

CHAPTER X. MITIGATION AND UNAVOIDABLE SIGNIFICANT IMPACTS

This water quality control plan will be implemented primarily through the adoption of a water right decision and to a lesser extent through the actions of other agencies. Because implementation actions will not be fully formulated and established in this plan, the SWRCB cannot mitigate for the potential significant impacts of this plan through regulatory actions incorporated into the plan. Such regulatory actions must wait until the plan is implemented through a water right decision. It is possible, however, to discuss some of the options available to the SWRCB to mitigate the potential adverse impacts of this decision, including policy recommendations to other agencies.

The SWRCB has developed the standards and recommendations in this preferred alternative by balancing all of the uses of water in the Estuary, thereby minimizing the adverse impacts on any one beneficial use. This plan increases the protection provided to fish and wildlife uses of the Estuary while maintaining existing water quality protections for other uses of water in the Estuary. Therefore, there are no significant adverse environmental impacts in the Estuary due to this plan. However, the higher level of protection for the fish and wildlife beneficial uses of water from the Estuary will result in decreased water availability in export areas and changes in reservoir levels and river flows in upstream areas. Consequently, mitigation measures likely to be implemented by other agencies will focus on actions that encourage the efficient use of available water supplies through conservation, conjunctive use, reclamation, mitigation funding, water transfers, combined points of diversion, offstream storage projects, the South Delta Program, purchase of Delta Islands, and the long-term Delta solution. The following sections discuss these measures.

A. CONSERVATION

The history and the measures associated with urban and agricultural water conservation are different. Therefore, urban and agricultural water conservation are discussed separately.

1. Urban Water Conservation

In 1988, during the Bay-Delta Proceedings, interested parties gave the SWRCB widely divergent estimates of water conservation potential in California. To resolve these differences, urban water agencies, environmental groups, and State agencies actively participated in a three-year effort which culminated in the publication of a Memorandum of Understanding Regarding Urban Water Conservation in California. This memorandum identified 16 Best Management Practices (BMPs) for urban water conservation; it committed the signatories to implementing the BMPs; and it established the California Urban Water Conservation Council to both oversee implementation of the existing BMPs and evaluate new BMPs. Over 100 water agencies, plus over 50 public advocacy groups and other interested parties, have signed the memorandum. A summary description of the 16 BMPs is provided below. A more detailed description can be found in the memorandum.

1. Interior and Exterior Water Audits and Incentive Programs for Single Family Residential, Multi-Family Residential and Governmental/Institutional Customers
2. New and Retrofit Plumbing
3. Distribution System Water Audits, Leak Detection and Repair
4. Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections
5. Large Landscape Water Audits and Incentives
6. Landscape Water Conservation Requirements for New and Existing Commercial, Industrial, Institutional, Governmental, and Multi-Family Developments
7. Public Information
8. School Education
9. Commercial and Industrial Water Conservation
10. New Commercial and Industrial Water Use Review
11. Conservation Pricing
12. Landscape Water Conservation for New and Existing Single Family Homes
13. Water Waste Prohibition
14. Water Conservation Coordinator
15. Financial Incentives
16. Ultra-Low Flush Toilet Replacement Programs

Water conservation will play a significant role in managing California's urban water needs. The widespread acceptance of urban BMPs in California ensures that their implementation will be the industry standard for water conservation programs. However, the SWRCB recognizes that, as water use continues to become more efficient, agencies will lose flexibility in dealing with shortages.

Recommendation. The SWRCB recommends that all urban users of water originating in the Bay-Delta watershed sign the Memorandum of Understanding Regarding Urban Water Conservation in California. In addition, the DWR, in cooperation with the California Urban Water Conservation Council, should continue to identify additional BMPs that can reduce urban water use.

2. Agricultural Water Conservation

There are three principal pieces of legislation that encourage agricultural water conservation: the California Agricultural Water Management Planning Act of 1986 (Stats. 1986, C. 954, Water Code §10800 et seq.), the federal Reclamation Reform Act of 1982, and the Agricultural Water Suppliers Efficient Water Management Practices (EWMPs) Act (Stats. 1990, C. 739, Water Code §10900 et seq.). This legislation is discussed below.

The California Agricultural Water Management Practices Act requires all agricultural water suppliers delivering over 50 TAF of water per year to prepare an Information Report and identify whether the district has a significant opportunity to conserve water or reduce the quantity of saline or toxic drainage water through improved irrigation water management. The legislation affected the 80 largest agricultural water purveyors in California. The districts that have a significant opportunity to conserve water or reduce drainage are required to prepare Water Management Plans.

The Reclamation Reform Act of 1982 requires federal water contractors to prepare Water Conservation Plans. In California, the USBR's Mid-Pacific Region developed a set of Guidelines to Prepare Water Conservation Plans and required all federal water contractors serving over 2,000 acres to submit water conservation plans. The CVPIA required the USBR's Mid-Pacific Region to revise its existing guidelines for reviewing conservation plans to include, but not be limited to, BMPs and Efficient Water Management Practices (EWMPs) developed in California.

The EWMPs Act charged the DWR to establish an advisory committee consisting of members of the agricultural community, University of California, DFG, environmental and public interest groups, and other interested parties to develop a list of EWMPs for agricultural water users. Approximately 22 practices are under consideration. The University of California at Davis surveyed 23 of the 79 agricultural water agencies affected by the act to assess what practices similar to EWMPs are currently in place. The results of that survey are displayed in the table below.

Table X-1. Summary of current efficient water management practices.

Practice	Currently in Place (%)
Irrigation Management	
1. Improve water measurement and accounting	70
2. Conduct irrigation efficiency studies	43
3. Provide farmers with "normal-year" and "real time" irrigation, scheduling and crop evapotranspiration ET information	52
4. Monitor surface water qualities and quantities	52 & 100 respectively
5. Monitor soil moisture	13
6. Promote efficient pre-irrigation techniques	17
7. Monitor soil salinity	26
8. Provide on-farm irrigation system evaluations	35
9. Monitor quantity and quality of drainage waters	39 & 52 respectively
10. Monitor ground water elevations and qualities	83 & 42 respectively
11. Evaluate and improve water user pump efficiencies	39
12. Designate a water conservation coordinator	48
Physical Improvement	
13. Improve the condition and type of flow measuring devices	61
14. Automate canal structures	35
15. Line or pipe ditches and canals	22
16. Modify distribution facilities to increase the flexibility of water deliveries	43
17. Construct or line regulatory reservoirs	26
18. Construct District tailwater reuse systems	39
19. Develop recharge basins	35
20. Improve on-farm irrigation and drainage systems	43
21. Evaluate efficiencies of District pumps	57
22. Provide educational seminars	57
Institutional Adjustments	
23. Improve communication and cooperative work among district, farmers, and other agencies	65
24. Change the water fee structure in order to provide incentives for more efficient use of water and drainage reduction	43
25. Increase flexibility in water ordering and delivery	65
26. Conduct public information programs	48
27. Facilitate financing capital improvements for District and on-farm irrigation systems	43
28. Increase conjunctive use of ground water and surface water	22
29. Facilitate, where appropriate, alternative land uses	4

The Advisory Committee on the Efficient Water Management Practices Act is working to develop a process for agricultural water management plans for implementation of EWMPs within the framework of rights and duties imposed by existing law. Water management plans will identify water conservation opportunities and set a schedule for implementation. It is difficult to assess the impact of EWMPs at the present time. Calculation of water savings resulting from implementation of EWMPs will require a detailed planning process by each individual district, including analysis of technical feasibility, social and district economic criteria, and legal feasibility of each practice.

In addition to the legislative programs discussed above, agricultural water conservation is also encouraged through the San Joaquin Valley Drainage Program (SJVDP), which was established as a joint Federal and State effort in 1984. The SJVDP published its recommended plan in September 1990 (SJVDP 1990). The recommended plan should guide management of the agricultural drainage problem, and one of the major elements of the plan is increased conservation efforts. In December 1991, eight State and Federal agencies, including the SWRCB, signed a Memorandum of Understanding to coordinate activities implementing the plan.

Recommendation. The SWRCB recommends that all agricultural water users receiving water from the Bay-Delta watershed implement water conservation measures to the maximum extent practicable. Reasonable conservation measures have been formulated under the Efficient Water Management Practices Act, and reasonable conservation goals in the San Joaquin Valley can be found in the SJVDP report. Implementation of this recommendation is not intended to take precedence over implementation of conjunctive use programs, as described in the next section.

B. GROUND WATER MANAGEMENT

Ground water basin management is defined as: protection of natural recharge and use of intentional recharge; planned variation in amount and location of extraction over time; use of ground water storage conjunctively with surface water from local and imported sources; and, protection and planned maintenance of ground water quality (DWR 1994). Because ground water will be used to replace much of the shortfall in surface water supplies, limitations on Delta exports will exacerbate ground water overdraft in regions receiving a portion of their supplies from the Delta. Effective ground water management can minimize overdraft problems and provide sustainable water supplies.

Management of ground water in California has generally been considered a local responsibility. This view is strongly held by landowners and has been upheld by the Legislature which has enacted a number of statutes establishing local ground water agencies. State agencies have encouraged local agencies to develop effective ground water management programs to maximize their overall water supply and to avoid lengthy and expensive lawsuits resulting in adjudicated basins.

The Water Code provides some limited authority to deal with ground water through a number of types of local water agencies and districts, formed either by general or special legislation. Thirteen ground water basins have been adjudicated and are operated in accordance with court settlements, eight ground water management agencies have been authorized by the State Legislature, and three water districts have special authority from the Legislature to levy a pump tax. A fourteenth watershed has been adjudicated in federal court, but water users are not limited in their ground water extraction (DWR 1994). In 1992, the Water Code was amended (Water Code section 10750, et seq.) to provide authority and define procedures to allow certain local agencies to produce and implement a ground water management plan. To date, more than 30 local agencies have expressed interest in using this part of the Water Code to adopt a ground water management program. A number of those agencies have adopted resolutions of intent in accordance with Water Code section 10750 to adopt a ground water management plan. The Legislature has also enacted several specific statutes establishing ground water management agencies that can regulate the amount of ground water that is extracted and limit its place of use within the district's boundaries. Eight ground water management agencies have been formed by such special legislation (DWR 1994).

Conjunctive use is an essential element of ground water management. Conjunctive use programs are designed to increase the total useable water supply by jointly managing surface and ground water supplies as a single source. The basin is recharged, both directly and indirectly, in years of above average precipitation so that ground water can be extracted in years of below average precipitation when surface water supplies are below normal. There are some instances, however, where conjunctive use is employed for annual regulation of supplies. These programs involve recharge with surface water or reclaimed water supplies and same-year extraction for use. An example of a large scale conjunctive use program is the Kern Water Bank which could be developed to store as much as one MAF and contribute as much as 140 TAF per year to the SWP in drought years (DWR 1994).

In the future, conjunctive use projects are expected to increase and become more comprehensive because of the need for more water and the higher cost of new surface water facilities. Conjunctive use programs generally promise to be less costly than new traditional surface water projects because they increase the efficiency of water supply systems and cause fewer negative environmental impacts than new surface water reservoirs (DWR 1994).

Recommendation. The SWRCB recommends that all water supply agencies receiving water from the Delta establish aggressive groundwater management programs at the local and regional levels. The programs should be focused on solutions to clearly identified problems, such as overdraft or seasonal availability of surface water supplies, so as to optimize the use of surface and ground water resources.

Local agencies should adopt programs for ground water management with the following goals:

- Identify and protect major natural recharge areas. Develop managed recharge programs where feasible.
- Optimize use of ground water storage conjunctively with surface water from local, including recycled water, and imported sources. Local agencies should manage conjunctive use programs to maximize use of ground water during dry periods and recharge the ground water during wet periods.
- Monitor ground water quality and make public information available on areas where constituents exceed allowable limits and on trends in the chemical contents of ground water.
- Develop ground water basin management plans that not only manage supply, but also address overdraft, increasing salinity, chemical contamination, and subsidence

C. WATER TRANSFERS

Currently, water transfers are the most promising way of closing the gap between water demands and dependable water supplies over the next ten years. There are fewer environmental impacts associated with transfers than with construction of conventional projects, and although difficult to implement, transfers can be implemented more quickly and usually at less cost than construction of additional facilities. Unfortunately, water transfers are not available on a statewide basis because some regions of the State are physically isolated from water conveyance facilities.

Under existing law, holders of both pre-1914 and modern appropriative water rights can transfer water. Holders of pre-1914 appropriative rights may transfer water without seeking approval of the SWRCB, provided others are not injured. Holders of modern appropriative rights may transfer water, but the SWRCB must approve any transfer requiring a change in terms and conditions of the water right permit or license, such as place of use, purpose of use, or point of diversion. Water held pursuant to riparian rights is transferrable if the new use will preserve or enhance public trust uses (Water Code §1707). Also, there is a recent practice in which downstream appropriators contract with riparians to leave water in a stream for potential downstream diversion under the appropriator's water right. Water obtained pursuant to a water supply contract is also transferable. However, most water supply contracts require the consent of the entity delivering the water.

Transfers of ground water, and ground water substitution arrangements whereby ground water is pumped as a substitute for transferred surface water, are in some cases subject to statutory restrictions designed to protect ground water basins against long-term overdraft and to preserve local control of ground water management.

Short-term (one year or less) temporary transfers of water under Water Code section 1725 et

seq. are exempt from compliance with CEQA, provided SWRCB approval is obtained. The SWRCB must find no injury to any other legal users of the water and no unreasonable effect on fish, wildlife, or other instream beneficial uses. CEQA compliance is required for long-term transfers. Because of complex environmental problems in the Delta, the SWRCB has announced that it will not approve long-term transfers that increase Delta pumping until completion of an environmental evaluation of the cumulative impacts. If the parties to a transfer intend to use facilities belonging to the SWP, the CVP, or other entity for transporting the water, they must make arrangements with the owner of the facility. In addition, permits from fish and wildlife agencies may be required if a proposed transfer will affect threatened or endangered species.

The CVPIA also contains provisions intended to increase the use of water transfers by providing that all individuals and districts receiving CVP water (including that under water right settlement and exchange contracts) may transfer it to any other entity for any project or purpose recognized as a beneficial use under State law. The Secretary of the Interior must approve all transfers. The approval of the affected district is required for any transfer involving over 20 percent of the CVP water subject to long-term contract with the district. Section 3405(a)(1) also sets forth a number of conditions on the transfers, including conditions designed to protect the CVP's ability to deliver contractually obligated water or meet fish and wildlife obligations because of limitations in conveyance or pumping capacity. The conditions also require transfers to be consistent with State law, including CEQA. Transfers are deemed to be a beneficial use by the transferor, and are only permitted if they will have no significant long-term adverse impact on ground water conditions within the transferor district, and will have no unreasonable impact on the water supply, operations, or financial condition of the district.

Recommendation. The SWRCB recognizes that the adoption of new, more restrictive standards for protection of fish and wildlife will reduce the capacity for water transfers through the Delta. Nonetheless, the SWRCB believes that water transfers, with appropriate safeguards against adverse environmental and third party impacts, are an important tool for solving some of California's water supply and allocation problems. The SWRCB expeditiously processes requests for water transfers, and it will continue to do so. Upon adoption of this plan, the SWRCB will reconsider its announcement that it will not approve long-term transfers that increase Delta pumping until completion of an environmental evaluation of the cumulative impacts. The SWRCB encourages other agencies with regulatory authority over water transfers to develop mechanisms for rapid processing of water transfer requests.

D. RECLAMATION

A discussion of both water reclamation issues relevant to this plan and the effect of this plan on water reclamation potential is provided in Chapter VIII.D of this report.

Recommendation. The SWRCB urges all water users in the State to maximize their production and use of reclaimed water. Urban water agencies should evaluate the installation of nonpotable water distribution pipelines to use reclaimed water for irrigation of parks, greenbelts, golf courses, and other landscaping irrigation in new developments.

E. MITIGATION FUND

Mitigation funds paid by water users in the Bay-Delta Estuary are a mechanism to limit the water supply impact of new Bay-Delta standards to individual water users (Fullerton 1994, CUWA 1994). A water supply impact threshold could be established beyond which compliance with Bay-Delta standards would be achieved with purchased water paid for by a fund established for this purpose and supported by payments from users of water from the Bay-Delta watershed. A supply impact cap would ensure that the environmental objectives of new Bay-Delta standards would be achieved while minimizing the uncertainty of water supply reliability and preventing severe economic impacts caused by water shortages.

CUWA has proposed that a mitigation fund would acquire the necessary water by two means: (1) purchasing water from willing sellers upstream of the Delta; and (2) paying export users to reduce their deliveries to meet export constraints. Using voluntary purchases to obtain supplies to meet Bay-Delta standards has several potential advantages. First, it ensures that water users avoid excessive reductions that would bring unreasonable costs to their customer base. Second, market forces would determine the source of supplies above the cap, reducing the negative impacts of forced reductions.

Relying on market forces to obtain additional supplies would lower overall costs to the State's economy because the water contributing least to the State's economic production would be the first sold for environmental restoration. A mitigation fund also would reduce third party or community impacts arising from supply reductions. Unlike regulatory reductions of water supplies, voluntary purchases leave the seller with monetary compensation for the reduction in water use. The seller can reinvest these revenues in other agricultural enterprises or in capital outlays such as water conservation.

A mitigation fund can also be used to mitigate the environmental effects of water storage, direct diversion and exports through construction of projects. These projects would include rehabilitation and construction of temperature control devices, rehabilitation and construction of fish screens, replenishment of spawning gravel, construction of Delta channel fish barriers, and other mitigation and monitoring projects identified by fishery agencies and other fishery experts. The CVPIA established a restoration fund for purposes of this nature.

Recommendation. The SWRCB encourages urban, agricultural, and environmental groups to develop a legislative proposal to authorize a mitigation fund for the Delta. Such a fund should incorporate a mitigation credits program, which will allow a water user to meet some or all of its obligations by substituting another resource deemed equivalent.

F. COMBINED USE OF CVP AND SWP POINTS OF DIVERSION IN THE DELTA

Currently, a water imbalance exists in the two projects. The CVP has an excess water supply north of the Delta, but it doesn't have sufficient conveyance capacity to transport it to its ultimate place of use south of the Delta. The SWP on the other hand has surplus capacity in its conveyance facilities but an insufficient upstream water supply. Therefore, the excess capacity in the SWP facilities could be used to transport more CVP water to the San Joaquin Valley without impairing the SWP, and a share of the CVP water supply could be sold to the SWP for use in its service area. The CVP has limited rights under its water rights permits to use the SWP diversion facilities in the Delta. D-1485 authorizes the CVP to use SWP facilities to make up deficiencies caused by the export restrictions in May and June established by the decision. The SWP water rights do not identify the CVP export facilities as an authorized point of diversion or rediversion.

In addition to the water supply issues, combined use of CVP and SWP points of diversion and rediversion have the potential to decrease fishery impacts. The two diversions are at different locations and different fish species are entrained at the diversions at different times. A combined point of diversion would allow pumping to shift between diversion points based on the density of fish near the diversion points.

The USBR has petitioned the SWRCB to add the Clifton Court Forebay as a point of diversion and rediversion in the water right permits of the CVP and to remove the 4,600 cfs rate of diversion restriction on pumping through the Delta Mendota Canal. To date, the SWRCB has not acted on this petition.

Recommendation. The SWRCB will consider authorizing combined use of the CVP and the SWP points of diversion and rediversion in the Delta during a separate proceeding following adoption of the plan.

G. OFFSTREAM STORAGE PROJECTS

Enhanced water supply reliability in the future can be achieved, in part, by construction of additional offstream storage. There are several major offstream storage projects presently under consideration or development: Los Banos Grandes Reservoir, Domenigoni Valley Reservoir, Los Vaqueros Reservoir, Delta Wetlands, and Mandeville Island. Los Banos Grandes Reservoir, a proposed feature of the SWP, would be located south of San Luis Reservoir, and it could provide 0.3 MAF of average and 0.26 MAF of drought year net water supplies under D-1485 conditions. Domenigoni Valley Reservoir, proposed for construction by the Metropolitan Water District, could provide 0.26 MAF of drought year net water supplies (DWR 1994). Los Vaqueros Reservoir, which will be used to improve water quality in the Contra Costa Water District and provide emergency storage, has received all necessary environmental and water rights permits and currently is under

construction. Delta Wetlands is a proposed storage project in the Delta with a capacity of approximately 238 TAF. Surplus flows would be diverted onto two islands, Bacon Island and Webb Tract, and subsequently wheeled through the SWP or CVP export pumps or released to meet Delta outflow requirements. Recently, a water right application for a similar project was filed to impound 330 TAF on Mandeville Island.

Recommendation. The DWR should evaluate the feasibility of the Los Banos Grandes project under the new regulatory conditions imposed by the plan. The Metropolitan Water District should move forward with its planned construction of Domenigoni Valley Reservoir. The SWRCB, as lead agency, will continue to process the water right applications for the Delta Wetlands and Mandeville Island Projects.

H. SOUTH DELTA PROGRAM

The South Delta Program is being undertaken by the DWR to increase the yield and flexibility of operation of the SWP. The principal features of the South Delta Program can be divided into five components: (1) construct and operate a new intake structure at the SWP Clifton Court Forebay; (2) perform channel dredging along a reach of Old River just north of Clifton Court Forebay to improve channel capacity; (3) increase diversions into Clifton Court up to a maximum of 20,430 acre-feet per day on a monthly averaged basis; (4) construct and operate a barrier seasonally in both the spring and fall to improve fishery conditions for salmon migrating along the San Joaquin River; and (5) construct and operate three flow control structures to improve existing water level and circulation patterns for agricultural users in the southern Delta. This program could augment SWP supplies by about 60 TAF per year (DWR 1994).

Recommendation. The DWR should evaluate the feasibility of the South Delta Program under the new regulatory conditions imposed by this plan.

I. PURCHASE OF DELTA ISLANDS

Delta soils fall into two general categories: peat soils in the western and interior Delta and mineral soils in the other parts of the Delta. In areas where peat soils predominate, substantial subsidence of land elevations has occurred because exposure of peat soils to oxygen and higher temperatures causes the soil to oxidize into a gas. This process is accelerated by agricultural activity.

Recommendation. The DWR, the USBR, and other interested parties should evaluate the feasibility of purchasing the Delta Islands with the most serious land subsidence problems and converting the land use to some function that would minimize subsidence and reduce water use. Water freed up by this project could be available for export.

J. LONG-TERM DELTA SOLUTION

In an April 1992 water policy speech, Governor Wilson stated that the Delta was broken and he outlined the steps necessary to move forward with a solution. One of the principal elements of his policy was the formation of a Bay-Delta Oversight Council which would establish criteria for a comprehensive study of Delta solutions, conduct the study, and make recommendations to the Governor's Water Policy Council. Recently, several federal agencies and the State of California signed a Framework Agreement which expanded on this concept by establishing a joint State/federal process to develop long-term solutions to the Delta problems. This process is still in an early stage and no long-term recommendation has been made.

Recommendation. The SWRCB recognizes that a long-term solution to the Delta problems is necessary to ensure water supply reliability and full protection of the beneficial uses of the waters of the Bay-Delta Estuary. The SWRCB will provide support to the joint State/federal solution finding process. Upon completion of the process, the SWRCB will evaluate its water quality standards to ensure that they are consistent with the proposed solution.

K. UNAVOIDABLE SIGNIFICANT IMPACTS

The mitigation measures discussed in this chapter are largely outside the control of the SWRCB, and the majority of the measures are moving forward regardless of the SWRCB's action because they have been planned for some time.

The SWRCB does not believe that the significant impacts identified in Chapter XIV of this report are fully mitigated by these proposals. The significant impacts identified in Chapter XIV are unavoidable.

Literature Cited in Chapter X

- SJVDP. 1990. A management plan for agricultural subsurface drainage and related problems on the westside San Joaquin valley. 183 pp.
- DWR. 1994. California Water Plan Update, Bulletin 160-93, Department of Water Resources. October 1994.
- Fullerton, D. Letter from NHI to Tom Howard, SWRCB, with attachments. May 25, 1994. 18 pp.
- CUWA. 1994. Proposals for a coordinated estuarine protection program for the San Francisco Bay-Sacramento and San Joaquin River Delta Estuary. August 1994.