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EXCHANGE OF WATER SUPPLY

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## Chapter I

### PROBLEMS AND OPPORTUNITIES IN THE EXCHANGE OF WATER SUPPLIES

California's water "problem" arises from a personal preference congeries relevant to an area yielding limited water supplies. Semi-arid Mediterranean Southern California coastal regions provide climatic amenities attractive to population. These same weather conditions are expensive to water resources. By contrast, more abundantly supplied Northern California has not attracted large populations. Yet in the modern metropolis a relatively abundant water supply is essential to meet a variety of requirements. The resolution of this paradox is central to California water resource development.

marked contrasts in water yield and population distribution can be noted in comparisons of the south and north coastal areas of California. The south coastal area comprising Ventura basin and the Southern California coastal plain contains over one-half of the state's population with less than two per cent of the state's natural run-off. By contrast, the north coastal area has less than three per cent of the state's population with nearly forty per cent of the state's water crop.

The problem of geographic redistribution of water supplies is further complicated by extreme seasonal and cyclical variations in floods and droughts. The long California summer season yields little precipitation. Most of the precipitation

occurs in the winter months, and it is either discharged as flood flows in the winter and early spring or must be stored in dams and underground basins to provide water during the long summer season.

In California's first fifty years, the primary water development focus was on agricultural and stock-raising practices. The birth of urban centers did not at first pose supply problems. Both Los Angeles and San Francisco were located partly with respect to water sources. By the century's turn, however, each city had neared the limits of its immediate supply.

The peculiar Los Angeles pueblo right yielded resources contingent to the city's expanding needs. The Los Angeles River watershed still supplies nearly one-fourth of those requirements. By the 1890 drought years the Spring Valley Water Company had impounded the peninsular creeks to supply San Francisco. In turn, each city sought outside sources. San Francisco indirectly acquired the Alameda Creek flow. Los Angeles built the aqueduct to Owens River. Before either supply was freed from litigation, new water needs were envisaged.

Los Angeles stirred widespread local opposition by her handling of Owens water distribution. The attempt to use the supply to expand the city boundaries created south coastal basin enmity. Realizing the importance of cooperation to secure future water importation, Los Angeles strived to bridge these feelings and to make the Colorado project a joint venture. Hoover Dam for a time furnished the bulk of municipal power,

but the city has yet taken little water.

For years San Francisco and the Spring Valley Water Company were in conflict over rates and service. Litigation was an accepted part of the relationship. The water company's inability to provide a satisfactory future supply was final impetus to municipal acquisition. The city and county planned and carried the Hetch Hetchy Aqueduct to completion, first delivering water in 1934.

High school debaters of the 1920's will recall the Marshall Plan. Col. Robert Bradford Marshall, chief geographer of the U. S. Geological Survey, while acting in a private capacity, proposed central Valley water resource development through a system of storage dams supplying east and west "Grand Canals".

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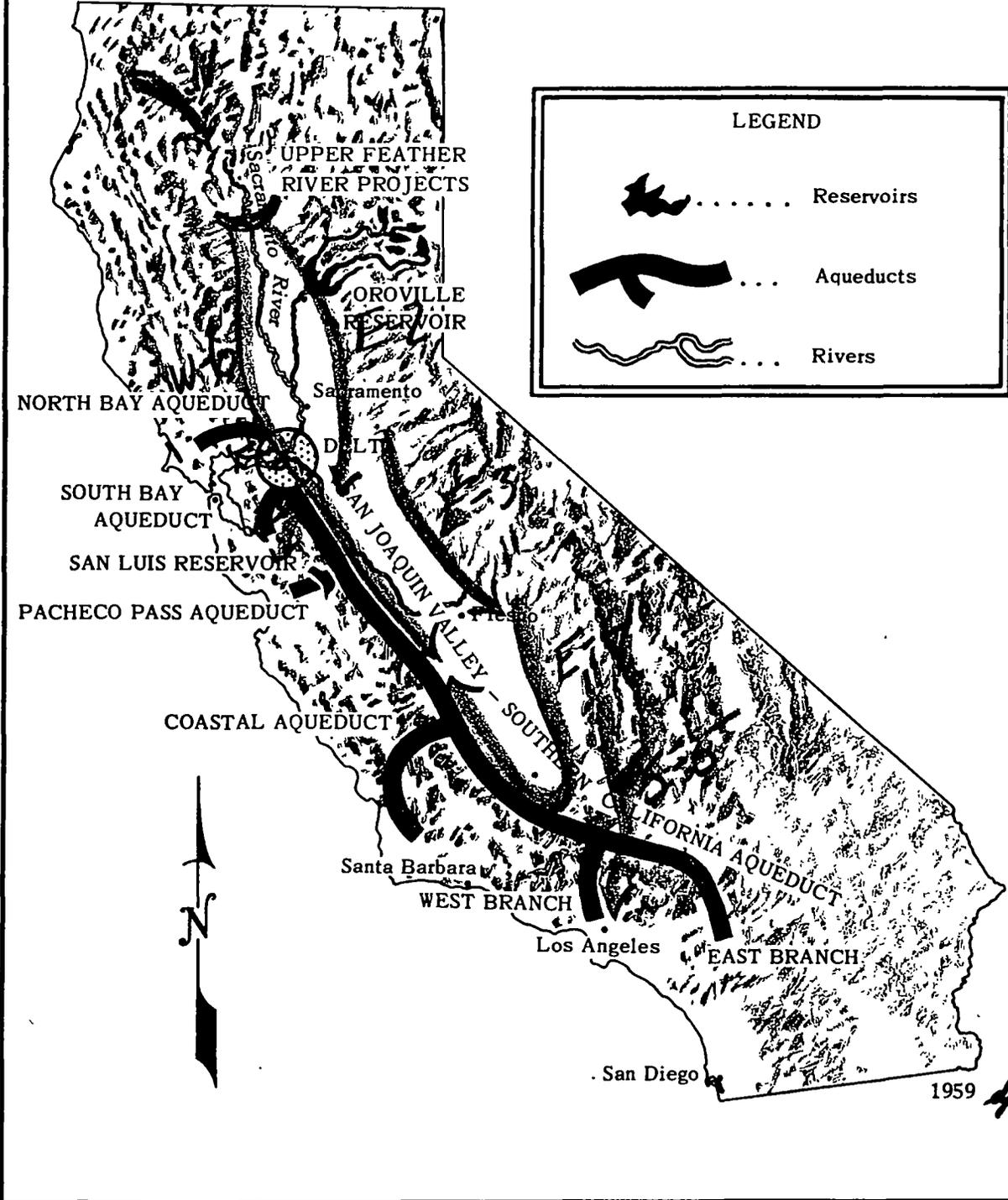
--Col. R. B. Marshall, "California's Great Opportunity," excerpted in U. S., House of Representatives, Committee on Interior and Insular Affairs, Central Valley Project Documents; Authorizing Documents, Part I, House Document no. 416, 84th Congress, 2d sess., pp. 139-150.

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For operating economy, Col. Marshall's "Grand Canals" were designed to minimize the need for pump lifts. Probably, too, this considered the mechanical limitations of the day. To secure this gravity flow objective, reliance was placed upon physical exchanges of water.

Marshall planned a great Iron ~~Cayon~~ Canyon Dam near Red Bluff. Its reservoir was to be filled with the flood waters of the

# Feather River Development and Delta Diversions



Sacramento and the imported flood waters of the Klamath system (North-1). From Iron Canyon the eastside aqueduct followed the valley foothills to below Stockton, picking up stored waters from the Feather and American Rivers systems (East-2). A second section of the east aqueduct began higher on the Stanislaus and flowed southward to end below Fresno in the Tulare Lake basin. Storage on the Tuolumne, Merced, Fresno, and other parts of the San Joaquin system maintained the flow (East-3). At an elevation of one thousand feet on the San Joaquin a third section of the east canal ran south adding water from the Kings and Tule rivers. Then it passed above Bakersfield and along the edge of the Tehachapis before sweeping up the west side of the valley to a point near Coalinga (East-4).

East of Bakersfield Marshall planned to divert the Kern River near Kernville to supply the Los Angeles coastal plain. By tunnel the water reached the Mojave where its route paralleled the Los Angeles Aqueduct (South-5).

Except for a Sacramento crossing Marshall envisioned a gravity flow aqueduct for the west side of the Central Valley. This ran from Iron Canyon to Coalinga and was tapped to supply Santa Clara and the bay area (West-6).

There is no evidence to indicate that Marshall considered carrying Klamath or Sacramento water to Bakersfield or Los Angeles. It made engineering sense to divert new

sources separately southward, because in this way each could harness gravity.

To supply the state's metropolitan needs, municipalities have constructed more than seven hundred miles of major aqueduct. Los Angeles and San Francisco reach four hundred miles to the Sierras to transport 768,000 acre-feet per year. Including the Metropolitan Water District of Southern California and the East Bay Municipal Utility District, the combined aqueducts will have capacities constructed to transport 2,344,000 acre-feet.

This mammoth urban undertaking can be contrasted with the state sponsored Central Valley Project. The resources available to urban areas demonstrate the financial requirements for undertakings of this magnitude. The federal government early provided major portions of the MWD's funds by bond purchase. It was necessary for the United States to assume the CVP construction and operation. In fact, the California Water Plan predicates major delivery to expanding metropolitan regions.

The multi-source unity of the Central Valley Project is a second contrasting feature. Urban aqueducts sweep across the state map. The cities obtained their supplies where they could secure them. The Central Valley development shows concerted effort to produce a program distributing supplies over the area. The Mendota Pool, the point at which Sacramento supplies enter the San Joaquin system, serves as the

program regulator. Supplies are maintained at this point to replace Friant-Kern Canal deliveries at a higher elevation. In fact, the bay area diversions on the Tuolumne and Mokelumne could efficiently have been integrated into this system. The Los Angeles Aqueduct would serve the Owens Valley and the Antelope-Mojave.

South coastal basin experiences show similar results. The City of Santa Monica is served by a Metropolitan Water District lateral crossing portions of the City of Los Angeles using Owens-Mono water. An exchange agreement between the cities would have voided the need for the line. Los Angeles has refused water service to eastern Ventura County, even through this will necessitate many miles of lateral construction if those areas annex to the MWD. The same can be said of Lake Arrowhead which could serve the upper Santa Ana basin if the supply flowing into Deep Creek and the Mojave River were replaced with Owens-Mono water. Finally, the California Aqueduct is to reach Perris Reservoir. MWD supplies could serve San Diego needs if the quantities were replaced in Los Angeles County.

The desire to proceed to redistribute water resources should not lead planners to risk financial feasibility. To recognize engineering capability to transport water the length of the state is not to conclude this to be the most economical means to provide water to the southland. If there are less expensive ways to supply water, means should be explored to achieve them.

One choice is between water movement from Del Norte to San Diego and staged transportation. In either case need and financial feasibility should be demonstrated. Need first means no local unused resources remain. It means, secondly, there are uses to apply the water which will pay transportation costs. Financial feasibility means the ability to repay the cost in a manner and time not unreasonably restricting other governmental requirements.

It is apparent that unused and unallocated supplies are available in Southern California. Considerable quantities of sewage effluent remain to be reclaimed for agricultural, industrial, basin replenishment, and salt water intrusion prevention purposes. The supply cost is competitive. Further immediate capital outlay or indebtedness would cost less than importation.

A second unused source of surplus is the available and prospective Colorado Aqueduct delivery. This can refill depleted and overdrafted south coastal basins. As these have been drawn down in the past, they could longer be taxed to delay importation.

Salt water distillation is, finally, a potential resource not to be ignored. Eventually technology will make this source competitive. Whether or not that time will precede seriously needed additional supplies is an unknown if not unexpected fact. The possibility is enough to require maximum aqueduct investment delay. Facilities would become useless and burdensome.

Unused local resources are not to be explained away by the probability that Southern California will eventually need supplementary Northern California water. Pressing economic needs require the prior development of the least expensive supply. It will not do to ignore this fact.

These surplus waters can be most economically used in coordination with presently developed supplies. The less transportation and distribution required the less expensive will be the delivered water. A wide range of possibilities exists. This study outlines arrangements designed to supply the Antelope Valley, the marginal coastal plains, and the upper Santa Ana basin. In each case currently applied water supplies are allocated in coordination with surpluses. Cost distribution is considered.

Extensive Antelope-Mojave delivery plans have been prepared by the Department of Water Resources. These proposals ignore the possibility of exchanges. Inland aqueduct water could replace a Kern diversion. Either MWD supplies or reclaimed sewage effluent could compensate for the Owens-Mono supply. Since legislation and litigation would be required, rejection follows reasonable but expensive logic.

Reclaimed sewage effluent shows possibilities in its own right. However, in most cases the least expensive operations involve uses lower in elevation than the collection points. Attendant pumping costs are thereby removed. Exchanges for either MWD supplies or rights to draw down foothill basins are possibilities.

The Santa Ana River system provides a brief discussion

focus for underground reservoir management possibilities. The peculiar and attractive features in this case are two: no supplemental delivery system has been provided for the San Bernardino basin. The Department of Water Resources predicates route selection and delivery date on quality conditions developing from upper Santa Ana basin uses.

It is not concluded that these particular prospects deserve development. They are alternative possibilities to be considered. The potential rewards in economies are so significant that feasibility would require their operation.

Administrative and legal obstacles of exchange arrangements center on the lack of use flexibility. California water-rights law has developed the concept of specified source access right. Added to this is the legislative prohibition against state operated exchanges with any but surplus waters. These problems are not insurmountable, but they are joined by a lack of administrative machinery competent to achieve full local resource use.

That no one owns the corpus of running water is the first principal of water-rights law. Ownership of land surrounding water gives nothing but access right, the right to divert or draft from the source. Excepting the appropriative right, water rights are relative to other users in the supply. Only the appropriative right is qualified. Almost in deference to the limited nature of the real property right, no water-rights doctrine allows separation of the right and its source. The consequence is rigid use once the rights to a source fully develop

its supply. This prevents the exchange of sources. No party would have a right greater than his contract.

This inflexible but protected legal position forms the basis to demand firm rights to given sources under statewide water development. What prevents use flexibility through exchanges in fully developed sources is sought for creation in Northern California projects.

Legislation governing the California Water Plan prohibits the State from operating exchange arrangements unless there is a water source surplus. This effectively prevents the State from developing exchange in the remaining unused Southern California water supplies. Coordination is ruled out.

To operate exchange arrangements it will be necessary to determine what legislative change may be needed in water rights, especially in future appropriations. The feasibility of eminent domain for riparian and overlying rights must be elicited.

In Southern California there is no political unit competent to provide basin-wide exchange arrangements. No agency has areal or legal jurisdiction. Since water right rigidity makes most exchanges undesirable, the absence of an administrative entity capable of exercising eminent domain effectively precludes exchange arrangements. The suitability of existing governmental authorities for these purposes requires investigation.

The state role in requiring full local development before water supply investment shows possibilities. The degree to which the Department of Water Resources might predicate delivery contracts upon exchanges is particularly pertinent. Conditions

under which coordination in and between hydrologic basins might be secured by state intervention or otherwise is a second phase of the problem.

Chapter I.

EXCHANGE ARRANGEMENTS: THE ANTELOPE VALLEY

At the turn of the century the City of Los Angeles sought outside sources of water to supply its growing population. Drought years had proven the local basin's low-level, firm supply. One alternative investigated was the Kern River's south fork. The Menache Meadows dam site seemed to assure a reasonable supply. Walker Pass and the ultimate Los Angeles Aqueduct route were attractive.

Despite project physical feasibility, including power drops to provide most pump-left energy, legal difficulties precluded the development. Riparian uses and Southern San Joaquin Valley over-appropriation left no potential appropriative surplus. Nor did the California Supreme Court consider the spring freshets or flood flows to be outside the normal Central Valley supply. As early as 1888 the Supreme Court termed these regular, recurrent, and expected.--

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-- See Heilbron v. Fowler Switch Canal Co., 75 Calif. 426, 432, 17 Pac. 535 (1888).

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In consequence, the firring structures would have invaded lower riparian rights. Engineer Frank Olmstead did not believe ". . . that Kern County under any condition would allow Los Angeles to take a drop. . . ."--

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-- City of Los Angeles, Board of Water Commissioners, Fourth Annual Report of the Board of Water Commissioners of the City of Los Angeles, California; including Report on Water Supply, Los Angeles, California, 1906, p. 75.

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Lower riparian land purchase achieved the Owens River solution. No water user could complain of the diversion. Upper riparian lands had no claim beyond the lower boundary.-- This possibility <sup>has</sup> never

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-- United States v. Central Stockholders' Corporation of Vallejo, 52 Fed. (2d) 322, 339 (C.C.A. 9th) (1931).

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existed on the Kern River. Suitable minimum lift diversion locations lie on the South Fork, now terminating at Isabella Dam. Even the City of Los Angeles' lower riparian position was subjected to extensive litigation when subsequent water requirements led to pumping maintenance of river flow. Los Angeles found it necessary to purchase infringed water rights and to modify its pumping arrangements.-- Litigation

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-- Hillside Water Co. v. Los Angeles, 10 Calif. (2d) 677, 688, 76 Pac. (2d) 681 (1938).

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commenced before a Kern River diversion would have been disastrous. Water rights law operative prior to 1923 led to injunction rather than physical solution. Riparian owners were as unreasonable as they liked against subsequent upstream appropriators. When public use had not intervened, injunctive relief followed.--

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-- Stanford v. Felt, 71 Calif. 249, 250, 16 Pac. 900 (1886).

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Had the City of Los Angeles completed a Kern River diversion, extensive damages would have been awarded. An additional liability was ground water depletion. In actuality, such possibilities were

academic. Lower San Joaquin Valley shortages then existed. It is not likely that diversion could have preceded an intervening suit.

Legal developments since 1928, however, anticipate the possibility of exchange-transfer arrangements. Either Kern or Owens-Mono water could supply the antelope-mojave area. In addition, the State of California is now taking a purposive position on water supply.

Ground sources supply agricultural, domestic, and industrial water in the Antelope-Mojave region. The Mojave River and other minor surface flow has long been beneficially applied. What is more, pumping levels continue to fall. Growth will depend on an imported supply, perhaps even long-term stability.

Department of Water Resources projections anticipate more than three million in population in the area several decades past 2000 A.D.-- This figure assumes a satisfactory water supply,

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-- These are figures provided by a special independent study, see State of California, Department of Water Resources, Feather River and Delta Diversion Projects, Bulletin No. 78: Investigation of Alternative Aqueduct Systems To Serve Southern California, Appendix A, Long Range Economic Potential of the Antelope Valley-Mojave River Basin, January 1959, p. xv. Hereafter, Bulletin No. 78.

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highway network completion, and continued industrial expansion. This predicts greater relative growth than that of coastal areas. If Antelope-Mojave population growth were to proceed as Department of Water Resources estimates indicate, water transportation repayment capability seems assured. In part this rationalizes the high-line Feather River route. On the other hand, growth emphasis predictions for Ventura, Santa Barbara, and Orange Counties could prove accurate. In these circumstances, an alternative source would be

desirable. It would permit staged development. It would allow  
 continued California aqueduct route selection flexibility.

Mojave River and Antelope Valley water utilization (consump-  
 tive use) for 1955 totaled 236,000 acre-feet-- Ultimately, the

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-- State of California, Water Resources Board, Bulletin No.  
 2: Water Utilization and Requirements of California, I, June 1955,  
 p. 198. Hereafter, Water Utilization.

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estimated expanded area consumptive use is 2,321,000 acre-feet--

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--Ibid.

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The "California Water Plan" anticipates an ultimate habitable  
 Antelope Valley water service area of 725,000 acres. Its mean  
 seasonal water requirement would be 1,520,000 acre-feet. Local  
 water <sup>production</sup> supplies now exceed 66,000 acre feet. Antelope-Mojave sources  
 produce 200,000 acre-feet per year. This includes 135,000 acre-feet  
 from the Mojave River.-- The "California Water Plan" makes

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-- State of California, Department of Water Resources,  
 Division of Resources Planning, Bulletin No. 3: The California  
 Water Plan, May 1957, p. 156.

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ultimate delivery provision for 2,250,000 acre-feet.--

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--Ibid., pp. 235-236.

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More recent planning makes no agricultural provision  
 Feather River water prices are considered to make such use  
 uneconomical. This substantially reduces the above figures.

The Antelope-Mojave service area includes portions of Kern, Los Angeles, and San Bernardino Counties. The present water needs of the area are met almost entirely from ground water. Service to this area could readily be provided from the east branch of the inland main aqueduct. For all systems, a maximum delivery to this area of 208,000 acre-feet of water per annum was projected.--

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--Bulletin No. 78, p. VI-13.

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The current ground water overdraft approaches 100,000 acre-feet per year.-- For practical purposes, increased surface diversion

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--Ibid., p. II-6.

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from firming structures would mean decreased ground water yield. Lacking decrease it is still unlikely that water table depletion will be allowed to continue at the present scale. Agricultural users, as well as others, depend upon pumping depth for profit margin. Active adjudication will limit drafting to correlative and prescriptive standards.--

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--See Pasadena v. Alhambra, 33 Calif. (2d) 908, 207 Pac. (2d) 17 (1949).

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The Raymond Basin decision, cited supra, limited all users, whatever the doctrinal basis of right, to a portion of the previous pumping rate. The court refused to adopt specifically the "mutual prescription" doctrine. Continued rightful pumping maintained, beneficially or prescriptively, a right to divert. Some

coast basin cities had the alternative Metropolitan Water District supply. The Antelope-Mojave has developed no supplement.

Whatever the predictive validity of the Department's Antelope-Mojave assumptions, 208,000 acre-feet per year is useful for examining alternative supply exchanges. Los Angeles Aqueduct supply exchanges would provide greater economies, the Kern River somewhat similar savings.

The South San Joaquin Valley is presently a water deficient area. This provides informative state water policy considerations. Westerly and southern Kern County has a current ground water overdraft exceeding half a million acre-feet per annum.-- Within most

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--Bulletin No. 78, p. II-6.

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sub-basins in the area, the use rate exceeds the replenishment rate.--

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--Water Utilization, p. 148.

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The Friant-Kern Canal's ultimate supplemental seasonal water supply is estimated at less than the rate of overdraft, or 459,000 acre-feet.--

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--Ibid., p. 184.

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The nature of water bearing sands in great portions of Kern County makes underground replenishment exceedingly difficult. Excepting the major Kern River supplied alluvial cones, clay

or hardpan overlays these sands. Once pumping levels become uneconomical, continued agricultural use requires a surface source.--

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--United States, Department of the Interior, Bureau of Reclamation, "Regional Director's Report," Central Valley Basin, Senate Document 113, 81st Congress, 1st session, August 1949, pp. 102-103. Hereafter, Central Valley Basin.

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There is clearly no Kern River surplus to supply such demands. Isabella Dam was constructed by the Corps of Engineers largely for Flood Control purposes.-- The Bureau of Reclamation, however, has

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--Letter, Region II to Commissioner, Central Valley Basin, p. 41.

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estimated that ninety-eight per cent of the operation is conservation.--

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--Letter of transmittal of Kenneth Markwell (Acting Commissioner) to Secretary Krug, Central Valley Basin, p. 12.

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In either event, construction's result has been flow regulation. This provides extended availability of flow at the cost of ground water replenishment on the lower reaches of the river. This amounts to redistribution or salvage, perhaps, but certainly not to water development.

In the same sense that firming attempts to create more duty for the existing water supply, the California Department of Water Resources holds two Kern reservations for increased power production.--

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--State of California, Legislature, Senate, Joint Committee on Water Problems, Ninth Partial Report: Report of the Counties of Origin Subcommittee, 1957 Regular session, January 17, 1957, p. 141.

Such limited consumptive use would not be available for appropriation. Without Isabella Dam it would not have been possible at all.

In 1955 the State Water Resources Board estimated present mean seasonal supplemental water needs for the Kern and Tulare Lake units at nearly 400,000 acre feet. Ultimately these areas could utilize nearly two million supplemental acre-feet.--

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--Water Utilization, p. 184.

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This would supply uses additional to the 520,000 acre-feet estimated safe local yield. Kern County water supply development is currently incomplete.--

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--Bulletin No. 78, p. II-14.

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This preponderance of evidence should disillusion any Kern River appropriation enthusiast. Similar facts satisfied the City of Los Angeles at the turn of the century. The exchange principle, however, raises the watersource transfer alternatives. Wholesale transportation from areas of surplus to areas of need supplies a third choice. The essential questions involve practicality factors and economic comparison. These are essentially engineering and legal problems. Water use demand and economic feasibility must, of course, be settled first.

The early proposed Menache Meadows diversion would no longer be satisfactory in terms of volume. A pump lift at Isabella

Reservoir is more promising.

The Isabella Dam site is located on the Kern River near the town of Isabella. The drainage area above the site is 2,080 square miles and the reservoir would control the run-off from 86 percent of mountainous portions of the drainage basin of the Kern River. The mean annual run-off at the dam site is 711,000 acre-feet.--

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-- "Comments of the State of California, 1946," Central Valley Basin, p. 395.

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Ignoring, for the moment, the legal requirements, the 570,000 acre-feet maximum storage capacity-- would easily provide the 208,000 acre-feet

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-- State of California, Department of Water Resources, Bulletin No. 17: Dams within the Jurisdiction of the State of California, January 1958, pp. 311-312.

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estimated for Antelope-Mojave use. Considering the dam's primary flood control purpose, impounding would be unlikely to near this capacity. Constant pumping to afterbays, ground spreading for percolation, or use area storage could solve this difficulty. Even if pumped from the permanent spillway at 2,605 feet above sea level the lift would not reach the 5,000-foot elevation. The route could follow Kelso Creek, pass the summit, and descent Cottonwood Creek and Jawbone Canyon.-- In addition this would provide a substantial power

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-- B & M, MD: 26S, 33E; 26S, 34E; 26S, 35E; 27S, 35E; 28S, 35E; 29S, 35E; 30S, 35E; 30S, 26E; 30S, 37E.

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drop covering some portion of the pump lift requirements. This lift is under 2400 feet, substantially less than that over the Tehachapis for the Feather River supply to Antelope Valley. The latter would exceed 2900 feet from inland pumping plant IV through VI. Moreover, the latter would employ a tunnel series. This possibility is not considered but substantial elevation economies might apply.--

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--Bulletin No. 78, pp. IV-21 - IV-22.

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From the engineering viewpoint the Kelso-Cottonwood route has elevation and length advantages. It would appear to have the same staged construction flexibility.-- Again, the power drop

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--Bulletin No. 28, p. IV-11.

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exceeds half the lift. These statements should, of course, be qualified to the extent that engineering surveys could reveal extensive difficulties. This alone does not make the possibility undeserving of surveys or consideration.

An Isabella diversion would throw an increased water resources depletion upon the Kern River up to the 208,000 acre-feet per year. This depletion could be replaced in the Bakersfield vicinity by gravity flow from below the inland aqueduct pumping plant IV. A lateral at this point is planned to deliver 340,000 acre-feet of water per year to the City of Bakersfield.-- No apparent

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--Bulletin No. 78, p. VI-7.

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reason prohibits an additional supply to replace the Antelope-Mojave diversion in the Friant-Kern Canal vicinity.

The affects of diversion and replacement would be limited to the portion from Isabella Dam to Bakersfield. Between these points are power generation developments; very limited riparian, overlying, and appropriative uses; and the proposed Arvin-Edison Canal.

"Existing and estimated potential hydroelectric power development" -- is estimated to require 440,000 acre-feet average at the lowest Kern River point. A reasonable Isabella storage

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Ibid.  
-p. 181.

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operation consistent with flood control requirements would permit the Antelope-Mojave diversion with very little impairment, if any. This might require ground water pumping management in the Antelope-Mojave area. Replenishment would be coordinated to minimize Kern diversions in less than average rainfall years. Flow regularization produced by Isabella construction has increased and will maintain ground waters. This requires hydrologic study but it is consistent with other experience. The redistribution affect has advantaged up-river users as against lower diversions. Water remaining from Antelope-Mojave diversion should prove more than sufficient to maintain riparian ground waters. In extreme dry years Antelope-Mojave ground water could be overdrafted. These are pertinent operations on all ranges of the river.

The Arvin-Edison Canal presents more difficult problems. It is a major diversionary project with 1,500 second-foot capacity. It supplies 100,000 acres.-- That there is sufficient

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--"Comments of the State of California, 1946," Central Valley Basin, P. 397.

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water to serve this area absent the Antelope-Mojave exchange is evident. Diversion twelve miles from Bakersfield and Friant-Kern replacement below that city are the bases. In some dry years combined Antelope-Mojave and Arvin-Edison diversions would prove incompatible. An overdraft system would be required. Maintenance expense aside, there is no apparent reason why this should not be required of Antelope-Mojave users.

Physical feasibility and potential construction and operation economies are apparent, but legal aspects are considerably more difficult. Under present law, the physical solution applies only if an appropriation can be secured. The water shortage rules out this possibility. Water Code section 11463 prevents the State of California from operating such an exchange. All Central Valley Project units are so governed. Eminent domain or negotiated agreements would at present be required.

In outline the "physical solution" to the Antelope-Mojave Kern River exchange details a water rights invasion. Much difficulty rests upon the legal doctrine of the "physical solution". In California water rights law it is a device to



gain full water source utilization. The terms of the 1928 constitutional amendment require reasonable beneficial use of water under reasonable methods of diversion and use.-- Essen-

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--See Peabody v. Vallejo, 2 Calif. (2d) 351, 379-380, 40 Pac. (2d) 486 (1935).

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tially it is a method directing the appropriator to provide a diversionary means or use which will not unreasonably affect previously vested paramount rights. When this is done, paramount or prior rights have no complaint. Rights are guaranteed and the appropriator enjoined from adverse claims.-- The "physical

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--Ibid.

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solution" or a physical solution has been applied to permit surface appropriations against paramount rights--or prior appropriative rights.-- Percolating rights whose source

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--Meridian v. San Francisco, 13 Calif. (2d) 424, 90 Pac. (2d) 537 (1939).

--Tulare Irr. Dist. v. Lindsay-Strathmore Irr. Dist., 3 Calif. (2d) 439, 45 Pac. (2d) 972 (1935).

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is a watercourse have been governed.-- A physical solution

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--Lodi v. East Bay Municipal Utility District, 7 Calif. (2d) 316, 60 Pac. (2d) 439 (1936).

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has been applied between riparian proprietors.--

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--Rancho Santa Margarita v. Vail, 11 Calif. (2d) 501, 81 Pac. (2d) 533 (1938).

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The physical solution has always, however, been applied on a given watercourse, never between water courses. No apparent reason would prohibit the application. If a given replacement quantity were made available an equal quantity would be removed. The courts would certainly permit no unreasonable interference with existing paramount and prior rights.

The California Water Code requires evidence of a surplus in the watercourse for a permit and a license.-- This is

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--Sec. 1375.

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insuperable. A Bakersfield vicinity surplus would not legally justify an Isabella appropriation. Should an appropriation be granted, the state would certainly reserve full riparian rights. It might also establish water use preference.-- At any point

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--East Bay Municipal Utility Dist. v. State Department of Public Works, 1 Calif. (2d) 476, 481, 35 Pac. (2d) 1027 (1934).

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prior to diversion and use, any downstream riparian owner might file suit for injunction and rights adjudication. The probable

result would be a declaratory decree of paramountcy and enjoinder of claim against present and potential riparian rights.-- Were diversion

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-- See Meridian v. San Francisco, 13 Calif. (2d) 424, 445, 90 Pac. (2d) 537 (1939).

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and use achieved, the public authority responsible would be subject to claims for property value lost once it became desirable to develop unused riparian rights. In any event, inverse condemnation claims would apply for at least the period of the statute of limitations.

The Antelope-Mojave Kern River exchange probably cannot proceed if California Water Code section 11463 continues in force.

In the construction and operation by the department of any project under the provisions of this part, no exchange of the water of any watershed or area for the water of any other watershed or area may be made by the department unless the water requirements of the watershed or area in which the exchange is made are first and at all times met and satisfied to the extent that the requirements would have been met were the exchange not made, and no right to the use of water shall be gained or lost by reason of any such exchange.

The courts of California have not interpreted this section. The California attorney general has ruled water exchange arrangements invalid as defined above. The Department may not import to replace water used to supply a second watershed.-- These provisions operate

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-- Ops. Calif. Atty. Gen. 8 (1955).

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only against the state. Isabella Dam and the proposed Feather River diversion are Central Valley Project units, and this provision governs.

These would be grounds, in all probability, to deny the permit application to appropriate Isabella water. Even more, the likely exchange authority, the Department of Water Resources, is directly prohibited from the arrangements.

In lieu, the Department would have to exercise extensive eminent domain authority.-- Alternatively, voluntary negotiations are applicable.

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-- Ibid.

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Such arrangements would preserve paramount and prior rights to Kern River flow should outside replacement supplies be reduced or withdrawn.

While eminent domain may produce extensive litigation, complexity, and cost, the result is firm and final. The central conflict during condemnation is the indefinite nature of riparian and overlying rights. Such paramount holders are entitled to both the present and the prospective range of uses.--

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-- See difficulties involved in United States v. Gerlach Live Stock Co., 339 U.S. 725 (1950).

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A public agency seeking to obtain a Kern water right of magnitude might find it necessary to acquire most riparian rights. This would protect both against subsequent potential uses and litigation regarding flow continuity.

Overlying rights present peculiar hydrologic problems. There is no intent to reduce percolation, indeed, exchange means no detriment. The public agency would supply local users whose rights had been separated.

It is doubtful that the water table would be affected. Indeed, the California aqueduct system will attempt to stabilize the water table to the replenishment rate. It should not be necessary, therefore, to acquire ground water rights. However, the courts might hold total ownership of natural flow rights to impinge upon overlying rights within the terms of section 11463.-- In any event, the point requires

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-- See Rank v. Krug, 142 F. Supp. 1 (S.D. Calif.) (1956). This is the latest in a series of suits involving the United States and overlying rights supplied from a watercourse.

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substantial hydrologic data, must of it after actual exchange development.

Water law complexity, natural supply fluctuation, and the relationship between supply cost and agricultural profit margin lead constantly to demands for firm and fixed rights to water source use. Such attitudes overvalue water. Certainly they create a marked degree of source access inflexibility. Operations manipulability is fundamental to the exchange principle.

Objections to the Kern supply Antelope-Mojave exchange lie, first, in a fear of water rights loss. A permanent guarantee against prescription, the purpose of section 11463, protects present holders. The users to be supplied by the exchange are aggrieved by the revokability of the new use right. In this lies Southern California's present dissatisfaction with the Feather River program. Prospective users argue that payment for water transportation system development supercedes property interest. They reject any arrangement where they may be deprived of the water supply. On the other hand, the first pertinent question is whether water charges will pay construction costs. Can water utilizing operations

profitably be conducted? If so, there is no economic loss involved. The second question is directed to the private economy. Is the water supply secure enough to justify long-range investments requiring an adequate water supply? The question's pertinence emphasizes the private property nature of water rights law.

Kern River and Antelope-Mojave deficiencies distinguish these areas only temporally. The present Sacramento River system surplus guarantees no perpetual abundance, Southern California diversions discounted. Fundamentally, to consider the Kern as an exportation source merely gives currency to alternate supply questions for potentially deficient areas. Kern River rights are vested in individuals. Statewide, present surpluses have been vested legally in the watershed or county of origin. The Kern exchange-difficulty is no greater than that prospectively on the Sacramento system. In this light, the shortage exchange prohibition makes poor sense. Section 11463 prevents full and economic utilization of state water resources.

To supply the Antelope-Mojave area with Owens-Mono water is physically attractive. The Los Angeles Aqueduct elevation falls 725 feet from Haiwee Reservoir to Fairmont Reservoir.-- Lancaster, Palmdale, and

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-- City of Los Angeles, Department of Public Service, Complete Report on Construction of the Los Angeles Aqueduct, 1916, p. 82.

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Victorville all lie below the 3,000-foot contour. Lancaster, the largest of these, is 2,356 feet above sea level. Thus it would not be physically difficult to supply these areas with Los Angeles Aqueduct gravity flow as water needs develop.

The delivery capacity of 320,000 acre-feet limits the Los Angeles diversion. Simultaneously, the supply exceeds the estimated Antelope-Mojave demand. On the other hand, the areas of origin could eventually consume 351,300 acre feet.--

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--Water Utilization, p. 199.

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In normal years, water exceeding the Los Angeles diversion is available for local use and underground replenishment or storage. Depending on price, the area might find it desirable to purchase rights to use water from the City of Los Angeles. If present and expanding demands justify, the Antelope-Mojave area would have as much reason to consider the alternative. { A } purchase basis could be the additional cost to Los Angeles to purchase its next available supply. |

During Fiscal year 1958 Los Angeles Metropolitan Water District purchases exceeded thirty-seven thousand acre feet. The purchase entitlement is nearly 440,000 acre-feet with the Colorado Aqueduct only half developed. Owens-Mono provided in excess of 320,000 acre feet. This leaves a substantial balance available should arrangements be desired and practical.--

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--City of Los Angeles, Board of Water and Power Commissioners, 57th Annual Report, 1958, p. 7.

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It has been estimated that sewage reclamation in Southern California would provide a greater supply than Owens-Mono. The process would cost less than salt water distillation.--

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--James C. DeHaven, Linn A. Gore, Jack Hirshleifer, A Brief Survey of the Technology and Economics of Water Supply (Santa Monica: The Rand Corporation, 1953), p. 36. See Section III.

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All Feather River Aqueduct routes will reach Los Angeles. The City of Los Angeles thus has one source presently available, two possible sources under its own jurisdiction, and a fourth northern California supply potential.

Assuming fixed alternate supply costs only, price agreements can be considered. Arbitrary estimates follow: \$19.00 per acre-foot for Los Angeles Aqueduct water; Metropolitan Water District, \$20.00; sewage effluent, \$50.00; salt water distillate, \$100.00; and Feather River water, \$43.00.

If Antelope-Mojave were to use the Los Angeles Aqueduct, the alternate Los Angeles Supply would determine the exchange water price. Thus, until Los Angeles had fully utilized its MWD rights, the Antelope-Mojave price would be \$20.00 per acre foot plus distribution and power loss costs to Los Angeles. The Antelope-Mojave would construct its own distribution system.

When the MWD source had been fully utilized, Los Angeles and the Antelope-Mojave would weigh the alternatives. Owens-Mono water would now be worth \$50.00 per acre-foot (Sewage

reclamation) plus increased distribution cost equivalents.--

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--Since sewage effluent sale to west basin cities would achieve economies, 2 three-way cost arrangement could be established. See Part III.

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Minimum salt water distillation cost would increase Owens water value to \$100.00. Considering only the desert pumping diseconomy, this would not be an unreasonable figure. Finally, a Los Angeles delivered northern supply would balance at \$47.00 plus equivalents for Antelope-Mojave region water.

Such arrangements provide water fiscally and administratively rather than by construction. This frees water importation planning from desert lift dependence if not otherwise necessary. Again, if full local water supply development is competitive, it precedes major northern supplementary delivery. As with the Kern River supply, willingness and ability to pay would determine diversion. Diversionary construction requirements would be considerably less than the most flexible published California Aqueduct plan provides. Delayed development would leave no dry water transport structures on the state tax burden. The Kern and Owens-Mono alternatives are based upon demand rather than upon population-industrial projections.

Los Angeles Aqueduct exchanges are based upon negotiation and contract. Appropriation, "physical solution," and eminent domain are not pertinent. The City holds firm and adjudicated rights. There is no reason to expect the municipal authorities

to jeopardize these rights. State water policy development might require, short of risk of right, the coordination of the Los Angeles supply with delivered supplies. This could achieve construction economy and/or delay in need.

In order to preserve the city's rights, federal route agreements and California Water Code provisions for municipal surplus distribution deserve consideration.

The Act of Congress of June 30, 1906, authorized the city to acquire a strip of public land 250 feet wide from the Owens River. Since others were interested in commercial development Congress prevented subsequent non-municipal profit by stipulating

Sec. 6. That the city of Los Angeles is prohibited from ever selling or letting to any corporation or individual, except a municipality, the right for such corporation or individual to sell or sublet the water sold or given to it or him by the city.--

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--34 Stat. 801.

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This provision has been incorporated into the Los Angeles City Charter.-- If interpreted literally the exception "municipality"

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--Article XXII, Sec. 219.

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probably rules out Antelope-Mojave exchange. There are no municipalities though there are seven public water districts, including suppliers in Palmdale, Lancaster, and Victorville.--

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--Water Utilization, pp. 288-289.

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There is also the massive East Kern-Antelope Water Agency. The more than fifty commercial water companies and mutual water companies would appear to be ineligible. In these areas the City of Los Angeles would be required to sell direct to consumers; it would not find this attractive. Public districts are not strictly municipalities, though for some state purposes they do qualify. The City of Los Angeles would not be likely to jeopardize its Aqueduct rights. The alternatives, short of a test case, are incorporation or Congressional action. The latter might not be difficult to obtain if in conformity with a state water plan.

Federal and state policy modification would permit negotiation and contract, but it would not affect the charter provision requiring a majority vote for water sale outside the city.--Either the charter would require amendment or the

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--Article XX II, sec. 220.

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authorization would be needed to obtain voluntary negotiation and contract. Such action might be achieved if tied to northern California delivery. Should Los Angeles not require a supplementary water supply such action might not follow.

The California Water Code provides that a city holding a water right surplus to present needs may be authorized "to become as to such surplus a public utility, subject to the jurisdiction and control of the Public Utilities Commission..." until it uses the water.-- There are reasons why the City would not adopt this

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--Sec. 1464.

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procedure. First the Owens-Mono supply is not currently surplus. The LWD supply is surplus, but the LWD protects these rights. Second, were the City to adopt the sec. 1464 method, the role of the public utility is not the only alternative open to state authorities. Temporary appropriation could be authorized to others to use the water during this time.-- Los Angeles might

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--Water Code, secs. 1462-1463.

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be required to utilize the Colorado supply until it could show Owens - Mono supply need. Finally, would the Public Utilities Commission consider the alternate source a just cost basis? These are conjectural possibilities the City would not risk.

It is apparent that Los Angeles would need substantial guarantees including legislative action before it would risk exchange arrangement liability. It would require that its own action without cost would return the aqueduct supply when other sources could not be obtained. It would, in other words, require its vested rights to be guaranteed.

Like the Kern River supply, this exchange provides no firm water rights for users. In fact, alternate supplies cost fluctuation for the City of Los Angeles would increase exchange users rates. As alternative Los Angeles sources were prepared, users could let the City slowly reclaim its supply while they sought another alternative. The cost of salt water distillation, for example, might place that source in this category. However, time increases the possibility of competitive technological im-

provement in salt water distillation as well as sewage effluent reclamation. Exchange arrangements assert efficiency and economy mandates. Because the water rights system vests access doctrines, long term importation planning risks ultimate diseconomies.

Exchange developments permits solution to present and relatively short-range needs. Without creating greater legal and administrative complexity, a water supply is obtained. Exchange arrangements based on the Owens-mono supply would create no vested rights, but they would entail less expenditure.

On the other hand, contractual arrangements can assure delivery security. Users could share alternate supply construction costs. They could agree to take designated quantities at contract prices. Future development guarantees might attract Los Angeles. The City has invested heavily in long-range supply insurance. There is no reason to anticipate that it would not welcome capital cost sharing. The Colorado River Aqueduct began as such an operation municipally instigated and financed. An equally attractive future supply might produce Los Angeles cooperation.

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of Southern California disputes these particular predictions of need by 1970, however. See the study prepared for the MWD, James M. Montgomery, Effects of Differences of Water Quality, Upper Santa Ana Valley and Coastal San Diego County, Pasadena, November 1959.

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change methods could delay this date, there would be a more widespread need throughout the South Coastal basin. Sewage reclamation and salt water distillation considerations could possibly be effected with an extension of the permissive period.

### 3.1. The Antelope-Mojave

The Antelope-Mojave region of Southern California is viewed by many as a great and scarcely touched land resource for southland expansion. Lying north of the San Gabriel and San Bernardino Mountains and to the east of the Tehachapis, the proximity to the coastal metropolis is clear enough. Since World War II growth rates for the area have been phenomenal and seem to justify the more imaginative expectations.

At the same time, most of this growth has been in defense activities, in aircraft, and in allied developments. And while the expansion produced in the last fifteen years has scarcely limited the estimated three million acres of habitable lands, a major change in economic, business, and commercial direction will be required to achieve the hoped-for growth.

California state government is planning for the most vigorous trend of development. Contracted research reports have indicated a population over three million by several decades after 2000 A.D.--

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--State of California, Department of Water Resources, Feather River and Delta Diversion Projects, Investigation of Alternative Aque-

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duct Systems To Serve Southern California, Long Range Economic Potential of the Antelope Valley-Mojave River Basin, Bulletin No. 78, Appendix A, January 1959, p. xv.

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On the basis of these estimates and those by the Department of Water Resources, state water authorities are preparing to deliver water to the area through the California Aqueduct. The State has created the East Kern-Antelope Water Agency which brackets together the portions of Kern and Los Angeles Counties lying within the area. An equivalent Mojave Water Agency has been made permissive under state legislation, and the Department of Water Resources has pressed for its activation by San Bernardino County.-- In the light of these policies and contradictory evaluations, serious consideration should be given to the alternatives for supplying the water needs of the Antelope-Mojave region.

*Complete  
Reclamation  
Project at  
Beyle*

### 3.2. Antelope-Mojave Supply

Agricultural, domestic, and industrial water supply in the Antelope-Mojave is presently derived from the Mojave River, other minor surface flow, and underground storage. The Mojave River supply, excepting irregular major flood flow, has long been beneficially applied. What is more, watertables continue to fall. Growth, perhaps even long-term stabilization, will therefore depend on an imported supply.

Water utilization (consumptive use) for the Mojave River basin and Antelope Valley totaled 236,000 acre-feet in 1955. Ultimately, the consumptive use for the estimated expanded area is 2,321,000 acre-feet.--

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--State of California, Water Resources Board, Water Utilization and Requirements of California, Bulletin No. 2, Volume 1, June 1955, p. 198.

The "California Water Plan" anticipates an ultimate habitable water service area for the Antelope Valley alone of 725,000 acres with mean seasonal water requirements of 1,520,000 acre-feet. Local water sources supply slightly in excess of 66,000 acre-feet. For the Antelope-Mojave together, sources produce 200,000 acre-feet per year, including 135,000 acre-feet from the Mojave River.-- The "California

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--State of California, Department of Water Resources, Division of Resources Planning, The California Water Plan, Bulletin No. 3, May 1957, p. 156.

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Water Plan" makes provision for an ultimate delivery of 2,250,000 acre-feet.--

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--Bulletin No. 3, pp. 235-236.

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More recent planning makes no provision for agriculture, considering Feather River water prices to make such use uneconomical. This substantially reduces the above figures. Even with an immediate overdraft approaching 100,000 acre-feet per year,-- the Department of

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--State of California, Department of Water Resources, Feather River and Delta Diversion Projects, Investigation of Alternative Aqueduct Systems To Serve Southern California, Bulletin No. 78, January 1959, p. II-6. D. H. 5<sup>th</sup>

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Water Resources plans a maximum delivery to this area of only 208,000 acre-feet of water per year. This is based, in part, on the assumption that agricultural use will decline with the development of other activities.--

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--Bulletin No. 78, p. VI-13. p. 126

Assuming the potential of the Antelope-Mojave but stressing its problematical development, two alternatives to California Aqueduct delivery exist. A supply from either the Kern River or the Los Angeles Aqueduct would allow increased flexibility to aqueduct planners. Delivery from Owens-Mono would primarily require only a distribution, rather than a transportation, system. A Kern River diversion at Isabella Dam would require a lesser pump lift and shorter route than the aqueduct allows.

### 3.3. Early Kern Study

By the turn of the century a series of drought years had proven the minimum safe level of the Los Angeles River. To supply its growing population, the City of Los Angeles investigated a project, among others, on the South Fork of the Kern River. A dam site below Menache Meadows and a route through Walker Pass and then along the ultimate Los Angeles Aqueduct line were feasible in both engineering and economic terms.

In spite of the attractiveness of the proposal, legal dilemmas of water-rights law precluded construction. As against the then riparian users lower on the river, the city could make no demand for reasonableness. Any appropriative diversion would have been, in law if not in fact, an invasion of riparian rights to the flow of the river. As against other appropriators there already existed a condition of over-appropriation of the normal flow. Nor was it possible, finally, to conserve the storm flow which provided floods and damage but also rich silt and natural irrigation for grasslands in the river bottoms. As early as 1888 the California Supreme Court had been convinced by these

latter considerations that flood flows in the Central Valley were regular, recurrent, and expected and thus a part of the natural flow.--

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--See, Heilbron v. Fowler Switch Canal Co., 75 Calif. 426, 432, 17 Pac. 535 (1888).

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To proceed in the face of these legal considerations would have, at that time, probably led to one of two alternatives. First, had the city completed both construction and diversion, its right to continue would have been contingent upon payment of extensive legal damages to riparian and ground water rights. On the other hand, this was really an academic alternative. Had any suit intervened prior to actual diversion and use, the Los Angeles project would have been brought to a complete halt.-- No claim to the then just developing doctrine of "inverse

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--Stanford v. Felt, 71 Calif. 249, 250, 16 Pac. 900 (1886).

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condemnation<sup>2</sup>, or after-the-fact application of eminent domain, would have stood the test of litigation.-- Engineer Frank Olmstead concluded

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--See the discussion, Peabody v. Vallejo, 2 Calif. (2d) 351, 377-379, 40 Pac. (2d) 486 (1935).

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that to believe " . . . Kern County under any condition would allow Los Angeles to take a drop . . . ." was fantasy.--

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--City of Los Angeles, Board of Water Commissioners, Fourth Annual Report of the Board of Water Commissioners of the City of Los Angeles, California including Report on Water Supply, Los Angeles, California, 1906, p. 75.

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The modification which public water-rights law has undergone since the constitutional amendment of 1928 re-opens some of these questions. There are reasons to suggest that a positive role on the part of state water authorities could accomplish the objectives of supplying the Antelope-Mojave from the Kern River.

3.4. Kern County Supply

The South San Joaquin Valley is presently a water deficient area. Within most sub-basins the use rate exceeds the replenishment rate,—

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--Bulletin No. 2, p. 148.

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and the over-all draft on ground water resources exceeds the replacement by more than half a million acre-feet per annum.— Nor is there

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--Bulletin No. 78, p. II-6.

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p. 69

any surplus on the Kern River to supply increasing demands. Isabella Dam was constructed by the Corps of Engineers largely for flood control purposes.— And while the Bureau of Reclamation estimates that ninety-

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—United States, Department of the Interior, Bureau of Reclamation, Letter, Region II to Commissioner, Central Valley Basin, Senate Document 113, 81st Congress, 1st session, August 1949, p. 41. Hereafter, Central Valley Basin.

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eight percent of the operation is for conservation,— the increased

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—Letter of transmittal of Kenneth Markwell (Acting Commissioner) to Secretary Krug, Central Valley Basin, p. 12.

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river regulation still leaves a deficit supply. In fact, to provide

an extended availability of flow on higher reaches of the river is only to lessen the underground replenishment lower down. This amounts to redistribution or salvage, perhaps, but not to water development.

The Kern River supplies most of the support for the underground aquifers in the basin. The condition of water-bearing sands in great portions of Kern County makes underground replenishment exceedingly difficult. Except for the alluvial cones on the river itself, clay or hardpan partially seals most of the water table. Once pumping levels become uneconomical, continued agricultural use requires a surface source.— A part of this growing agricultural requirement is provided

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—"Regional Director's Report," Central Valley Basin, pp. 102-103.

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by exchange between the San Joaquin and Sacramento River systems. The Friant-Kern Canal, operating at full design capacity, can supply 459,000 acre-feet to the area, less than the annual deficit. In 1955, with this delivery at less than capacity, the State Water Resources Board estimated the then mean seasonal supplemental water needs for the Kern and Tulare Lake units at upwards of 400,000 acre-feet. Ultimately these areas could utilize nearly two million supplemental acre-feet,— in addition to the 520,000 acre-feet estimated safe local yield.—

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—Bulletin No. 2, p. 184.

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—Bulletin No. 78, p. II-14. p. 71

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Kern County is obviously a water deficient area in terms of already existing uses. Viewed as a problem of regional supply, however, the

role of state water policy in supplying both the Kern and Antelope-Mojave can be examined for over-all efficiency. This requires a comparison between direct aqueduct supply of both Kern and desert areas as against northern delivery to the one and exchange with the other.

### 3.5. Physical Exchange Features

While the early proposed diversion from Manache Meadows would supply the volume planned by the state for Antelope-Mojave, a pump lift at Isabella Dam would permit increases in planned delivery if required. Isabella Dam at the confluence of the south and north forks of the Kern River controls the run-off from some eighty-six percent of the river's mountainous drainage, or 2,080 square miles. Mean annual run-off from these lands is 711,000 acre-feet at the dam site.-- With maximum storage capacity at 570,000 acre-feet, the reservoir could

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--"Comments of the State of California, 1946," Central Valley Basin, p. 395.

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supply more than the 208,000 acre-feet estimated for Antelope-Mojave use.-- Assuming the dam's continued use for flood control, impounding

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--State of California, Department of Water Resources, Dams Within the Jurisdiction of the State of California, Bulletin No. 17, January 1958, pp. 311-312.

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would be unlikely to reach capacity, but regular pumping to afterbays, ground spreading for percolation, or storage in the area of use would provide solution to statutory requirements for maintenance of reservoir space.

Pumped from as low even as the permanent spillway at 2,605 feet above sea level, the water would require a lift of less than 2,400 feet, passing the crest at below the 5,000-foot elevation. The route could follow Kelso Creek, pass the summit, and descend Cottonwood Creek and Jawbone Canyon.— This lift is substantially less than that over the

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--B&M, MD: 26S, 33E; 26S, 34E; 26S, 35E; 27S, 35E; 28S, 35E; 29S, 35E; 30S, 35E; 30S, 36E; 30S, 37E.

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Tehachapis for the Feather River supply to Antelope Valley. The latter would exceed 2,900 feet from inland pumping plant IV through VI. Moreover, the latter would employ a series of tunnels. This possibility is not considered here, but substantial elevation economies might be achieved.—

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--Bulletin No. 78, pp. IV-21, IV-22. p. 152

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From the engineering viewpoint the Kelso-Cottonwood route has advantages of elevation and length. It provides a power drop exceeding half the lift. It will allow flexibility of both staged construction and supply. To be sure, engineering surveys could reveal extensive difficulties, but this should not preclude investigation.

The increased depletion on Kern River basin supplies could be replaced in the vicinity of Bakersfield by gravity flow from the California Aqueduct. A lateral below inland pumping plant IV is planned to delivery 340,000 acre-feet of water per year to the City of Bakersfield.— This, then, could be increased to replace the diversion-created

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--Bulletin No. 78, p. VI-7. p. 123

deficit near the terminus of the Friant-Kern Canal.

The affects of diversion and replacement would be limited to the portion of the Kern River from Isabella Dam to Bakersfield. Between these points are power generation developments; very limited riparian, overlying, and appropriative uses; and the diversion for the Arvin-Edison Water Storage District.

"Existing and Estimated potential hydroelectric power development" is estimated to require 440,000 acre-feet average at the mouth of Kern Canyon.-- A reasonable storage operation at Isabella Dam, con-

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--Bulletin No. 2, p. 181.

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sistent with flood control requirements, would permit the Antelope-Mojave diversion with very little impairment, if any, of this use. What might be required, however, is ground water management in the Antelope-Mojave area. Replenishment would be coordinated to minimize diversions from the Kern in less than average rainfall years. In the extremely dry years, Antelope-Mojave ground waters could be overdrafted. On the Kern, on the other hand, the regulation of flow has increased and will help to maintain ground waters. While this requires hydrologic study, it is consistent with other experience. Nevertheless, water remaining from Antelope-Mojave diversions should prove more than sufficient to maintain riparian ground waters.

The Arvin-Edison Canal presents more difficult problems. It is a major project with 1,500 second-feet capacity. Involved are a diversion twelve miles above Bakersfield with replacement from the Friant-

Kern Canal below the city. The project is to supply 100,000 acres, ultimately.— That there is sufficient water to serve this area in

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—"Comments of the State of California, 1946," Central Valley Basin, p. 397.

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the absence of the Antelope-Mojave exchange is evident. In some dry years, however, combined Antelope-Mojave and Arvin-Edison diversions would prove incompatible. The overdraft system would be required to achieve the full development of this project as well as to maintain power operations.

### 3.6. Legal Problems

Physical feasibility and economies of construction and operation are apparent from an Antelope-Mojave exchange, but the legal aspects present considerably greater difficulties. First, under present law, the "physical solution", a legal device for maximizing the yield from a watercourse, can be applied only when an appropriation can be secured. Second, an appropriation, in turn, requires a surplus of water, and the shortage of supply on the Kern rules out this possibility. Third, an exchange from a deficient watershed, which is the case here, may not be performed by the state water authorities. The only opening remaining is use of eminent domain or negotiated arrangements.

The physical operation of the Antelope-Mojave exchange could be a water rights invasion in law, the primary difficulty resting upon the legal doctrine of the "physical solution". The terms of the 1928 constitutional amendment require reasonable beneficial use of water

under reasonable methods of diversion and use,— Under this doctrine,

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--See, Peabody v. Vallejo, 2 Calif. (2d) 351, 379-380, 40 Pac. (2d) 486 (1935).

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the "physical solution" is essentially a method directing the appropriator to provide a diversionary means or use which will not unreasonably affect previously vested paramount rights. When this is done, the paramount or prior rights are unhindered in their exercise, the rights are guaranteed, and the appropriator is enjoined from adverse claims. The "physical solution" or a physical solution has been applied to permit surface appropriations against paramount rights,— or prior appropria-

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--Meridian v. San Francisco, 13 Calif. (2d) 424, 90 Pac. (2d) 537 (1939).

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tive rights.— Percolating rights whose source is a watercourse have

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--Tulare Irrigation District v. Lindsay-Strathmore Irrigation District, 3 Calif. (2d) 439, 45 Pac. (2d) 972 (1935).

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been governed.— Finally, a physical solution has been applied between riparian proprietors.— The "physical solution" has always, however,

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--Lodi v. East Bay Municipal Utility District, 7 Calif. (2d) 316, 460 Pac. (2d) 439 (1936).

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--Rancho Santa Margarita v. Vail, 11 Calif. (2d) 501, 81 Pac. (2d) 533 (1938).

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been applied on a given watercourse, never between basins or watersheds. No apparent reason would prohibit the application, however, for, if a

given replacement quantity were made available, an equal quantity would be removed. This would instigate no unreasonable interference with existing paramount and prior rights.

The California Water Code requires evidence of a surplus in the watercourse for a permit and a license to appropriate.-- This is all

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--Sec. 1375.

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but insurmountable. A surplus in the Bakersfield vicinity would not legally justify an appropriation at Isabella, or so it would seem. Should an appropriation be granted, however, the state would certainly reserve full riparian rights, and it might also establish water use preferences.-- At any point prior to diversion and use, any down-

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--East Bay Municipal Utility District v. State Department of Public Works, 1 Calif. (2d) 476, 481, 35 Pac. (2d) 1027 (1934).

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stream riparian owner might file suit for injunction and rights adjudication. The probable result would be a declaratory decree of paramountcy and enjoinder of claim against present and potential riparian rights.-- After diversion and use, the public authority responsible

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--See, Meridian v. San Francisco, 13 Calif. (2d) 424, 445, 90 Pac. (2d) 537 (1939).

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would be subject to claims for property value lost once it became desirable to develop unused riparian rights. In any event, inverse condemnation claims would apply for at least the period of the statute of limitations.

The Antelope-Mojave exchange probably cannot proceed if California Water Code section 11463 continues in force.

In the construction and operation by the department of any project under the provisions of this part, no exchange of the water of any watershed or area for the water of any other watershed or area may be made by the department unless the water requirements of the watershed or area in which the exchange is made are first and at all times met and satisfied to the extent that the requirements would have been met were the exchange not made, and no right to the use of water shall be gained or lost by reason of any such exchange.

The courts of California have not had occasion to interpret this section, but the California Attorney General has ruled water exchange arrangements invalid as defined above. The Department may not import to replace water used to supply a second watershed.-- While these provisions

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--25 Ops. Calif. Atty. Gen., 8, \_\_ (1955).

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operate only against the state, Isabella Dam and the proposed Feather River diversion are Central Valley Project units governed by the provision. These would be grounds to deny the application for a permit to appropriate Isabella water. Even more, the likely exchange authority, the Department of Water Resources, is directly prohibited from performing the arrangements.

In lieu of the necessary authority, the Department would have to exercise extensive eminent domain authority.-- Alternatively, voluntary

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--Ibid., 8, \_\_ (1955).

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negotiations are applicable. Such arrangements would preserve paramount and prior rights to the flow of the Kern River should outside replacement supplies be reduced or withdrawn. In Wolfsen v. United States

such a contractual arrangement was subsequently litigated before the U. S. Court of Claims. It was argued that riparian rights had been extinguished, but, in the absence of a California ruling, the court refused to apply the foreign waters doctrine. "We do not believe that the United States could, with impunity, take away the substituted waters."--

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--142 U. S. Court of Claims, \_\_\_\_, \_\_\_\_ (1958).

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But while eminent domain may produce extensive litigation, complexity, and cost, the result is firm and final. The central conflict during condemnation is the indefinite nature of riparian and overlying rights. Such paramount holders are entitled to both the present and the prospective range of uses.-- Thus, a public agency seeking to obtain a water right of

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--See difficulties involved, United States v. Gerlach Live Stock Co., 339 U.S. 725 (1950).

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magnitude on the Kern might find it necessary to acquire most riparian rights. This would protect both against subsequent potential uses and litigation regarding continuity of flow.

Overlying rights present peculiar hydrologic problems, but where there is no reduction in percolation, exchange means no detriment. The public agency would supply local users whose rights had been separated. This factor is taken into consideration in condemnation proceedings.-- In fact,

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however, it is doubtful that the water table would be affected. Indeed, the California aqueduct system will attempt to stabilize the water table to the rate of replenishment. It should not be necessary, therefore, to acquire ground water rights. However, the courts might hold total ownership of rights to natural flow to impinge upon overlying rights within the terms of section 11463.-- In any event, the point

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--See Rank v. Krug, 142 F. Supp. 1 (S.D. Calif.) (1956). This is the latest in a series of suits involving the United States and overlying rights supplied from a watercourse.

requires substantial hydrologic data, much of it after an actual exchange development.

### 3.7. Owens-Mono Supply

The anguish and anger which have plagued relations between the City of Los Angeles and Inyo and Mono Counties span the last half century. Early bad feeling arose when the Owens River farm population saw itself deprived of a federal reclamation project in favor of a supply for Los Angeles. In the 1920's and 1930's there were disputes over the underground water supplies which Los Angeles required to maintain flow at aqueduct capacity. With the extension to Mono basin, both counties have fought with the City over taxation of water rights. Management of underground recharge and storage is equally conducive of current controversy.

From the point of view of the two northern jurisdictions, the real solution lies in a state provided supply for Los Angeles and a reversion of local resources. Not only is this unlikely, but the great expense of providing Inyo-Mono with an alternate supply is largely discounted by state water authorities.— These areas could, of course, use large

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—State of California, Water Resources Board, Report on the California Water Plan, Volume III, Bulletin No. 3, May 1956, preliminary edition, pp. 11-59/11-62. Subsequent revisions to 1960 portray the extreme expense of importation and the local incapacity for repayment.

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quantities of water, estimated at more than 350,000 acre-feet consumptively.— This would ultimately require a supplemental supply in excess

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--Bulletin No. 2, p. 195.

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of 300,000 acre-feet, assuming continued diversion by the City of Los Angeles.-- The one obvious fact is that, should state policy

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--Bulletin No. 2, p. 205.

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seek to supply urban developments in the Antelope-Mojave from agricultural uses, in the Owens-Mono, there is no water surplus. The Los Angeles Aqueduct offers the only means to such a supply without exercise of eminent domain.

### 3.8. Physical Exchange Features

An Owens-Mono supply for the Antelope-Valley would have the physical attractiveness of gravity flow as well as that of a limited construction requirement. Contoured for natural flow, the Los Angeles Aqueduct falls 725 feet in elevation from Haiwee Reservoir to initial terminus at Fairmont Reservoir, 3,035 feet above sea level.--

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--City of Los Angeles, Department of Public Service, Complete Report on Construction of the Los Angeles Aqueduct, 1916, p. 82.

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Since most of the Antelope-Mojave lies below this contour, delivery can harness gravity flow. The present urban areas, Lancaster, Palmdale, and Victorville, are below the 3,000-foot delivery contour, with Lancaster, the largest, at 2,356 feet above sea level.

Design capacity of the Los Angeles Aqueduct is 320,000 acre-feet

per annum, but it will, in fact, carry something like 330,000 acre-feet. Actual delivery depends on flowage constancy, rate of evaporation in open sections, seepage, and down time for repairs or maintenance. As recently as calendar year 1958, actual delivery to the city system was 328,768 acre-feet.-- In terms, then, of quantity as well as

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--Figures supplied by, Office of Water Executives, Statistical Division, Department of Water and Power, City of Los Angeles.

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Proximity, the Aqueduct could more than supply the state anticipated needs for the Antelope-Mojave of 208,000 acre-feet per year.

The City of Los Angeles has available to it, technically, a current annual delivery of 603,756 acre-feet of water from the Metropolitan Water District of Southern California. This is 49.8 per cent of the Colorado Aqueduct capacity. When current obligations assumed by annexing members are paid out, the Los Angeles entitlement will be reduced to 34.1 per cent or 413,292 acre-feet, even less depending on the relative future assessed valuations of members and tax rates established by the MWD.--

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--The entitlement of a member is the proportion of levies paid to the total paid by all members. Payments by the City of Los Angeles in tax levies for the period 1929 through June 30, 1959: \$166,308,239. Total levies paid: \$333,871,884. Total unpaid annexation charges: \$153,817,704. Metropolitan Water District of Southern California, Report for the Fiscal Year July, 1, 1958, to June 30, 1959, Los Angeles, California, 1949, pp. 152,157.

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The City of Los Angeles uses the figure 34.3 per cent or 415,716 acre-feet "estimated ultimate Colorado River entitlement; "assuming no further capital expenditure program or annexations to MWD".--

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--550.8 cubic feet per second of 1,605 cfs. City of Los Angeles, Board of Water and Power Commissioner, "A Study of Alternative Methods of Financing Metropolitan Water District's Portion of Cost of Importing Water from Northern California," February 11, 1960, "summary sheet", following p. 4.

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Los Angeles is unlikely, of course, to construct facilities capable of receiving more than the long-range entitlement somewhat in excess of 400,000 acre-feet per year. For, even if the city purchases Feather River water through the MWD, the California Aqueduct route to Southern California will deliver near the San Fernando Valley. Within the next two years, however, Los Angeles will be able to absorb 253,328

acre-feet of Colorado water into its storage and delivery system per year, <sup>though the MWD may not be able to</sup> City lines will connect with the MWD at ~~twenty-one~~ <sup>twelve</sup> points with diversion capacity of 350 second feet, <sup>four of them inactive</sup> <sub>will be able to divert 365,516 acre feet per year,</sub> <sup>within ten to fifteen years the Ci.</sup>

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--Figures supplied by, Office of Water Executives, Statistical Division, Department of Water and Power, City of Los Angeles.

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Within recent years Los Angeles has been steadily increasing its use of Colorado water. In the year ending June 30, 1959, the City diverted 82,817.0 acre-feet, 16.2 per cent of its supply and more than one-fourth the 313,820.6 acre-feet taken to that date.-- In 1957-58

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--Metropolitan Water District of Southern California, Report for 1959, pp. 37-38

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the city took only 37,729.0 acre feet, or 8.1 per cent of its supply, from the MWD.-- Nor is the increase to be considered as a result of

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—City of Los Angeles, Board of Water and Power Commissioners, Water and Power 57th Annual Report, 1959-1958, Los Angeles, California, 1959, p. 7.

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reduction in local and Owens-Mono supplies but, rather, as a result of dry conditions and the city's expanding needs.— And, while water

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—A comparison of the 1958 and 1959 figures shows Los Angeles River and other local underground supplies to have yielded greater quantities in 1959 than in 1958. The Los Angeles Aqueduct ran at capacity both years, though its yield was 1,686 acre-feet less in 1959 than in 1958. See, City of Los Angeles, Board of Water and Power Commissioners, Water and Power 58th Annual Report, 1958-1959, Los Angeles, California, 1959, pp. 6-7, and ibid., pp. 6-7.

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officials frequently estimate that they will not fully utilize the MWD entitlement until about 1990, the Department of Water and Power would like to contract for 100 second feet, roughly, 72,000 acre-feet per year, from the California Aqueduct.— In balance, then, Los Angeles

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—City of Los Angeles, Board of Water and Power Commissioners, "A Study . . .", "summary sheet", following p. 4.

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has a surplus but is taking no risks.

As part of a program of delaying the necessity of California Aqueduct delivery by 1970 or of delaying delivery to the Antelope-Mojave, however, the water quantities available to the City of Los Angeles are fully adequate. By negotiated arrangements the City could operate an exchange with the East Kern-Antelope Water Agency. The essential features of this exchange would be administrative and fiscal, rather than physical.

### 3.9. Fiscal and Administrative Exchange Features

In administering an exchange between the City of Los Angeles and the Antelope-Mojave a purchase basis could be the additional cost to Los Angeles to acquire its next available supply. The Colorado supply is the obvious alternative, but three others are possible and potential. It has been estimated that sewage reclamation in Southern California would provide a greater supply than the Owens and Mono basins at a price less than the cost of salt water distillation, a third alternative.--

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--James C. DeHaven, Linn A. Gore, Jack Hirshleifer, A Brief Survey of the Technology and Economics of Water Supply (Santa Monica: The Rand Corporation, 1953), p. 36.

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Since all California Aqueduct routes will reach Los Angeles, the City has one source presently available, two possible sources under its own jurisdiction, and a fourth potential from Northern California.

Assuming hypothetical costs for alternate supplies will allow consideration of pricing agreements. Assume the following arbitrary estimates: Los Angeles Aqueduct, \$20.00 per acre foot; Colorado Aqueduct, \$30.00; Sewage effluent, \$40.00; California Aqueduct, \$45.00; and salt water distillate, \$125.00.

If the East Kern-Antelope Water Agency were to use water from the Los Angeles Aqueduct, the alternate supply for the City of Los Angeles would determine the exchange water price. Thus, until Los Angeles had fully utilized its rights to the MWD supply, the price of water for the

the Antelope-Mojave would be \$10.00 per acre-foot, plus any additional costs incurred by Los Angeles in Distribution and plus the value of power revenue lost from the exchange. The east Kern-Antelope Water Agency would construct its own distribution system.

When the MWD source had been fully utilized, Los Angeles and the Antelope-Mojave would weigh the alternatives. Owens-Mono water would now be worth \$20.00 per acre-foot (sewage reclamation) plus the increased costs of distribution. Minimum salt water distillation cost would increase the value of Los Angeles Aqueduct water to \$105.00. Considering only the diseconomy of pumping distilled salt water to the desert, this would not be an unreasonable figure. Finally, a supply from the California Aqueduct would exchange for Owens-Mono water at \$25.00 per acre-foot. These prices, of course, assume the willingness of the City of Los Angeles to sell without profit.

Such arrangements provide water by fiscal and administrative means rather than by major construction. This frees planning for water importation from dependence on pump lifts to desert areas, if these are not otherwise necessary. Construction requirements would be, thus, considerably less than provisions of the most flexible plan for the California Aqueduct. Again, if the variety of local water supply alternatives are competitive with northern importation, these can be allowed to precede supplementary delivery by the state. Finally, as with the Kern River supply, willingness and ability to pay would be prerequisites to diversion. Since the Kern and Owens-Mono alternatives could be constructed upon demand rather than upon population-industrial projections, there

would be no possibility of dry water transportation structures to burden the California general fund.

Los Angeles Aqueduct exchanges are based upon negotiation and contract. Appropriation, "physical solution", and eminent domain are not pertinent. But since the City holds firm and adjudicated rights, there is no reason to expect the municipal authorities to jeopardize these rights. Short of risk of right, however, state water policy development might require the coordination of the Los Angeles supply with delivered supplies, in order to achieve economy of construction and/or delay in need.

#### 3.10. Legal and Administrative Conflicts

The primary problems facing an exchange from the Los Angeles Aqueduct are city policy, federal legislation, and California water code provisions regulating use of surplus waters.

Quite obviously the City of Los Angeles is opposed to the sale of water outside its boundaries, including purchase by other municipalities. Not since the defeat of bond issues in 1913 to support the "Graham Plan" for sale of surplus water to the highest bidders,--

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--Vincent Ostrom, Water and Politics (Los Angeles, California: The Haynes Foundation, 1953), pp. 153-154

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has the City of Los Angeles seriously considered sale of water outside its boundaries. Charter provisions are extremely strict. Surplus water may be sold under contracts only if limited to fifteen years, and these

contracts must contain three-year cancellation clauses. The contracts must be approved by the voters as well as by the City Council and the Board of Water and Power Commissioners.-- Water rights may not be sold

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--Charter of the City of Los Angeles, Article XXXII, sec. 220.

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or leased without a two-thirds vote. Rights to the Los Angeles River may not be sold at all. No water sale of any nature is permitted to any but a municipal purchaser or its inhabitants with its permission.--

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--Sec. 219.

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The Metropolitan Water District was forced to construct a lateral through the City of Los Angeles, across lines carrying Owens-Mono water, to the City of Santa Monica, because Los Angeles was not willing to exchange water supplies. Other lines to the West Basin Municipal Water District are similarly constructed. The Board of Water and Power Commissioners has rejected informal requests for sale of water in eastern Ventura County and in the Antelope Valley. Finally, William S. Peterson, General Manager and Chief Engineer of the Department of Water and Power, told the Assembly Water Committee in 1959 that the Board of Water and Power Commissioners does not want to sell water outside the jurisdiction.--

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--Hearings, Los Angeles, October 20, 1959.

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Clearly, then, policy and charter provisions would require revision, or state legislative policy would have to over-rule them.

In order to preserve the access rights held by Los Angeles, federal

route agreements might require modification. The Act of Congress of June 30, 1906, authorized the City to acquire a strip of public land 250 feet wide from the Owens River. Since others were interested in commercial development, Congress prevented subsequent non-municipal profit by stipulating:

Sec. 6. That the city of Los Angeles is prohibited from ever selling or letting to any corporation or individual, except a municipality, the right for such corporation or individual to sell or sublet the water<sup>sup</sup> or given to it or him by the city.--

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--34 Stat. 801.

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This provision has been incorporated into the Los Angeles City Charter.--

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--Article XXII, Sec. 219.

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If interpreted literally, the exception "municipality" probably rules out Antelope-Mojave exchange. There are no municipalities in the area, though there are seven public water districts, including suppliers in Palmdale, Lancaster, and Victorville.-- There is also the massive Ante-

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--Bulletin No. 2, pp. 288-289.

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Valley-East Kern Water Agency. The more than fifth commercial water companies and mutual water companies would appear to be ineligible, except, perhaps, through the AVEKWA. In these areas, if the City of Los Angeles were required to see direct to consumers if at all, it would not find the investment attractive.

Public districts are not strictly municipalities, and, though for

some state purposes they do qualify, the City of Los Angeles would not be likely to jeopardize its Aqueduct rights. The alternatives, short of a test case, are incorporation or Congressional action, and the latter should not be difficult to obtain if in conformity with a state water plan.

The California Water Code provides that a city holding a water right which is surplus to its present needs may be authorized "to become as to such surplus a public utility, subject to the jurisdiction and control of the Public Utilities Commission..." until it requires the use of the water.-- There are reasons why the City would not

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--Sec. 1464.

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adopt this procedure. First, the Owens-Mono supply is not currently surplus. The MWD supply is surplus, the MWD status protects these rights. Second, were the City to adopt the section 1464, the role of a public utility is not the only alternative open to state authorities. Temporary appropriation could be authorized to others to use the water for the duration of non-use.-- Los Angeles might be required to util=

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--Water Code, secs. 1462-1463.

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ize the Colorado supply until it could show a need for the Los Angeles Aqueduct. Finally, would the Public Utilities Commission consider the cost of an alternate route a just basis for computing price? These are conjectural possibilities, to be sure, but the City of Los Angeles is not likely to undertake any risk of any kind.

It is apparent that Los Angeles would need substantial guarantees,

including legislative action, before it would risk exchange arrangements to supply the Antelope-Mojave region. It would require that its own action, without any cost to itself, would return the supply when other sources could not be obtained. In other words, it would require its vested rights to be guaranteed.

### 3.11. Inter-basin Exchange

Objections to supplying the Antelope-Mojave with a Kern River exchange lie, first, in a fear of the loss of water rights. A permanent guarantee against prescription, the purpose of section 11463, protects present holders of water rights. In turn, the users to be supplied by the exchange are aggrieved by the revolvability of the new right of use. In this lies Southern California's present dissatisfaction with the Feather River program. Prospective users argue that payment for development of a water transportation system should supercede property interests. They reject any arrangement where they may be deprived of the water supply.

On the other hand, the first pertinent question is whether water charges will re-pay the costs of construction. Can operations utilizing water be conducted profitably? If so, there is no economic loss involved in construction. But the second question is directed to the private economy. Is the water supply secure enough to justify long-range investments requiring an adequate water supply? The question emphasizes the private property nature of water-rights law.

Kern River and Antelope-Mojave deficiencies distinguish these areas only in time from Northern California. The present surplus on the

Sacramento River system guarantees no perpetual abundance, even if Southern California diversions are not effected. Fundamentally, to consider the Kern as a source of exportation merely gives currency to questions of alternate supply for areas of potential deficiency. Kern River rights are vested in individuals, but, statewide, present surpluses have been vested legally in the watershed or county of origin. The difficulty of effectuating a Kern River exchange is no greater than that prospectively on the Sacramento system. In this light prohibitions against shortage exchanges, even where an outside surplus is involved, make poor economic sense. Section 11463 prevents full and economic utilization of state water resources.

Like the Kern River supply, an Owens-Mono source provides no firm water rights for users in the Antelope-Mojave region. In fact, fluctuating costs of alternate supplies would increase exchange prices. Of course, as additional sources were prepared for Los Angeles, users could allow the City slowly to reclaim its supply while they sought another alternative. The cost of salt water distillation, for example might place that source in this category. However, time increases the possibility of competitive technological improvements in salt water distillation as well as sewage effluent reclamation.

Exchange arrangements assert efficiency and economy values. Because the water-rights system vests access doctrine, long term planning for importation risks ultimate diseconomies. Unlike this, exchange developments permit solution to present and relatively short-range needs. Without creating greater legal and administrative complexity,

### 5. Exchange and Abundance

These case studies have been selected to demonstrate the types of natural and artificial conditions which should be considered in the importation of supplementary supplies to Southern California. Taken together, they emphasize the need to treat the region's water requirements and resources on a unified basis. Perhaps, also, they suggest the types of regional arrangements which may effect comprehensive water management.

Management is the use of available resources to achieve the greatest number of objectives. But if policy-makers are goal centered, still, they often do not concern themselves with the multiplicity of goals. This is all the more true where a governmental unit deals with a single function only. Thus, authorities may fail to take cognizance of demands, other than their own, for resources. Or, to be sure, they may recognize these and compete vigorously for a greater share of the total, regardless of consequences to the over-all objectives of governmental policy. Following from this kind of behavior is the situation in which a group, sharing like but separate interests, seeks to command a preponderant share of total resources and thus to minimize conflicts internal to the group.

In the semi-arid Southern California region, water shortages, conflicts over use, and the resultant litigation have crystallized into an atmosphere of conflict. This dissention has been variously muted by the growth of organization for the provision of water supply, particularly by the development of the Metropolitan Water District of Southern Calif-

ornia. But the condition seems endemic, and the participants seek to limit its repercussions by acquiring abundance of supply.

If, on the contrary, the attempt were made to secure full utilization of local supplies in order to delay importation, conflicts of use and law would occur. But, rather than seek to solve these problems, the participants avoid them, though apparently at substantial economic cost, by committing themselves to the development of supplies needed only in the long future. Like the woman who wants her pie and coffee to come out even, they pour more coffee rather than eat more pie. This permits water authorities to ignore, even if regretfully, the economies that might be achieved were they to exchange their water supplies as well as to pool their fiscal resources.

The concluding portion of this paper, therefore, will attempt to suggest the types of administrative and legal solutions to the problems which have been raised here.

a water supply is nevertheless obtained. Thus, while exchange arrangements based on an Owens-Mono supply would create no vested rights, they would entail less expenditure.

On the other hand, contractual arrangements can be written to assure security of delivery. Users could share costs of alternate supply construction, and they could agree to take designated quantities at contract prices. Guarantees of future development might attract Los Angeles. The City has invested heavily, in the past, in long-range insurance of supply, and there is no reason to anticipate that it would not consider serious offers to share capital costs. The Colorado River Aqueduct began as such an operation, municipally instigated and financed. An equally attractive future supply might procure cooperation from Los Angeles.

#### 4.1. Effluent Reclamation in Southern California

In the formulation of the "California Water Plan", the inventory of water resources available to the Los Angeles metropolitan area has redirected interest in a substantial and unused supply. State water authorities estimate that of the more than 600,000 acre-feet of sewage which the southland discharges annually, 240,000 acre-feet could be reclaimed at a per acre-foot cost of less than Feather River delivery.--

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--Bulletin No. 78, pp. II-8/11-9.

p 69

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The unfortunate aspect of this supply is that few local authorities are going ahead with plans for reclamation. The City of San Bernardino,

as a part of the controversy in the Santa Ana basin, has authorized the sale of bonds to construct reclamation facilities for recharge above the Bunker Hill dike. In conjunction with that city, the San Bernardino Valley Municipal Water District will provide a 160-acre settling basin.-- The City of Oceanside has already reclaimed

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--Los Angeles Times, February 15, 1960

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its entire sewage flow, somewhat in excess of 2,000 acre-feet per year. Faced with the choice of constructing a new ocean outfall or a water treatment plant, the Oceanside voters approved the extra \$150,000 to acquire the water supply. By 1980, Oceanside expects to be processing a daily flow of twenty-one acre-feet.--

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--Robert A. Weese and Harry H. Bailey, "Oceanside Pioneers as First Beach City To Reclaim Its Entire Sewage Flow, "Western City, XXXV (April 1959), pp. 22-23.

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Throughout the southland, of course, there are other minor programs which use production from sewage farms for agricultural purposes. In outlying areas reclaimed water is used for golf courses, parks, and athletic facilities. Some industrial firms re-use a part of their water.--

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--State of California, State Water Pollution Control Board, A Survey of Direct Utilization of Waste Waters, Sacramento, California, 1955, industrial, pp. 19,21; agricultural, pp. 35, 39, 45; recreation, p. 59.

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In general, however, the major quantities of sewage effluent in the area continue to be discharged into the Pacific, despite claims of the urgency

of state water development. State water authorities, themselves concerned with prospective delivery requirements, have shown little concern. That the development of these resources would compete, in part, with the California Aqueduct, perhaps even impair its financial feasibility, is considered only indirectly. The Department concludes

...this reclaimed water, because of its limited magnitude and because of the problems inherent in its reclamation and utilization, cannot be considered as a substitute for importation of water from northern California.--

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--Bulletin No. 78, p. II-10.

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While this may be correct ultimately, it may not be true for the next ten to twenty years.

Both the County and the City of Los Angeles as well as the West Basin Water Association have studied the practicability of reclamation of sewage effluent. In 1946 a consulting engineer supported the feasibility of effluent reclamation for the West Basin.-- The lower over-all

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--See the study done for the West Basin Water Association, Harold Conkling, An Imported Water Supply for West Basin, Los Angeles County, Los Angeles, California, 1946.

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cost led the area to annex, instead, to the Metropolitan Water District in 1948. Jointly, the chief engineers for Los Angeles County, the County Flood Control District, and the County Sanitation Districts reported the practicability and supported the reclamation of local sewage supplies.-- In 1951, Los Angeles City Engineer Lloyd Aldrich

concluded with regard to the outfall system operated by the City

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--County of Los Angeles, Board of Engineers, Report upon the Reclamation of Water from Sewage and Industrial Wastes in Los Angeles County, California, April 1949. Hereafter, Report upon the Reclamation... Los Angeles County.

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It is felt that the discharge of this treated effluent into the ocean at Hyperion constitutes an economic waste of major proportions and that this waste should be corrected as soon as possible. \*\*\* At the present time over 200,000,000 gallons of effluent (more than 200,000 acre-feet per year) are being discharged daily into the waters of Santa Monica Bay. A program of conservation to conserve this great natural resource could provide a supply of water sufficient for the domestic use of over 1,000,000 people.--

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--City of Los Angeles, City Engineer, Annual Report of the City Engineer, Los Angeles, California, May 9, 1951, p. 10.

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In the decade that has passed, only limited steps have been taken to effect effluent reclamation. The chief engineers of the Los Angeles County Flood Control District and the County Sanitation Districts recommended again in 1958 that use be made of waste waters available at the Whittier Narrows and at Hyperion.-- The City of Los Angeles, the Los

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--H. E. Hedger, A. M. Rawn, "A Report Upon the Potential Reclamation of Sewage Now Wasting to the Ocean in Los Angeles County," November 1958, p. 1.

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Angeles County Flood Control District, and the West Basin Municipal Water District have tentatively agreed to begin experimental use of Hyperion effluent in 1960-1961. The Hyperion plant includes a full secondary treatment facility which processes an easily treated effluent. The project would use this product in test wells to prevent salt water intrusion in coastal margins of the WBMWD. The LACFCD would operate these wells with partial financing by the WBMWD.--

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--Los Angeles Times, August 8, 1960, and interview with Norman Hume, Hyperion Treatment Plant, August 5, 1960.

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It seems strange that water authorities turn to the importation of supplies from Northern California in lieu of full development of these local resources. In fact, Los Angeles County Engineers estimate that the water supply being by-passed exceeds the county's annual overdraft of ground waters.-- Perhaps the most obvious reasons for this omission have

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--Hedger, Rawn, "A Report upon the Potential Reclamation . . .," p. 6.

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been public mistrust and the

dilemmas of law. The Los Angeles County engineers reached this conclusion in 1949: "Public prejudice, lack of appropriate health and nuisance standards and absence of clear, legal authorities are deterrents to such a reclamation program."-- Since the consequences of inaction,

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--Report upon the Reclamation . . . Los Angeles County, p. 11.

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however, could involve higher water costs or the financial feasibility of the California Aqueduct, these problems should be opened to wider discussion.

#### 4.2. Regional Supply and Lower Use

Because of pumping costs, effluent reclamation is most efficient if combined with re-use below the level of discharge. In the Oceanside experience more than half the capital costs were for pumping facilities to return the supply from the beach plant.-- If reclamation is only

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--Weese and Bailey, op. cit., p. 22.

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one aspect of sewage disposal investment, as it is with both San Bernardino and Oceanside, the residual cost of pump lifts may be acceptable. Both of these cities are otherwise faced with construction of outfall systems. For Oceanside, the cost of pump lifts was not much greater than capital costs for an outfall. In the case of San Bernardino, the outfall cost would be much greater. For a local government already possessing an outfall system, however, reclamation with attendant pumping costs would be a resort of lower priority.

The second cost factor in sewage effluent reclamation is related to the composition. The greater the rating of soluble parts per million and the more deleterious the mineral content, the higher the expense of reclamation. Primary removal of solids is relatively inexpensive, but to treat and abstract soluble materials is much more costly. Nevertheless, a sewage supply with a high dissolved content will corrode 2nd scale in boilers if used industrially and pollute or contaminate underground aquifers if used for replenishment.

Sewage supplies, like the economic areas from which they are generated, show substantial differences in quality. Industrial effluent is sometimes so noxious and corrosive that it is prohibited from dis-

charge into sewage lines to protect the facilities themselves. The brines from oil fields can make effluent all but unreclaimable. Even considering the increasing use of detergents, however, primarily residential areas yield an effluent more easily and economically subject to reclamation. The Los Angeles County engineers found substantial differences in quality from the separate trunk lines. Some regional effluents, for example, compare favorably with Colorado River water.--

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--See, Report upon the Reclamation . . . Los Angeles County, Table 4, "Probably Mineral Content of Reclaimed Waters Compared with Other Water Supplies," following p. 28.

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Most considerations of effluent reclamation assume that discharges which contaminate and prevent practical secondary treatment must be prevented by law before an effective program can be initiated. The Los Angeles City Engineer concluded in 1951 that certain industrial wastes would require additional legislative action. The report of the Los Angeles County engineers, voided similarly, a need for more inclusive restrictions. However, in part, the report to the supervisors recognized an alternative solution.

The Sanitation Districts have in mind the possibilities that exist to promote this necessary segregation when additional truck sewer facilities become necessary. The rapid development of the San Gabriel Valley and its corresponding need for sewerage facilities may eventually dictate a new trunk sewer roughly paralleling the existing older facilities.--

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--Report upon the Reclamation . . . Los Angeles County, P. 22.

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Conceivably of an equal affect would be a zoning policy which based restrictions upon the areal contamination of influent. Highly pollutant or contaminant industrial zoning would in some cases segregate sewage supplies as effectively as construction of separate trunk facilities. Especially if sewage effluent is not considered as an immediate source of supplementary supply, it should be possible to plan zoning restrictions which will eventually yield an economically reclaimable product. Conjecturally, zoned sites welcoming contaminant industries, rather than placing heavy costs and restrictions upon them, might provide an effective instrument for industrial planning. Except to restrict materials which would damage facilities or provide a public nuisance, sewage authorities could allow free discharge of contaminants.

#### 4.3. The Los Angeles City Supply

The City of Los Angeles in fiscal year 1959 released a quantity of sewage into the Pacific exceeding 290,000 acre-feet.-- This is a

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--262 MGD average from Hyperion. City of Los Angeles, Department of Public Works, Bureau of Sanitation, Annual Report, 1958-1959, Los Angeles, California, 1959, p. 40.

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significant rise from the 213,000 acre-feet reported from Hyperion in 1949.-- In fact, the 1959 figure is a slight reduction from 1958 due

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--State of California, Water Resources Board, Water Resources of California, Bulletin No. 1, Sacramento, California, 1951, p. 556.

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to light rainfall and the transferral of the City of Vernon from the

Los Angeles City system to county facilities.

By the year 2000, it is estimated that Hyperion will carry flow loads of 420 million gallons per day.-- Assuming a conservative

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--City of Los Angeles, Department of Public Works, Bureau of Sanitation, Annual Report, 1956-1957, Los Angeles, California, 1957, p. 42.

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average of seventy-five per cent, this is in excess of 350,000 acre-feet per year. The Bureau of Sanitation, under present plans, will then discontinue the current intermediate type secondary treatment now used for all sewage. A supply of 110,000 acre-feet per year will be given standard rate activated sludge treatment, a full secondary process. Additional flow will be given primary treatment only and discharged through the outfall. With softening, if required, the fully treated water will be "available for water reclamation purposes."--

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--Idem. 120 MGD.

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The year 2000 approximates the date at which the City of Los Angeles will require a supplement to currently available supplies. Present use could be made of this source, however, if sewage trunks were segregated by quality and a discharge zoning policy adopted. As a supplementary source the reclaimed effluent would be available for use in industrial areas of Los Angeles or for ground water recharge and salt water barrier construction in the Central and West Basin Water Replenishment District.

#### 4.4. Physical Exchange Features

In the San Fernando Valley industrial areas tend to concentrate below residential and commercial elevations.-- This development, of

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--See, Bulletin No. 2, II, plate II, sheets 1-6.

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course, could be consolidated and encouraged by discharge zoning. In addition the relatively heavy run-off incurred from rainfall in the Valley and the higher water table level that is maintained there tend to lessen contaminant concentration to within economic reach of pollutant levels. Since an effluent reclamation plant is not designed to treat all sewage but only to remove the most susceptible quantities, a plant located near the Los Angeles narrows could readily obtain the desired flow.

Preliminary, primary, and secondary treatment at the narrows could supply either industrial purposes in central Los Angeles or multiple purposes in the West Basin. Treatment at Hyperion, which would require a reduced capital development, would provide a source for a salt water barrier or industrial uses in the West Basin. Equally, the supply can be exchanged with the Antelope-Mojave region.

Both the County of Los Angeles, which could develop its own supply from its sewage outfall system, and the Central and West Basin Water Replenishment District are concerned with falling water tables and salt water intrusion. The County currently purchases Colorado River water for basin recharge through the County Flood Control District. At a reduced rate of \$12.00 per acre-foot this is more economical than estimates

of costs of reclamation. However, as members of the Metropolitan Water District utilize the total supply of the Colorado Aqueduct, these authorities will require other sources for basin protection.

#### 4.5. Legal Dilemmas

Since lower use is a physical advantage in effluent reclamation, the jurisdictional and legal aspects of redistribution must be opened to wider consideration. Judicial precedent for analysis of the affect of effluent exchange upon water rights is scarce, unfortunately. Certain of the doctrines, however, which have applied to property characteristics, abandonment, foreign waters, adverse use, salvage, duty and the peculiar pueblo right would seem to be pertinent. An evaluation of the new applications is merited in the light of potential costs and benefits.

Property characteristics. Sewage is contaminated water which has been used in the exercise of a water right. Under the California rule, water thus separated from real property becomes personal property. Water delivered to the consumer for domestic or industrial use is personal property.— Adolphus Moskovits, deputy attorney general, has

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—Lewis v. Sczighini, 130 Calif. App. 722, 724, 20 Pac. (2d) 359 (1933).

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noted two theories of the right to reclaim and re-use sewage effluent.

First, it might be reasoned that by virtue of its accepted function of receiving and conveying away waste water, the sewage system owner has been impliedly granted the right by the appropriator of the water to re-use it or reconvey it to someone else. The second theory, which may be more satisfactory, is that the sewage system owner is in possession of abandoned personal property, that is, waste water in artificial pipes, conduits and receptacles over which it has complete dominion until it, in turn, abandons the water. The owner of

the system would, therefore, have the right to reclaim and re-use the water itself or to contract to deliver it to others.--

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--"Quality Control and Re-Use of Water in California," California Law Review, XLV (December 1957), p. 600.

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This reasoning relies on common law doctrine and creates legal fictions to clarify the status of sewage effluent. In the absence of precedent, the Legislature, possibly, could define the property characteristics.

Abandonment. Sewage districts are authorized to reclaim water supplies for use or sale, and municipalities and counties have the necessary authority.-- The reclamation affect on other users, however, and upon these in special circumstances, has not been clarified. Thus,

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--California Health and Safety Code, sec. 5008; California Government Code, secs. 38730-38742, 38900.

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one who has been abandoning waters may subsequently reclaim those waters inside his jurisdiction, because previous use by others does not preempt the right. Only the water is considered abandoned and not the usufruct.--

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--Stevens v. Oakdale Irrigation District, 13 Calif. (2d) 343, 350, 90 Pac. (2d) 58 (1939).

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However, the first California case on water rights led the Supreme Court to a different conclusion. The prior appropriators had abandoned the use, and they were not permitted to reclaim the supply. They had left their premises to do so, and others had, meanwhile, applied the water to beneficial use.-- The more liberal Stevens doctrine has allowed a foreign

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--Eddy v. Simpson, 3 Calif. 249 (1853).

appropriator to sell waste waters even when others have been using these beneficially. In that case, the new user lay below the waste appropriator, but the rule against upstream prescription was applied.--

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--Haun v. DeVours, 97 Calif. App. (2d) 841, 844, 218 Pac. (2d) 996 (1950).

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Foreign waters. These decisions have governed appropriated foreign waters to which riparian rights do not attach.-- Waste waters not for-

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--E. Clemens Horst Co. v. New Blue Point Mining Co., 177 Calif. 631, 635, 641, 171 Pac. 417 (1918).

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foreign to a watercourse, however, are subject to appropriation or to riparian rights. While quantitative beneficial use measures an appropriation,-- reasonable diligence is allowed in putting the water in actual

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--Felsenthal v. Warring, 40 Calif. App. 119, 133, 180 Pac. 67 (1919).

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use,-- and a municipality may appropriate for future use, present waste

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--Now determined administratively, California Administrative Code, Title 23, secs. 776 and 777.

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not being allowed.--

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--California Water Code, sec. 1203.

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Adverse use. In the south coastal basin, release through outfall lines prevents lower sewage reclamation. In excess of ninety-five per cent of sewage flow is discharged at sea in Los Angeles County.-- It

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--Report upon the Reclamation . . . Los Angeles County, p. 11.

is presumed that governments have a prescriptive right to continue such disposal, because lower users have not reclaimed or applied the sewage effluent. Even if these units have gained a prescriptive right to discharge sewage, however, no prescriptive right to reconvert the sewage has been created. Prescriptive rights are limited to the adverse use creating the right.--

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, --Moore v. California Oregon Power Co., 22 Calif. (2d) 725, 740, 140 Pac. (2d) 798 (1943).

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Salvage. Where treated sewage waters settle in a basin, such as in the upper Santa Ana, reclamation authorities would have to claim the re-use right under salvage doctrines. The agent saving water is entitled to the amount salvaged, provided lower users obtain the natural supply.--

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--Wiggins v. Muscupiabe Land & Water Co., 113 Calif. 182, 196, 45 Pac. 160 (1896); Pomona Land & Water Co. v. San Antonio Water Co., 152 Calif. 618, 662, 664, 93 Pac. 881 (1908).

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According to Wells A. Hutchins, western salvage cases require proper safeguard of other supplies and allow the first salvage right to the person making the improvements.-- There must be an actual savings, how-

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--Selected Problems in the Law of Water Rights in the West (Washington, D.C.: United States Government Printing Office, 1942), p. 372.

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ever, and if it is shown that the water would have naturally become available to prior and paramount users, there is no salvage.

Use made possible by reclamation of effluent when the water would otherwise have percolated is applicable to the Raymond Basin, for ex-

ample. Pumping rights have been adjudicated and the overall supply limited to the harvest of the annual water table replenishment rate.--

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--See, Pasadena v. Alhambra, 33 Calif. (2d) 908, 207 Pac. (2d) 17 (1949).

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In such a case, where sewage could have otherwise been discharged at sea, the use would be supplemental and not abstractive. On the Santa Ana, however, San Bernardino's new sewage treatment plant has been designed for alteration to provide a satisfactory effluent for basin recharge. Officials believe this might provide increased water table stability.--

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--"San Bernardino's Sewage Program Financed by Bonds, Service Charge," Western City, XXXV (April 1959), p. 29.

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But water use, if Los Angeles is a valid example in its San Fernando Valley experience, provides only about one-half its amount in sewage.--

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--In Fiscal Year 1958-1959 the City of Los Angeles used 456.6 million gallons of water per day average and produced 208 MGD of sewage effluent. City of Los Angeles, Board of Water and Power Commissioners, 58th Annual Report, 1958-1959, p. 11. City of Los Angeles, Bureau of Sanitation, Hyperion Treatment Plant, telephone interview, August 12, 1960.

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Evaporation and evapotranspiration consume the remainder. Thus, re-use would reduce the lower Santa Ana basin supply and could not be considered salvage.

Duty of Water. Certainly, the City of Los Angeles, or any other city, may not be required to reclaim its sewage effluent or to continue reclamation once it should begin an elastic program. No such duty of water is demanded by the 1928 constitutional amendment.--

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--Pasadena v. Alhambra, 33 Calif. (2d) 908, 934-935, 207 Pac. (2d) 17 (1949).

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However, might those who wished to reclaim the supply demand access to the City's sewage discharge. In a case where long-continued means of water diversion were shown to yield losses as great as forty-five per cent, the Supreme Court accepted the custom of the area, refusing to accept the most scientific methods as the measure of "reasonable".--

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--Tulare Irrigation District v. Lindsay-Strathmore Irrigation District, 3, Calif. (2d) 489, 573-574, 45 Pac. (2d) 972 (1935).

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However, in the Tulare case the court measured the junior appropriator's desire to save water by his willingness to defray the cost.-- Why would

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--Idem.

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this approach not apply to reasonable waste by sewage disposal?

Pueblo right. The implications of water rights are pertinent to the City of Los Angeles with reference to Angelope-Mojave exchanges as well as to local exchanges. Adjudication of the pueblo water right held by the City of Los Angeles has expressly permitted the operation of a sewage system as against other rights on the Los Angeles River supply.--

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--Los Angeles v. Pomeroy, 124 Calif. 597, 57 Pac. 585 (1899).

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The city's needs have always limited the exercise of the pueblo right, however.-- Therefore, lower riparians and appropriators could require

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--Los Angeles v. Glendale, 23 Calif. (2d) 68, 75, 142 Pac. (2d) 289 (1943).

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Only the water not needed for municipal use.-- However, exercise of

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--Los Angeles v. Baldwin, 53 Calif. 469 (1879).

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the right does not allow the sale of water outside the city.--

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--Feliz v. Los Angeles, 58 Calif. 73, 79-80 (1881); Vernon Irrigation Co. v. Los Angeles, 106 Calif. 237, 250-251, 39 Pac. 762 (1895).

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Would these settled rules govern reclaimed sewage effluent?

Salvage or prescription rules would leave the right of use free and clear. On the other hand, reclamation would provide a present surplus for use, and the use-as-needed pueblo right might create access to water if it were economically useful below the Los Angeles jurisdiction. The important factor would be whether the existence of a surplus required the City to allow use by others of either native or foreign resources, however. If the salvage or adverse use doctrines were not applicable, the right to sell the water supply as against lower prospective users could be successfully litigated. And, as in Los Angeles v. Glendale, other basin cities could continue to draft from the basin until Los Angeles required the supply. A surplus would permit pumping in the San Fernando Valley until the reclaimed sewage effluent supply were fully utilized.-- Apparently, Los Angeles can

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--See, Los Angeles v. Glendale, 23 Calif. (2d) 68, 80-81, 142 Pac. (2d) 289 (1943).

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most safely avoid litigation by non-reclamation or by flexible development limited to immediate needs. The Colorado supply, with its protected status under state law, can be treated as the surplus.

## Chapter IV

### EXCHANGE ARRANGEMENTS: THE SANTA ANA BASIN

Exchange arrangement features can be distinguished as they emphasize reclamation for lower basin use, transfer between hydrologic basins, and devotion to upper basin use with lower basin replacement. The first avoids increased water importation. The second deals with management external to the basin. In the final category management within the basin defines importation. These approaches are not mutually exclusive. They do serve to point up merits involved in the variety of exchange arrangement solutions. ✓

Basin management, the third approach, is particularly pertinent to the south coastal basin. In that area three hydrologic determinants characterize river basins. Los Angeles, San Gabriel, and Santa Ana River supplies rise in the mountainous watershed areas. The erratic water crop is stored in natural fault and hill defined reservoirs in the upper plains and valleys. With limited withdrawal this storage releases a relatively consistent supply to percolate and flow to areally impervious, clay-capped ocean plains.

Recent Santa Ana basin litigation-- follows the pattern ✓

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--The broadest, publicized case is Orange County Water District v. City of Riverside et al., 173 Advance Calif. App. 167 (1959).

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seeking an approximation to natural supply.-- California

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--Defined as any determination of the quantity of water available in an area over a given time. This is to be distinguished from the riparian claim to natural flow.

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courts have long since accepted the water supply interconnection principle.-- Hydrologists and hydrographers can determine

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--On this point Wells A. Hutchins concludes, "The physical inter-connection of natural water supplies is thus an essential factor in their maintenance and their usefulness. The legal interconnection or coordination of rights of use that attach to various portions of interconnected water supplies is just as essential to the protection of rights in the lower level supplies. Rights to the use of water---appropriative, riparian, correlative overlying---that attach to the various recognized kinds of water sources are necessarily affected by the exercise of rights in higher level water sources with which they are physically interconnected, and could be impaired or destroyed by the unregulated exercise of the latter. In California, aside from diffused surface waters---as to which there is a paucity of authority concerning rights of use---the principles established by decisions rendered in this field since the turn of the century point to a high degree of correlation." Wells A. Hutchins, The California Law of Water Rights (Sacramento, California: State of California Printing Division, 19560, p. 515.

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the degree to which surface diversions deplete the underground supply and vice versa. With doctrine and data holders of water rights have required conditions substantially approximating a natural state in the south coastal basin. To be sure, at any given time conditions impose limits upon ability to determine natural supply. The cultural level redefines soil and water

interaction. Again, acquired rights conflicting with natural flow prevail. But within such limits the general proposition holds.

Two operations <sup>are used</sup> seek to define this water use: Safe yield measures the total that may be taken from the common supply. "Reasonable beneficial use by reasonable means of diversion and use" is the standard of how and by whom the water may be diverted.-- These formulae seek to balance individual

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--"The safe yield from a body of ground water under any given set of conditions may be defined as the amount of water which can be continuously extracted from it for useful purposes over an unlimited period of time." State of California, Department of Public Works, Division of Water Resources, Referee, Report of Referee, City of Pasadena, a Municipal corporation, Plaintiff, vs. City of Alhambra, a municipal corporation, et al., Defendants, No. Pasadena C-1323, Volume 1, p. 115. Safe yield becomes a standard as well as a measure when tied to natural supply, as it is.

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← cost and maximum production.--

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--Production volume involves not only current producers but all who might produce (less those who might withdraw) given permitted volume at varying per unit cost. A water use tax operates in a similar fashion.

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Excluding importation, some total basin draft limit is essential. But immediately supply supplement importation is considered, delivery point becomes pertinent. This usually

means entire basin delivery by pressure, elevation combination. In the event only a basin portion pays the water transportation cost, the delivery plan need envisage only that area.

This approach essentially concerns itself with external basin management, i.e., how water is to be obtained and delivered. Within the basin, supplemental water is normally added to the existant water system. While supplemental delivery may be modified to serve the present distribution system, seldom is consideration given current use modification to facilitate importation. This is a comment on the normal supplemental supply approach: to obtain a large supply for the far future. In these terms it is unnecessary to coordinate the present supply and the supplement. The latter is temporally incremental at best.

Even accepting these conditions, internal basin management to coordinate with supplementary supplies is hydrologically feasible in the south coastal basins. The historical experience of the City of Los Angeles with the San Fernando Valley underground reservoir is one example. To reverse this method might provide utility. Delivery could be below the mountain base reservoirs, allowing the latter watertables to fall far below current limits. This would provide future storm storage not now available. This amounts to a natural supply reservation for a basin portion least easily served by imported water. In terms of the Santa Ana basin, as a case, one might consider the entire naturally occurring supply to be available above the Bunker Hill Dike, the Riverside Narrows, or Santa Ana Canyon.

In determining boundary, the first essential feature is a ground water reservoir sufficient to carry the area over the long Southern California dry cycle period. In fact, it is not entirely possible to hold the supply from lower basin areas. In the Santa Ana in extensive rainfall years it is never possible to absorb all surface flow. In normal years ocean wastage follows south coastal storms. Urban development and flood control measures are expected to double present mean storm outflow. Upper Santa Ana effluent seepage, especially from the Bunker Hill subunit,

has normally been roughly proportional to ground water elevations northeast of the Bunker Hill Dike. However, in recent dry years when ground water levels have been abnormally low, deviations from this proportionally have been observed. Greater effluent seepage has occurred with a given ground water elevation than would have been predicted from data for more normal years, and it appears that ground water levels could be lowered indefinitely without reducing effluent seepage below certain minimum amounts. This may indicate that rising water from the confined aquifers is small under such conditions and that effluent seepage is largely from applied water in the pressure area reaching the streams via the perched free ground water.--

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--State of California, Department of Water Resources, Division of Resources Planning, Santa Ana River Investigation, Bulletin No. 15, February 1959, p. 21.

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This is an entirely different consideration than that portrayed in Pasadena v. Alhambra where the appellants maintained that the basin should be drawn down for future storage. What was neglected there was provision for areas dependent on Raymond

basin outflow. In the absence of provisions, underground storage drafts could only produce a deficiency.

Following the 1949 decision an exchange arrangement operated in the Raymond Basin. The basis was along the policy lines followed by the City of Los Angeles in internal water management. Pasadena purchased water from the Metropolitan Water District, selling to other cities the rights she had acquired to the Raymond supply. The alternative method would have been to release the MWD supply at a lower level to replace the water which Pasadena would draw in excess of her basin rights.

*Edwards*

In both the San Fernando Valley and the San Gabriel (as well as the Raymond Basin) there are existing delivery systems which would make such exchange arrangements superfluous. In the upper Santa Ana, however, there is no delivery provision for an outside supplementary supply. The cost of delivering MWD water to some areas would be impractical or nearly impossible. One crucial factor in both San Bernardino Valley Municipal Water District MWD annexation elections appears to have been the back taxes payment costs to MWD without water delivery provision.--

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--Of course, this is frequently the case with annexations to the MWD. Back taxation is a condition for annexation, the funds made available providing the repayment cost to complete the second barrel of the Colorado Aqueduct. The MWD does not provide a distribution system internal to any district but merely sells wholesale. The San Bernardino Valley happens to provide particular internal delivery difficulties which have not plagued other areas to the same degree. The areas least likely to obtain service from the SBVMWD have most strongly opposed MWD annexation.

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it could be made advantageous that the SBV.MD has not constructed a delivery system. Hydrologic data appear to make it practical to devote the Santa Ana supply to upper basin areas obviating distribution system construction cost or MWD lateral construction.

Orange County Water District v. City of Riverside made reference to earlier litigation to describe the San Bernardino basin: "The whole mass of underlying strata composing this basin is saturated with water.-- Whatever

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--at 173 ad. Calif. app. 136.

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the present depletion, the basin has a huge capacity.

It is about twenty-five miles long from northwest to southeast, and ten miles wide. \* \* \* The porous material filling the bed of the ancient lake is at least one thousand feet in some places.--

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--San Bernardino v. Riverside, 186 Calif. 7, 11, 12, 198 Pac. 784 (1921).

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In 1956 after a long series of dry years, record wells were at levels ranging between 100.3 and 321.8 feet below the surface.--

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--State of California, Department of Water Resources, Water Supply Conditions in Southern California During 1955 and 1956, Bulletin No. 39-56, March 1957, p. 45.

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A measurement of a 100-foot depth zone, fifty feet above and below the water table, showed a capacity of 591,000 acre-feet.--

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--State of California, Department of Water Resources, Division of Resources Planning, Santa Ana River Investigation, Bulletin No. 15, February 1959, p. 34.

The probable mean seasonal consumptive use for the same area is 145,100 acre-feet.-- Under probable ultimate

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--Ibid., p. 62.

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water supply development and utilization conditions there will be an inflow of 145,200 acre-feet and an outflow of 64,700 acre-feet. For the eleven year base period 1927-28 through 1937-38 the figures were 122,700 and 35,500, respectively.-- Estimated mean annual rainfall for the same period

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--Ibid., p. 22.

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is 116,100 acre-feet.-- It is these conditions that lead

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--Ibid., p. 15.

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to need predications based not upon supply deficiency but upon quality considerations for lower unit outflow. Even under long-term depletion, the basin holds immense management potential.

The first requirement of such an exchange arrangement would be total rights clarification throughout the Santa Ana River basin. Not only cities but private users would have uses measured and permanently limited<sup>ae</sup> to quantity. As in

Orange County Water District v. Riverside it would make no difference what lower basin rights were if upper basin rights could be fixed. On the basis of this determination, it would be a mechanical operation to allow increased pumping in the upper basins. Each party drafting in excess of fixed quantity would pay the lower basin replacement cost.

The MWD line crosses the Santa Ana above Prado Dam. Means to provide the SBV-MWD with an increased water supply without importation are apparent. By annexing to the Metropolitan Water District, the SBV-MWD could use water quantities limited only by local factors, ignoring out-flow requirements. The water obtained by MWD annexation would provide an extended right to pump the local valley reservoir. In return, water so taken would be replaced at lower system points. This would provide mixing to control quality as well as quantity.

It will be important to determine the degree and the quantity to which this would increase water availability in the upper Santa Ana. One bench mark for planning purposes would be an amount obviating an alternate supplementary supply through the California Aqueduct. Short of this would be an increase sufficient to delay aqueduct delivery to Southern California until areas outside the Santa Ana require it.--

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--See State of California, Department of Water Resources, Feather River and Delta Diversion Projects, Investigation of Alternative Aqueduct Systems To Serve Southern California; effects of Differences in Water Quality, Upper Santa Ana Valley and Coastal San Diego County, Bulletin No. 78, Appendix B, January 1959.

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Important in Southland delivery calculations by the California Department of Water Resources is a required Santa Ana basin delivery date. If severe economic losses will occur in that basin unless non-Colorado River water is used, the construction of the aqueduct development is assumed to be the date of requirement. This is presently 1970.-- Could

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--This accepts the proposition that the State of California and the taxpayers place a high priority on the maintenance of an agricultural economy in the Santa Ana River basin. The Metropolitan Water District disputes these particular predictions of need by 1970, however. See the study prepared for the MWD, James M. Montgomery, Effects of Differences of Water Quality, Upper Santa Ana Valley and Coastal San Diego County, Pasadena, November 1959.

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exchange methods delay this date, there would be a more widespread need throughout the South Coastal basin. Sewage reclamation and salt water distillation considerations could possibly be effected with a permissive period extension.

## LEGAL AND ADMINISTRATIVE REQUIREMENTS

For at least sixty years California water planning has faced an inherent dilemma. It must reconcile future needs where supplies are abundant with present demands where water is scarce. The role the state now chooses to play is of dictating importance.

Generally speaking, the current administrative solution is to seek major firming and conveyancing structures furiously. This is a time buying policy. If enough money is spent and enough water is supplied, the abundance will satisfy.

This is drastically unlike past attitudes. The State has always recoiled in the face of the dilemma. The twin problems have been left to local solution. Unfortunately, traditional approaches to water shortage including the structure of private water rights law are not satisfactory when the State begins to intervene.--

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--See California, Legislature, Senate, Joint Committee on Water Problems, Ninth Partial Report: Report of the Counties of Origin Subcommittee, 1957: Regular Session. The Appendix contains: California State Chamber of Commerce, "Report of the Subcommittee on "Areas of Origin" of the State-Wide Water Resources Committee," p. 155-173; "Report to Edmund G. Brown, Attorney General of California, by the Attorney General's Committee of Water Lawyers on County of Origin Problems," pp. 174-208; "Report, State Department of Water Resources," pp. 209-218. Hereafter, Ninth Partial Report.

The Attorney General, in his opinion on the constitutionality of surplus areas reservations, emphasized that

Distribution of the aggregate water resources of the State by a public agency acting in the public interest could not, and cannot be effected wholly within the framework of a water law whose 'first in time' and 'appropriation to beneficial use' concepts are adequate and equitable in the settlement of controversies between the limited interests of plaintiff and defendant in private litigation.--

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--25 Ops. Calif. Atty. Gen. 8 (1955).

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The primary difficulties arise from legislative inaction in the face of immovable stare decisis. California Legislative attempts to provide a water use system have been stifled. Water resources have generally been developed as private holdings and the courts have prevented an active, legislative role in private water rights law.

In essence, the more recent pattern attempts to create two spheres, one for private water rights law and another for public development. It is not unexpected that the two conflict, since the differences are more often in kind than in magnitude. The larger activities threaten to swallow local prospective developments. The small projects hamper major projects, when they do not destroy feasibility. This spheres dichotomy is, of course, a generalization. The policy-making branches have themselves established the reservations as part of public water law.

The dual policy's result has been to <sup>gear</sup> broad developmental programs toward least interference with local supplies. It is probably not correct to conclude that construction and operation economy have not been demanding considerations. But the dual water development policy necessitates a construction program with one hand tied. Some resources are off limits to planners. Exchange arrangements must by definition impinge upon use rights to specific sources. The dual policy severely restricts use flexibility by segregating presently beneficially applied quantities unless voluntary arrangements can be secured.

No solution can avoid integration of private and public water resources policies. One solution would be to separate the usufruct from its sources and to quantify rights. The California courts have shown vigorous determination not to quantify riparian rights,-- but they have partially succumbed in the

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--Prather v. Hoberg, 24 Calif. (2d) 549, 150 Pac. (2d) 405 (1944).

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case of underground supplies.-- Could an administrative agency

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--See Pasadena v. Alhambra, 33 Calif. (2d) 908, 207 Pac. (2d) 17 (1949).

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be charged with ascertaining proportional shares in riparian or underground waters?-- A proportion can be interpreted annually

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--For a broadened consideration of the court interpreted role of water administration, see Temescal Water Co. v. Department of Public Works, 44 Calif. (2d) 90, 280 Pac. (2d) 1 (1955).

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as a quantitative share. Fluctuating as this might appear, annual rainfall variation will in any event require a regulated water delivery. Combined with repeal of the abundance restrictions on exchange arrangements, this would permit commingling and physical solution not limited to one watercourse. Analogous to the appropriative right there would be no concern<sup>as to the source</sup>.--

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--See Hoffman v. Stone, 7 Calif. 46 (1857); Los Angeles v. Glendale, 23 Calif. (2d) 63, 142 Pac. (2d) 289 (1943).

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The analogy to the physical solution is also apparent.

Increased use of eminent domain is an alternative, however, which accepts the dual water policies. Taken together, voluntary agreement, commingling and/or physical solution, and eminent domain should provide adequate machinery for task accomplishment.

These means would depend upon State assumption of water administration obligations. The approach suggested by the Department of Water Resources provides that the State

...assume a continuing responsibility for the proper and timely development of the water resources of the state in coordination....Where necessary, the State shall either construct water projects or provide financial assistance to local public agencies....--

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--Proposed amendment to Article XIV of the Constitution by the Department of Water Resources, in Ninth Partial Report, p. 214.

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The policy and mechanics are meaningful in a public utility sense where water quantity is delivered, rather than a source.

A State obligation to redistribute water is not simply a local projects gestalt. If a local jurisdiction desired an increased water supply it would assume a bonded indebtedness. The California Water Plan is not a congeries of local obligations. As presently proposed, local units will only contract for water delivery. California will assume the financial obligations as statewide indebtedness. Demanded rights to firm water quantities under non-abridgeable contracts could only be balanced by agreements to take fixed delivery at established prices.

The purposes of such a requirement are three: financial feasibility, valuation of water, and review of alternatives. Water is not so precious a substance that it can not be valued and efficiently priced. Water is worth what it costs to deliver. Any contrary assumption is contradicted by payment in taxes and charges. Population projections and water use ratios are useful for long-range planning. But contracts for delivery have no substitute in determining financial feasibility. This does not prohibit expansion planning. Authorities might provide for presently undeveloped areas. This is a statewide obligation deserving recognition on its own merits. It will not do to prepare unrealistic contracts declaring proven over-all financial feasibility.

In a full contract, service and consideration, both parties benefit. State authorities can require full local resource

utilization in preface to contracts. Water cost knowledge forces users to consider the resource alternatives which can otherwise be ignored. Sewage reclamation and salt water distillation must be studied within reasonable cost reduction projections. Mandatory development and delivery obligation secure minimum state financing.

Though generally framed as legal questions, "county of origin" and "area of origin" problems are primarily political and economic. Northern California's vast water resources drain from the mountains in less than half the year. Excepting lands riparian to major rivers, the North requires firming structures beyond the region's present and predictable bonding capacity. In part this is due to federal land holdings which are uncounted in assessing valuation. This is the economic problem.

Presently far behind the San Joaquin Valley and Southern California in population and industrial development, the northern area lacks political power to secure development. The financially feasible projects within a foreseeable future are smaller up-river dams and reservoirs. Reasonable growth might sustain these with state development and user repayment. However, projects planned to provide southland diversion could utilize the full quantities. Little or no supply would remain for future development. Even assuming perfect operation and bond <sup>repayment</sup> Southern California need satisfaction might lessen impetus for northern development. This is the political problem.

The Feigenbaum Act of 1927 provided for filings to reserve

unappropriated supplies for a state water plan--- Then in 1931

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--Calif. Stats. 1927, chap. 286; California Water Code, sec. 10500.

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the Legislature adopted the requirement, now codified, that

No priority under this part shall be released nor assignment made of any appropriation that will, in the judgment of the Department of Finance (Now Department of Water Resources), deprive the county in which the appropriated water originates of any such water necessary for the development of the county.--

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--Calif. Stats. 1931, chap. 720, p. 1514; California Water Code, sec. 10505.

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In 1933, the Legislature specifically limited the Central Valley Project operating authority from depriving a watershed or area of origin or a conveniently served area

...of the prior right to all of the water reasonably required to adequately supply the beneficial needs of the watershed, area, or any of the inhabitants or property owners therein.--

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--Calif. Stats. 1933, chap. 1042, p. 2650; California Water Code, sec. 11460.

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The California attorney general has ruled that water taken and used elsewhere can be reclaimed against the authority when need develops.--

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--25 Ops. Calif. Atty. Gen. 8 (1955).

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The State's apparent authority to abridge contracts with political subdivisions also limits rights which the south may acquire. Together, these reservations would force Southern California to support appropriations to supply dams and reservoirs for northern future needs. Water supply loss would be the alternative. These provisions are northern legal insurance against the economic and political weaknesses inherent in the present position.

Southern Californians have proposed a variety of solutions. One method procedurally determines the ultimate quantity believed to be needed in the area of origin. This quantity is to be reserved. The remainder is to be subject to State of California development. Deficient areas are to buy firm rights under legislatively inalienable contracts. This approach removes the legal brace for the political and economic northern weaknesses. There remains no state development guarantee. A water supply is reserved. This may prove inadequate, however, if projections are incorrect.

Other compromise formulas would follow this focus--

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--"Proposed Amendment to Article XIV of the California Constitution To Be Enacted as a Statute Pending Its Adoption by the Electorate," in Ninth Partial Report, Section 6, pp. 203-204.

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but would establish a development fund partly beyond Legislative control. The fund would finance California Water Plan projects

as these became financially feasible. There is also the possibility of water contracts which source may be changed to pre-specified alternatives.--

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--Ibid., sec. 8, pp. 205-206.

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As passed by the 1959 Legislature and referred to popular approval, S.B. 1106 would issue \$1,750,000,000 in bonds to develop the California Water Plan. Additional appropriations for a special Fund are to be approved by the Legislature. Prospective income above costs is to return to the Fund. The bonds, should the development not pay its way, are to be a lien on the general revenue. Bonds totalling \$130,000,000 plus a share of income above costs are to provide firming structures in the areas of origin. Deficient area water delivery contracts are to be irrevokable until bond retirement. This supercedes for the period Water Code sections 10505 and 11460-11463.

This legislation provides "something for everyone". Southern California is to be provided water transportation and northern structures to firm the supply. Bonds plus tidelands revenue will provide the initial expenditures. Bond repayment is not due until after 2000 A.D., conceivably as late as 2040 in some cases. This lies beyond efficient prediction.

The areas of origin will have available for development the bond revenue, any surplus over operation and maintenance costs, and additional legislative appropriations. At worst there will be \$130,000,000 to meet developing needs. Until the bonds are

redeemed these areas will not be able to tap the export firmed supplies. In the short run, therefore, the areas of origin stand to achieve little state aid for water resources development. A long-run, abundant supply could be available at southern expense.

In essence, the proposed development is a system of immediate, massive water transport. Development is greater and earlier than proven required. Staged transfer economies are ruled out and predictability and clear financial feasibility bypassed. So-called "ultimate" requirements are substituted and massive structures planned. Reservations for areas of origin are preserved. Ultimately, the dual policy is susceptible of reduction entirely to private water rights.

Present State water plans are geared to magnitude. The Feather River delivery system is but partly staged. Maximum depth and width canals are initially constructed. If thirty-year predictions are accurate, economies are achieved. Such savings are desirable if use justifies, but no one can really demonstrate this to be the case. Long partial use would cancel financial feasibility and savings. A first California water development principle is thus maximum possible delay. Potential delay harm is to be avoided by full local resource use. This means sewage reclamation, salt water barrier construction, and foothill basin management.

A second principle is removal of exchange arrangement restrictions. Authority to negotiate and condemn exist. Authority should be granted to operate by diversion, commingling, physical

solution, or other method not harmful to pre-existing rights.

Third, where necessary to accomplish programs use rights should be separated from source and quantified. Land value is not reduced by source substitution. What then is the cost of condemnation? Presently unappropriated water supplies should be granted under permit and license only quantitatively and not by source. This requires legislative modification of the appropriation process.

Fourth, the state should be empowered to require full available resource use by reclamation or exchange prior to state supply delivery.

Fifth, State water delivery should depend on purchaser capability to finance and construct facilities for an adequate hydrologic and service area. The distributing authority should be able to assume contract obligations for fixed delivery. The authorities should be adequate to effect water exchanges, sewage reclamation, or other measures for full local supply use.

The Antelope Valley-East Kern Water Agency creation provides an approach to assumption of statewide water distribution responsibility.-- The law provides the necessary machinery

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--See SB 1068, secs. 49-96.

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to receive water. SB 1068 blankets the Antelope-Mojave portions of Kern and Los Angeles Counties into a single water authority which becomes an operating reality when the first board of

directors is appointed by the Governor. In this case the State has acted to fill a local administrative vacuum which would limit water distribution in the Antelope-Mojave.

The Antelope Valley-East Kern Water Agency is given extensive authority to provide a comprehensive water distribution system. The Agency may join the Metropolitan Water District of Southern California. It may join with any public agency to develop supplies jointly. The Agency may acquire any other water supply by purchase or contract and may condemn private holdings within its boundaries. It may salvage water supplies. It may issue bonds and has adequate taxing authority.--

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--SB 1068, sec. 61.

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The Agency may use financial operations to induce underground basin users to substitute a surface provided supply. There is no power to force such substitution except by condemnation. There is no limitation upon what the alternate supply might be, however. The Agency would be free to substitute a supply from the Kern River, Owens-Mono, the Colorado, or the north. Reclaimed sewage effluent might be used. In general, there is little limit to the Antelope Valley-East Kern Water Agency ability to perform general supply functions and exchange operations within existing legal limits. Further, the Agency is adequate as a unit to perform mandatory exchanges of the above sources if the state authorities required this prior to

water delivery.

In Southern California no districts or authorities exist which could perform the exchange arrangements previously discussed under one jurisdiction. An individual city such as Los Angeles could reclaim its own effluent, but not entirely within the framework of lower user economies. Extensive units such as the West Basin Municipal Water District do not have control of sewage produced within their jurisdictions. The County of Los Angeles has no sale guarantee for reclaimed effluent, except the flood control district. No agency has control of the Kern or could tap the Owens-Mono supply.

The Antelope Valley-East Kern Water Agency is perhaps designed to provide an advance solution for metropolitan status. The enactment case is probably not analogous to an already developed metropolitan region. Accessions to the Southern California Metropolitan Water District have been mostly determined by pressing supplementary supply needs. The MWD, further, is not a distributor and does not control any supply other than the Colorado. It would be most unfortunate, viewed as district and agency multiplication, to create a new authority to perform south coastal basin exchange arrangements. To substitute the Department of Water Resources for the existing agencies would be equally difficult, with the Kern River supply exception.

The area pattern is decentralized distribution with both centralized and decentralized water transportation. Where potential supply users have not formed a common distribution system centralized water transportation has been adopted.

To be sure, contract operations would have applied. A mixed system is used in a portion of the Raymond Basin. This has been a special rule exception.

The MWD provides no overlapping exchange example because its exclusive concern has been transportation rather than distribution. The geographical features of effluent reclamation provide a special operations basis rather than general network transportation. Nevertheless, these supplies are extensive and require specialized governmental coordination. If effluent is to be mixed with other supplies across boundaries or if other supplies themselves are to be exchanged beyond boundaries, administrative machinery is required. The negotiations pattern could, of course, take place between the distribution agents themselves. For exchanges of any distance, however, the transportation factor is a hindrance. In addition, limited exchanges not fully utilizing native resources might limit use flexibility. Extensive basin exchanges are more analogous to the MWD function than to that of any other existing administrative unit.

Accepting the need for formal south coastal basin water use coordination, the MWD may provide the most feasible unit, politically, economically, and geographically. There has not been a high Southern California correlation between these kinds of communities. Concentric development has largely maintained and somewhat institutionalized a sporadic community character. The Metropolitan Water District of Southern California has a political, service character and occasionally attempts to provide some direction in regional water policy. In public water questions

the MWD position is, however, supplementary to constituent unit policy positions. Northern water importation is only the latest example. Except in State policy planning there is no south coastal basin water community but rather a series of communities wherein the MWD is a mosaic unit.

It is this water community lack, whatever that term may mean empirically, which the State of California is attempting to solve in the Antelope-Imojave. Whether by special district or otherwise, the south coastal basin requires some such unit, perhaps more to increase native resource use than to accept imported supplies. The California Water Plan would do the water community concept a disservice to contract delivery to the MWD constituent units. A device to further the water community might consist in assigning local use development responsibility to the MWD.

The upper San Gabriel and Santa Ana basins are not Metropolitan Water District members. These areas could provide separate facilities, but this might increase the overall local and state costs. Again, water quality control and basin management are not fully possible without these units. In physical fact these units are parts of a whole. Some annexation arrangement segregating the Colorado supply might be considered. The three municipal water districts involved continue to refuse MWD back taxes while the Colorado Aqueduct supply may be lost through litigation. In any case, an exclusion would vitiate the attempt to integrate local water resource use.

Maximum use flexibility and its economies are the advantage assignable to developing a south coastal basin water administration unity. If the State does not require full

local resource use as an importation condition or if contracts are negotiated with any independent unit capable of water distribution, there is no point in providing further regional water organization. The physical development requirement of regional water community depends upon the state assumption of water development and supply obligations. While the State of California is not to be a water distributor, economic feasibility involves local as well as transportation system costs.-- This encompasses

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--The Department of Water Resources has based its support for the so-called high-line on this factor, in part. See Chapter VI, "Conveyance and Distribution of Imported Water Within Service Areas," in State of California, Department of Water Resources, Feather River and Delta Diversion Projects, Bulletin No. 78; Investigation of Alternative Aqueduct Systems To Serve Southern California, January 1959, pp. VI-1 to VI-27.

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potential exchange arrangement economies, even when rejected. Not to assume these obligations may price State water off the immediate market.

The attempt to provide future coherence and water use unity in the Antelope-Mojave is required in all areas of need. California water program financial feasibility depends on use rationalization through widespread application of these purposes. The core of this device is the lodging of political and administrative authority sufficient to achieve use flexibility.