative licence is considered to have reverted back to the public, and is considered unappropriated water. Such a reversion occurs upon a finding by the SWRCB, following notice to the permittee and a public hearing if requested by the permittee.

An appropriative licence that is not put to beneficial and reasonable use can be withdrawn by the SWRCB, who may then issue the right to another appropriator.

## **Riparian rights**

Riparian rights may be lost by non-use following adjudication by the SWRCB or court. Unused riparian rights are extinguished.

Land loses its riparian right if it is severed from the land bordering the stream. Riparian rights are vested in the soil. Consequently, if re-conveyancing separates the land title of the riparian land into a riparian and non-riparian parcel, the non-riparian parcel can no longer claim a riparian right.

## **Prescription**

Riparian rights and appropriative licences to surface water can be lost through prescription. A prescriptive right is obtained when an appropriator maintains continuous use for five years, and the:

- use is adverse to any prior vested rights; and
- owners of the vested rights fail to file for legal action.

After five years, the prior right owner's recourse to the courts becomes barred by the Statute of Limitations.

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There are certain conditions that must be fulfilled before a prescriptive right is obtained.

- The use must be continuous and uninterrupted for a period of five years.
- The use must be open and notorious, exclusive, under claim of right, hostile and adverse to the title of the prior owner, and an invasion of the prior owner's right.
- The prior right owner must have had an opportunity to prevent the adverse use by legal action, and such taxes as are assessed must be paid (SWRCB 1990).

### **Defences against loss of right**

The Water Code sets out certain instances where abandonment, non-use and prescription will not apply to water rights (Water Code, Part 2, Chapter 1). Water rights are not lost through abandonment, non-use or prescription if water use is reduced because of:

- compliance with crop control or soil conservation efforts;
- a cessation or reduction in groundwater extraction to facilitate replenishment;
- a cessation or reduction in the use of fresh water due to the use of recycled water, desalinated water or polluted water;
- lack of use by indigenous tribes on trust lands; or
- the temporary transfer of water.

There are also provisions specifically preventing the loss of appropriative licences to surface water. Appropriative licences are not lost due to:

- water conservation efforts; or
- conjunctive use of surface waters and groundwaters.

Cessation or reduction of water use must be notified to the SWRCB for rights to be maintained.

## **4.5 Exclusivity**

A water right is exclusive, if at the margin, it ensures that the benefits and costs of accessing and using water accrue to the right holder. Generally, this is achieved through the use of a number of conditions:

- the Constitutional 'reasonable and beneficial use' requirements';
- specification of conditions on appropriative licences to surface water ; and

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- ‘no injury’ provisions on water right holders.

First, all rights must be put to a beneficial and reasonable use. As noted previously, what defines beneficial and reasonable use has changed over time.

Second, appropriative licences to surface water are issued with certain conditions attached. These conditions relate to the:

- purpose to which the water will be used;
- point at which the water will be diverted;
- place where the water will be used; and
- environmental requirements including the fulfilment of water quality control plans.

Water appropriated under a licence must be used in accordance with these conditions. Licensees face penalties under the Water Code where failure to abide by the licence conditions occurs.

Third, an individual holding a riparian right, correlative right or appropriative groundwater licence can only change the point of diversion, place of use or purpose of use if others are not injured by such a change. For example, appropriative licences to surface water are issued for particular uses. A prior appropriator cannot change an established use of the water to the detriment of a subsequent appropriator, including any change that may reduce return flows upon which a subsequent appropriator may rely. To this end, a desire to change the use to which the water is put must be approved by the SWRCB.

## **4.6 Detached from land title**

Appropriative licences are in principle separable from land and possess their own deed of conveyance. Riparian and correlative rights are tied to the ownership of the riparian or overlying land respectively. Federal reserve rights are tied to the reservation with which they were created.

## **4.7 Divisibility and transferability**

Since federal reserve, riparian and correlative groundwater rights are typically attached to the land from which the rights derive, they are generally not transferable (SWRCB 1999).

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Appropriative licences are transferable. Transfers must be approved by the SWRCB because a change in the conditions of a licence — that is, a change in the point of diversion, place of use or purpose of use — may affect return flows and injure right holders downstream or elsewhere in the aquifer.

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## 5 Government involvement in water allocation

### 5.1 Allocation mechanisms

Water rights in California are the private property of their holders and generally cannot be limited or removed without compensation.

As noted, appropriative licences are specified as a volume with a particular date of appropriation, other forms of rights are not expressly quantified. Users may take what they require from the source provided the use is beneficial and reasonable. As a result, no authority exists to pre-determine how much water should be allocated to right holders. Determinations only occur after parties have sought the courts or the SWRCD to adjudicate.

As a result, the state is actively involved in using market-based methods to re-allocate water. For example, the Bay–Delta Program’s Ecosystem Restoration Program (ERP) aims to help restore and improve the health of the Bay–Delta system for all native species. It does so, by among other things, ensuring that sufficient volumes and timing of water is available for the needs of native fauna and habitats. Under the ERP, the state determines the preferred volume of water to be allocated to those functions.

Similarly, the implementation of the federal CVPIA 1992 also involves the re-allocation of water from consumptive to environmental uses. Part of this re-allocation occurs through water trading, but also as a result of the non-renewal of expired water supply contracts.

### 5.2 Bay–Delta Program

The Bay–Delta Program’s ERP is subject to federal and state government legislation — most notably, the *National Environmental Policy Act 1969* (NEPA 1969) and the *Californian Environmental Quality Act 1970* (CEQA 1970).

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All activities undertaken under the ERP, including the acquisition of water rights, are subject to the requirement to prepare environmental impact assessments (EIAs).

The ERP is guided by the Ecosystem Restoration Program Plan. The Ecosystem Restoration Program Plan comprises three documents: the Strategic Plan for Ecosystem Restoration; the Ecological Attributes of the San Francisco Bay–Delta Watershed; and the Ecological Management Zone Visions.

The Ecosystem Restoration Program Plan is also accompanied by a plan for implementing the priorities of restoring the environment and gathering information.

## **Resource assessment**

The Ecological Attributes of the San Francisco Bay–Delta Watershed identifies the stressors that impair the health of the watershed, and presents a vision of the desired outcomes for ecological processes and functions and fish and wildlife habitats. This vision forms the foundation of the ERP and establishes a basis for the actions outlined in the Ecological Management Zone Visions volume of the Plan.

## **Objectives**

The Strategic Plan for Ecosystem Restoration provides the scientific and practical framework for restoring the Bay–Delta watershed. It guides planning by establishing six strategic goals that bound the scope of the ERP (see box 5.1). The majority of the goals are to manage and restore the Bay–Delta ecosystem and watershed.

The Strategic Plan also presents more detailed objectives. These objectives establish adaptive management as the primary tool for achieving the objectives of the Strategic Plan, and provide a basis for determining whether or not progress is being made toward achieving each strategic goal.

The Ecological Management Zone Vision presents an overarching goal for each of the 14 ecological management zones established by the ERP. Each vision contains a brief description of the management zone, and the ecological processes and the habitats and species in the zone. It also identifies the stressors that impair the functioning of these processes.

The Ecological Management Zone Vision establishes strategic objectives, targets, actions and conservation measures necessary for improving the ecological health of the zone and its contribution to the health of the watershed. Rationales are presented that clarify, justify or support the targets and actions established.

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**Box 5.1      The six strategic goals of the Strategic Plan for the Ecosystem Restoration Program**

The six strategic goals established by the Strategic Plan for Ecosystem Restoration are to:

1. Achieve recovery of at-risk native species (those listed under federal or state endangered species legislation) dependent on the Delta and Suisun Bay as the first step toward establishing large, self-sustaining populations of these species; support similar recovery of at-risk native species in the Bay–Delta estuary and the watershed above the estuary; and minimise the need for future endangered species listings by reversing downward population trends of native species that are not listed.
2. Rehabilitate natural processes in the Bay–Delta estuary and its watershed to fully support, with minimal ongoing human intervention, natural aquatic and associated terrestrial biotic communities and habitats, in ways that favour native members of those communities.
3. Maintain and/or enhance populations of selected species for sustainable commercial and recreational harvest, consistent with the other Ecosystem Restoration Program strategic goals.
4. Protect and/or restore functional habitat types in the Bay–Delta estuary and its watershed for ecological and public values such as supporting species and biotic communities, ecological processes, recreation, scientific research, and aesthetics.
5. Prevent the establishment of additional non-native invasive species and reduce the negative ecological and economic impacts of established non-native species in the Bay–Delta estuary and its watershed.
6. Improve and/or maintain water and sediment quality conditions that fully support healthy and diverse aquatic ecosystems in the Bay–Delta estuary and watershed; and eliminate, to the extent possible, toxic impacts to aquatic organisms, wildlife, and people.

*Source:* CBDA (2000).

## **Impact assessment**

The impacts of the strategies developed to meet the objectives and visions of the Ecosystem Restoration Program Plan are assessed according to principles set out in the Water Management Strategy Evaluation Framework. The role of the framework is to ensure that assessments are undertaken comprehensively and on a technically consistent basis.

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The framework allows CALFED participants to:

- predict the possible impacts from proposed water management actions;
- evaluate those impacts with respect to CALFED objectives and solution principles;
- learn more about water management system responses to various actions;
- help answer pressing policy questions (such as ‘Who are the beneficiaries of a proposed water management action?’);
- identify tradeoffs among alternatives to help people choose which water management strategy best meets their needs; and
- improve investment benefits by discovering more efficient combinations of water management actions (CBDA 2002b).

The framework provides information on how the benefits and impacts on fisheries, ecosystems, water quality, water deliveries and San Francisco Bay–Delta outflow can be assessed and allows policy makers and stakeholders to compare alternative strategies. The framework also allows for the trade-offs to be considered in formulating compromises between competing interests (CBDA 2002b).

## **Transparency**

Under the NEPA 1969 (s. 102), there is a statutory requirement that planners publish records of decision. As noted, a record of decision is a succinct statement of the decision made, its background, other alternatives considered, the basis for the decision, the environmentally preferable alternative, measures to minimise environmental harm, and public involvement in the decision making process. The record must also identify any adverse environmental effects which cannot be avoided should the proposal be implemented.

## **Consultation**

The BDPAC advises the various state and federal agencies involved in the Bay–Delta Program on all aspects of program implementation, and holds various public information sessions and workgroup meetings in order to engage the general public (CBDA 2002c).

The Ecosystem Restoration Subcommittee of the BDPAC is responsible for consulting over the development of the ERP. Consultation occurs through public information meetings, public working group meetings. Submissions are invited on the draft environmental impact statements and reports.



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## **Review**

The progress of the Bay–Delta Program and its various programs (including the ERP), is reported annually by the Bay–Delta Authority. Programs may be changed at any time if all participating agencies agree to such a change.

The California Governor or the SoI have the power to revise the schedule of the Bay–Delta Program. However, notice of a proposed change must be given to all agencies involved and consultation with those agencies undertaken.

### **5.3 Central Valley Project Improvement Act 1992**

As a federally-owned initiative, the US BoR is required, under the NEPA 1969 to prepare programmatic environmental impact statements (PEISs) when operating the CVP and when implementing the CVPIA 1992.

#### **Objectives**

A key objective of the CVPIA 1992 is to protect, restore and enhance fish and wildlife habitats in the Central Valley and Trinity River basins. Generally, the objectives of the activities under the program are clearly specified and include targets. Objectives relate to ecosystem restoration, catchment management, water supply reliability, storage, conveyance, water quality, water use efficiency and conservation.

#### **Impact assessment**

A PEIS was developed to assess the potential impacts of implementing the CVPIA 1992. The PEIS addresses the Act’s region-wide impacts on communities, industries, economies, and natural resources and provides a basis for selecting a decision among the alternatives.

The PEIS is a system-wide analysis — rather than a detailed analyses of specific projects and sites — that assesses the environmental impacts of various scenarios, including a no-action alternative. The impacts assessed are largely environmental. However, there is also a degree of consideration of the social and economic impacts on low income or minority groups (DoI, BoR and FWS 1999).

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## **Consultation and transparency**

Throughout preparation, meetings were held with the US BoR and US Fish and Wildlife Service, other interested agencies and groups and the public (DoI, BoR and FWS 1999). As with the Bay–Delta ERP, the CVPIA 1992 is subject to the NEPA 1969 (s. 102) and the US BoR is required to publish its records of decision.

## **Review**

The progress of the CVPIA 1992 is assessed every 10 years. Annual reports are published on the achievements under the CVPIA 1992 and on the results of eco-system level monitoring.

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## 6 Administering water rights

Applications to obtain a water right are only necessary for appropriative licences to surface water. Riparian, correlative and appropriative licences to groundwater are contingent upon ownership of certain parcels of land. Applications for water rights are also subject to US federal government legislation, including the *Clean Water Act 1972* and the requirement to obtain section 404 permits from the US Army Corps of Engineers, and the federal *Endangered Species Act 1973*. These administrative provisions are described in PC (2003).

The Water Code establishes a procedure for any person to obtain an appropriative water right for small domestic or livestock stockpond use upon registering that use with the SWRCB, and thereafter applying the water to reasonable and beneficial use with due diligence. These registrations are limited to 4500 gallons per day (~17 kL per day) of direct diversion or 10 AF per year (~12 ML per year) of water storage.

### 6.1 Issuing new water rights

To obtain an appropriative licence to surface water, prospective appropriators must file an application with the SWRCB for a permit. The application must describe the proposed project's source, place of use, purpose, point(s) of diversion and quantity to be diverted. The SWRCB must notify the applicant within 30 days if the application is in an acceptable form.

The SWRCB must publish a notice of the applicant's intent. The public is permitted to comment on the application, and any protest must be given to the applicant, who is required to respond.

Agreement between the disputing parties is sought on mutually acceptable conditions. Where this fails and the volume of water or the storage capacity at issue does not exceed 85 litres a second or 250 megalitres respectively, the SWRCB's Division of Water Rights may issue a decision upon the issue following the completion of a field investigation. The decision may be appealed in the state's courts.

In determining whether to issue the permit, the SWRCB gives consideration to:

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- all prior rights and the availability of water in the source;
  - the flows needed to preserve in-stream uses, such as navigation, recreation and fish and wildlife habitat (the Public Trust doctrine);
  - the relative benefit derived from all beneficial uses of the water concerned and the reuse and reclamation of the water sought to be appropriated;
  - any water quality control plans; and
  - the state's goal of providing a decent home and suitable living environment for every Californian.

In determining the public interest, the SWRCB must give consideration to any general or co-ordinated plan looking toward the control, protection, development, utilisation and conservation of the water resources of the state.<sup>5</sup>

Under the CEQA 1970, an EIA must be undertaken by the SWRCB when a proposed project is likely to have significant environmental effects. An EIA contains a description of the project, a discussion of the project's environmental impacts and mitigation measures, any public comments received on the proposed project and the SWRCB's response to those comments.

The SWRCB may attach any conditions to a permit required to comply with the EIA. It may also attach any conditions that, in its judgement, will best develop, conserve and utilise water resources for the public interest. The SWRCB may also attach such conditions as are necessary for the fulfilment of any water quality control plans. Any conditions imposed by the SWRCB can be reviewed by the courts.

The SWRCB will issue the permit, once it is satisfied that unappropriated water is available for use, and that the appropriation is in the public interest. A permit allows for the developer to finalise construction of the infrastructure necessary to apply the water to beneficial use.

When construction of the project is complete and the largest volume of water under the permit has been put to beneficial use, the applicant can apply to SWRCB to confirm the terms and conditions and issue a licence to the appropriator. This licence is the final confirmation of the water right and remains effective as long as its conditions are fulfilled and beneficial use continues.

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<sup>5</sup> The most significant plan is the California Water Plan. The plan predicts future demands for water and quantifies available supplies, and proposes solutions to how future demands may be met.

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## 6.2 Changing water rights

Under Californian water law, appropriative licences may be freely traded, and there is no role for the state in approving the transfer of ownership. However, if the new owner wishes to change the purpose of use, point of diversion and place of use of the appropriative licence, an application must be made to the SWRCB for its approval. The Water Code specifies procedures for obtaining this permission (Water Code, ch. 10).

The licensee must file an application with the SWRCB that states:

- the name and address of the petitioner and is signed by the petitioner, or the petitioner's agent or attorney;
- information reasonably available to the petitioner, or which can be obtained from the Department of Fish and Game, concerning the extent, if any, to which fish and wildlife would be affected by the change;
- any measures proposed to be taken for the protection of fish and wildlife in connection with the change;
- sufficient information to demonstrate a reasonable likelihood that the proposed change will not injure any other legal user of water; and
- any other appropriate information.

The SWRCB may request the provision, within a reasonable period, of any other additional information reasonably necessary to clarify, amplify, correct or otherwise supplement the information provided.

If requested by the SWRCB, the petitioner must publish a notice of the application in a manner prescribed by the SWRCB. In all cases, the petitioner must notify the Department of Fish and Game in writing of the proposed change.

Any interested party may file a written protest with the SWRCB against approval of the application. The protest must include:

- the name and address of the objector;
- the signature of the objector, or the objector's agent or attorney;
- the objector's objections and the bases for these objections; and
- any other appropriate information.

The written protest must be served on the petitioner by the protestant, and the two parties must then make a good faith effort to resolve the protest within 180 days of the original filing of the protest. For good cause, the SWRCB may extend the

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negotiation time, and may request from either party any additional information necessary for the resolution of the dispute.

The SWRCB may request any other information it considers necessary, but must allow a reasonable period of time for submitting this information.

In determining whether to change a licence, the SWRCB is required to consider the same range of issues as for granting new appropriative licences. The SWRCB may impose a range of conditions to ensure that the water right's use remains reasonable and does not injure the rights of others.

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# 7 Distribution management

Water distribution involves the collection, storage, release and transportation of water to users.

## 7.1 Water accounting

Water accounting is the process of keeping an inventory of the amount of water available for supply at any point in time and the amount of water that has been assigned and distributed to uses and users. The functions of this process are:

- determining the amount of water available for distribution and assigning it to uses and users;
- maintaining records of the amount of water assigned to, stored by, carried over and borrowed by, storage losses of, and delivered to water users (managing water accounts);
- accounting for the effects of water right transfers;
- accounting for water losses experienced in transit (conveyancy losses); and
- assigning and reallocating water during periods of serious water shortage.

### **Determining availability and assigning water**

The storage operator determines how much water is available for distribution and how much of this will be assigned to each water user's account.

The Operations Control Office (OCO) of the DWR is responsible for directing overall water and power operations of the SWP. The OCO balances many factors when developing the operational plan for the SWP. It accomplishes this by:

- analysing water and power operations on a long-term basis (up to 20 years into the future);
- developing strategic plans for current and next year's water and power operations;
- preparing specific plans for water and power operations for the upcoming weeks;

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- monitoring project operations compared to regulatory requirements and recommending changes to current schedules or future plans to assure compliance (OCO 2003).

The OCO manages the daily and minute-to-minute operation of the SWP. It prepares daily water and power operation schedules, administers water and power contracts and implements and coordinates continual daily water and power schedules. The OCO is also responsible for assuring reliable and efficient systems for schedules and dispatching operations of the SWP (OCO 2003).

### **Arrangements for water shortages**

In the event of a dry year or drought, surface water allocations are reduced across all users according to established priorities in the purpose of use and between different types of right. The DWR, subject to a public hearing, may set new priorities that override existing priorities of water rights (Water Code s. 350–259). The Californian Water Code stipulates the priorities that prevail during a drought. These priorities are: first, the domestic use needs of riparian users; second, domestic purposes to appropriative users; third, irrigation uses of riparian users; and fourth, irrigation uses of appropriative licences.

Any water surplus to the domestic use needs of the state is then apportioned between riparian users for irrigation purposes. Once this is accomplished, the irrigation needs of appropriative users are satisfied according to their time-based priorities.

If there is still water available, it is then used to satisfy any additional needs of vested right holders. Riparian users have first call upon the surplus but must share it equally between themselves, with appropriative users entitled to share any remaining water according to priority.

It is common for users to suffer significant reductions in their allocations during a drought. For example, in the drought of 1991, the SWP could supply only 20 per cent of Los Angeles normal allocation, and, overall, Los Angeles faced a 15 per cent shortfall in its water supply.

A number of strategies are employed by suppliers and users to balance demand and supply in the event of a shortage. One common technique is to replace lost surface water supply with groundwater, and, as noted previously, over-extraction is a common occurrence during dry periods.

Another method employed is the use of water conversion programs, such as education campaigns. For example, in response to the shortfall of 1991,



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Los Angeles Water and Power sought to educate users to reduce their water consumption by 25–30 per cent.

In some instances, however, conservation strategies have implications for revenue streams. Some agencies rely solely upon volume pricing, and thus revenues can fall dramatically during and after the deployment of water conservation strategies.

## **7.2 Water distribution**

Water distribution is the transportation of water to consumptive and non-consumptive uses and is undertaken by storage managers in rivers whose flow is controlled by storages. Storage managers are also responsible for distributing water to the environment or controlling water flows to meet environmental needs.

### **Managing environmental flows**

Environmental flows are managed under the Wild and Scenic Rivers legislation, in-stream flow requirements, and the Bay–Delta and CVPIA programs. In some cases, the water allocated to these environmental programs is managed co-jointly — that is, water dedicated to achieving the objectives of one program may also go some way to satisfying the water needs of another program (see box 7.1).

#### *Wild and scenic rivers*

Flows in wild and scenic rivers constitute the largest environmental water use in California. The Wild and Scenic Rivers legislation aims to preserve the free flowing characteristics of rivers having outstanding natural resource values. Under the legislation, no dam or extractive work can be built upon a declared river if that work will have a direct or adverse effect upon the river’s natural flows (DWR 1998, 4–34).

#### *In-stream flows*

In-stream flows are the water left in a stream or river for in-stream beneficial uses such as fisheries, wildlife, aesthetics, recreation and navigation. In-stream flows can be established in a variety of ways:

- agreement executed between the California Department of Fish and Game and a water agency;

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- attaching specific terms and conditions to an appropriative licence issued by the SWRCB;
  - attaching specific terms and conditions to a Federal Energy Regulatory Commission hydro-electric power licence;
  - a court order; and
  - agreement among interested parties (DWR 1998, 4–36).

Required flows on most rivers vary by month and year type, with wet year requirements generally higher than dry year requirements.

The original in-stream flow requirements were established in 1990 as base conditions for the development of the 1993 California Water Plan. Since then, subsequent agreements and decisions have increased the number of declared rivers and increased in-stream flow requirements.

#### **Box 7.1 Managing environmental water use on the American River**

The return flow from one water user can supply a downstream user. The water budgets in the California Water Plan account for the multiple uses of water in a river basin. The re-application of flows in the American River for environmental purposes illustrates how the plan accounts for multiple uses in its water budgets.

The American River originates in the Sierra Nevada, flowing generally from east to west down through the foothills into the Sacramento Valley, ultimately reaching the Sacramento River and the San Francisco Bay–Delta. The upper watershed of the American River consists of the north, middle and south forks. The mainstream of the American River begins at the confluence of the north and south forks. Environmental water supplies are re-applied at several locations between the upper watershed and the Delta.

#### **Wild and Scenic Rivers**

In the plan's water budgets, the demand side of the budget for the north fork of the American River recognises 584 000 acre-feet (AF) (approximately 720 GL) for wild and scenic purposes that are matched by environmental in-stream flows on the supply side of the budget. Similarly, the demand side of the budget for the mainstream of the American River recognises 20 000 AF (~25 GL) that are also supplied by environmental in-stream flows.

Environmental demands are not consumptive. Therefore, wild and scenic river supplies are available for downstream use.

*Source:* DWR (1998, 4–38).

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**Box 7.1 (continued)**

**In-stream flow requirements**

The American River has several in-stream flow requirements on its three forks as well as on its mainstream. For example, a 54 000 AF (~67 GL) requirement exists below Ralston Afterbay Dam on the middle fork and a 72 000 AF (~89 GL) requirement exists below Chili Bar Dam on the south fork.

The river's largest in-stream flow requirement is on the mainstream below Nimbus Dam. On the demand side of the budget, this requirement is recognised as 'environmental water use' and is matched on the supply side with the required environmental in-stream flow. This environmental demand is not consumptive, and water is available for downstream use.

The in-stream flows required for the American River are re-applied downstream to meet the Bay-Delta's outflow requirements. The California Water Plan's water budgets classify this flow as re-applied surface water supply. Around 4 million AF (~5000 GL) of the Bay-Delta environment water demand is satisfied through the re-application of water released to meet environmental in-stream requirements in rivers tributary to the Delta.

*Source: DWR (1998, 4-38).*

*Central Valley Project Improvement Act*

The CVPIA requires that the SoI determine in-stream flow needs for anadromous fish for all Central Valley Project controlled streams and rivers, based on recommendations of the U.S. Fish and Wildlife Service, after consultation with the Californian Department of Fish and Game.

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## 8 Pricing

Most water in California is delivered by publicly-owned and operated water systems (PRIPP 1999). These publicly-owned systems include:

- bulk water suppliers, principally the federal US BoR (operator of the CVP and Colorado River facilities) and DWR (operator of the SWP); and
- water districts, which may receive supply from the bulk water suppliers under contract, from their own sources or from a combination of both.

Water districts may be constituted as an irrigation district, municipal water district or some other type of district.

Investor-owned water utilities supply only a small proportion of water. Their water rates are regulated by the California Public Utilities Commission (CPUC). The CPUC regulates privately-owned electricity, natural gas, telecommunications, water, railroad, and passenger transportation companies. It is responsible for assuring customers have safe, reliable utility service at reasonable rates and are protected from fraud (CPUC 2003).

### 8.1 US Bureau of Reclamation

Water projects authorised by the federal *Reclamation Act 1902* and subsequent legislation set out financial terms and repayment obligations for the recovery of expenses incurred in the construction and operation of federally-funded facilities. Generally, these terms required that all federal moneys expended in developing and constructing a water project be reimbursed by the beneficiaries of the project, and that all subsequent operating and maintenance costs be repaid by all users (Teerink 1993).

#### Cost recovery

Under the original repayment arrangements, capital costs were allocated between types of water use. Reimbursement of the capital costs allocated to some uses — flood control, recreation, fish and wildlife and Native American uses — was not required and was paid for out of state and federal general revenues (Teerink 1993).

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Capital costs allocated to municipal and industrial uses were repaid at the current federal interest rate, while those allocated to irrigation were interest free over a 40-year period. Repayments by irrigators were also subject to an ability-to-pay requirement — if repayments without interest exceeded an irrigator’s ability to pay then the costs could be reimbursed through hydroelectricity power generation revenues or from municipal and industrial users (Teerink 1993).

The *Reclamation Reform Act 1982* required full cost pricing for water delivered to a landholding in excess of 960 acres. Certain multiple ownership holdings were required to pay full cost for water delivered to acreages in excess of 640 acres (Teerink 1993). Water delivered to smaller-sized allotments was priced according to the original pricing arrangements.

Full cost was defined as the amount required to amortise federal expenditures allocated to irrigation facilities, including operating and maintenance expenditures, with interest. The interest rate chosen was the average interest of US Treasury bonds issued during the year of expenditure (Teerink 1993).

However, the *Reclamation Reform Act 1982* introduced a complicated formula for allocating the capital costs of building and financing a water project. Under the legislation, the US BoR must determine both the percentage of capital costs attributable to each use, and then the actual amount that it will charge each user group (CBO 1997).

The capital component is made up of a storage, conveyance, pumping and distribution system. The US BoR uses a ‘postage stamp rate’ to recover storage and conveyance costs — these costs are the same for all users regardless of where along the system the user is served or from which reservoir it is supplied (Teerink 1993).

## **Price structure**

For water delivered through the CVP, the CVPIA 1992 required that the US BoR use tiered pricing structures for both agricultural and urban water users. Under this arrangement, the first 80 per cent of a water allotment is repaid at the contract price (the price the US BoR charges water districts), the next 10 percent at the average of the contract and the full-cost price, and the last 10 percent at the full-cost price (CBO 1997).

Tiered prices are imposed upon water districts rather than on individual farmers. In addition, they do not have effect until long-term contracts are renewed (CBO 1997).

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## 8.2 Department of Water Resources

The prices charged for water delivered through the SWP must return to the State of California all costs of project operation and maintenance and the capital costs (plus interest) of construction. Full cost recovery has been consistently applied (Teerink 1993).

The DWR sells water through the SWP to water districts under long-term contracts. The contracts specify agreed quantities of water and pricing arrangements.

Contracts specify a storage and conservation charge (termed the Delta Water charge) and a transportation charge for conveyance. The Delta Water charge is on a per-AF basis applied to the quantity of water taken by the contractor. The transportation charge has a capital cost component allocated by reaches of the conveyance system. The level of the transportation charge at any particular reach is determined by the maximum rate of flow requested by the contractor utilising that reach of the conveyance (Teerink 1993).

There is also an interest-bearing repayment obligation upon contractors to recover fixed costs. This may be specified as an equivalent cost per acre-foot, but it must be paid even if the actual quantity of water received differs from that specified in the contract. During the drought in the early 1990s, this fixed cost component had to be paid by contractors, and only variable costs were reduced (Teerink 1993).

## 8.3 Water districts

Water districts determine the retail water prices that they will charge their customers. They may recover their costs by charging either a per-unit price for water use or a charge independent of the quantity used, such as a fixed charge per acre of land. Approximately one-third of California's irrigation water is distributed on a per-AF basis (CBO 1997).

In most cases, pricing arrangements reflect a district's need to generate only enough revenue to meet operating expenses and debt without making a profit. Under California law, all water districts are not-for-profit entities (CBO 1997).

In many cases, local agencies have incorporated hydroelectric generation facilities in their dams, which provide income to pay much of the cost of facilities. The usual practice has been to sell power at or near market rates, and charge only a nominal price for the supply of water (PRIPP 1999).

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Prices remain subsidised. For example, in some areas of Southern California, cities pay 10 to 100 times more for an AF of water than do neighbouring agricultural irrigation districts (PRIPP 1999).

The fact that some water districts may take their supply from more than one source can result in complex pricing structures and various pricing anomalies. The prices paid for water at the consumer level can vary within a water district depending upon the source of supply.

For example, the Metropolitan Water District of Southern California takes water from the Colorado River and the SWP. Under the pricing arrangements governing Colorado River water, the US BoR generates enough water revenues to recover operating and maintenance costs from its facilities because the sale of electricity has been sufficient to repay the construction costs. As a result, the Metropolitan Water District pays only \$US0.25 per AF for water taken off the Colorado River. By contrast, the equivalent unit cost for water taken from the SWP is \$US232 per AF (Teerink 1993).

## **8.4 Investor-owned utilities**

Historically, rates for investor-owned utilities have been cost-based and determined prospectively. For rate making purposes, water utilities are divided into Uniform Systems of Accounts classes according to size as follows:

- Class A: Greater than 10 000 connections.
- Class B: Between 2000 and 10 000 connections.
- Class C: Between 500 and 2000 connections.
- Class D: Less than 500 connections (CPUC 1997).

### **Rate making procedures**

Different procedures are employed by the CPUC to establish water rates for the different classes of water utilities. Class A utilities must file a formal General Rate Case application to obtain an increase in water rates, while Classes B, C and D may use informal processes (CPUC 1997).

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### *Class A utilities*

Class A utilities must file formal applications to increase rates. Each utility must file a notice of intent and then a formal application with testimony and working papers to substantiate its request (CPUC 1997).

The CPUC holds public meetings to explain the request to customers and interested parties. The CPUC then produces its own testimony and working papers, and the CPUC, the utility and any interested parties meet to work out a stipulated agreement if possible (CPUC 1997).

If agreement cannot be attained, those items still in dispute are heard in a public hearing, with sworn testimony and transcripts. An assigned Administrative Law Judge presides and issues a proposed decision within 90 days. The proposed decision is sent to all interested parties for review and comment (CPUC 1997).

Comments and inputs from the CPUC are incorporated into the proposed decision to produce the final decision, which must be passed by a majority of the appointed commissioners. The signed decision has force of law. Non-compliance is punishable by a fine of between \$US500 and \$US20 000 per offence. A decision may be appealed to the CPUC and the California Supreme Court (CPUC 1997).

Class C and D utilities file once a year for a CPIU (Consumer Price Index for All Urban Consumers) rate increase. A class A or B utility that purchases a class C or D utility may also increase the purchased utility's rates at CPIU for seven years after the purchase date (CPUC 2001a).

### *Class B, C and D utilities*

Class B, C and D utilities may file informal rate increase requests — although this does not prevent these utilities from filing formal applications (CPUC 1997).

The company submits standard working papers. The CPUC then conducts an investigation and issues a results of operations report (CPUC 1997).

Based upon the report, the CPUC and the utility negotiate on the proper level of annual revenues and design of rates. These negotiations are recorded in a resolution. After the CPUC's approval, a resolution is issued that authorises the utility to file an letter of advice with tariffs establishing the new rates as lawful rates (CPUC 1997).

The CPUC encourages Class B, C and D utilities to file for an informal review of rates no less often than one every five years (CPUC 1997).



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## **Rate design**

Water rates can be either a flat rate or a metered rate. The flat rate varies with lot size or the number of buildings on a lot. The metered rate consists of a monthly service charge and a separate charge, or charges, for the amount of water consumed (CPUC 1997).

The CPUC has long supported metering of water services, and there have been no new flat rate customers since 1912 (CPUC 2001b).

In 1984, the CPUC investigated whether the metered rate design policy existing at the time resulted in a realistic and appropriate distribution of revenues between the service charge and consumption charge. The investigation resulted in a flatter rate design, so that service charges recovered no more than 50 per cent of the fixed costs of operations. These fixed costs included maintenance expenses, transmission and distribution expenses, customer account expenses, administrative and general expenses, rent expenses, depreciation expenses, property tax and a gross return on investment (CPUC 1997).

This structure was modified in 1990 to allow recovery of 50 per cent of fixed costs in the service charge for class A and B water companies, 65 per cent for class C and 100 per cent for Class D. The modification also allowed any regulated water utility that acquired an inadequately operated and maintained small water utility to recover up to 100 per cent of the fixed costs in the service charge (CPUC 1997).

## **Expense offsets**

Expense offsets allow a utility to pass on to the customer changes in certain costs that are considered to be beyond the utility's control and in the public interest to allow the utility to recover. Expense offsets allow dollar-for-dollar recovery of these expenses, and may be booked for accrual recovery when they occur (CPUC 2001a).

Expense offsets may include:

- purchased power (electricity or natural gas that the utility buys);
- purchased water;
- groundwater extraction charges (pump taxes); and
- costs booked to a memorandum account found reasonable for recovery (CPUC 2001a).

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Class C and D utilities may also request an offset for employee labour, payroll taxes, the portion of contract work that is for operation and maintenance of plant facilities (Class D only) and unanticipated repair costs (CPUC 2001a).

Expense offsets are tracked using a balancing account. A balancing account tracks the lost revenue from the time of the change in the offsettable expense until the change is incorporated into general water rates. Once water rates have been adjusted to reflect the expense change, the utility tracks the actual extra revenue collected by the change in general water rates against the actual incremental cost incurred. Any imbalance is balanced out as part of the next general review of water rates (CPUC 2001a).

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## 9 Monitoring and enforcement

Disputes involving federal reserve, riparian, correlative and appropriative groundwater right holders are resolved through the courts. The courts may refer the case to the SWRCB for investigation or for the SWRCB to act as referee. All rights of any form may be included under this procedure.

The SWRCB adjudicates upon disputes concerning appropriative surface water right holders, and its decisions may be appealed to the courts. The SWRCB will investigate and take action (Water Code, s. 1052) on a written complaint received, alleging:

- violation of the conditions of a permit or licensed issued by the SWRCB;
- waste or unreasonable use of water;
- illegal diversions or use; or
- unreasonable effects on public trust or public interest uses of the water (SWRCB 1990).

The SWRCB's compliance program is new. In 1998, the California Legislature financed the creation of a compliance unit to conduct compliance inspections and follow-up activities for the State of California. Existing appropriative surface water right holders are inspected to determine if they are in compliance with the terms of their water rights. Reservoirs identified using areal surveys are also inspected to determine if they have a basis of right (SWRCB, pers. comm. 17 October 2002).

Compliance activities target five watersheds per year. Notification of inspections is given to all water right holders in the watershed and selected parties are called to arrange for an inspection. The largest water right holders in the watershed are always chosen and all water rights held by that party are inspected (SWRCB, pers. comm. 17 October 2002).

Global positioning system meters are used to locate points of diversion and places of use, and monitoring records or visual observations are used to determine the quantity diverted. Where a party denies access to the property, the SWRCB can obtain an inspection warrant and inspectors are accompanied by a police officer (SWRCB, pers. comm. 17 October 2002).

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Inspection results are provided to the water right holder and time is provided for the party to provide a basis of right for any infraction or to refute the results. A party may also request a hearing upon the issue before the SWRCB (SWRCB, pers. comm. 17 October 2002).

Where parties do not agree with the decision of the SWRCB, they may file a lawsuit. Aggrieved parties may continue to appeal the decision of a court to an appellate court (SWRCB, pers. comm. 17 October 2002).

The SWRCB tries to bring the party back into compliance by requiring the party to lodge water right change petitions or file for additional water rights. If warranted, the SWRCB can issue an *administrative liability complaints* for up to \$500 per day of a violation or issue a *cease and desist order* with a time schedule for compliance. Violation of a *cease and desist order* can be penalized with a fine of up to \$1000 per day (SWRCB, pers. comm. 17 October 2002).

All monitoring results are on the public record, but individuals must request the results or go to the SWRCB's office to review them. The SWRCB intends to post all enforcement actions on their website in the future. There is no other reporting requirement (SWRCB, pers. comm. 17 October 2002).

Water right applicants are provided with a page explaining who needs to obtain a water right by application to the SWRCB. This page also provides information on the enforcement section of the Water Code (SWRCB, pers. comm. 17 October 2002).

The SWRCB has requested that all county planning departments provide a copy of this page to all prospective parties who are obtaining a water permit to build a pond. The SWRCB also intends to describe enforcement procedures in more detail on its website. This has not yet been completed (SWRCB, pers. comm. 17 October 2002).

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