The California State Water Project

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THE CALIFORNIA STATE WATER PROJECT

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New Sources of Water for Energy
Development and Growth: Interbasin Transfers

a short course sponsored by the
Natural Resources Law Center
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Introduction

The State of California is a land of contrast, which complicates its water problems. Its 40 million hectares (100 million acres) include both the highest and the lowest elevations in the contiguous United States. Its northern and southern borders, 1,100 kilometres (700 miles) apart, are separated by 10 degrees of latitude; 10 degrees of longitude separate its eastern and western extremities. Its climate ranges from subtropical to alpine. Annual precipitation varies from less than 0.05 metres (2 inches) to more than 2.5 metres (100 inches). Floods and droughts occur often, sometime in the same year. California has large heavily populated cities and vast wilderness areas. Highly productive agricultural developments are located in arid and semiarid regions of the State. Most of the State's population live in areas close to the seacoast and remote from abundant water supplies. These contrasts are responsible for most of California's water problems. To a large extent, they have determined the scope and direction of the interbasin water development in the State.

Water Supply Problems

Considering the State as a whole, California's basic water problem is one of distribution rather than inadequacy. Presently and for the foreseeable future the State's average annual runoff substantially exceeds its water requirements.

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This runoff, however, does not occur at the same time or place as the consumptive uses. Most of the runoff occurs during the winter and spring when these needs are usually at a minimum.

The major sources of water are in Northern California, while the major urban and agricultural lands are in the central and southern portions of the State. Great distances and rugged mountains intervene between the source areas and areas of demand. About 70 percent of the total streamflow occurs north of the latitude of Sacramento, while 80 percent of the ultimate water requirements lies south of that line. The large variations of runoff that occur from year to year are another part of California's water problem. The typical pattern consists of a dry period of one to seven years followed by one or more years of above-normal runoff.

Redistributing the water in time and place is a primary planning objective. Winter flows must be stored for use during the summer growing season, and the excess runoff of wet years captured for use during drought periods. To a certain extent, this is accomplished naturally. Snow in the mountains accumulates during the winter, and its melting produces runoff during the ensuing spring and summer months. Huge quantities of runoff are stored in ground water basins and made available for future use.

The State's extensive ground water basins have served in the past as a natural mechanism for ironing out the irregularities in water supply. Over the years, these ground water reservoirs have furnished a major part of California's water supplies. Some of the largest and most productive of the ground water reservoirs are located in the San Joaquin Valley and in Southern California. Unfortunately, they have been heavily exploited to the point where extractions exceed replenishment. Overdraft conditions have existed for many years, and continue in the San Joaquin Valley.
Since natural processes are not adequate to meet California's water needs, additional surface and underground storage are needed. In addition to storage, transportation facilities capable of moving the water from the places of occurrence to the areas of need were required. Large conduits were built extending for hundreds of miles, and crossing formidable mountain barriers such as the Tehachapis and the Coast Range. Active faults were crossed and major structures built in areas of seismic activity. The conveyance of water through the channels of the Sacramento–San Joaquin Delta requires major engineering and environmental considerations.

History of Water Development

The record of water development in California goes back to the latter part of the 18th century when Spanish missionaries diverted water from streams to irrigate crops in the valleys of Southern California. The gold rush of 1849 gave impetus to water development, and many ditches were constructed in the Sierra Nevada for placer mining. Some of these ditches were later utilized for irrigation and power, and some of them are in use even today.

Information on California's water resources has been systematically recorded since 1849 when precipitation stations were established at Sacramento and San Francisco. The first streamflow gauging stations in California were established in 1878 under the direction of the first State Engineer, William Ham Hall. Systematic planning for the comprehensive development of California's water resources began in 1873, when a commission appointed by President Grant investigated the water resources of the Central Valley. The report of this commission offered a plan for utilizing the water supply of the Sierra Nevada and pointed to the responsibility of the Federal and State Governments in providing guidance, direction, and leadership in developing California's water supplies.
The State launched its first comprehensive investigation of its water resources and development in 1878 under direction of the State Engineer. He concurred in the 1873 study that the waters of the Central Valley should be developed in a systematic manner, and he published a series of maps and reports to substantiate his views.

Until the present century, water development in the State generally was accomplished by individuals or companies. As California grew and the need for water increased, private initiative was followed by community enterprises, irrigation districts, public utilities and municipal projects of steadily increasing size and complexity. The metropolitan centers, Los Angeles, San Francisco, and the Oakland area, were leaders in developing projects to import water.

Before the 1920s, water development planning in California was conducted primarily by local entities to solve local problems. These plans were conceived and executed without the benefit of a statewide framework to provide guidance and coordination.

Water development planning on a statewide basis was initiated by Colonel Robert B. Marshall, chief geographer of the U. S. Geological Survey, and outlined in a bulletin published in 1919. Colonel Marshall proposed that waters of the Sacramento River and its tributaries be impounded and delivered to the Sacramento and San Joaquin Valleys through large canals for irrigation of 4.9 million hectares (12 million acres). He also proposed exporting water to Southern California.

In 1921, the State Legislature authorized the State's water officials, then in the Department of Public Works, to conduct a statewide water resources investigation and that Department made its first report to the Legislature on its investigation in 1923.
In 1931, the State Engineer made a report (Bulletin 25) to the Legislature on what he called the State Water Plan. Nine years and $1 million were spent in the preparation of this report. It discussed both the physical and economic aspects of the proposed development. It provided for an exchange of water between the north and south portions of the Central Valley, recognized the national benefits, estimated the cost, and discussed possible methods of repayment.

Federal agencies also reported on various phases of the proposed development of the Central Valley. The most important reports were those by the Corps of Engineers in February 1931, and the Bissell report made cooperatively by the Bureau of Reclamation and the State of California in May 1931.

Two years later, in the midst of California's worst recorded drought, the Legislature passed the Central Valley Project Act of 1933 to implement the initial features of the State Water Plan in the Central Valley. (This same act was later incorporated by reference in the Burns-Porter Act of 1959 and provided the vehicle for additional financing of the State Water Project.)

The Central Valley Project Act provided for dams, reservoirs, canals, pumping plants, and power plants in an extensive system to improve utilization of the Sacramento, San Joaquin, and other rivers. The Act also provided financing through issuance of $170,000,000 in revenue bonds. While the Act was before the Legislature, there was some opposition from northern Sacramento Valley landowners who feared their water would be taken away from them to be turned over to the San Joaquin Valley.

Electric power companies offered little objection until an amendment was proposed including as part of the project a transmission line which would make possible the sale of Central Valley Project power to public agencies in the Sacramento Valley. The amendment had the backing of the State Grange, the League
of California Municipalities, and many water and irrigation districts over the State. Following this, the power companies sought defeat of the bill in the Legislature, or its veto by the Governor. Failing in this, a referendum movement was organized by Mr. Fred G. Athearn, San Francisco attorney for the Pacific Gas and Electric Company, which carried the measure to a vote of the people at a special election on December 19, 1933. Following a vigorous campaign, the measure was sustained by a statewide vote in ratio of 1.1 to 1. Regional differences were considerable, with Northern California majority carrying the measure. The San Joaquin Valley voted 5 to 1 in favor, the Sacramento Valley 3 to 1, and the San Francisco Bay area 2 to 1. On the other hand, Southern California, which stood to gain only indirectly through increased commerce with the San Joaquin Valley, opposed retention of the measure by a vote of 2 to 1.

No funds, however, could be obtained to begin construction of the Central Valley Project, because the nationwide depression of the early 1930s made the revenue bonds unmarketable. Subsequently, federal authorization and financing through the Bureau of Reclamation of the U. S. Department of the Interior was arranged and construction began in 1935. Today, the Central Valley Project of the Bureau of Reclamation constitutes a major water development, storing water in many reservoirs and delivering several million acre-feet of water throughout the Central Valley.

Early Interbasin Transfer Projects. The large metropolitan areas of the State were the first to feel the pressures of growing water demands, coupled with diminishing local supplies. Large interbasin water transfer systems were developed as the solution, although there has been great controversy surrounding most of those plans which has increased over the years. These interbasin transfer projects include:
Los Angeles Aqueduct. In 1905, the City of Los Angeles recognized that it would soon outgrow its local water supplies. In 1913, it completed the first phase of the Los Angeles Aqueduct to carry water from the Owens River on the eastern slope of the Sierra Nevada to San Fernando Valley in the northern part of the city. The diversion of water from the agricultural area east of the Sierra Nevada created lasting bitterness in the Owens Valley, which remains today. Although many of the means Los Angeles used to obtain Owens River water were legitimate, even today the name of the Owens Valley evokes images of a water grab throughout California and the West.

In 1941, the Los Angeles Aqueduct system was extended northerly to divert water from streams that previously replenished Mono Lake. Mono Lake is a large natural lake which is a major California nesting site for gulls and haven for other migratory birds. The upstream diversions of about 123,000 cubic dekametres (100,000 acre-feet) per year have caused the lake level to drop and its area is being continually reduced. There is a major concern regarding the degradation of water quality, loss of brine shrimp, brine flies, and brine fly larvae which are an important food source for the birds. There is concern also for the adverse effects that the upstream diversions have caused to the scenic value of Mono Lake. The Department of Water Resources advocates that the water diversions from the Mono Basin be reduced.

In Southern California the Los Angeles Aqueduct was followed by another even larger project, the Colorado River Aqueduct. This aqueduct was built by The Metropolitan Water District of Southern California in the 1930s and enlarged to its present capacity in the 1950s. It is designed to convey up to 1,500,000 cubic dekametres (1,212,000 acre-feet) annually from the Colorado River
some 390 kilometres (242 miles) across mountains and deserts by a system of
tunnels, canals, and pumping plants, with a total lift of approximately 490
metres (1,600 feet). It terminates at Lake Mathews, south of Riverside.

- The Hetch Hetchy Project was constructed by the City of San Francisco and
  began delivery of water from Hetch Hetchy Reservoir and Lake Eleanor in
  Yosemite National Park to the San Francisco Peninsula in 1934. The Hetch
  Hetchy Aqueduct is about 240 kilometres (150 miles) in length and features a
  40 kilometre (25 mile) tunnel through the Coast Range Mountains. The
  environmental impact of this project has been controversial from its
  beginning. John Muir was actively opposed to project authorization but was
  not successful in his efforts.

- The San Francisco East Bay metropolitan area formed the East Bay Municipal
  Water District and that district constructed a water project to import water
  from Pardee Reservoir on the Mokelumne River, a distance of 153 kilometres
  (95 miles).

- A system to divert about 1.75 million cubic dekametres (1.4 million
  acre-feet) of water annually from the Trinity River Basin to the Sacramento
  River Basin was completed in 1964. The system, built by the U.S. Bureau of
  Reclamation, includes dams on the upper Trinity River, power generating
  facilities, tunnels, and a fish hatchery. There has been a major decline in
  the anadromous fisheries on the Trinity River subsequent to the Trinity
  River development. This, of course, has led to a major controversy over the
  proper balance between environmental protection, and development of water
  and energy. Fortunately, Secretary Andrus ordered increased flows
  downstream of the dam, and the fishery to some extent has been restored.
Major controversies have resulted from the interbasin transfer projects described above and from others that have been proposed, such as from the Eel River in the north coastal area. Northern California citizens are embittered and are hostile towards any such transfers in the future. During the current election campaign, polls show that the margin against the State Water Project and Peripheral Canal run from seven or even ten to one in Northern California. It is up to those who propose new or increased interbasin water transfers to show they will not damage areas of origin.

Statewide Water Planning

In recognition of the need for a coordinated statewide water resource planning effort, due to the phenomenal growth of California during and after World War II, the Legislature in 1945 directed that the water resources of the State be studied and evaluated, and that a plan be formulated to meet California's ultimate water requirements for all beneficial uses. Funds were provided in the 1947-48 budget for commencement of the investigation and additional funds were provided through 1955, by subsequent appropriations. These investigations were carried out by the Division of Water Resources of the Department of Public Works as a service for the State Water Resources Board.

Resources and Estimates. These planning studies were designated the "Statewide Water Resources Investigation". The first published results of this investigation appeared in 1951 as Bulletin 1, "The Water Resources of California". This report listed the basic water resources of the State and provided a concise summary of data on precipitation, stream runoff, flood frequencies, and quality of water for all watersheds of the State.

The second report, Bulletin 2, was released in 1955 under the title "Water Utilization and Requirements of California". This bulletin contained estimates of the then current use of water in California for all consumptive
purposes. It also included forecasts of the so-called "maximum potential" or "ultimate" water requirements in the State based upon the physical capabilities of the land resources to support a development judged to be balanced. These forecasts were not predicated upon consideration of the economic, social, and organizational constraints which must also be accounted for in the water resources planning process.

The California Water Plan. Bulletin 3 of the series, entitled "The California Water Plan", was published in 1957. It presented a comprehensive outline plan for the ultimate control, protection, conservation, distribution, and utilization of California's water resources for all beneficial uses and in all areas of the State. The plan was adopted by the Legislature in 1959 as a guide for future water development by all interests.

The California Water Plan is a master blueprint for ultimate development of all water resources of the State. It was purposely designed to be flexible and adaptable to changes dictated as a result of subsequent studies. The plan presents possible solutions to many of the State's present and probable future water problems, but it is not a construction proposal.

The California Water Plan, as published in Bulletin 3, and frequently amended since then, is accepted as a legal forework for planning purposes. However, we now recognize that total development of the State's water resources is not economically, financially, or environmentally feasible.

State-Federal Relationship

We are sometimes asked why the State entered the water development business rather than simply expanding the federal Central Valley Project (CVP). While there are no doubt many reasons involved, one can only speculate on the deciding factors.
The Central Valley Project, under the Federal Reclamation Act, was primarily concerned with providing irrigation supplies, while the pressing need in Southern California was for municipal and industrial supplies. Furthermore, while The Metropolitan Water District would never have admitted it, there was a good possibility that California could lose the lawsuit over water rights to the Colorado River — a concern later proved a reality in the Supreme Court decision of 1963. This added to the feeling of urgency.

Also, there were a number of water interests, both in and out of government, that were unhappy with federal policies affecting construction and operation of the federal CVP, the project that had originally been conceived and planned by the State. These interests felt that the irrigation and power policies of the CVP should be directed by California to make sure that issues affecting our social and economic system were decided by citizens of California through the democratic process, not by bureaucrats in Washington.

Specifically, San Joaquin Valley farmers did not like the 160 acre limitation because federal water was being used as a supplement to already established large farms through ground water development. Private utilities, and especially PGandE, wanted to prevent any further expansion of public power transmission and distribution at the expense of private enterprise.

As a result, the State actually considered plans to either buy the federal CVP, or at least attain the authority for operation and maintenance of the project. Proponents of the takeover of the CVP cited the original intent that the project be built and operated as a State project. Further, during the years before 1935, there was strong support both within California and Washington (Public Works Administration) for State construction of the CVP. Federal construction came about originally because of the pressing need for the Central Valley Project. The State's inability to finance the CVP during the great
depression, and the requirement for advanced payment contracts for water and power which would have been required prior to selling revenue bonds to fund the project tipped the scales to federal construction.

As a result, in 1931, the California Legislature authorized for what has since become the State Water Project -- to be designed, constructed, and operated by the State. Plans for a State takeover of the CVP, however, were dropped.

**State Water Project Development**

During the early 1950s, the Division of Water Resources pursued more detailed studies of the first stage of the California Water Plan, a project that would meet the water requirements of the State in the immediate future. In May, 1951, the State Engineer presented the first complete report on the Feather River Project.

This report proposed a multiple-purpose dam and reservoir on the Feather River near Oroville, complete with power plant, afterbay dam and power plant, a Delta Cross Channel, an electric power transmission system, an aqueduct to transport water from the Delta to Santa Clara and Alameda Counties, and an aqueduct to transport water from the Delta to the San Joaquin Valley and Southern California.

The proposed project was authorized by the Legislature in 1951 and funds were provided for further study. The Division of Water Resources was directed to continue necessary investigations, surveys and studies, including the preparation of plans and specifications for the construction of the authorized works, and to submit them to the Water Project Authority for approval.

The Division of Water Resources continued such investigation and, in 1955, submitted another report to the Legislature on the proposed Feather River Project. This report showed that the project had engineering and financial
feasibility. It recommended that the Legislature appropriate funds to start construction. It also recommended modifications of the original 1951 plan by including the addition of San Luis Reservoir on the west side of the San Joaquin Valley and by including service to San Benito County from the aqueduct serving Santa Clara and Alameda Counties.

Burns-Porter Act. Although units of the State Water Project had been authorized and construction begun in 1957, it was not until 1959 that the Legislature enacted the legislation necessary to fully implement these authorizations. A comprehensive water program was presented to the Legislature, and it adopted the California Water Resources Development Bond Act (the Burns-Porter Act) subject to ratification by the voters at the 1960 general election. This Act, together with other measures, was designed to assist in the financing of the State Water Resources Development System. The Act took its name from Hugh Burns, the Democratic leader in the Senate, and Carley Porter, Chairman of the Assembly Water Committee, the men Governor Pat Brown picked to spearhead the drive to make it law. Through the months that followed, Brown used the weight of his office to ensure its passage. Similar to the 1933 vote on the CVP, the measure carried in the 1960 election by a statewide vote of 51 percent for, to 49 percent against. However, in contrast to the 1933 vote, Southern California voters supported the measure 62 percent to 38 percent. While a few northern counties also voted their support, Northern California as a whole voted against the project 64 percent to 36 percent.

The Act authorized the issuance of $1.75 billion in general obligation bonds to assist in the financing of construction of the State Water Project.

The constitutionality of the Burns-Porter Act was sustained by the California Supreme Court in Metropolitan Water District v. Marquardt, which was a
mandate action to test the validity of the water contract between the State and
The Metropolitan Water District of Southern California.

State Water Facilities. The State Water Facilities as defined and
authorized in the Burns-Porter Act, include:

- Five small reservoirs in the Upper Feather River drainage area (three of
  these reservoirs are constructed today).
- Oroville Dam and Reservoir on the Feather River near the town of Oroville
  (the embankment dam has been constructed to a height of 235 metres (770
  feet) and lake capacity of 4.3 million cubic dekametres (3.5 million
  acre-feet).
- Conveyance works in the Sacramento-San Joaquin Delta.
- Aqueducts for delivery of water to the north and south San Francisco Bay
  areas to the San Joaquin Valley, to the Central Coastal area and to Southern
  California. The main California Aqueduct begins at sea level at the
  Sacramento-San Joaquin Delta at 283 cubic metres per second (10,000 cubic
  feet per second), and extends through the San Joaquin Valley, over the
  Tehachapi Mountains, to Los Angeles, a distance of 713 kilometres (443
  miles).
- San Luis Reservoir—A 2.6 million cubic dekametre (2.1 million acre-foot)
  offstream storage reservoir located on the western side of the San Joaquin
  Valley. It is jointly owned and operated by the State and the U. S. Bureau
  of Reclamation.
- San Joaquin Valley drainage works were authorized but are not yet
  constructed. The primary facility would be a drainage canal along the San
  Joaquin Valley trough, discharging in the Suisun Bay area of the
  Sacramento-San Joaquin Delta. This would be a joint project with the
  Federal Government.
Water Contracts and Demand Build-up. Thirty public agencies have contracted for long-term water supplies from the State Water Project. Their maximum entitlements of firm water supply amount to 5.22 million cubic dekametres (4.23 million acre-feet) per year. Of this total amount, approximately one-third is for agriculture and two-thirds is contracted for urban use.

There has been a steady build-up in the contractors' demands for SWP entitlement water. The annual amount exceeded 1.23 million cubic dekametres (one million acre-feet) for the first time in 1975 and will be about 2.47 million cubic dekametres (two million acre-feet) in 1982. DWR estimates that the total demand for SWP entitlement water will reach 4.3 million cubic dekametres (3.5 million acre-feet) per year in year 2000. The State is encouraging all water agencies to practice water conservation; this will reduce or delay the need to construct additional projects and will reduce statewide energy requirements.

Problems Facing the State Water Project

Potential Water Shortages. Although the major aqueducts and initial reservoir facilities of the SWP have been constructed, only about one-half of the water committed by the water contractors has been developed. Furthermore, the Delta facilities have not been constructed. Instead, natural Delta channels are being used by both the SWP and the federal CVP to transport water across the Delta. This causes problems in controlling salinity intrusion and has also drastically depleted the fishery resources of the Delta-Bay estuary. Without corrective action, more frequent and prolonged water shortages can be expected, along with the continued decline of the fishery resources that depend on the estuary. Many of the privately owned Delta islands are protected by levees which are very weak and poorly maintained. The Delta landowners would, of course, like the State to rebuild those levees as part of our Delta Facilities construction program.
The present dependable SWP water yield is about 2.8 million cubic dekametres (2.3 million acre-feet) per year. In the future, this yield is expected to decrease to between 2.0 and 2.2 million cubic dekametres (1.6 and 1.8 million acre-feet) per year, as a result of increased use in areas of origin, maturity of contractual obligations of other agencies, and other prior rights. Without new surface and underground storage by the year 2000, the potential water shortages under dry year conditions could be about 2.2 million cubic dekametres (1.8 million acre-feet) per year.

Energy Supply and Cost. The energy load of the SWP is enormous and will increase as water demands increase. In 1981, the total annual load was about 5 billion kilowatt hours. By year 2000, it will be 10 billion. The development and cost of this energy supply is of major concern to the Department of Water Resources and we are actively investigating alternative future energy sources.

Additional hydroelectric energy generation is planned at power plants on the California Aqueduct as it crosses over the Tehachapi Mountains and descends to Southern California. We expect to generate energy at 14 proposed small hydroelectric plants. Power generators are planned at two existing dams which currently do not have power plants, and at virtually all new dams proposed for construction.

In 1978, the Department began construction of a 55 megawatt geothermal power plant at the Geysers which is scheduled for completion in 1984. This plant is located at a site of high quality geothermal steam, and at least one more power plant is planned in the general area. We are also studying the feasibility of power generation from geothermal hot water in the Imperial Valley.

The Department is participating with the Nevada Power Company in the construction of the Reid Gardner coal-fired power plant which is about 25 percent
complete. DWR will receive about one billion kilowatt hours of energy per year from this project which is scheduled for completion in 1983.

Other future sources of State Water Project energy include a biomass fueled project which would be a hybrid geothermal-wood waste power plant; cogeneration projects, and wind powered plants. The Department's long-range goal is to have 100 megawatts of wind-powered generating capacity by 1990.

Electrical transmission service for SWP power and pumping plant operation is also being acquired by the Department. In April 1982, DWR and the Pacific Gas and Electric Company (PGandE) agreed on transmission services and interconnection arrangements. This will provide the Department with the firm transmission service it needs in PGandE's service area, and it will allow the Department to meet its commitments for sale of power to Southern California Edison Company and others.

**Financial Requirements.** The high construction costs and high interest rates required for building and repaying the cost of future additional facilities will test the financial capacity of the SWP. Part of the additional water yield planned for the SWP is planned from one or more federal projects. The State may be required to provide a large portion of the initial cost to construct federal water supply projects under the cost sharing plan that is being developed by the current federal administrators.

State Water Project financial planning through 1981 has considered the sale of water revenue bonds to fund construction. In 1982, the Department studied the alternative of not selling revenue bonds to fund construction, but instead paying for future SWP facilities as costs are incurred for construction.

There is a difference in the timing of construction payments under the alternative financing plans. Rather than being paid for over a longer term, which is required when revenue bonds are sold, construction would be paid for
during the same period it occurs under the pay-as-you-go-plan. The effect of this is to eliminate interest costs. Pay-as-you-go is an alternative financing method which SWP contractors could elect to use whether revenue bonds can be sold or not.

Total capital requirements to construct the SWP facilities planned to meet year 2000 water demands amount to about 5.5 billion in inflated dollars. Under the pay-as-you-go financial plan for those facilities, funds ranging from $175 million up to $485 million would be required annually from 1983 to 1999.

**Future of the State Water Project**

A new major direction of the Department's planning for future water facilities and management of the SWP is to develop and implement water conservation and reclamation goals, as directed under Governor Brown's Executive Order B-68-80, and provide sufficient surface and underground storage to (1) offset potential water shortages, and (2) reverse the decline of Delta fishery resources and restore them to historic levels. This would be done by changing the present method of using natural channels for transporting SWP supplies across the Delta by building the Peripheral Canal and enacting strong legal guarantees to protect water quality and fish and wildlife resources of the Delta, Suisun Marsh, and San Francisco Bay. Future project direction was provided under the general framework of SB 200, which, after more than 15 years of study, restudy, and debate, was enacted by the Legislature and signed by the Governor on July 18, 1980.

A major difference has occurred in the SB 200 approach to solving California's water shortages compared to the original SWP planning and development. Currently we are advocating less development in Northern California and placing more emphasis on developing the maximum potential of water supplies in the service areas. This includes conservation, ground water basin
development, and reuse of reclaimed brackish water and waste water. We are also investigating some offstream surface water developments which will be less environmentally sensitive than onstream development.

As a campaign measure to SB 200, the Legislature also passed Assembly Constitutional Amendment No. 90. This measure appeared as Proposition 8 on the ballot for the November 1980 election, where it won voter approval; subject to SB 200 becoming effective. In summary, Proposition 8 would:

1. Incorporate water quality and fishery protection provisions in SB 200 into the State Constitution.

2. Change the vote required to dam the wild and scenic rivers of California's North Coast from a simple majority vote in both houses of the Legislature to a two-thirds majority in both houses or a vote of the electorate.

3. Limit the Legislature's ability to weaken or repeal the Delta Protection Act (which was enacted in 1959 at the same time the Burns-Porter Act was approved to fund the SWP).

4. Prohibit public agencies, such as DWR, from using eminent domain proceeding to acquire water rights in the Delta for the purpose of exporting water from the Delta.

5. Shorten the litigation process to review or void provisions of SB 200 including actions which attack implementation of the Peripheral Canal.

A referendum on the SB 200 issue qualified for the June 8, 1982 general election to determine if SB 200 would become law. The outcome of that referendum will, of course, have a major impact on our planning and management plans for the SWP.

Near-Term. The Department's current program for solving the long range water supply problems of the SWP include feasibility level investigations and environmental impact reports on the developments proposed under SB 200.
Many of these proposed developments were included in the original 1951 SWP authorization, as amended, and the subsequent 1959 Burns-Porter Act. Collectively, these SWP authorizations include: (1) initial storage facilities; (2) a complete aqueduct system, including facilities to transport water across the Delta; and (3) additional, but unspecified, future storage facilities. The following are definitely considered authorized under prior law:

1. Facilities to protect the Delta, including the Peripheral Canal, to transport SWP water across the Delta;
2. Thomas-Newville Reservoir;
3. Enlargement of the East Branch of the California Aqueduct; and
4. Los Vaqueros Reservoir.

Investigations of facilities proposed under EB 200 include:

- Delta facilities for water transfer and to protect the environment of the Sacramento-San Joaquin Delta.
- Conjunctive operation of the California Aqueduct with ground water basin storage located at or near SWP service areas.
- Conjunctive operation of the SWP with additional surface water storage reservoirs. The yield accomplishments and consequently the economic feasibility of these projects are enhanced by the proposed Peripheral Canal.
- Water reclamation plans to reclaim brackish ground water, urban waste water, or agricultural drainage water. Construction is now under way on a demonstration facility for desalting agricultural drainage water in the San Joaquin Valley near the city of Los Banos. The demonstration facility will be operated until June 1985. If commercial feasibility of the desalting alternative has been established, detailed plans and specifications will be prepared for a prototype desalting facility at a capacity of 30,000 dm$^3$ (25,000 acre-feet) per year. Department studies indicate that by
year 2000, up to 420 000 dam$^3$ (340,000 acre-feet) of agricultural
drainage water may be available annually for treatment by SWP desalting
facilities.

- Enlargement of the East Branch of the California Aqueduct. This will
  enhance ground water basin conjunctive use plans.
- Water purchase plans in which agricultural water would be purchased during
critical drought conditions and used to augment the yield of the State Water
  Project.

**Long-Term.** The long-term future of the SWP, i.e., beyond year 2000,
will require continued emphasis on statewide water conservation. It is likely to
include such water development plans as water transfers, desalting, greater use
of reclaimed waste water, offstream storage, and ground water basin development.

One surface water plan which appears to have potential for additional water
supply and hydroelectric power is the enlargement of the federally owned Shasta
Dam on the upper Sacramento River. The Department of Water Resources and
U. S. Bureau of Reclamation have initiated a joint feasibility investigation of
enlarging Shasta Dam to provide firm water supplies for the State Water Project
and Central Valley Project.

**Water Reform Initiative.** In November, Californians will vote on an
initiative which would attempt to correct several existing water management
problems.

On the average in California we overdraft our ground water basins by
about 2.5 million cubic dekametres (2 million acre-feet) annually. The bulk of
this occurs in the naturally arid San Joaquin Valley where the water is used for
irrigation.

Despite local water development and imports from the State Water
Project and the federal Central Valley Project, this overdraft has continued.
Currently there are no guarantees that additional imports would go to alleviating the ground water mining. As has sometimes been done in the past, the water could be used to bring even more land into production.

The proposed Act would provide a solution. For the critically overdrafted basins it would require a ground water management program be approved by the State before any additional interbasin import could be permitted. One year after the effective date of the Act, no land within any critically overdrafted area could be irrigated unless the land had been irrigated for at least one growing season in the past three years. This requirement would remain until a ground water management plan was approved. Small wells, defined as less than 75 gallons of water per minute, would be exempted from the requirement.

Improved water management throughout California would be another benefit of the Act. Despite our push for increased conservation and reclamation there are still major inefficiencies in distribution and use. For instance, we have confirmed that the Imperial Irrigation District's system needlessly loses more than 400,000 acre-feet annually to the Salton Sea. Cost effective waste water reclamation projects go unconstructed. Water leakage in many water systems is higher than necessary.

The Act would require that cost effective improvements in efficiency would have to be implemented for large water suppliers before additional interbasin transfers could be approved. All reasonable water supply alternatives would have to be analyzed in the required conservation plan. These include:

1. Water conservation and other practices to achieve greater efficiency in water use;
2. Waste water reclamation;
3. Improved water management practices including ground water management and conjunctive use of ground and surface water;
4. Pricing and rate structure changes which would result in water conservation;

5. Banking of water supplies for use in water deficient years;

6. Interbasin and intrabasin transfers of developed water supplies; and

7. Inbasin conventional water supply development.

The water conservation plan would have to include a cost comparison of the alternatives versus importation of new supplies. Where alternatives are cheaper, the Act would require them to be implemented before additional imports.

The Act would bring about several other reforms not directly related to interbasin transfers. The most important is that for the first time in California, water rights could be granted for instream uses. If unappropriated water is available it could be permanently set aside for such beneficial uses as fisheries, water-related wildlife, scientific study, recreation, and water quality.

The State Water Project would not be greatly affected by the initiative for many years, until large new water projects were at a stage where water rights were required.

The mere fact that the initiative qualified for the statewide ballot (over 500,000 signatures were submitted) indicates that citizens are concerned about the impact of new interbasin water transfers. Win or lose, it is a sign that these large projects are controversial, and must be undertaken with great environmental sensitivity and an awareness of citizen concern with high cost.