

WATER SECURITY AND FUTURE DEVELOPMENT IN THE SAN JUAN BASIN: THE ROLE OF THE SAN JUAN BASIN AUTHORITY

Prepared for the
San Juan Basin Authority
and the
National Water Research Institute

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EXECUTIVE SUMMARY

This report presents and discusses the findings and recommendations of an institutional study requested and supported by the San Juan Basin Authority and the National Water Research Institute. The study was intended to research and assess the development and operation of the San Juan Basin Authority as it related to the overall goal of enhancing water security within the San Juan Creek watershed. The study proposed to present findings and recommendations concerning the maintenance, modification, or re-design of institutional arrangements to aid in achieving that goal.

The report finds that:

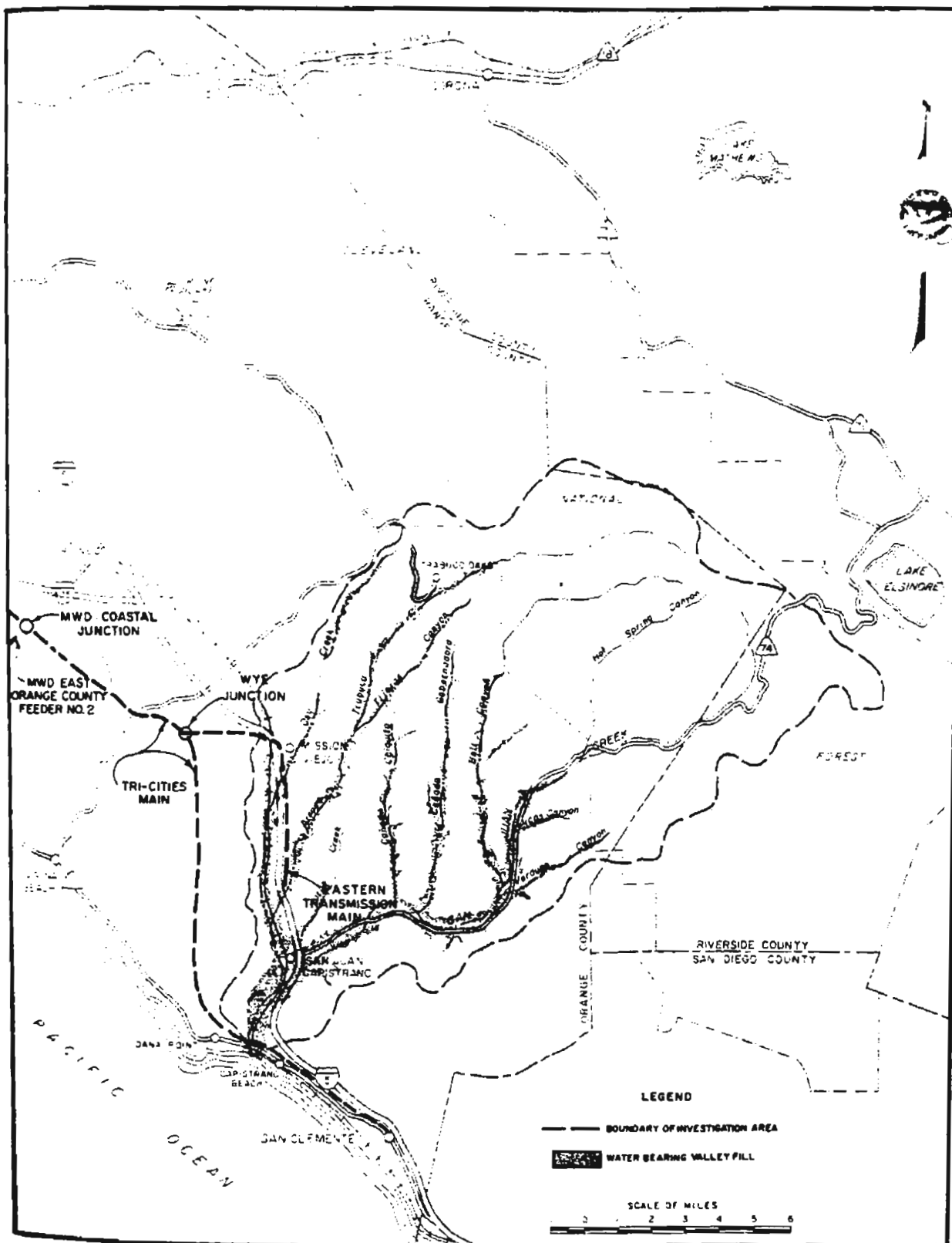
- the basin authority's continued existence would be beneficial to the attainment of the goals of improved water security for residents and water producers within the San Juan Creek watershed;
- the principal impediments to greater progress toward meeting the goals of the San Juan Basin Authority have been institutional, and have included disagreements and uncertainties over water rights, funding responsibilities, and the purpose of the basin authority; and,
- the governance structure of the basin authority is essentially sound, but a few aspects of the administrative function could be improved.

The report recommends that

- the basin authority be retained, with a revised purpose as watermaster for the San Juan Basin;
- the basin authority as watermaster focus on an agenda that features programs of watershed-wide benefit, such as:
 - a) implementation of a watershed monitoring program,
 - b) serving as a forum for communication among water producers within the basin, and
 - c) over the longer term, development of a basin management program;
- the basin authority and its staff take primarily an accounting and facilitating role in the development and implementation of the monitoring and management programs within the basin;
- the basin authority pursue additional goals of promoting
 - d) awareness of regional, county, state, and federal planning efforts on behalf of its members,
 - e) water use efficiency through regular circulation of water conservation plans and programs, and
 - f) public education, awareness, and support;

- the basin authority board of directors continue as constituted, but reduce the frequency of its meetings and supplement its information base through the creation of a Technical Advisory and Coordinating Committee (TACC) that will include representative from other entities as well as the member agencies and basin authority staff.

It was a pleasure and an honor to perform the research for this report, and to present this report to the San Juan Basin Authority, its member agencies, and the National Water Research Institute. The institute's financial support of the research is acknowledged with appreciation. The findings and recommendations are, however, solely those of the author and not necessarily those of the San Juan Basin Authority, its member agencies, or the National Water Research Institute.



SAN JUAN CREEK WATERSHED, SHOWING TRIBUTARIES AND GROUNDWATER AREAS

Source: California Department of Water Resources, Bulletin 104-7 (1972)

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Part I. Background

A. Background of this project

The National Water Research Institute established and funded this project after the San Juan Basin Authority requested support for a study of the institutional arrangements for promoting water security and future development in the San Juan Creek watershed. The project proposal indicated that the study would 1) analyze the development of the San Juan Basin Authority and its role in water resource development and management within the watershed, 2) assess the problems confronting water producers in the watershed and their goals, and 3) report findings and recommendations concerning institutional changes relating to the basin authority that appear likely to facilitate the resolution of those problems and the realization of those goals.

The contract between the National Water Research Institute and the principal investigator was for one year, beginning November 1, 1997 and ending October 31, 1998. The project had a six-month timetable for completion of the research, followed by preparation and delivery of a report. The project report was delivered in draft form at the end of May 1998, discussed with representatives from the basin authority and its member agencies at the end of June, revised, and is presented in final form here.

This report includes: an assessment of the utility of the San Juan Basin Authority and its continued existence and operation, the identification of a focused agenda of watershed-wide benefit for its short-term future, and additional findings and recommendations concerning the governance and administration of the basin authority. These recommendations are intended to allow the basin authority to proceed in a direction that the local water districts and producers seem to want it to take, while keeping the basin authority's own organizational and administrative overhead and activities to a minimum and allowing the existing water districts to perform most water development and delivery tasks and operate most of the facilities.

B. Background concerning the San Juan Basin

The San Juan Creek watershed is located almost entirely within Orange County, California, more specifically the southern portion of the county. The watershed encompasses a drainage area of about 176 square miles, or about 111,000 acres, extending from peak elevations of 5,700 feet in the Cleveland National Forest in the Santa Ana Mountains to sea level at Doheny State Beach.

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Along its 27-mile course, San Juan Creek is fed by Hot Spring Canyon, Cold Spring Canyon, Lucas Canyon, Verdugo Wash, Bell Canyon, Canada Gobernadora, Chiquita Canyon, Horno Creek, and Trabuco Creek. Trabuco Creek is fed by Oso Creek, Hickey Canyon Creek, and Live Oak Canyon Creek.

Average annual precipitation within the watershed ranges from around 14 inches per year near the coast to 26 inches per year at the highest inland elevations. As throughout California, however, annual precipitation is highly variable, with some extremely wet years on record with more than 40 inches of rainfall and other critically dry years with 5 inches or less.

Water conditions can change from drought to flooding within the same year. Fluctuations at least as great can occur from one year to another. Streamflow conditions therefore also exhibit great variation. According to figures provided by the San Juan Basin Authority, annual streamflow in San Juan Creek just during the period 1986-1996 ranged from approximately 1,000 acre-feet to more than 70,000 acre-feet.

Subsurface soils in the canyons and along San Juan Creek receive and retain water, so the water resources within the watershed consist of both surface and underground supplies. While the underground water supplies have been understood to be subsurface manifestations of surface streams, and therefore surface water rights law and regulations have been applied to the appropriation and use of the waters of the watershed, most water production in the watershed has been achieved by using wells rather than dams and ditches or other surface diversion structures. The characteristics of the replenishment, storage, movement, and quality of the underground water supplies of the San Juan Creek watershed have been at least as important as, and one could easily argue more important than, the characteristics of the surface stream flows.

Most of the underground water storage capacity and subsurface flows in the watershed are located in the following subbasins:

- the Upper San Juan Creek Subbasin, which extends southwesterly and ends where the Christianitos Fault intersects the creek near the mouth of Chiquita Canyon;
- the Middle San Juan Creek Subbasin, which reaches from the Christianitos Fault to the confluence of San Juan and Trabuco Creeks;
- the Lower San Juan Creek Subbasin, which extends from the San Juan Creek-Trabuco Creek confluence to the ocean; and
- the Lower Trabuco Creek Subbasin, which extends from to the confluence with San Juan Creek.

Estimates of the underground water storage capacity of the alluvial materials

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underlying San Juan and Trabuco creeks range between 40,000 and 60,000 acre-feet. The *usable* underground storage capacity is probably within an equally wide range of somewhat smaller figures (e.g., 35,000-55,000 acre-feet), because the first estimates counted the storage capacity all the way up to the ground surface, and it would be imprudent and probably actionable to store water all the way up to the ground surface.¹

The alluvial materials along the upper and middle reaches of San Juan and Trabuco creeks are shallow, reaching only about 100 feet below the ground surface even in the best locations. Their thickness increases in the Lower San Juan Subbasin nearer the ocean, and may be 200 feet thick in that area.

The alluvial materials accept and yield water readily in the upper subbasins, with underground water levels fluctuating as much as 50 feet in a year. In these areas, water levels can fluctuate nearly the entire range of usable subsurface material in a short period (12 months or less). Fluctuations are smaller in the lower subbasin, for a combination of reasons that includes a greater proportion of clay in the overlying soils, the lining of most of the lower reach of San Juan Creek, and the smaller amount of water production.

Average annual natural groundwater recharge from and along San Juan Creek and its tributaries has been estimated to be between 10,600 and 12,600 acre-feet per year. However, for the reasons given above, the variation around this mean is very large.

The subsurface water recharges most quickly and accumulates the greatest volume of water when two conditions are met—underground water levels are low at the beginning of a period during which precipitation and streamflow are high. The subsurface recharges the least when either of the opposite conditions is met—i.e., underground water levels are comparatively high or precipitation and streamflow are comparatively low. The range of recharge quantities between these extremes is large—recharge may be as little as 1,000 acre-feet in a year where the latter conditions prevail or as much as 25,000 acre-feet in a year exhibiting the former

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In fact, groundwater levels should be kept at least 10, and preferably 20, feet below the ground surface, in most locations throughout the subbasins. There are two reasons for this. First and most obvious is the potential for damage to land structures caused by saturation, seepage, or flooding due to an excessively high water table. Second and less obvious, but of potentially great relevance for some management options in the San Juan Creek watershed, are California Department of Health Services guidelines for the use of reclaimed water for groundwater recharge. Those guidelines indicate that reclaimed water should travel through at least 20 feet of soil before reaching the saturated zone.

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conditions.

Groundwater quality, particularly as indicated by concentrations of total dissolved solids (TDS), is best in the Upper San Juan Subbasin ($\text{TDS} < 500 \text{ mg/L}$), marginal in the Middle San Juan Subbasin ($500 \text{ mg/L} < \text{TDS} < 1,000 \text{ mg/L}$), and poorest in the Lower San Juan and Lower Trabuco subbasins ($\text{TDS} > 1,000 \text{ mg/L}$).

Streamflow quality displays a similar pattern. Non-storm flows have been of highest quality in Upper San Juan Subbasin ($\text{TDS} < 500 \text{ mg/L}$), marginal quality in the Middle San Juan Subbasin ($500 \text{ mg/L} < \text{TDS} < 800 \text{ mg/L}$), and poorest quality in Lower San Juan ($\text{TDS} > 1,000 \text{ mg/L}$) and Lower Trabuco ($\text{TDS} > 2,000 \text{ mg/L}$) subbasins. Storm flows have been of higher quality overall ($150 \text{ mg/L} < \text{TDS} < 600 \text{ mg/L}$), with the same pattern of declining quality from upper to lower areas.

The Lower San Juan Subbasin is exposed to sea-water intrusion, in the sense that there is no natural barrier along the coast between the ocean and the aquifer. Despite past modeling efforts, it remains unclear how much sea-water intrusion has occurred in the past, whether and to what extent it is still occurring, and exactly what effect it has had on water quality in the Lower San Juan Subbasin.

The San Juan Creek watershed includes all or part of the incorporated municipalities of Capistrano Beach, Dana Point, San Juan Capistrano, Mission Viejo, Laguna Niguel, and Laguna Hills. It also includes some unincorporated communities such as Coto de Caza, Dove Canyon, Trabuco Canyon, Las Flores, and Rancho Santa Margarita.

Within the past fifty years, land use within the watershed has changed dramatically, from primarily undeveloped ranch, forest, and agricultural land to a current transitional state in which nearly half of the land within the watershed is fully developed. By the year 2020, most of the developable land within the watershed will be devoted to residential, commercial, and recreational uses. Projections performed by the Center for Demographic Research at California State University-Fullerton are reprinted in Appendix Three of this report. They show 90,000 housing units and a population of approximately 220,000 persons in the census tracts comprising the watershed by the year 2020.

C. The current situation within the watershed: problems, goals, and prospects

Unlike some other southern California watersheds, the San Juan Basin has not experienced sustained overdraft or severe sea-water intrusion. Imported water has been available in adequate quantities in most years even as the population of the watershed has risen. Use of reclaimed water for non-potable purposes have

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increased steadily, which has helped to meet the demand pressure without increasing imports proportionately.

Meanwhile, water demands have not risen as sharply as projected back in the late 1960s and early 1970s. Ultimate water demand projections within the watershed are nearly half what was projected a quarter-century ago.

In the lower area, the city of San Juan Capistrano pursued growth-slowing policies during the 1970s that reduced the number and pace of new building permits and, more important, bought up much of the remaining undeveloped land. The city now owns about 42% of the land surface within the city limits. Partly as a result of these policies, the city's ultimate population is expected to be between 32,000 and 35,000, up only a little from the current 28,000-29,000 and less than half the 75,000 projected in the city's 1969 master plan for water supplies.

In the upper area, difficulties in the real estate market in the 1980s and early 1990s postponed development of a substantial amount of land that was expected to be in residential use by now. Environmental issues concerning habitat and species protections have also reduced the total amount of land likely to be brought under development. In the interim, housing demand patterns have shifted toward buyers' preference and willingness to pay for more upscale homes on larger lots, meaning that fewer homes and residents will occupy the areas currently under development and slated for development in the foreseeable future. Projections made in the late 1970s of 80,000 new housing units on undeveloped ranch lands in the upper area of the watershed had been scaled back by the late 1990s to about half that amount.

The principal water supply and water quality problems to be addressed in the San Juan Basin concern some undesirable recent and current trends, and gaps between the aspirations of the water producers and the conditions of the watershed.

Water producers in the San Juan Basin wish to develop increased use of the local water supplies. A problem of great concern throughout South Orange County, including San Juan Basin, is the area's heavy reliance on imported water supplies. Imported water supplies, mostly from the Colorado River but also from northern California, have supported virtually all of the increased demand for potable water in the watershed since the 1960s. Those water supplies come to the San Juan Basin via facilities of the Metropolitan Water District of Southern California (MWD) and its member agencies, the Municipal Water District of Orange County (MWDOC) and Coastal Municipal Water District.

The area's reliance on imported water is perceived as a problem, feeding the desire to increase development of the local supplies, for at least three major reasons.

- One is *relative price*. The water producers within the watershed are eager to

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pursue methods of developing and using the local water supplies more fully if those methods will produce water at lower cost than the treated imported water that meets most of the water needs currently.

- A second dimension is *local control*. The decisions concerning the availability and cost of imported water supplies are made in forums where the local water districts are represented but cannot control outcomes; thus, the greatest portion of their water supply budget is not under their control.
- A third dimension is *reliability*. The watershed currently has almost no emergency water storage capacity, and an interruption of imported water supplies due to a disaster or an extreme shortage would have significant undesirable consequences. Soon after the arrival of imported water in the basin, the need to maintain the local supply was recognized and described as follows: "Although lack of reliability does not allow planned use of groundwater, it should be used whenever it is available and its quality is satisfactory. In addition, it is essential to maintain the wells for an emergency supply, in conjunction with surface storage, in the event that imported water is not available for extended durations" (Osborne and Meadows, 1969: 11).

The gap that arises between the local agencies' desire to reduce their reliance on imported water and the current water conditions in the San Juan Basin has two dimensions: availability of local supplies, and the quality of those supplies. With respect to the availability of local supplies, the sum of the desired local production by the major water producers in San Juan Basin exceeds the estimated average annual yield.

The combination of current claims, goals, and guarantees of annual production by the major producers within the watershed amounts to a little less than 12,000 acre-feet per year.

- The protest settlement agreement with Capistrano Beach Water District assures CBWD of up to 1,300 acre-feet per year of pumping from the Lower San Juan Subbasin, free from interference by the rest of the basin authority with either the quantity or quality of that basin water.
- The water rights settlement agreement with Capistrano Valley Water District and the city of San Juan Capistrano assures the district of up to 2,900 acre-feet per year (1,500 acre-feet for potable uses and 1,400 acre-feet for non-potable uses) and the city of up to 425 acre-feet per year for non-potable uses from their wells in the Middle San Juan, Lower San Juan, and Lower Trabuco subbasins, free from interference by the rest of the basin authority with either the quantity or the quality of that basin water.
- The 1991 Projects Agreement among the members of the San Juan Basin Authority assigned Trabuco Canyon Water District 350 acre-feet of groundwater extractions per year, although this occurs in and along the

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upper reaches of Trabuco Creek outside the four subbasins that have been mentioned previously. The district's water supply projections in its 1995 Urban Water Management Plan Update included a similar amount of groundwater production.

- The 1991 Projects Agreement assigned Moulton Niguel Water District 1,000 acre-feet of groundwater extractions per year. Although Moulton Niguel does not currently produce water from the San Juan Creek watershed, it has participated in watershed governance and planning activities through its membership in the San Juan Basin Authority, in part because it values that Projects Agreement allocation as a potential supplemental water source in its overall water supply picture.
- In its strategic plan, Santa Margarita Water District states a goal of developing a groundwater supply of 2,500 acre-feet per year to replace a like amount of imported water. Although this amount has not been recognized in any agreement among the water districts in San Juan Basin, it may be taken as Santa Margarita's production goal for purposes of this study.
- One of the largest water producers within the watershed is not a water district but Rancho Mission Viejo, a private company that owns most of the remaining developable land. Its water production has to be taken into account in any sensible assessment of the water supply and demand conditions within the watershed. Estimates of pumping by Rancho Mission Viejo's consulting engineer during the period 1979-90 placed the average annual production of its wells at approximately 3,400 acre-feet, with an annual low of 2,155 acre-feet estimated to have been produced in 1989 and an annual high of 5,501 acre-feet estimated to have been produced in 1987. Rancho Mission Viejo applied to the State Water Resources Control Board for an appropriative right of 3,500 acre-feet per year.
- The sum of these amounts is 11,975 acre-feet per year, which exceeds the estimate of the sustainable annual yield of the watershed contained in a 1994 report produced by NBS/Lowry for the basin authority and approaches the upper end of estimates of average annual natural groundwater recharge.

The above plans and agreements anticipate the installation of some additional groundwater extraction facilities. Moulton Niguel Water District and Santa Margarita Water District, for example, were projecting only their potential production from the basin. A 1991 inventory of production wells in the watershed, reported in the 1994 Groundwater Management Study produced by NBS/Lowry for the San Juan Basin Authority, showed the following:

- the San Juan Basin Authority had an active well in San Juan Capistrano north of San Juan Creek below the Oso Creek confluence, and one within the Santa Margarita Water District at the confluence of Canada Gobernadora and San Juan Creek.
- Capistrano Beach Water District had a production well on its property near

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the mouth of the creek.

- Capistrano Valley Water District had three active production wells: one in the stretch of San Juan Creek between Chiquita Canyon and Oso Creek, and two near the Oso Creek confluence.
- Trabuco Canyon Water District had two active wells at the upper reach of Trabuco Creek.
- Rancho Mission Viejo and its subsidiary businesses had 10 active wells along San Juan Creek, about half above and half below Chiquita Canyon.
- There were another 14 privately-owned active wells, and one publicly-owned one (Caspers Park).

Even if the local water resources of San Juan Basin could supply the *quantity* of water each major producer wishes to develop, there is another gap to be breached, between the desired and actual *quality* of those water supplies. As noted in the preceding section of this report, the groundwater that can be extracted in the middle and lower areas of the watershed—where several of the existing wells are located—is high enough in TDS, including constituent minerals such as iron and manganese, that it requires additional treatment to be acceptable for potable uses and to avoid undesirable effects in domestic distribution systems. The need to improve the quality of the local groundwater in order to achieve the other goals was stated in the same 1969 report quoted above:

If the groundwater quality can be improved either through management of the groundwater basin or through economical treatment, the groundwater basin has a potentially large value to the district. This value is twofold: (1) as a source of lower cost supplemental water, and (2) as seasonal storage. Withdrawals from the groundwater basin during summers would allow more uniform pipeline deliveries from MWD, would probably allow the construction of smaller pipelines to import MWD water, and/or would allow construction of a smaller amount of costly surface storage (Osborne and Meadows, 1969: 11).

These gaps between the aspirations of the area water producers and the conditions of the watershed cannot be addressed without also taking into account recent and current trends. Some of the trends that have been under way since development really accelerated in the San Juan Basin have prompted concern and been identified as problematic in recent studies. In its feasibility study of the San Juan Creek Watershed, the U.S. Army Corps of Engineers listed the following problems in the watershed, which it attributed primarily to the development that has occurred in the area since 1960:

- stream channel degradation
- poor surface water quality
- poor groundwater quality

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- loss of floodplain habitat
- loss of riparian habitat
- flooding
- loss of recreation opportunities
- decline in floodplain moisture
- geotechnical instability
- declining imported water supplies
- depletion of sand sources for beach replenishment
- higher peak discharges
- erosion
- decrease or disappearance of aquatic species
- decrease or disappearance of riparian species
- invasive species
- declining overall aesthetic quality of the watershed
- piecemeal treatment of problems
- excessive litigation
- excessive regulatory actions.

Several of these problems are interrelated, and some warrant additional discussion. For instance, development in the upper areas of the watershed has increased surface runoff from precipitation and applied water, and this runoff is likely to continue increasing until the ultimate buildout of the upper areas. This increased and increasing runoff flows toward the lower areas. This phenomenon has multiple effects, which are perceived in different ways.

On one hand, the runoff enhances year-round flow in some of the canyon streambeds and in the main channels of San Juan and Trabuco Creeks. It therefore increases the potential for percolation through the streambeds into the subsurface soils, and could raise the estimate of sustainable annual groundwater yield closer to or even slightly above 10,000 acre-feet per year.

On the other hand, the quality of this increased surface runoff is uneven and not completely understood. The quality of surface runoff from precipitation is probably better (at least with respect to TDS) than the quality of surface runoff from applied water, since the former begins with lower TDS than the latter. Thus, the increased surface runoff to the lower area may raise the quantity of water that can be captured while having other effects upon the quality of that water, depending upon the other constituents found on and carried from the paved and unpaved surfaces of the upper areas (e.g., oil and other roadway constituents, pesticides and herbicides, etc.).

Furthermore, increased surface runoff from the developed and developing upper areas is understood to be aggravating some of the lower area's ongoing water

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problems, namely, flooding during storm events, increased channel erosion, and deteriorating aesthetic quality of the areas adjacent to the stream channels. Separating the effects of flood flows caused by natural storms from the effects of increased runoff caused by development is virtually impossible, and flood events clearly produce more visible and immediate impacts. There is no question, however, that channel erosion in the San Juan Basin has cost millions of dollars due to damage to infrastructure—especially the exposure of pipelines buried in and along creek beds, and also the undermining of bridges and road beds across or adjacent to the streams—and has spurred both threatened and actual litigation.

Finally, the phenomenon of year-round flows in some of the canyon streams due to increased surface runoff has also been identified as a potential and probable cause of ecological changes, particularly the mix of species of flora and fauna in the canyons and other riparian areas of the watershed. As year-round flows have become commonplace in San Juan Creek, even though their existence has been created artificially by the increased runoff, the risk grows that the stream will be designated by regulatory authorities as requiring certain protective measures in order to maintain habitat conditions for aquatic and riparian species that locate there or move farther upstream than they would have under the pre-development conditions when streamflows were ephemeral.

Development throughout the watershed has also increased the production of wastewater, bringing with it the need for treatment and disposal practices and facilities. As with the increased runoff, the effects of the increased wastewater production can be viewed in different ways. Treatment, conveyance, and disposal facilities are expensive to construct and to operate properly and maintain at high standards, and not every facility in the watershed has been operated up to those standards in the past.

On the other hand, some of the water districts in the watershed already operate treatment facilities that produce water of high enough quality for use in landscape irrigation, and these forms of water reuse account for a significant and rising share of the water supplies employed for non-potable uses in the watershed. And some districts are planning or developing advanced water treatment facilities that will yield water of high enough quality to meet regulatory standards for use as part of a recharge operation that could enhance the sustainable yield of groundwater from the San Juan Basin. The districts that construct and operate those advanced facilities will plainly want to be able to find a valuable use for the water produced. But even with waters of such quality, there are regulatory limits on their use for groundwater recharge, and their use within the San Juan Creek watershed will require a permit obtained through the South Orange County Reclamation Authority (SOCRA).

Using captured streamflow or treated water blended with other sources, a recharge

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program could enhance the average annual water yield as well as the amount of water in storage in the San Juan Basin. The U.S. Army Corps of Engineers has identified several sites in the San Juan Creek watershed that could be developed to promote groundwater quality protection or improvement, groundwater recharge, and ecosystem restoration. These are known as 1) the Gravel Pit site located in the Upper San Juan subbasin between Canada Gobernadora and Bell Canyon, 2) the River Mouth site located in the Lower San Juan subbasin east of the San Juan Creek channel at the Capistrano Beach Wastewater Treatment Plant, and 3) the Oso-Trabuco site located in the Lower Trabuco subbasin along currently unlined portions of the Oso and Trabuco Creek channels in the vicinity of their confluence.

It should be clear from this discussion that the problems being experienced within the San Juan Creek watershed are related directly to the goals of the area water producers, but also contain within them some opportunities or prospects for their resolution. Neither the San Juan Basin Authority nor this study and report are attempting to address all of those problems or pursue all of those prospects simultaneously.

The goal of the San Juan Basin Authority and of the local water districts is primarily to improve the security and quality of water supplies within the watershed. That primary goal brings several objectives under consideration:

- to improve the quality of water in portions of the watershed where the local supplies are currently unusable;
- to manage the underground water storage capacity within the watershed to increase its overall yield and reliability;
- to allow each of the current water producers to achieve its goals for the development and use of local resources;
- to find economically beneficial uses of conserved and reclaimed water generated within the watershed;
- to accommodate the remaining planned development within the watershed;
- to develop other sources of water supply that could be brought to the watershed for use and/or storage;
- to create storage and exchange capabilities that would improve the area's ability to withstand an interruption in imported water supplies; and
- to achieve an equitable distribution and balance of the benefits and costs of the activities undertaken to advance these objectives.

The other goal that is terribly important to water producers in the watershed, though perhaps not as often and clearly articulated, is maintaining local control by governing and managing the watershed themselves. The San Juan Basin Authority and its member agencies hope and intend to avoid having external bodies decide what shall be the beneficial uses of the watershed, how it shall be developed and protected, and restrictions ought to be placed upon its use. That goal brings with it

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some additional objectives, such as maintaining the ecological and aesthetic properties of the watershed at levels that will promote and maintain the values and quality of life preferred by the residents, and reduce the need or motivation for legislative or regulatory interference by regional, state, and federal agencies.

The goals of the San Juan Basin Authority and the major water producers in the watershed have been easier to describe than to achieve. We conclude this section, therefore, with a brief assessment of what appear to be the principal barriers to goal attainment.

Physical barriers to goal attainment

- Insufficient or lacking surface water storage, groundwater recharge, and groundwater treatment facilities
- Few inter-basin connections with the rest of southern California, and especially the rest of Orange County

Institutional barriers to goal attainment

- Legal
 - Multiplicity of water rights claims possible under California law
 - Regulatory limits on water reuse
- Economic
 - Financial feasibility of projects depends on MWD prices
 - Uneven distribution of wealth among the local water districts has impeded the development of cooperative arrangements for local funding of projects
- Political
 - Occasional feuding among members of the San Juan Basin Authority
 - Turnover in the membership and administration of the San Juan Basin Authority and its member agencies
 - Actions of county, state, and federal officials, from threats of consolidation to unfulfilled promises of support, that have distracted or frustrated local leadership
- Information, or decision support
 - Uncertainty, or at least a lack of information all parties trust, regarding local water supplies and quality
 - Uncertainty, and to some extent a lack of concerted study, concerning the benefits or value of high-quality water supplies in the area, which has led to an emphasis on the costs of projects and activities rather than their potential for enhancing the area's future.
 - Key elements of the water supply decision environment remain under the control of actors outside the watershed, any of which could affect the

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feasibility and/or urgency of actions to be taken within the watershed.

Among these elements of the decision making environment are:

- * The plans and fates of other Orange County water agencies, including considerations of county-wide or cross-watershed projects as well as the possible reorganization of some water agencies within the county;
- * MWD's discussions and future decisions concerning water rates, and the availability of its facilities for use by member agencies for conveying water supplies;
- * The outcomes of decision making processes concerning the Bay-Delta and the Colorado River, which will affect the overall availability of imported water supplies, as well as their timing, prices, and the mix between the two sources.

Although individuals and agencies in the San Juan Basin have worked hard to address the physical barriers to attainment of their goals, the extent of institutional barriers they have faced has proved more daunting. The next part of this report examines some of those institutional difficulties in greater detail, in the course of reviewing the principal water development and management organizations in the San Juan Creek watershed, and their activities.

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Part II. Water and Institutional Development in the San Juan Basin

A. Historical Development of Water Agencies

San Juan Basin is home to some of Orange County's oldest sites and settlements as well as some of its newest. Days before the famous Portola expedition camped at and named the Santa Ana River in what is now Orange County, it crossed the San Juan Creek watershed, traversing the Plano Trabuco—a mesa-like area between the upper areas of Trabuco Creek and Canada Gobernadora—on July 24, 1769.

1. Settlement and Land Ownership: 1776-1860. Portola returned to the San Juan Basin seven years later to participate in another milestone in the history of California and Orange County. Downstream in the San Juan Basin, Father Junipero Serra, under the commission of King Carlos II of Spain and accompanied by his Franciscan brothers and some of Portola's soldiers, established the Mission San Juan Capistrano on July 4, 1776.

The mission became the center around which more residences were constructed and European-style agricultural development began in the surrounding valley. In 1794, 40 adobe structures were built to house workers and soldiers on a plain between the mission and San Juan Creek that is now the Los Rios Historic District. One of those structures, the Rios Adobe, is now the oldest continually occupied home in the American West, and San Juan Capistrano is the oldest community in Orange County. Another landmark associated with the mission— the Great Stone Church constructed by the Catholic Church, at its time the largest stone structure west of the Mississippi—unfortunately was obliterated in a tremendous earthquake that hit the region in 1812.

The area around and inland from the mission gained the name Mission Viejo, and agricultural uses connected with the mission developed on those lands. For example, cattle bearing the mission's brand could be found grazing as far up as Plano Trabuco, which later became Rancho Trabuco.

In 1822, when Mexico became independent of Spain, Alta California became a province of Mexico. Over the next two decades, in a process that has become known as the "secularization of the missions," the Mexican governors retained some mission lands for themselves, and sold others off to raise revenue, encourage development, and strengthen political ties. An Englishman, John Foster or Forster, married Governor Pio Pico's sister and became known as Don Juan Forster. His relationship to the governor probably aided in Forster's acquisition of the approximately 22,000-acre Rancho Trabuco, and a couple of years later, another roughly 47,000 acres known as Rancho Mission Viejo (which Forster also called "La Paz").

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Mission San Juan Capistrano itself was sold to Forster. The structures at Mission San Juan Capistrano have survived better than those at other missions, perhaps because Forster actually lived and conducted business there, and thus attended to their maintenance better than the owners of missions elsewhere in California that fell into greater disrepair.

In 1846, during the war between Mexico and the United States, Governor Pico fled the advancing American troops and repaired south to his own ranch, Rancho Santa Margarita y las Flores. After the war, California and much of the rest of the American Southwest became territories and states of the United States. In the early 1860s, President Abraham Lincoln returned the Mission San Juan Capistrano to the Catholic Church, but the other lands in the watershed remained in private hands through accession or acquisition of the Mexican land grants.

2. Land, Water, and the Reorganization of Upstream Development, 1860-1930. In the post-Civil War period, which was still the early decades of California statehood, Americans acquired more of the previously Mexican-owned lands. In the Aliso Creek watershed, for example, Lewis Fenno Moulton purchased his 19,000-acre ranch by acquiring a former Mexican land grant. In the upper area of the Santa Margarita River watershed, John Forster gained Rancho Santa Margarita y las Flores. Through this and other acquisitions, Forster boosted the total of his land holdings in the San Juan Creek and Santa Margarita River watersheds to approximately 200,000 acres.

Shortly thereafter, the connection between water and development in the San Juan Basin became painfully evident. A severe drought began in the late 1870s and persisted through the early 1880s, damaging local agriculture generally but with especially devastating effects on the pasturage and cattle herds in the San Juan Basin and other southern California watersheds. With his enormous ranch properties, Forster was hit particularly hard. Forster died, debt-ridden, in 1882. Out of financial necessity, his sons sold his lands. Similar fates befell other large holdings in southern California, and the period is known as the time of breakup of the ranchos.

Richard O'Neill, a cattleman and Irish immigrant, and James C. Flood, the owner of the famous Comstock Lode silver mine and known as the "Silver King of Nevada" or the "Comstock Silver King," bought the Rancho Mission Viejo, Rancho Trabuco, and Rancho Santa Margarita y las Flores. Flood and O'Neill were equal partners, and their partnership drew upon their respective strengths: the wealthy Flood contributed more than half of the money, while the cattleman O'Neill worked as resident manager of the properties.

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Cattle grazed on the vast O'Neill and Flood holdings from Aliso Creek in Orange County to Oceanside in San Diego County. O'Neill also initiated wheat production on Plano Trabuco in 1893, and the ranch's grain operations became quite extensive in the early 1900s. James C. Flood died, and in 1907 his son James L. Flood deeded to the 80-year-old Richard O'Neill the half-interest O'Neill had acquired by virtue of his work. The elder O'Neill subsequently deeded it to his son Jerome.

Jerome O'Neill continued to operate the ranch and acquire more properties, maintaining a partnership with James L. Flood. In 1923, O'Neill and Flood recombined their holdings and established the Santa Margarita Company. At their peak, the O'Neill and Flood properties covered 230,000 acres in the San Juan Creek and Santa Margarita River watersheds.

3. Downstream: Boom, Bust, and the Development of Private and Public Water Service Organizations, 1880-1960. In the meantime, important developments had transpired downstream. The railroad arrived in the area in 1887, stimulating a new era of agricultural development. The Santa Fe railroad located its tracks through San Juan Capistrano, between the mission and the Los Rios district, accessible from the beach as well as from the inland portion of the valley. In 1894, a depot was constructed alongside the tracks near the mission, and the location is now the oldest train stop operating in southern California.

The improved accessibility of the downstream lands attracted new inhabitants. One of these, Aaron Buchheim, moved to the area from Santa Ana immediately after the turn of the century, and in 1901 or 1902 established a farm with his family at Capistrano Beach. Buchheim drilled the first well in the lower area of the San Juan Creek watershed, on a hill near their house. He built a 10,000-gallon tank, ran tap lines from it to a few other homes there, and thus provided the first water service operation supplying groundwater in the watershed.

Around 1924, the Doheny family's company bought land and beach frontage adjacent to Buchheim's land, and then bought his land, too. They constructed another well with a larger reservoir in the palisades above San Clemente, created a private water company which absorbed the Buchheims' operation, and constructed some additional road and water systems.

Properties in the valley were supplied with water by either their own facilities or private water service organizations, and farming and land sales continued to progress until the onset of the Great Depression late in 1929. On January 21, 1930, to develop and maintain water service in the Capistrano Valley, the Orange County Board of Supervisors established Orange County Water Works District Number 4 under the provisions of Section 55000 of the California Water Code, which

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authorized such districts to acquire, control, distribute, store, spread, treat, reclaim, and conserve water, including sewage and storm waters, for beneficial use within the district. It could also collect, treat, and dispose of sewage. It could borrow money, and collect revenue from a property tax on land and improvements to pay for facilities and debt, while collecting revenue from water sales to pay for operations and administration.

As created, Orange County Water Works District Number 4 covered 270 acres in the community of San Juan Capistrano and serving 206 connections with population of just over 600 persons. It issued bonds and used the proceeds to buy the facilities and customer base of a private water company, and to construct a reservoir and distribution system.

Land sales and population growth in the valley resumed after World War II. Among the postwar arrivals to San Juan Capistrano were Larry and Carl Buchheim, Aaron's sons, who had moved from Capistrano Beach, and T.J. Meadows, who had become general manager of the Water Works District in 1946 and remained in that position until 1979. Larry Buchheim and others organized a campaign to incorporate San Juan Capistrano as a city, and an incorporation referendum passed handily at an election in 1961. Carl Buchheim was the newly incorporated city's first mayor. Both he and brother Larry have served on the city council and as mayor.

Orange County Water Works District No. 4 grew, too. Two large annexations in 1959 and 1961, combined with some earlier and smaller ones, increased the total area of the district to a total of 8,702 acres, with a population in its service area estimated in 1968 to be 4,500. In the years following incorporation, city leaders in San Juan Capistrano began requesting the county to transfer control of the water district. In 1970, the Orange County Board of Supervisors ceased to be the governing board of Orange County Water Works District Number 4, and it became a subsidiary district of the city of San Juan Capistrano. From that time to the present, the San Juan Capistrano city council served as the district's board of directors. In 1983, the name of the district was changed from Orange County Water Works District Number 4 to the Capistrano Valley Water District.

Parallel though not identical developments occurred in neighboring Capistrano Beach. Although the private water service company that traced its origins back to Aaron Buchheim's well survived the Great Depression and into the postwar period, in 1948 the owners of what was then called the San Juan Water Company succeeded in getting a public entity--the Capistrano Beach County Water District--organized under the County Water District Act. The service area of the Capistrano Beach County Water District (now called the Capistrano Beach Water District) includes both the community of Capistrano Beach and most of the neighboring community of Dana Point, which is also located along the beach but on the other

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side of the San Juan Creek channel.

The district was created to purchase the San Juan Water Company's franchise and assets, but that process took 12 years to complete. Much of the water company's "assets" were in failing condition. The principal alternatives available to the new district were to purchase the existing system and rehabilitate it, which would take many years, or install a new and essentially duplicate system to replace it, which would take an estimated \$800,000. A bond issue to raise the \$800,000 was placed on the ballot in 1956, and district voters rejected it by a large margin.

The district and the water company owners resumed negotiations over the purchase of the company's facilities, and reached agreement on a sum of \$450,000. In November 1959, a bond issue for \$500,000—the extra \$50,000 designated for beginning the rehabilitation work—passed with more than the two-thirds majority needed. Thus, although formed in 1948, the Capistrano Beach County Water District did not actually take over the operation of the area's water system until 1960. The work to rehabilitate the system, and the repayment of the bonds approved in 1959, were accomplished using property tax revenues and proceeds of water sales. Gradually, Capistrano Beach County Water District replaced nearly all of the water distribution system, spending more than a million dollars at an average rate of \$50,000 per year for 20 years through the 1960s and 1970s.

During the 1950s and 1960s, as the local groundwater supplies were tapped for growing domestic uses, awareness grew among water district staff and water consumers in both Capistrano Beach Water District and Orange County Water Works District No. 4 of some undesirable water quality characteristics. The water drawn from underground in these lower areas of the watershed was "hard," with mineral content high enough to create undesirable effects on plumbing as well as taste and odor.

These concerns about water quality combined with a rising level of apprehension in southern Orange County about water quantity. The coastal communities in particular, from Newport Beach down to San Clemente, had relatively small local water sources with which to accommodate their growing popularity as retirement and resort destinations. Some of these communities led the process of gaining access to the imported water supplies which were already being brought to southern California by the Metropolitan Water District of Southern California (MWD).

MWD had been formed in the late 1920s by a coalition of 13 southern California cities for the purpose of constructing an aqueduct to bring Colorado River water across the desert to Los Angeles and other rapidly growing neighboring areas. Three cities in northern Orange County—Anaheim, Santa Ana, and Fullerton—were

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among the original 13 MWD members, but there were no MWD members in the South County region (or for that matter, in the rest of the northern county outside the three cities). MWD was interested in having other communities annex to the district as well, but for a couple of reasons had also decided that it did not wish to pursue annexations on a municipality-by-municipality basis. Instead, MWD encouraged communities to band together and form districts that could annex to MWD.

The first such district to be created and annexed to MWD was composed of Orange County coastal communities. In 1940, Laguna Beach (which was especially short of local water sources) led the establishment of the Coastal Municipal Water District under California's Municipal Water District Act. "Coastal," as the district became known, was not created to develop water works or operations of its own, but simply to be the organizational vehicle through which Orange County communities other than Anaheim, Santa Ana, and Fullerton could gain membership in MWD and an entitlement to a portion of the imported water it supplied. Upon a favorable vote of the electorate within the newly formed district, Coastal completed the process of formal annexation to MWD in 1942, still several years before MWD water deliveries to southern California actually began.

MWD Colorado River water arrived in portions of southern California in the late 1940s, by which time the California Department of Water Resources was already investigating the possibility of moving water from northern California's Feather River watershed to the growing Southland. As planning for this project, which became known as the State Water Project, proceeded through the 1950s, MWD emerged as the primary (though not only) organizational vehicle through which southern California communities would be supplied with northern California water.

The prospect of gaining access to supplemental water supplies from both the Colorado River and northern California increased several southern California communities' interest in joining MWD. The northern California water was known to be of extremely high quality. For areas such as the San Juan Basin in southern Orange County, water deliveries from MWD held the promise of alleviating both their concern with the quality of their local water supplies and the fear that local water supplies would prove insufficient to support the anticipated growth in water demands.

Another group of Orange County communities created a second municipal water district in 1951, known then as the Orange County Municipal Water District and now as the Municipal Water District of Orange County (MWDOC). Like the Coastal Municipal Water District, MWDOC was intended to be a means by which Orange County municipalities could connect with MWD's imports, and it annexed to MWD later that same year. Even though Coastal's original creators envisioned

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that Coastal would be the principal MWD member agency for Orange County's communities, Coastal's territory remained principally the strip of communities from Newport Beach to San Clemente. Nearly all inland communities within Orange County joined MWDOC instead.

This differentiation was reflected in the lower San Juan Basin. Capistrano Beach joined with Dana Point and San Clemente in 1959 to form the Tri-Cities Municipal Water District, which joined Coastal. Orange County Water Works District No. 4 joined MWDOC. Thus, both Capistrano Beach and San Juan Capistrano gained access to MWD and its imported water supplies, but through different MWD member agencies.

4. Upstream: The Second Breakup of the Ranchos, and the Coming of Residential Development, 1925-1990. In the upper area of the watershed, both partners in the Santa Margarita Company, James L. Flood and Jerome O'Neill, died in 1926, dissolving the partnership and corporation. The O'Neill interests were placed in trust for Jerome's brother, Richard O'Neill Jr., and sister Mary Baumgartner. With the change in ownership arrangements followed shortly by the Depression, active cultivation of much of the land ceased for a while.

Richard O'Neill, Jr.'s portion was the Orange County properties, Rancho Mission Viejo and Rancho Trabuco. Richard O'Neill, Jr. died in 1943 or 1944, and his properties passed to his wife Marguerite and their children, Alice and Richard Jerome O'Neill. Active cultivation of grain and orchard trees resumed on some of the land. The Flood and Baumgartner properties were located in northern San Diego County—the old Rancho Santa Margarita y las Flores. Most of this land was sold to the United States in the 1940s for Camp Pendleton.

The lands in the upper area of the watershed remained largely undeveloped, and those that were developed were devoted to agricultural use, through the first 20 years of the postwar period. Here is how sparse the settlement was even into the 1960s: according to a 1985 account of the development of the Moulton Niguel Water District (which at that time covered about 25,000 acres in the San Juan and Aliso Creek watersheds with a service area population of about 55,000), the population of the district 20 years earlier had been eight.

Nevertheless, by the early to mid-1960s, the continuing growth of population and economic activity in the rest of Orange County stimulated several individuals' thinking about the possibilities for future residential development on Plano Trabuco and the canyons of the San Juan Basin. As always in southern California, thoughts of land development turned quickly to thoughts of water development.

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A reliable supply of water would be crucial to sustaining agricultural development and initiating residential development of the upper watershed lands. The creeks that drain the canyons feeding San Juan Creek were ephemeral, and the water-bearing underground strata in those canyons were relatively thin. While groundwater supplies in and along San Juan Creek itself were substantial and of high quality, the lands they lay under represent only a small fraction of the upper watershed area. Most of the developable land was away from the main creek and therefore less favorably situated for development.

The need to improve the availability and reliability of water supplies in order to accommodate economic development led quickly to the creation of three water districts covering portions of the upper watershed. All three were established during the period 1962-1964. They were formed under the state's County Water District Act and California Water District Act, and therefore had a broad array of powers. In addition to being able to acquire imported water supplies by annexing to a member agency of MWD, these districts could undertake and fund projects to develop the local water supplies.

The first of the three upper-area districts, organized officially on February 26, 1962, was the Santa Ana Mountains County Water District. Actually situated in the foothills of the Santa Anas, the district covered about 9,000 acres in Live Oak Canyon and upper Trabuco Canyon, with elevations from 900 to 2,400 feet above sea level. Nearly 1,000 acres are within either the Cleveland National Forest or O'Neill Regional Park. This district covers the northernmost portion of the San Juan Creek watershed, and the area farthest from the San Juan Creek stem itself. Its local water resources included only the occasional surface flows in the canyons plus the groundwater that could be extracted from the relatively thin water-bearing soils underlying them. Although all local water supplies in the San Juan Creek watershed are at risk during a severe or extended drought, the lands in this area were and are the most likely to be left (literally as well as figuratively) high and dry.

The Santa Ana Mountains County Water District joined the Municipal Water District of Orange County (MWDOC), thereby gaining potential access to MWD imported water. It also constructed a couple of wells to withdraw water supplies along the upper reach of Trabuco Creek. Effective January 1, 1989, the district was renamed Trabuco Canyon Water District (TCWD).

Moulton Niguel Water District was established on April 14, 1964 under the California Water District Act, covering lands in both the Aliso Creek and San Juan Creek watersheds. Part of the district's name acknowledges the fact that much of the land it covers in the Aliso Creek basin was once the Moulton Ranch. The San Juan Basin portion of Moulton Niguel's area was in the far southwestern reach of the O'Neill Rancho Mission Viejo property. Even though Moulton Niguel Water

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District was virtually uninhabited in 1964, plans for its development were already well advanced. The district joined Orange County Municipal Water District (now MWDOC) in order to be able to receive imported water to accommodate those plans.

Later that year, on December 23, 1964, Santa Margarita Water District was officially organized, also under the California Water District Act. It too joined Orange County Municipal Water District to assure future access to imported water. Although it was the last of the five local water districts to be created, Santa Margarita Water District covers the majority of the land in the San Juan Creek watershed. Its land area of more than 60,000 acres encompasses upper Oso and lower Trabuco creeks, plus Chiquita and Bell canyons, Canada Gobernadora, and most of the reach of San Juan Creek itself. It was nearly uninhabited in 1964, and virtually all of the land in the district at the time of its creation was still owned by the O'Neill family and its development company. Although much of the district has been developed in the ensuing quarter-century, it still contains most of the remaining developable land in the watershed.

As noted, the organization of these water districts—especially Moulton Niguel and Santa Margarita—was stimulated by the emergence of development plans for the upper watershed area. The first to be followed through to completion was for the community of Mission Viejo, situated in northern portion of Moulton Niguel Water District and the western portion of Santa Margarita Water District.

In 1963, Richard O'Neill and Alice O'Neill Avery sold 10,000 acres along the western edge of Rancho Mission Viejo to Donald Bren, Philip J. Reilly, and James Toepfer, who formed the Mission Viejo Company to develop the land. In 1965, the Orange County Board of Supervisors approved the company's development plan, which called for 30,000 homes and business properties in a community to be named Mission Viejo. After the Orange County Board of Supervisors approved the company's master plan, the Deane brothers were hired to build the homes.

The pace of development in Mission Viejo was rapid. Its first residents moved in during 1966, but by 1968 an estimate of the population indicated that Mission Viejo had already eclipsed San Juan Capistrano as the largest community in the San Juan Basin with a population of 5,500. In the 1970s, the Philip Morris Company purchased the Mission Viejo Company and continued the development of the community. Lake Mission Viejo was constructed from 1974 to 1978 to provide an additional recreational focal point for the community and to stimulate additional interest in home sales. By 1987, Mission Viejo contained 20,000 homes and 60,000 residents. A successful vote on municipal incorporation in November 1987 led to Mission Viejo's official designation as a city on March 31, 1989.

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Meanwhile, the Santa Margarita Company was reincorporated in 1979 to manage and develop the remaining lands of Rancho Mission Viejo and Rancho Trabuco. A residential community named Rancho Santa Margarita was established on Plano Trabuco, with official groundbreaking on May 30, 1985. The Santa Margarita Company was responsible for the development of that community, while the ownership and development of the remaining upper area lands were reorganized once again into a company called Rancho Mission Viejo.

Other residential developments appeared farther east and north in the upper canyons. In what is now Trabuco Canyon Water District, the Trabuco Canyon and Dove Canyon communities were constructed in the upper reaches of Trabuco Creek. Within the Santa Margarita Water District, Macco Realty Corporation sited and began the Coto de Caza development in Canada Gobernadora on lands that were once part of Bryant Ranch. As the Orange County real estate boom accelerated through the 1970s and continued into the 1980s, many individuals anticipated that the open ranch lands and canyons of South County would be filled in with hundreds of thousands of new residents by the end of the century.

B. The Water Agencies Today

The same set of water agencies serve the San Juan Creek watershed today. Their current organization and operations are as follows.

1. The Water Suppliers: MWDOC, Coastal, and Tri-Cities. The Municipal Water District of Orange County (MWDOC) is the largest supplier of MWD imported water supplies to Orange County, and to the San Juan Basin in particular. Within the San Juan Basin, MWDOC provides imported water to Capistrano Valley Water District, Moulton Niguel Water District, Santa Margarita Water District, and Trabuco Canyon Water District.

MWDOC's service area of more than 600 square miles takes in about 80% of Orange County, and contains a population of more than 2 million people. The second largest MWD member agency, MWDOC delivers more than 200,000 acre-feet of imported water per year.

Among MWDOC's many water delivery facilities, none is more important to the San Juan Basin than the 27-mile Allen-McCulloch Pipeline that carries treated MWD water from the Diemer Filtration Plant in Yorba Linda to the Los Alisos and El Toro water districts in the neighboring Aliso Creek watershed. Water from the pipeline is then moved to and through the San Juan Creek watershed by means of the South County Pipeline. MWDOC built, operates, and maintains the Allen-McCulloch Pipeline as trustee and agent for 10 participating retail water agencies, including

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those in the San Juan Basin. The \$110 million pipeline, named in honor of past presidents of the district, is one of the largest locally funded projects in California, and the nation's first multiple-agency, non-profit sub-lease arrangement.

Coastal Municipal Water District continues to supply MWD water to portions of Orange County outside of MWD OC and the three MWD member cities of Anaheim, Fullerton, and Santa Ana. Coastal's service area of more than 50 square miles includes a population of more than 300,000 persons living in Newport Beach, Laguna Beach, Capistrano Beach, Dana Point, San Clemente, and parts of Costa Mesa and Brea. Those communities are almost completely dependent upon imported water for their domestic supplies.

Coastal levies no taxes, has no operating staff, and does not own any water facilities other than capacity in MWD's East Orange Feeder No. 2. It merely purchases the MWD water that is carried via its feeder capacity; the water itself is stored and delivered by the retail water suppliers within Coastal's area. Its small annual operating budget is supported by connection charges and interest income.

Tri-Cities Municipal Water District continues to purchase and deliver most of the water brought to the South County region by Coastal. In a joint venture with Orange County Water Works No. 4, Irvine Ranch Water District, and Moulton Niguel Water District, Tri-Cities constructed a transmission main, known as the Tri-Cities Transmission Main, from an MWD connection off of East Orange County Feeder No. 2 in Irvine to the South County coastal area.

Tri-Cities' service area of 23 square miles includes 18 in Orange County and another 5 in northern San Diego County, with a resident population of about 50,000. The Orange County portion includes the service areas of the Capistrano Beach Water District (Dana Point and Capistrano Beach) and the City of San Clemente. The San Diego County portion includes the San Onofre Nuclear Generating Station and San Onofre State Park.

2. Capistrano Beach Water District. Capistrano Beach Water District is the retail agency responsible for water supplies to its service area of 1,400 acres in Capistrano Beach and 1,000 acres in Dana Point. It delivers 3,500-4,000 acre-feet per year of water to its resident population of approximately 20,000.

Essentially all of the water supplied by Capistrano Beach Water District is treated imported water acquired through Tri-Cities Municipal Water District. Capistrano Beach Water District's ability to use local groundwater was inhibited for years by the poor quality of the groundwater at its end of the San Juan Creek watershed, and by the inferior condition of the district's water treatment facilities. Currently, the

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district is constructing a new treatment facility that will allow it to resume use of some of the local water supply.

3. Capistrano Valley Water District. Capistrano Valley Water District covers approximately 9,000 acres in the lower area of the watershed. It includes the city of San Juan Capistrano, plus some areas southwest of the city in Dana Point. It provides water supply service to approximately 10,000 residential and commercial connections (about 1,000 of these are in Dana Point), and its service area population contains approximately 30,000 residents

Reliant exclusively on groundwater until 1965, the district was an active early participant in the effort to bring imported water to the San Juan Basin. It purchased 15 cubic feet per second (cfs) capacity in MWD's East Orange County Feeder No. 2 and 15 cfs in the Tri-Cities Transmission Main, and jointly built the Eastern Transmission Main with Moulton Niguel Water District. In 1995, the district added a turnout from the South County Pipeline at Ortega Highway. Capistrano Valley has a contract for up to 10 cfs from that turnout.

Although the district switched to imported water for its domestic supplies in 1965, it has maintained five wells for supplemental, non-potable, and emergency uses. Today, imported water accounts for about 80% of the approximately 9,000 acre-feet of water the district supplies each year, and groundwater and a modest amount of reclaimed water make up the remainder. At present, Capistrano Valley does about the only pumping for domestic delivery in the San Juan Creek watershed, using wells a little farther up San Juan Creek.

Since 1970, the San Juan Capistrano city council has doubled as Capistrano Valley Water District's board of directors. Because the district's boundaries extend beyond the city, however, the district has also maintained an advisory board that includes a representative of the Dana Point portion. The discrepancy between the district's boundaries and those of the City of San Juan Capistrano also means that the district cannot officially become a city department. A recent reorganization, however, eliminated the formal separation between the district staff and the city public works staff, such that now the city public works staff comprises the entirety of the district staff. In essence, the district "contracts" with the city's public works department for staffing.

4. Santa Margarita Water District. Santa Margarita Water District provides water, sewer, and wastewater treatment and disposal services to its 62,285-acre service area covering most of the City of Mission Viejo plus unincorporated areas such as Rancho Santa Margarita and Coto De Caza. The service area population has been

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growing rapidly and will continue to do so until at least 2020.

When Santa Margarita Water District was created in 1964, there were very few residents in the area. As noted earlier, it was created in order to provide imported water access (via MWDOC and MWD), and wastewater collection and disposal for the future development of the O'Neill properties (which made up the majority of the district) and the Bryant Ranch, which was developed into Coto De Caza. Most other South County water districts—such as Moulton Niguel Water District, Los Alisos Water District, El Toro Water District, and Irvine Ranch Water District—were created around the same time and for the same reasons: to support development, annex to MWDOC and obtain access to imported water coming from MWD, and gain authority for wastewater collection and disposal.

Santa Margarita Water District was organized as a "landowner district," in which voting privileges, like tax payments, were based on assessed valuation of real property. The district was governed by a five-member board of directors elected by landowners to staggered four-year terms. Each landowner's vote entitlement was calculated based upon one vote for each dollar of assessed valuation of land owned. Given that the O'Neill properties accounted for approximately 45,000 of the district's 62,000 acres, this arrangement meant that the water district and the ranch had a very close relationship through the 1960s and 1970s and well into the 1980s.

In 1992, special state legislation converted Santa Margarita from a landowner district to a one person-one vote district. The district still has an elected five-member board of directors serving four-year terms, but the directors are elected from geographic divisions within the district with the divisions drawn to contain equivalent numbers of residents. This change tilted the composition of the district board sharply toward Mission Viejo, which is only a small part of the district geographically but contained most of the residents as of the 1990 census. The first board of directors under the new arrangement was elected in November 1993, resulting in a new board and also the selection of a new general manager.

In part to protect the owners of land in the rest of the district from being taxed to pay for all of the water and sewer facilities in the Mission Viejo area, the Santa Margarita Water District is divided into seven improvement districts. This method allows property levies to vary within the district, with all improvement districts supporting their share of Santa Margarita's overhead, but each improvement district paying for the construction and operation & maintenance (O&M) of water and sewer facilities only in their portion of Santa Margarita Water District.²

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The district imports water from MWD via MWDOC. Treated imported water from MWD is delivered through several turnouts along the Allen-McCulloch Pipeline and the South County Pipeline, and constitutes essentially all of the potable water supply within Santa Margarita Water District. Approximately 20,000 acre-feet of MWD water are used per year within the district now. Santa Margarita is also a member agency of the Santiago Aqueduct Commission (SAC), and owns capacity in the commission's Baker Pipeline, which conveys untreated MWD imported water from northern Orange County to Santa Margarita's neighbor, Los Alisos Water District. Santa Margarita can move that water to its service area by means of a pump station.

Santa Margarita has been pursuing several ideas for augmenting its water supplies. The district hopes to diversify its water supply sources, reducing its virtually total dependence on MWD for water for human uses. A related but nonetheless distinct concern is securing an emergency water supply to aid in coping with since any unexpected interruption of MWD imports. The district is also exploring whether lower-cost alternative water sources may be found.

Santa Margarita Water District provides wastewater treatment and disposal services through a combination of methods. It is a member of the South East Regional Reclamation Authority (SERRA), a joint powers authority that owns and operates sewage treatment and ocean outfall facilities. Santa Margarita's Improvement District No. 1, serving Mission Viejo, has a contract for capacity in SERRA's treatment plant. Santa Margarita also operates its own wastewater reclamation system that consists the Oso Creek Reclamation Plant, the Upper Oso Seasonal Storage Reservoir, a force main and distribution system for effluent disposal and an interceptor system for collecting ground water and low flow surface waters in Oso Creek. The water reclaimed through this system—about 2,000-2,500 acre-feet per year—is used for irrigation of a golf course and some landscape areas in Mission Viejo.

Newer developments within Santa Margarita Water District have dual water distribution systems to allow delivery of treated imported water for potable uses and reclaimed water for landscape irrigation and other non-potable uses.

5. Moulton Niguel Water District. Like the Santa Margarita Water District, Moulton Niguel Water covers a service area that was completely agricultural until about 35 years ago. Residential and commercial development transpired more rapidly in Moulton Niguel, though, and today nearly all of the district's 24,500 acres are

sanctuary—because no development is expected ever to occur in those areas.

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occupied by the homes, businesses, schools, and parks associated with the cities of Mission Viejo, Laguna Hills, Laguna Niguel, and the community of Aliso Viejo.

Moulton Niguel Water District began as a landowner district but was converted to a one-person, one-vote system. The five members of the district's board of directors are elected from divisions within the district and serve four-year, overlapping terms.

Moulton Niguel Water District provides water, sewer, and wastewater treatment and disposal services. Its water service for domestic uses consists almost exclusively of MWD imported water received from MWDOC and Tri-Cities via the Tri-Cities and Eastern Transmission Mains. Its distribution system includes hundreds of miles of pipelines, and dozens of water pumping and sewer lifting stations and above-ground water storage tanks.

Moulton Niguel is a member of both regional wastewater treatment agencies, the South East Regional Reclamation Authority (SERRA) and Aliso Water Management Authority (AWMA), and has constructed its own advanced wastewater treatment plant. During the 1990s, the district has accelerated its reuse of treated reclaimed water for landscape irrigation.

6. Trabuco Canyon Water District. Created as the Santa Ana Mountains County Water District in 1962, Trabuco Canyon Water District started with a largely uninhabited service area of 9,100 acres. In 1980, it had 300 service connections and a population of 1,400. By 1995, its service area population was 8,886, with 3,468 metered connections for water supply and 2,557 metered connections for wastewater collection, treatment, and disposal. The district's 1995 Urban Water Management Plan Update projects that connections will grow to approximately 7,050 equivalent dwelling units when buildout occurs between 2010 and 2015, and total water demand is projected to be between 4,600 and 5,000 acre-feet per year by that time.

Currently, Trabuco Canyon Water District obtains water from the following sources:

- 2,400 acre-feet through the Santiago Aqueduct Commission via the Baker line, treated in neighboring Los Alisos Water District and then brought to Trabuco Canyon;
- 730 acre-feet of reclaimed water and another 100 acre-feet of recycled water produced in the district's own treatment plant;
- about 600 acre-feet pumped from their local wells in upper Trabuco Creek;
- about 225 acre-feet from Irvine Ranch Water District's system; and
- about 100 acre-feet of native water from neighboring Santiago County Water District (native water).

Trabuco Canyon has access to treated MWD imported water from MWDOC via the

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Allen-McColloch Pipeline, which can be moved from the pipeline to the district by means of Santa Margarita Water District's South County Pump Station and Antonio Delivery System.

The district's groundwater supplies in upper Trabuco Creek come from two relatively shallow wells that are normally able to produce water only during the spring and early summer, depending on weather conditions. The water they produce is cheaper and better than MWD's imported Colorado River water, however, so Trabuco Canyon tries to get as much from them as possible.

The district's wastewater treatment plant produces recycled water that is used for non-potable purposes such as landscape irrigation. Water reuse has been growing, and the district's projections of 4,600-5,000 acre-feet per year of total water demand at buildout include 1,050 acre-feet per year of recycled water for irrigation.

Trabuco Canyon anticipates meeting its projected water demands with 1,050 acre-feet per year of recycled water, 3,300-3,700 acre-feet per year of imported water, and about 500-700 acre-feet per year of groundwater. The district has an agreement with neighboring Santiago County Water District for emergency exchange and the sale of non-emergency surplus water, and the two districts have points of interconnection between their water distribution systems that help improve the dependability of supply for each. Trabuco Canyon also maintains emergency water connections with Santa Margarita Water District, Irvine Ranch Water District, and El Toro Water District.

Trabuco Canyon Water District is governed by a five-member board of directors, elected to alternating four-year terms at elections held every two years.

C. The San Juan Basin Authority

Acquisition and delivery of imported water supplies motivated the formation of most of the water districts within or overlapping the San Juan Creek watershed—Coastal Municipal, Tri-Cities Municipal, Trabuco Canyon, Moulton Niguel, and Santa Margarita. Although Orange County Water Works District No. 4 had not been created for that purpose, it joined the imported water effort and in 1961 its voters approved a \$2.8 million bond issue to participate with the neighboring districts in financing and constructing the physical works needed to bring water across Orange County from MWD's Diemer Treatment Plant in Yorba Linda.

The first MWD imports of Colorado River water reached the lower portion of the San Juan Creek watershed via the Tri-Cities Transmission Main in late 1964 and the

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Eastern Transmission Main in early 1965. The arrival of imported water marked the culmination of a period of successful institution-building.

1. Creation of the San Juan Basin Authority, 1965-1972. At the same time, these imported supplies brought new concerns and prompted another period of institution-building. State public health regulations required local water suppliers to stop using inferior-quality water sources for non-emergency potable use once better-quality water sources were available. The underground water supplies in the lower areas of the San Juan Basin—the service areas of Capistrano Beach Water District and Orange County Water Works District No. 4 (now Capistrano Valley Water District)—exceeded drinking water standards for certain minerals, while the MWD water was within the standards.³

The high mineral content of the local groundwater even stirred a lawsuit in 1965 over its effects on copper plumbing in housing developments within Orange County Water Works District No. 4. Judgment in that suit, Dana Development Company v. Orange County Waterworks District No. 4—Orange County Superior Court Case No. 120957, was entered in favor of the plaintiff. In June 1966, the parties settled upon a final award of \$242,500 from the district to the developer.

The combined effect of the regulations and the lawsuit was that the two lower area districts—Orange County Water Works District No. 4 and Capistrano Beach County Water District—substituted MWD Colorado River water they purchased through Orange County Municipal Water District and Coastal Municipal Water District for the poorer-quality water they extracted with their wells.⁴ Thus, two of the largest pumpers in the watershed effectively ceased pumping from the Lower San Juan Subbasin.

Total groundwater pumping in the San Juan Basin declined after the arrival of imported water. Groundwater extractions, which were estimated to have averaged 6,000 acre-feet per year during the 1950s and 1960s, peaked in the early 1960s at 6,500-7,000 acre-feet per year, then declined to less than 5,000 acre-feet per year

³ Just as one example of the water-quality differential, the MWD Colorado River water first provided to the area in 1964 had a hardness of 300 parts per million (ppm) compared to 860 ppm from the Capistrano Beach County Water District wells, and a total dissolved solids content of 660 ppm versus 1,680 ppm.

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Moulton Niguel received imported water deliveries this early, too, but it wasn't pumping in the San Juan Creek watershed so the arrival of the imported supplies did not have the same effect on that district.

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by 1968 (California DWR, 1972: 71). In its 1969 water plan, Orange County Water Works District No. 4 reported that its four wells "remain serviceable but are used only for emergencies." In the meantime, imported water purchases and deliveries had grown to approximately 2,850 acre-feet in 1968 (California DWR, 1972: 6).

While the imported water supplies were welcome, the accompanying forfeiture of the local groundwater resource was troubling for the two lower-area districts. Their general managers and board members began to think about how the local supplies of the watershed might somehow be restored to the system. These thoughts brought to attention two other related concerns.

One was whether pumpers in the upper area of the watershed, where the water quality was better, would increase use of the local supplies and foreclose—or at least greatly diminish—future uses by the lower districts. Given some of the projections about the potential development of the upper area lands, it seemed possible that upstream demands could consume the entire yield of the watershed. If upper-area water users developed and put to use all of the usable-quality local water, the lower districts might be shut out of the basin altogether and left utterly dependent on imported water.

That concern was inseparable from another. Purchasing imported water was (and is) more expensive than pumping local groundwater. As in all southern California basins, the arrival of imported water deliveries prompted questions of fairness—who would pay for imported water and how, who would continue to pump local supplies and how much, and how should the costs of supplemental water supplies that benefitted the local water resource be distributed among the water users? Indeed, it has become commonplace to observe that these intra-basin issues are not really about water, but about money.

These questions were acute in the San Juan Basin. The drinking water regulations, combined with the water quality differential between the lower and upper areas, had the potential to leave the lower-area users stuck permanently with the more expensive imported water alternative while others could exploit a cheaper mix of imported and local supplies.

Individuals from the local water districts in the San Juan Creek watershed began thinking about ways in which local water resources could continue to be used to supplement the imported supplies and improve the reliability of the overall water supply for the area. Possibilities included capturing and distributing high-quality surface storm flows, and improving the quality of the local groundwater supplies in the lower area in order to restore its availability for supplemental or emergency use.

These and other ideas appeared in a long-range planning document for Orange

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County Water Works District No. 4, co-authored in 1969 by George Osborne of the Orange County Flood Control District and T.J. Meadows of Orange County Water Works District No. 4. The ideas in that document all related to the goals of enhancing the availability and quality of the local supplies of the San Juan Creek watershed, alleviating the problem of imported water dependency, providing local seasonal storage to meet peak and emergency water demands, and improving the prospects for an equitable sharing of the costs and benefits of whatever mix of imported and local water ultimately supported the area's development.

In 1968, Osborne had approached the California Department of Water Resources (DWR) on behalf of all the local water districts in the San Juan Creek watershed. He requested that the department, with the support of the local agencies, conduct a study of the water resources and projected water demands of the San Juan Basin. The department agreed, and the stated purpose of the study was "to investigate the ground water basin and maximize use of local water supplies through full utilization of the basin resources" (California DWR, 1972: iii).

Local agency support included a San Juan Basin Study Advisory Committee, composed of the prominent water personnel within the watershed at the time:

- H.G. Osborne represented the Orange County Flood Control District,
- Kenneth Lawrence represented Capistrano Beach County Water District,
- Carl Kymala represented Moulton-Niguel Water District,
- William Bathgate represented the city of San Juan Capistrano,
- Warren Wilson represented Santa Margarita Water District,
- Les Boyle represented the Municipal Water District of Orange County,
- Keith Robertson represented Coastal Municipal Water District,
- John Serences represented Tri-Cities Municipal Water District, and
- Henry Stewart represented the San Juan Capistrano Soil Conservation District.

The DWR study took three years, and was published as Bulletin 104-7 in 1972. It included information on the geology and hydrology of the watershed, and the quality of local water supplies. It also included projections of population and water demand within the watershed, and described several scenarios for combining imported water supplies, local groundwater, and reclaimed wastewater to meet projected demands. Estimates of the costs of these combinations were supplied to provide some guidance for the local decision makers.

Although the study began thirty years ago, Bulletin 104-7 still contains as comprehensive an examination of the geology and hydrology of San Juan Basin as has yet been done. Its findings about the storage capacity and sustainable annual yield of San Juan Creek and its tributaries are benchmarks that still influence the understanding of the basin.

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Its findings about future water demand, however, were alarming, and fortunately, overstated. Although the study area population was estimated to be only 11,100 as of 1970, Bulletin 104-7 reported that the projected population by the year 2020 was 390,000 (California DWR, 1972: 33). Those estimates led to a jolting projection of a nearly tenfold increase in water demand: "The water demand of the San Juan Creek Basin area was approximately 9,500 acre-feet in 1970; by 2020 it is expected to be 90,000 acre-feet" (California DWR, 1972: xi).

Supplies would fall far short of that figure. The DWR study estimated that net percolation of precipitation and streamflow during the base study period had averaged 10,500 acre-feet per year. The one water importation facility then operating in the basin (the Eastern Transmission Main) had a capacity of 11,700 acre-feet per year. Even the additional water importation facilities that were then expected to be built in the watershed would not be able to make up the difference, assuming MWD had the additional water to sell.

If imports—which every district in the watershed was counting on—were going to be insufficient, two other options would have to be pursued more aggressively: conjunctive use of the local groundwater resource, and increased wastewater reclamation and reuse. Bulletin 104-7 advocated both.

Wastewater treatment and disposal were already important issues in the San Juan Creek and Aliso Creek watersheds, because of the growth of Mission Viejo, San Juan Capistrano, Laguna Niguel, and Laguna Hills. The local water districts in those watersheds reasoned that it would be more efficient to create regional wastewater agencies than for each water district to construct and operate its own treatment and disposal facilities and obtain and maintain the necessary regulatory permits. Around this time, California state government was also trying to discourage the proliferation of new, separate special districts for water reclamation.

In the San Juan Basin, the cities of San Juan Capistrano and San Clemente, plus Capistrano Beach Water District, Santa Margarita Water District, Moulton Niguel Water District, and Dana Point Sanitary District established the South East Regional Reclamation Authority (SERRA) in 1970. Water districts in the Aliso Creek watershed created the Aliso Water Management Agency (AWMA) at the same time. These joint-powers authorities (JPAs) operate and maintain wastewater treatment and disposal facilities in their respective watersheds that serve their member districts.

Water reuse, on the other hand, was still fairly new in the late 1960s and early 1970s. Bulletin 104-7 reported that small amounts—less than 1,000 acre-feet per year—of reclaimed water were being used for irrigation supplies (California DWR, 1972: 6). Increasing water reuse posed a slightly different challenge. Permits have

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to be obtained from the state's Regional Water Quality Control Boards for water reuse projects. The South County watersheds straddle the boundary between the jurisdictions of two regional boards, Region 8 (Santa Ana) and Region 9 (San Diego). This raised the possibility that a local water district, or AWMA or SERRA, might have to get more than one permit for the same project. The regional boards supported the formation of a third joint-powers authority—the South Orange County Reclamation Authority (SOCRA)—by the member districts in SERRA and AWMA, plus Trabuco Canyon Water District and Irvine Ranch Water District. SOCRA coordinates the permits for all the water reclamation facilities in Regions 8 and 9 in southern Orange County, with the goal of facilitating the development of reclamation and reuse projects in the South County region. SOCRA was also conceived as a possible vehicle for financing new reclamation facilities, though this hasn't happened yet.⁵

The establishment of three JPAs in the two watersheds may seem like a great deal of organizational infrastructure. Actually, AWMA, SERRA, and SOCRA are housed together in one office and share a common staff. Their separate identities are tied to the areas they cover (in the case of AWMA and SERRA) or their purpose (in the case of SOCRA). Staff services and other overhead costs are charged to the member districts of the three authorities based on the work performed for each, and operations are funded through a "project committee" structure that confines payment of costs to the districts benefitting from or participating in a particular project.

Improving wastewater reclamation was one possibility for reducing the gap between water supplies and anticipated water demands in the San Juan Basin. The other was conjunctive use of the local groundwater supplies with the imported water and other supplies. Addressing that option was likely to require some projects to enhance groundwater recharge and recovery, improve groundwater quality, or install water treatment facilities for pumped groundwater.

Although the local water districts within the San Juan Creek watershed had common interests in improving the local water supplies and increasing their use, each district was unwilling to undertake such efforts itself, for understandable reasons. Any district that did so would bear the costs of improving the local resource while providing a significant benefit to the other districts. To be accomplished at all, the effort would have to be a cooperative one.

At the same time the wastewater JPAs were created, the managers of some of the

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SOCRA is, however, participating with U.S. Bureau of Reclamation in the development of a master plan for water reuse in the region.

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districts in the San Juan Basin discussed the formation of another authority to pursue these other possibilities. Such a body might provide the organizational vehicle for coordinating the development, and promoting the fullest and fairest use, of the local groundwater supplies along San Juan Creek and its tributaries. It could also be a means of defending the local water resources from new pumpers who might initiate or increase use of the water to the long-term detriment of the public agencies.

On November 22, 1971, Capistrano Beach Water District, Orange County Water Works District No. 4, and Santa Margarita Water District signed the "Joint Exercise of Powers Agreement Creating the San Juan Basin Authority." It remained a three-member JPA until the 1980s, when Trabuco Canyon Water District joined in 1987, followed by Moulton Niguel Water District in 1988.

While each of the five water districts within the watershed continued its own efforts to reduce its reliance on imported water supplies, the San Juan Basin Authority became a means to undertake joint endeavors to do so. The watershed remains significantly dependent upon MWD imports, which meet approximately 58 percent of all water needs within the region (CVWD, 1995: 6).

2. Basin Authority Membership and Administration, 1972-1998. Each member agency in the San Juan Basin Authority designates an individual to serve on the basin authority's board of directors. Agencies normally designate a second person to serve as an alternate. The members of the basin authority's board of directors choose one from among them to serve as president of the board.⁶

Member agencies also provide financial support for the overhead or administrative costs of the basin authority. The basin authority board has employed a general manager or administrator of the basin authority. Costs of basin authority projects have been apportioned among the member agencies by different means, as discussed later.

The San Juan Basin Authority started with three member agencies, had five briefly in the late 1980s, dropped to four in 1989, and in 1997 was back down to three. In mid-1998, one of the agencies that had left re-joined and the other was considering doing so. Only Capistrano Valley Water District and Santa Margarita Water District have been members continuously since 1971, and at times even they have raised

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The first president of the San Juan Basin Authority's board was Warren Wilson, a director on the Santa Margarita Water District board who was closely associated with the O'Neill family. The current president of the basin authority board is John Schatz, general manager of the Santa Margarita Water District.

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questions about their participation. Some of the changes in basin authority membership and administration are related to changes in the activities and the perceived purpose of the basin authority (including changes of general managers), so we turn to a review of those membership changes.

Trabuco Canyon Water District was not one of the original San Juan Basin Authority members. At the top of the watershed, the district is poorly situated physically to capture much benefit from water projects the basin authority might undertake along San Juan Creek or even in the lower portions of Trabuco and Oso creeks. Nevertheless, in 1987, the Trabuco Canyon chose to join Capistrano Beach, Capistrano Valley, and Santa Margarita in the San Juan Basin Authority in order to be part of watershed planning.

Trabuco Canyon Water District apparently was drawn toward joining the San Juan Basin Authority by speculation that the basin authority might enter into negotiations on behalf of its members with northern Orange County interests concerning the management and use of waters in the Santa Ana River watershed. One member of the Trabuco Canyon Water District board--Manny Bauer--was especially interested in that prospect. After Trabuco Canyon joined the San Juan Basin Authority, Bauer became first the Trabuco Canyon Water District representative on the San Juan Basin Authority's board of directors, and served for a while as president of the basin authority board.

Moulton Niguel Water District also was not one of the original basin authority members. Most of Moulton Niguel's service area is in the neighboring Aliso Creek watershed, and only about 15 percent of the San Juan Creek watershed is covered by Moulton Niguel. Moulton Niguel did not extract groundwater from within the San Juan Basin, and the upper reach of Trabuco Creek is about the only place where they might have been interested in capturing some water for irrigation use.

Instead, Moulton Niguel's interest in the San Juan Creek watershed developed over facilities for wastewater treatment and disposal. Moulton Niguel Water District joined the San Juan Basin Authority in 1988, formalizing a relationship that had begun years earlier over the "Lakefill Line" project (described below). Moulton Niguel was also interested in the prospect of the San Juan Basin Authority undertaking an emergency water storage facility, which the entire South County region needs.

For reasons that included some internal financial difficulties, Capistrano Beach Water District began to discuss pulling out of the San Juan Basin Authority around the same time that Trabuco Canyon and Moulton Niguel joined. The prospects of new activities by the basin authority may have intrigued Trabuco Canyon and Moulton Niguel in the late 1980s, but stirred concerns within Capistrano Beach.

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Late in 1988, Capistrano Beach undertook earnest negotiations with the other basin authority members about withdrawing, and selling their share in one of the basin authority's projects--the "Lakefill Line." The basin authority and Capistrano Beach Water District reached a settlement whereby \$50,000 (\$10,000 per year for five years) was returned to Capistrano Beach, and the district's withdrawal from the basin authority became effective on April 5, 1989.

The financial issues associated with Capistrano Beach Water District's withdrawal encouraged the remaining San Juan Basin Authority members to reconsider and revise the internal organization and operation of the basin authority. This revision was one of the two most significant changes in the administration of the basin authority during its history.

On February 5, 1991, the San Juan Basin Authority and its member agencies adopted the "San Juan Basin Authority Projects Agreement," fitting member agencies' financial contributions and accumulation of assets in basin authority projects more closely to their voluntary membership and agreed share in "project committees." Under the agreement, basin authority activities would be established, funded and operated on a "project committee" basis. Project committees would be established for each San Juan Basin Authority project, consisting of the member agencies that chose to support that project. The project agreement approach, which is used in many other JPAs, was intended to reduce the internal tensions that had arisen over whether one or another member agency would receive "its money's worth" of benefit from a basin authority undertaking.

The other most significant change in the administration of the basin authority was an experiment that lasted from 1993 to 1996. In 1993, T.J. Meadows was succeeded as general manager by Bill Becker, who had provided engineering consulting services to the basin authority when Meadows was general manager. Becker was also the general manager for SERRA, and it was hoped that sharing a general manager could lower the overhead costs for both JPAs. The basin authority already shared office space with SERRA, AWMA, and SOCRA. In December 1993, the basin authority board approved an agreement with SERRA to provide administrative services to the San Juan Basin Authority.

In 1994, while the San Juan Basin Authority was administratively housed with AWMA/SERRA/SOCRA, there was also an active push for consolidation of water and sewer agencies in Orange County. At this time, the member agencies and staffs of AWMA, SERRA, SOCRA, and the San Juan Basin Authority undertook an

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examination of the possibility of some reorganization or consolidation.⁷ The consulting firm RM & Associates presented a report with proposals to a special joint meeting of the boards of the four JPAs in February. State Senator Marilyn Bergeson even introduced and passed through the California legislature in 1994 a bill allowing greater joint administrative operations among AWMA, SERRA, SOCRA, and the basin authority, and Governor Wilson signed it into law.

At the March 1995 San Juan Basin Authority board meeting, General Manager Becker reported that a merger agreement was being prepared to combine all four JPAs one agency. Santa Margarita's director on the basin authority board, John Schatz, had agreed to revise the document. At the basin authority's May 1995 board meeting, the members voted unanimously to adopt a resolution approving the reorganization agreement for shared staff resources among AWMA, SERRA, SOCRA, and the San Juan Basin Authority. The basin authority board was the first of the four boards to vote on the agreement.

Under a formal agreement until July 1, 1997, the San Juan Basin Authority was staffed and administered along with and through SERRA, AWMA, and SOCRA. The experiment proved unsatisfactory for a variety of reasons, some of which had little to do with the administrative structure. On February 18, 1997, not long after there was a change in general managers, the San Juan Basin Authority board voted to end the staffing through SERRA, AWMA, and SOCRA effective July 1, 1997.

The basin authority continued with four members through these major administrative changes from 1990 through 1996, but at that point Trabuco Canyon reevaluated its participation. As noted earlier, Trabuco Canyon Water District's geographic position within the watershed made the likelihood of a tangible benefit from any basin authority water projects appear small, which for a long time discouraged the district from even joining. Even after the district joined, some Trabuco Canyon board members would revisit the question of what return they were receiving for the money they provided to support the basin authority.

By themselves, those reservations might not have pulled Trabuco Canyon out of the San Juan Basin Authority. The district's relationship with the other member districts grew strained during the 1990s over water rights allocations and Trabuco Canyon's groundwater pumping.

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The director and alternate from Moulton Niguel Water District also suggested that the San Juan Basin Authority pursue the possibility of combining its administrative functions with the Municipal Water District of Orange County (MWDOC), of which all the member agencies of the basin authority are also members.

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Shortly after Trabuco Canyon joined the basin authority, the basin authority had embarked upon a project to determine water production histories and future plans throughout the watershed, establish projections of how much water everyone was going to use, and then assign entitlements. At that time (approximately 1990-91), Trabuco Canyon Water District had some good-capacity production wells that had been neglected and were producing only a fraction of their capability. In the district's view, its production entitlement in the basin authority's allocation scheme significantly understated both its production capability and its intent—perhaps by 1,000-2,000 acre-feet per year compared with an estimated allocation closer to 350 acre-feet per year.

As Trabuco Canyon clarified its intention to increase its groundwater production, Santa Margarita and Capistrano Valley objected to the district pumping water they felt it was not entitled to. The possibility that membership in the San Juan Basin Authority might actually limit Trabuco Canyon's use and enjoyment of local water resources rather than enhance them merely fed the concerns of some Trabuco Canyon directors about the costs and benefits of basin authority membership.

Director Manny Bauer—serving at that time as president of the San Juan Basin Authority board—was a strong supporter of continued participation by the Trabuco Canyon district, but in November 1996 Bauer lost a reelection bid for his seat on the Trabuco Canyon board and, thus, relinquished his position on the basin authority board, too. A new majority on the Trabuco Canyon board was interested in reducing district expenditures, and did not at that time see adequate benefit to justify the district's basin authority membership. The board voted to withdraw, and notified the basin authority in February 1997 of its decision to withdraw, effective June 30, 1997.

Also in 1997, in the aftermath of the experiment with joint administration with SERRA, AWWMA, and SOCRA, the San Juan Basin Authority moved its office to space provided by member agency Moulton Niguel Water District. Don Martinson, who had been a consulting engineer to the basin authority, became interim administrator and in 1998 administrator. Currently, administrative support for the basin authority is provided by Moulton Niguel and financial services are provided by member agency Santa Margarita Water District. Mr. Martinson and the basin authority board have focused since July 1, 1997 on repairing some of the tensions among the members that had developed during the 1990s.

Trabuco Canyon's withdrawal pulled the basin authority back down to three members (albeit not the same trio that had started the JPA in 1971), but only briefly. In 1997, while the basin authority and Capistrano Beach Water District were resolving their dispute over water rights within the watershed, they also discussed the possibility of Capistrano Beach's return to membership in the basin authority.

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Some of the larger and more ambitious projects planned by the basin authority that had contributed to Capistrano Beach's decision to leave had been shelved by the late 1990s, and by 1997 the basin authority was contemplating more of a watermaster role within the watershed. Early in 1997, the Capistrano Beach Water District board voted to accept an invitation from the basin authority to rejoin. Although Capistrano Beach's return was not officially complete until the water rights settlement was finished in 1998, it did rejoin at that time, raising basin authority membership back to four.

During 1998, Trabuco Canyon Water District discussed rejoining the San Juan Basin Authority. The issue of their groundwater production from within the watershed was still controversial, however. At the same time it was considering rejoining the basin authority, the Trabuco Canyon board was assessing whether to file an application with the State Water Resources Control Board to appropriate 600-650 acre-feet per year from Trabuco Creek, considerably more than the 350 acre-feet per year in the 1991 San Juan Basin Authority Projects Agreement.

3. A Brief Summary of Basin Authority Projects and Initiatives, 1972-1997. The San Juan Basin Authority has pursued several programs intended to improve and protect the quality and quantity of local groundwater supplies so that they could be used to enhance water supply reliability and reduce dependence on imported water. A full description of them is beyond the scope of this report. On the other hand, some awareness of the projects and initiatives pursued by the basin authority is essential to understanding the changing perceptions of its purpose, and some members' frustration with its accomplishments. Accordingly, a brief summary is included here.

a. Monitoring stream flows. The San Juan Basin Authority has streamflow gauges located throughout the watershed. This program has allowed the basin authority and its members to maintain some data on water quantities measured as flows. Some of the gauges are shared with the U.S. Geological Survey, and some of those pre-date the basin authority itself. Indeed, the oldest gauging stations in the watershed have provided streamflow data since 1928. The California Department of Water Resources and the U.S. Geological Survey shared the costs of maintaining and staffing the gauging stations. More recently, the San Juan Basin Authority, Orange County, and the Geological Survey have shared the costs.

b. Improving lower-area groundwater quality, and the "Lakefill Line." The DWR study completed and published in 1972 recommended that the water districts within the San Juan Basin try to improve groundwater quality in the lower area by removing some of the poor-quality groundwater and allowing it to be replaced by

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high-quality inflow from upstream. One of the San Juan Basin Authority's first endeavors after its formation at the end of 1971 was to undertake such a removal-and-recharge program, which led the basin authority gradually toward the ownership of a pipeline that was known originally as the "Lakefill Line" and later as the "basin bypass line."

In the early 1970s, the basin authority worked with member agency Capistrano Valley Water District on a project to restore some of Capistrano Valley's lost groundwater production. The basin authority constructed a well on San Juan Creek on some Rancho Mission Viejo property upstream from Capistrano Valley's service area, and supplied groundwater from that well to Capistrano Valley. Although the actual cost of the groundwater delivered to Capistrano Valley Water District by this project was quite low, Capistrano Valley agreed to pay San Juan Basin Authority the going rate for MWD treated imported water, for two reasons. First, the San Juan Basin groundwater was in fact replacing a like amount of MWD water the district would have purchased anyway, so there was a logic to the argument that the value of the groundwater was its replacement cost rather than its production cost. Second, by paying the MWD rate for water that the basin authority produced for much less, Capistrano Valley was helping the fledgling JPA get on its feet financially and support future projects.

Having procured upstream water for Capistrano Valley,⁸ the basin authority worked on the three remaining pieces of the puzzle—removing additional groundwater from within Capistrano Valley's service area, capturing and diverting poor-quality upstream flows in Oso Creek so they would *not* recharge the underground supplies, and impounding better-quality upstream flows on San Juan Creek for controlled release so they *could* recharge the underground supplies.

In the mid-1970s, the Mission Viejo Company constructed Lake Mission Viejo to stimulate sales of lots and homes. Originally, the company planned to fill the lake with MWD imported water acquired through Santa Margarita Water District. Just as construction of the lake was completed, however, the 1976-77 drought occurred. During the drought, the state barred the use of potable quality water for non-potable uses, such as filling a lake of potable quality water. At that moment, the Mission Viejo Company's desire to fill its lake coincided perfectly with the San Juan Basin Authority's desire to remove non-potable groundwater from the lower portion of the watershed. The Mission Viejo Company agreed to construct a well field in San Juan Capistrano and a pipeline up to the lake. Groundwater from Capistrano Valley

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As it happened, Capistrano Valley Water District customers still complained about the quality of the water that was obtained from the basin authority's well, and that portion of the project was terminated.

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Water District's service area would be removed and sent up the line to Lake Mission Viejo--hence the origin of that pipeline's name, "the Lakefill Line."

By the time the system was completed, however, the drought had ended, and the company did not actually use the line to fill the lake. Instead, the company donated the system to the Santa Margarita Water District, which gave it to the San Juan Basin Authority. At that point, the basin authority's intention for the line changed somewhat. The upper reach, from Mission Viejo down to San Juan Capistrano, would be used along with a barrier built by the basin authority across Oso Creek to intercept poorer-quality Oso Creek flows. A lower reach was added with an ocean outfall in Dana Point harbor. Thus redesigned, the "Lakefill Line" was converted to something more nearly like a "brine line" for diverting water past the lower basin.

The effort to improve lower-area groundwater quality proved disappointing. It now appears that the composition of the subsurface soils in the lower area accounts for the quality of the groundwater in the Lower San Juan Subbasin as much as, or more than, the quality of the inflow.

Nevertheless, the line became a valuable asset for the San Juan Basin Authority. By the late 1970s, Santa Margarita Water District and Moulton Niguel Water District needed additional wastewater treatment and disposal capacity to meet demands in Mission Viejo and other upstream areas. The line was converted to those purposes.

Santa Margarita built a 3 mgd treatment plant in upper Oso Creek, and needed to reuse the product water and dispose of the waste. They built Upper Oso Reservoir to receive the treated water and began using it for landscape irrigation in Mission Viejo. The waste to be disposed of was conducted via the Lakefill Line--renamed the Basin Bypass Line (but which was commonly referred to as the Lakefill Line for many more years)--which the basin authority had extended past another Oso Creek barrier built by Santa Margarita, and on up to Santa Margarita's treatment plant. At the downstream end, a connection was added to the SERRA treatment plant and its ocean outfall.

As a basin authority asset, interests in the Lakefill Line were owned by Santa Margarita, Capistrano Valley, and Capistrano Beach. Moulton Niguel was not yet a San Juan Basin Authority member; however, its need for a disposal line was at least as great or greater than Capistrano Valley's or Capistrano Beach's. Thus began Moulton Niguel's relationship with the San Juan Basin Authority.

Moulton Niguel planned to build a sewage treatment plant on Camino Capistrano in Mission Viejo adjacent to the Lakefill Line. At first they wanted to lease some capacity in the Lakefill Line, but ended up buying out Capistrano Valley's share becoming a member of the basin authority. The Basin Bypass Line was connected

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to Moulton Niguel Water District's Plant 3A. In an arrangement worked out through SERRA, Santa Margarita Water District acquired capacity in Plant 3A, too, which allowed Dana Point Sanitary District to have more capacity in the SERRA treatment plant down at the ocean. During the 1990s, due to flooding and other problems that created some emergency situations along the line, Moulton Niguel Water District incurred significant costs maintaining the Basin Bypass Line. Moulton Niguel offered to buy out the line, and Reach 1 of the line was sold by the basin authority to Moulton Niguel in 1997.

c. Capturing San Juan Creek flows. The goal of improving both the quantity and the quality of groundwater available in the San Juan Basin led the basin authority also to pursue the possibility of an impoundment facility in the Upper San Juan Creek Subbasin. Such a facility could aid in capturing storm flows and retarding their progress down the creek, reducing the amounts that would be lost to the ocean and increasing the amounts that would percolate underground.

It was at that time estimated that 10,000 acre-feet of water or more wasted to the ocean in an average year. The water-bearing materials beneath San Juan Creek have somewhere in the range of 25,000 and 60,000 acre-feet of storage capacity. If both estimates were accurate, impounded normal-year stream flows alone could fill the basin and keep it full even while it supported groundwater production of a little more than 10,000 acre-feet per year. Accordingly, the San Juan Basin Authority began considering projects such as a dam for water conservation and flood control, and/or a series of low dams to promote recharge.

In the 1980s, the basin authority began planning a dam on a site on the upper San Juan Creek in Caspers Regional Park. Most of the basin authority members supported the project, as did the U.S. Bureau of Reclamation, which agreed to provide \$42 million for it. About this time, Trabuco Canyon Water District joined the basin authority in 1987, partly (as noted earlier) out of an interest in the construction of some water storage facility in the watershed. On the other hand, Capistrano Beach Water District opposed the project as too costly and unlikely to provide a clear and adequate benefit to them, and chose in 1989 to terminate its membership in the basin authority.

Rather quickly, however, two occurrences coincided to impede progress on the dam project. The U.S. Bureau of Reclamation did not come through with the funding it had promised, and opposition to the project arose from several quarters. The Orange County Department of Beaches and Parks, and then the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game opposed the site because of its location in Caspers Regional Park. Without the federal funding, the project would have to be

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supported locally, and that became politically as well as financially infeasible due to the opposition the site had generated.

With the Caspers Park site in trouble, Santa Margarita Water District, Rancho Mission Viejo, and the Orange County director of public works supported an alternative site on San Juan Creek just above Verdugo Canyon. By that time, however, the area's economic slowdown made it impossible to proceed without federal funding, which was still not forthcoming.

The dam project remained dormant until the area's economic recovery was under way in 1993. At that time, the San Juan Basin Authority's Technical Advisory Committee recommended resurrecting the Caspers Park site re-conceived as a multi-purpose project with wetlands and recreational amenities, but especially emphasizing its potential flood control benefits in light of the area's disastrous experiences in the winter of 1992-93. The basin authority's board of directors agreed to have its consulting engineer, Don Martinson of NBS/Lowry, explore it with the city of San Juan Capistrano's Flood Plain Committee, and with George Osborne, who had previously worked at the Orange County Flood Control District and for the county's Emergency Management Agency and was currently a director at the Orange County Water District and a member of the Water Advisory Committee of Orange County. Initial conversations were encouraging, and in mid-1994 Mr. Martinson developed a Scope of Work for the project. It soon appeared, however, that opposition from the county's parks department to any kind of project in Caspers Park would be just as adamant as it had been in the 1980s, and it was unlikely that the county supervisors would proceed with the project if the parks department opposed it. Once again, the dam project was dropped.

d. The desalter project. The 1970s effort to improve lower-area groundwater quality by removal and replenishment had proved unsuccessful. At the end of the 1980s, the attempt to capture a greater extent of the higher-quality storm flows on San Juan Creek had stalled. In the meantime, the price of MWD's treated imported water had escalated significantly, and the water districts in the area felt their dependence upon MWD even more acutely during the 1987-92 drought as questions rose about MWD's long-term capability to supply future increases in water demand.

The combination of these events brought another idea squarely to the fore for advancing the San Juan Basin Authority's goal of enhancing the use of the local water resources—a demineralization plant to treat lower-area groundwater up to usable quality. Higher MWD costs made it financially feasible to consider pumping and treating the local water and distributing it to some of the member agencies, who could thereby reduce the amount of treated imported water they had to buy.

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For several reasons, including mainly the availability of well sites and the presence of a significant amount of groundwater in need of restoration, the plans for a demineralization facility—known more simply as a "desalter"—focused on sites in the lower area of the watershed, within Capistrano Valley Water District. As those plans developed, the project began to take the following shape. Groundwater produced from several wells in the Lower Trabuco and Middle and Lower San Juan subbasins would be manifolded together to feed a desalter sited somewhere near the San Juan-Trabuco confluence. The desalter would be built and brought on line in two phases—the first phase capable of producing about 2,000 acre-feet per year for domestic uses within the watershed and a peak emergency capacity of up to 4,000 acre-feet, and the second phase bringing the total sustained production capacity to about 4,000 acre-feet per year and the emergency capability to about 8,000. Some of the product water from the desalter could supply domestic uses in Capistrano Valley, and the rest could be pumped up into Santa Margarita's area and connected to the South County Pipeline as well as introduced at one or more points along San Juan Creek for basin recharge.

Projections of future MWD imported water prices made the first phase appear financially workable soon, and the second phase worthwhile after the passage of a few more years. In the early 1990s, the basin authority proceeded along three fronts more or less simultaneously. First, it retained the engineering firm of NBS/Lowry to study the economic feasibility of the projects, the hydrology that would support the basin's ability to yield enough water to sustain the project, and to perform site selection and project design tasks. Second, the basin authority in 1992 filed an application with the State Water Resources Control Board for a permit to appropriate 12,500 acre-feet of water per year—essentially all of the unappropriated water in the San Juan Creek watershed—with the desalter project as the intended use.⁹ Third, the basin authority in 1993 hired the firm of Culbertson, Adams & Associates to perform the tasks needed to comply with the requirements of the California Environmental Quality Act (CEQA). These three planning efforts would cost the basin authority and its member agencies hundreds of thousands of dollars;

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The water rights application—Application Number 30123, filed on April 3, 1992—was assembled by the basin authority's attorney, Fritz Stradling, its general manager, T.J. Meadows, and its consulting engineer, Don Martinson. They filed for more water than the anticipated yield of the desalter, anticipating some other future projects for basin recharge and/or sea-water intrusion.

Although the water feeding the desalter would be pumped groundwater, the State Water Resources Control Board regards San Juan Creek as an underground stream, so appropriative rights have to be acquired through the same process as for the diversion of surface water in an above-ground stream.

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the facility itself would ultimately cost tens of millions.

Controversy soon enveloped the basin authority's new initiative, and the most formidable opponents used the water rights application process as the means of registering their objections. Some of the objections might have been expected; others probably could not have been. On the more predictable side, protests to the basin authority's water rights application were filed by the California Department of Fish & Game, which expressed concern about the impacts the additional pumping would have upon stream and riparian habitat conditions, and by two neighboring pumpers who expressed concern about the impact on their wells. The largest pumper in the watershed, Rancho Mission Viejo, however, did not formally protest the basin authority's application.¹⁰

Somewhat less predictable, but not entirely surprising, was a protest filed by Capistrano Beach Water District. Capistrano Beach had left the basin authority in 1989, and thus perceived itself as unlikely to benefit from the basin authority's plans to intercept a great deal of groundwater upstream of them and feed it to a desalter for use by basin authority member agencies. The basis of Capistrano Beach's protest, however, was that the project and the appropriation permit for it would interfere with Capistrano Beach's plans to resume groundwater pumping in the lower subbasin (which it had largely abandoned in 1965). Capistrano Beach Water District filed its own application with the State Water Resources Control Board¹¹ for 2,000 acre-feet per year from the basin to supply water for its own desalter. The San Juan Basin Authority protested Capistrano Beach Water District's application.

More surprising was a protest filed against the San Juan Basin Authority's application for an appropriation permit by the city of San Juan Capistrano and its water supplier, Capistrano Valley Water District—a member agency of the San Juan Basin Authority, as well as the agency within which the desalter was likely to be built and to which most of its product water was likely to be delivered. In retrospect, the city's decision to protest the basin authority's application may be seen in light of the emergence of a stronger environmental and anti-growth position within the city and on the city council during the 1970s and 1980s, which diminished support for projects perceived as facilitating growth. Local residents near the prospective sites for the desalter also expressed concerns about noise and

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The ranch did, however, file its own application to convert nearly all of its production along the San Juan Creek from a riparian to an appropriative right.

¹¹

Application Number 30337.

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other aesthetic impacts.

Perhaps the most unexpected complication for the desalter project came from MWD, which at the end of 1993 announced new projections of its prices for imported water. Instead of rising 25% by 2002, MWD now projected that its prices would rise only 5 or 6%. Those new price projections changed the calculations of the desalter's financial feasibility substantially, as the NBS/Lowry engineer conducting the study reported to the basin authority board in January 1994.

By early 1994, progress on the desalter project and the water rights application connected with it had slowed to a crawl. The basin authority board had to reconsider whether the project was worth pursuing in light of the revised projections of the costs of imported water, it had protests at the State Water Resources Control Board to settle, a CEQA process to complete, and (if it chose to go ahead) a project to fund and build. By the end of 1994, the basin authority board was informed by its general manager that virtually every aspect of the desalter project--from water rights agreements through CEQA to funding--was substantially behind schedule.

Nevertheless, throughout 1994 and 1995, the basin authority board members proceeded, on the ground that improving the reliability of their water supplies was too important to sacrifice entirely to the consideration of whether the project would produce water that was incrementally higher or lower in price than MWD water. The NBS/Lowry feasibility and site selection studies were completed later that year, and the board focused on settling the protests to the water rights application. The board agreed to retain the services of a Sacramento-based water rights attorney to aid in guiding the application through the remainder of the State Water Resources Control Board process.

The protests by the other pumpers were settled in a fairly straightforward fashion with some modifications to the basin authority's application. Greater emphasis was placed on settling the protest with San Juan Capistrano and Capistrano Valley Water District, since the desalter site was in their district and they were a member of the basin authority. (In fact, the chief of the water rights section at the State Water Resources Control Board had observed that the basin authority appeared to be the first organization to have protested its own application.)

The city of San Juan Capistrano and the Capistrano Valley Water District had based their protest on the ground that the city had succeeded to Mission San Juan Capistrano's original "pueblo water right" under Spanish law, and that the basin authority's attempt to appropriate all of the remaining water in the watershed would interfere with the city's and the district's current and future exercise of that right. Ultimately, the State Water Resources Control Board staff recommended that the

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pueblo water right basis for the protest be rejected, but the city and Capistrano Valley Water District were allowed to keep their protest alive for purposes of completing a negotiated settlement with the basin authority.

Although settlement negotiations had begun in 1993, they persisted through all of 1994 and nearly all of 1995 before a final agreement was reached and approved by the San Juan Basin Authority, the city of San Juan Capistrano, and the Capistrano Valley Water District. In that protest settlement agreement, dated November 21, 1995, the city agreed to set its pueblo water right claim aside (though reserving the right to raise it in other actions) and withdrew its protest in exchange for the San Juan Basin Authority's recognition that the district was entitled to 2,900 acre-feet per year, and the city another 425 acre-feet per year, of groundwater production from the basin free from interference with respect to either quality or quantity caused by the operation of the basin authority's desalter project.

Negotiations between the San Juan Basin Authority and Capistrano Beach Water District took even longer—four years in all, resulting in a protest settlement agreement adopted by their respective boards of directors on April 7, 1998. In that settlement agreement, the basin authority recognized Capistrano Beach's entitlement to divert (pump) 20% of the available safe yield of the basin, up to a maximum of 1,300 acre-feet in a year. Capistrano Beach recognized San Juan Basin Authority's entitlement to 80% of the available safe yield, up to a maximum of 12,500 acre-feet in a year.

The settlement of all of the protests by mid-1998 cleared the way for the San Juan Basin Authority's application before the State Water Resources Control Board. But the water rights issues had not been the only ones in the path of the desalter project.

Among other distractions, apprehension about the possibility of increased upstream pumping by Rancho Mission Viejo led to a study in mid-1994 of the feasibility of diverting advanced-treatment reclaimed water produced by SERRA to supply the basin authority's desalter. The effort to settle Capistrano Beach Water District's protest led to some mid- to late-1994 discussions of the possibility of a joint desalter project between the basin authority and Capistrano Beach.

Also, a significant internal debate emerged in September 1995 over whether member agencies were committed to dedicating the return flows of their imported water supplies to the desalter projects. Santa Margarita Water District declared its intention to reclaim its import return flows for its own purposes. Santa Margarita threatened to withdraw its support for the desalter project (of which it was paying most of the costs) if the project agreement were interpreted to require its forfeiture of rights to the return flows of its imports.

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In the meantime, the basin authority board agreed to attempt to pass CEQA review using a Mitigated Negative Declaration rather than a full-blown Environmental Impact Study and Report. Even so, the preparation of the Mitigated Negative Declaration consumed most of 1994, as the basin authority's consultant identified several items that would have to be addressed and the basin authority's water rights attorney also reviewed the declaration meticulously. After its publication in December 1994, the Mitigated Negative Declaration drew ten responses—including ones from the State Water Resources Control Board, the California Department of Fish and Game, Rancho Santa Margarita, and Capistrano Beach Water District. Although the basin authority board and its consultants hoped to have those issues resolved by April 1995, the process was extended until August 31st.

Just before the expiration of the period for public comments on the revised Mitigated Negative Declaration on that date, Capistrano Beach Water District terminated discussions of a joint project and instead filed a lawsuit against the San Juan Basin Authority. Settlement of that lawsuit was combined with the effort to negotiate a settlement of the water rights application protests each body had filed against the other, and as noted above, those negotiations continued until settlement was reached in April 1998.

From 1994 through 1997, the basin authority pursued funding possibilities for the desalter project. Some funding might be available from MWD as part of its Local Resources Program, but larger amounts would be needed to support a project estimated to cost in excess of \$30 million. Basin authority staff began contacting the California Water Commission to have the desalter placed on their list of projects recommended for state funding, and in October 1994, the basin authority board voted to secure the services of a lobbyist in Washington, DC to try to obtain federal funding.

The effort to gain federal support encountered two new complications. First and almost immediately, the November 1994 elections produced new majorities in the U.S. Congress who took a more aggressive position against increasing federal agency budgets for domestic spending in 1995 and 1996. An effort to include \$4 million in funding for the desalter project in the Fiscal Year 1996 appropriation for the U.S. Bureau of Reclamation failed, despite the efforts of Representative Ron Packard and Senator Barbara Boxer. Efforts in 1996 and 1997 to get the project included in the executive branch budget requests for Fiscal Years 1997 and 1998 were also unavailing.

Second, any approval of federal funding for the project would be contingent upon the completion of environmental impact studies in compliance with the National Environmental Protection Act (NEPA), in addition to the CEQA compliance process that was already under way and near completion. Early in 1995, the basin authority

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board awarded a contract to another consulting firm to begin work on the NEPA process. In March 1997, after the desalter project again did not make it into the budget request for the Bureau of Reclamation, the basin authority board voted to postpone any further work on the NEPA process until after the water rights issues had been resolved.

e. The basin authority's new direction: Project Committee 10. The basin authority member agencies and staff have been rethinking the basin authority's direction, especially as the difficulties with the water rights application and the effort to construct an impoundment facility and/or a desalter continued through the mid-1990s. In the latter half of 1994, the basin authority board considered assuming the lead-agency role under the state's AB 3030 process for developing and implementing groundwater basin management programs, which would have been a different way of approaching the fulfillment of the basin authority's mission to improve the use of the area's water resources while protecting its environmental and other assets. Upon advice of counsel, the basin authority board decided not to pursue the AB 3030 process, but the contemplation itself was indicative of some member's search for a different approach.

In 1996, Interim Administrator Don Martinson presented to the basin authority board a concept and direction for the basin authority of monitoring water conditions within the watershed, as one step toward eventual development of a conjunctive use program for the basin. At its December 3, 1996 meeting, the San Juan Basin Authority board endorsed the commencement of a groundwater monitoring program.

In February 1997, Mr. Martinson presented a proposal, budget, and study plan for a new project committee, PC 10, to be focused on basin management with a view of the basin authority as "watermaster" for the San Juan Creek watershed. Through PC 10, member agencies could participate in the development of a basin monitoring program, the U.S. Army Corps of Engineers' San Juan Creek Watershed Study, and other beneficial future activities aimed at improving the coordinated use of the local native and reclaimed water resources together with imported supplies.

Since February 1997, the basin authority board and staff have given repeated attention to the development of the basin authority's role as watermaster. This role may either supplement or supplant—which one remains to be seen—the basin authority's past efforts to be the project builder in the watershed.

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Part III. Institutional Barriers That Have Impeded Progress for the San Juan Basin Authority

In and of themselves, the physical and financial circumstances of the San Juan Creek watershed have not impeded the progress of the San Juan Basin Authority. While the physical characteristics of the San Juan Creek watershed are unique—as are those of every watershed—they are not necessarily more difficult than most from the standpoint of the development and implementation of projects and methods to improve water supply reliability and water quality. And although the economic downturn in southern California in the late 1980s and early 1990s certainly affected the financial progress of some projects, overall the South County region is a prosperous area where economic conditions are favorable to supporting infrastructural and other undertakings in the public interest.

The obstacles to greater progress in the San Juan Basin Authority's efforts to fulfill its mission have been primarily institutional—that is to say, arising from the legal, political, and economic arrangements within the basin authority and in its relationships with other organizations. This part of the report discusses and presents findings concerning the three most significant institutional impediments revealed during the research for this project.

1. Uncertainties and Controversies Concerning Water Rights. California water rights law is, to say the least, complex. Over time, that body of law has recognized competing theories about the basis upon which a superior water right can be established. It was perhaps inevitable that, some day, several of those competing theories would be asserted within the same watershed, creating a sort of institutional "train wreck."

Unfortunately, that watershed turned out to be the San Juan Basin. After the San Juan Basin Authority filed an application before the State Water Resources Control Board to appropriate up to 12,500 acre-feet per year from the watershed, four competing theories of California water rights law were employed by producers within the basin who wished to either protest the basin authority's application or assert a separate right of their own.

Under one theory of California water rights law, one establishes a prior and paramount right to appropriate water based on historical use, and formalizes that right by applying for a permit from the State Water Resources Control Board. Diversions of water dating from before the establishment of the California Water Code in 1914 are superior even to subsequent uses that have obtained a permit. This theory was relied upon by Capistrano Beach Water District when it protested the basin authority's application and filed its own application to appropriate up to

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2,000 acre-feet per year. Groundwater production by the Capistrano Beach Water District and its predecessor organizations can be argued to date all the way back to Aaron Buchheim's well and before 1914. Even though Capistrano Beach Water District had ceased groundwater production in the 1960s, it nevertheless relied upon its historic use as the underlying theory supporting its protest and application.

Under another theory of California water rights law, "pueblo water rights" granted during the period of Spanish rule of the region were carried over and recognized through the Mexican period and eventually to California's admission to the United States. The pueblo right is a non-quantified right to as much of the native waters in a watershed as is needed to fulfill the purposes of the pueblo or its successor, and supersedes any competing claim of right to the use of that water which would interfere with the pueblo's needs. As recently as 1975, in City of Los Angeles v. City of San Fernando et al., the California Supreme Court honored the continuing vitality of the pueblo right in California water law. When it protested the basin authority's application, the City of San Juan Capistrano and its water supplier, Capistrano Valley Water District (despite being a member agency of the basin authority and thus in a sense protesting its own application), relied upon evidence of a pueblo water right originating with Mission San Juan Capistrano and its related settlements as the basis for their claim that the city and the district possessed a paramount right to the waters of the San Juan Creek watershed.

Under yet another theory of California water rights law, recognized by the California Supreme Court in the same Los Angeles v. San Fernando decision, any agency that imports water into a watershed has a paramount right to capture and reuse the "return flows" of those imported supplies. Each of the five water districts in the San Juan Basin imports water from outside the watershed and delivers that water for application on the watershed surface, thereby creating return flows potentially subject to capture and reuse. There is some confusion over whether the San Juan Basin Authority included the appropriation of these "import return flows" in its estimates of the available water in the watershed, and whether member agencies agreed to dedicate their import return flows as source water for the demineralization project the basin authority planned to construct and operate. Nevertheless, the right of a water importer to capture and reuse its return flows was asserted by Santa Margarita Water District when, in 1995, it announced its intention to withdraw the availability of its import return flows from the demineralization project and use them itself within its own service area.

Finally, California water law recognizes "riparian rights." The owner of land adjacent to a surface stream or overlying an underground stream—known as riparian land—may withdraw and apply water from that stream for beneficial purposes upon that riparian land, as well as any contiguous parcels that he or she owns. The riparian right is non-quantified and does not require a permit, and although

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California law does not explicitly declare that riparian rights are superior to appropriative rights, existing riparian uses of a stream must be taken into account when determining the availability of surplus water for appropriation, so effectively riparian rights are superior once exercised. In the San Juan Basin, Rancho Mission Viejo owns most of the land in the upper portion of the watershed and operates several wells that extract water for use on lands owned by the company. It therefore possesses riparian rights that the member agencies of the San Juan Basin Authority realized would limit the water available to the authority.

The basin authority's application for a right to appropriate up to 12,500 acre-feet per year of surplus water in the watershed, and the demineralization project to which that application was connected, thus ran into four competing claims to a portion of the same water, each with a legitimate argument that its claim was "superior," and each founded upon a recognized doctrine of California water law. Negotiating through those claims presented formidable obstacles, consuming far more time and money than any of the member agencies anticipated when the application was filed in 1992. Member agencies' enthusiasm for the demineralization project faltered as it was repeatedly placed on hold while one after another water rights issue arose. The project could not be funded until it had a secure water supply, and its water supply was not secure as long as these claims were unresolved.

Much of the difficulty concerning water rights claims in San Juan Basin may therefore be attributed to the vagaries of California water law. But those difficulties have been compounded, and others have arisen, from actions and decisions taken by the basin authority without an understanding or consensus that was clear enough to survive the passage of time and the turnover of staff and board members.

Opinions differ about the relationship between 1) the water production quantities reserved to the member agencies in the Projects Agreement, 2) the 12,500 acre-feet of appropriative water rights applied for by the basin authority, and 3) the subsequent claims made by some of the water producers in the watershed. If there ever was a consensus about these relationships, it clearly has broken down.

According to some of the individuals interviewed for this study, the basin authority intended to "lock up" the remaining water rights in the watershed on behalf of the member agencies by applying for an appropriative right to 12,500 acre-feet per year. Since it was unlikely that any "surplus" water would remain available for appropriation once the basin authority acquired rights to as much as 12,500 acre-feet per year, the member agencies would no longer have to worry about some other entity coming into the watershed and gaining a superior right to produce local water. By acting on behalf of its members, the basin authority could pre-empt and preclude such future production. According to this version of events, the member agencies could allocate and reallocate production rights, up to and including the

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aggregate 12,500 acre-feet per year, among themselves by one or more agreements.

But the water rights application was filed in 1992, *after* the Projects Agreement had been approved by the member agencies. The Projects Agreement contained an allocation of *future* production among the member agencies--for instance, Moulton Niguel was allocated 1,000 acre-feet per year even though it had no production facilities in the basin. Because the projects agreement preceded the water rights application in time, and contained prospective allocations of future production quantities rather than an enumeration of historical amounts, divergent interpretations have emerged concerning its relationship to the 12,500 acre-feet per year applied for by the basin authority.

One view has been that the 12,500 acre-feet per year *included* the amounts allocated to the member agencies in the Projects Agreement--in other words, the agreement represented an initial distribution of the water rights applied for the authority, with any remaining balance between the 12,500 acre-feet and the member agency allocations to be reserved by the authority for distribution on some other basis. Supporting this interpretation has been the argument that the sustainable annual yield of the San Juan Creek watershed is *at best* somewhere near the 12,500 acre-feet figure, so the basin authority's application was for the full flow of the watershed, which would then be allocated among the member agencies according to their plans for using the local supplies.

The alternate view has been that the amounts in the Projects Agreement were reserved to each member agency prior to and apart from the basin authority's application for 12,500 acre-feet per year. In this view, each member was entitled to its Projects Agreement allocation *plus* whatever share of the basin authority's appropriative right it might obtain. Supporting this view has been the argument that the basin authority, like any applicant for an appropriative right, was applying for the available surplus water. The Projects Agreement established the claims of the members agencies to the expected annual yield of the watershed, and the basin authority was applying for all remaining water above and beyond those claims, i.e., the "surplus."

Such a discrepancy between these interpretations would have been problematic enough by itself. The matter has been clouded further by the protests to the authority's application by Capistrano Valley Water District and the City of San Juan Capistrano and by Capistrano Beach Water District, as well as the applications for appropriative rights made by Capistrano Beach Water District and by Rancho Mission Viejo, and the settlements of those protests and applications.

The protest settlement agreement between the San Juan Basin Authority and Capistrano Valley Water District/City of San Juan Capistrano protects the water

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district's right to produce up to 2,900 acre-feet per year and the city's right to produce up to 425 acre-feet per year from the local water supply, free from any interference by the basin authority or any project it operates. The protest settlement agreement between the San Juan Basin Authority and Capistrano Beach Water District protects that district's right to produce up to 1,300 acre-feet per year from the local water supply, free from any interference by the basin authority and any project it operates. Rancho Mission Viejo, although not a member of the Projects Agreement, applied for a permit to appropriate up to 3,500 acre-feet per year that nevertheless had a potential impact upon the basin authority's ability to appropriate 12,500 acre-feet per year.

The relationship among these settlement amounts, the ranch's application, the basin authority's application, and the Projects Agreement amounts has been unclear. The difficulties caused by this lack of clarity were apparent when the basin authority board attempted to conclude its settlement agreement with Capistrano Beach Water District. Not only did the board members of the basin authority and its legal counsel raise the issue of the impact upon the basin authority's application of the guarantee of 1,300 acre-feet per year to the district, but the legal counsel for the Capistrano Valley Water District raised the additional issue of the impact of that guarantee upon the guarantee already made to Capistrano Valley Water District and the City of San Juan Capistrano and how all three guarantees related to the basin authority's application. The attorney for Capistrano Valley Water District wished to maintain a priority for the district's and the city's guarantees over the basin authority's application, referring back to the Projects Agreement and to the notion that the basin authority was applying for the "surplus water" in the basin and therefore took a back seat to the guarantees to the members. Similarly, Capistrano Beach Water District wanted its 1,300 acre-feet per year to be considered separate from the basin authority's 12,500 acre-feet rather than part of it. Board members from other member agencies, and the legal counsel for the basin authority, expressed concern that such an interpretation would undermine the basin authority's application and result in the State Water Resources Control Board approving a reduced amount for the authority.

The significance and proper interpretation of the Projects Agreement arose again in 1998 with respect to the plans of Trabuco Canyon Water District. In 1997 and again in early 1998, the district requested that the basin authority clarify its view of whether the Projects Agreement still applied to Trabuco Canyon, since the district ceased to be a member of the authority effective July 1, 1997. That question begged another: what did Trabuco Canyon's 350 acre-feet per year allocation in the Projects Agreement mean? Was it a minimum entitlement to groundwater production within the watershed by Trabuco Canyon, a maximum ceiling on that production, or simply a share in the yield of any water project the basin authority might undertake?

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Part of the reason for Trabuco Canyon's request appeared to be that the district planned to increase its groundwater production, lowering the pumps at its two wells and also beginning to purchase groundwater from a private well. As the basin authority board discussed whether the 350 acre-feet per year allocation in the Projects Agreement for Trabuco Canyon represented a ceiling upon their production, questions arose once again about whether the allocations in the Projects Agreement stood apart from the basin authority's application for an appropriative right to 12,500 acre-feet per year or were included within them. If they stood apart, Trabuco Canyon's only way to gain a firm right to its 350 acre-feet per year, much less the 600 or 650 acre-feet per year it was said to be contemplating, would be to file its own application with the State Water Resources Control Board. That prospect prompted a promise that at least one member agency would protest such an application, and a recommendation that the basin authority staff and the Trabuco Canyon Water District staff try to work out an agreement. But if Trabuco Canyon's allocation were understood to be included in the 12,500 acre-feet applied for by the basin authority, that interpretation could simply regenerate the controversy between the basin authority and members Capistrano Valley and Capistrano Beach, who appeared to perceive their respective production guarantees as lying outside the basin authority's application.

These divergent interpretations of the entitlements of members, non-members, and former members are not merely academic. In the end, the plethora of numbers and the differences of opinion about whose claims are included in which sums, must confront the amount of water typically available in the watershed. If each claim is independent, then the 3,325 acre-feet guaranteed to Capistrano Valley and the City of San Juan Capistrano must be added to the 1,300 acre-feet guaranteed to Capistrano Beach, to which is added the 350 for Trabuco Canyon and the 3,500 claimed by the ranch and the 12,500 acre-feet per year requested by the basin authority--all together, 20,975 acre-feet per year, compared with past estimates of the watershed's average annual yield ranging between 8,000 and 12,000 acre-feet per year (depending, among other things, upon whether one counts import return flows, which are themselves in question). So the issue of whether the 12,500 acre-feet per year applied for by the basin authority includes or excludes the amounts claimed by Capistrano Beach, Capistrano Valley, the City of San Juan Capistrano, and Trabuco Canyon matters a great deal to the prospects for sustainable water development in the watershed and to the distribution of that development.

Furthermore, although the amounts of water claimed may seem small compared with the amounts at issue in some other southern California watersheds, the stakes for the water producers are large. Even 1,000 acre-feet per year represents about 20% of the annual water use for producers such as Capistrano Beach, Trabuco Canyon, and Rancho Mission Viejo, 10% for Capistrano Valley, or 5% for Santa Margarita. The potential financial impact of being able to use local supplies to meet

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that proportion of demand, compared with the imported water alternatives, may be great. The impacts upon a producer's water security–the reliability of supplies under a range of scenarios–may be even greater.

Institutionally-created uncertainties–whether originating in the law of water rights or in the confusing combination of the Projects Agreement, the basin authority's water rights application, and the protests, settlements, and competing claims since that application–have cost the San Juan Basin Authority and its member agencies millions of dollars, several years, and an incalculable amount of trust and goodwill. The water rights conflicts may also have contributed to a few instances of turnover in staff or board members, and perhaps even to changes in membership in the basin authority itself.

2. Uncertainties and Disagreements Over Funding Responsibilities. Our interviews and our review of board meeting minutes have found substantial and repeated misunderstandings about the relative financial responsibilities of member agencies for projects pursued by the basin authority. While these disagreements have paled somewhat in comparison with the protracted disputes over water rights, they have probably compounded the difficulties the basin authority and its member agencies have had in working together and making progress.

There have been times within the past decade, for example, when member agencies have withheld their financial contributions to the basin authority because of disagreements about who had contributed how much and when to which projects and what the proper allocation was or should have been. Funds withheld by a member agency in one instance accumulated to a total of \$2 million. In another instance involving another member, the basin authority commissioned and paid for an audit to comb through financial records and statements just to resolve these sorts of disagreements and get a member agency to resume its payments.

It is important to point out that disagreements about the allocation of financial responsibilities are common within joint powers agencies. The fact that such disagreements have arisen within the San Juan Basin Authority does not necessarily mean there is something wrong with the basin authority itself, and representatives of the member agencies should not despair whenever such differences present themselves. "Dividing the pie" is rarely easy in a JPA or any other human enterprise involving coordinated action. The most obvious rules of thumb, such as "equal shares," do not always fit neatly if there are differences among the contributors in terms of financial capacity or the anticipated distribution of benefits. On the other hand, working out formulas that take these other factors into account can quickly become difficult as the contributors debate their relative capabilities and benefits.

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Nevertheless, while some extent and frequency of disagreement over the distribution of costs and benefits may be inevitable within a joint powers agency, there have been indications that the institutional arrangements within the San Juan Basin Authority have increased them. As a starting point, we should note that there appears to have been some uncertainty about how the basin authority's "project committee" structure works in this regard. Our interviews revealed that at least one individual with extensive experience with the basin authority believed that all member agencies vote on project committee actions (even when not all member agencies are members of that project committee), while other individuals with equally extensive experience believed that voting on project committee actions was and should be confined to the members of the committee in question. Board minutes from meetings during the 1990s reinforced the conclusion that representatives of the member agencies did not share an understanding on this point. It is dangerous to have that degree of uncertainty over such a fundamental issue as who gets to vote on matters that involve some members' money but not all; lack of clarity on that point is bound to increase the extent and frequency of disagreements within a JPA about cost allocations.

Uncertainties and disagreements appear to have been relatively common within the San Juan Basin Authority concerning how to recognize costs borne by an individual member with respect to a basin authority project. Representatives of member agencies have disagreed not only over how to credit such expenditures when calculating and approving the allocation of other costs incurred by the same project, but also about whether member agencies were entitled to "refunds" when project assets were sold or when external sources of funding were secured.

A particularly complex example of how the project committee structure and the uncertainties regarding how to recognize expenditures made by one member agency on a basin authority project arose in the mid-1990s with respect to the Basin Bypass Line (part of which is the old "Lakefill Line"). Although the line was originally donated to the basin authority as a whole, the adoption of the project committee structure resulted in the line being part of a Project Committee No. 2, of which Capistrano Valley Water District and Santa Margarita Water District were the only members. In the meantime, Moulton Niguel Water District was in the process of acquiring the line by "buying out" the basin authority's ownership of it. Unfortunately, weather-related and operational problems caused substantial repairs to be needed on the line during this same period, and some land-use and transportation changes prompted its relocation, too. The institutional complication was that expenditures involving Project Committee No. 2 were supposed to be approved and borne by Santa Margarita and Capistrano Valley, but Moulton Niguel was actually performing the repair work and paying the costs. Whether Capistrano Valley or Santa Margarita were required to share in the expenditures depended on whether the repair work was considered a maintenance item or a capital

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improvement. In the meantime, Capistrano Valley and Santa Margarita were in the position of approving expenditures that were actually being borne primarily by Moulton Niguel, while Moulton Niguel was not on the project committee that was technically still in control of the line. Later, as the negotiations over Moulton Niguel's purchase of Reach One of the line from the basin authority neared completion in 1996 and 1997, the issue arose of whether and how to recognize the money Moulton Niguel had spent on the repairs and relocation.

Although the bypass line situation was unique, temporary, and has been resolved, it provides a particularly vivid example of the difficulties that can arise when one member agency is incurring expenditures on a basin authority project. There may be sound arguments in favor of working out each situation when it arises and based on its unique circumstances, but the basin authority should at least consider whether clearer guidelines could be formulated in basin authority by-laws about whether and how to count expenditures or in-kind contributions made to a basin authority project by an individual member. Even somewhat improved (if still imperfect) clarity might help inform individual members' decisions and actions, and avoid or lessen subsequent disagreements.

3. The Most Important Uncertainty: The Purpose of the San Juan Basin Authority Itself. The San Juan Basin Authority's stated mission is "to develop and maintain a reliable, high quality, economical local water supply for the residents of the San Juan Basin by maximizing water use through management of local ground and surface water of San Juan Creek and its tributaries, with due consideration for preservation, enhancement and conservation of the environment, including, but not limited to, the natural resources, fish and wildlife, infrastructure improvements, and the cultural heritage of the area."

The basin authority has pursued water development, water conservation, and water reclamation projects, but has for a variety of reasons encountered difficulties in bringing projects to completion over the years. Our interviews and the review of minutes and memoranda have indicated that differences in members' views of the basin authority's primary purpose have contributed to those difficulties.

Conceptions of the basin authority's purpose have differed, both over time and among the members. Some have conceived of it as primarily a mechanism for jointly financing and constructing water projects. Others have conceived of it less as a project builder in its own right and more as a means of facilitating and coordinating the water development and water use activities of the members. This is related to the newest conception of the basin authority's purpose, reflected in the formation of Project Committee 10, as the watermaster for the San Juan Basin.

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These differing and changing conceptions have contributed to some degree to the changes in membership composition, as the local districts' own perceptions of the costs and benefits of basin authority membership were shaped by their views of the basin authority's purpose and direction. The conception of the basin authority as a project builder was more attractive to some agencies but less so to others. The view of the basin authority as an umbrella organization to coordinate local water development efforts was similarly attractive to some but not others. Fortunately, the emerging view of the basin authority as watermaster seems to have attracted all five of the water districts.

A lack of clarity about the purpose of the basin authority may have been aggravated by turnover during the 1990s of board membership and general managers within the basin authority's member agencies. All five local water districts in the watershed have employed new general managers since 1991, and the boards of directors of most of them are composed of majorities that have been elected since then, as well. New board members and general managers, confronting at least five significant JPAs within the watershed—San Juan Basin Authority, SERRA, AWMA, SOCRA, and the Santiago Aqueduct Commission—may understandably express some confusion about the purpose of each and the benefits of participation relative to the costs.

It should be added that the same phenomenon—a significant proportion of relatively new board members and general managers—can be very positive. Few of the current leaders of the water agencies in the San Juan Creek watershed were participants in the past disappointments and internal disagreements of the basin authority. An opportunity therefore exists for those agencies to consider anew the authority's existence, long-term purposes, and shorter-term objectives and activities.

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Part IV. The Threshold Issue: **The Existence and Value of the San Juan Basin Authority**

Before it is possible to proceed to a discussion of how the San Juan Basin Authority and others in the watershed should approach their current problems and attain their goals, it is necessary to consider whether the San Juan Basin Authority should continue to exist, and the value of its continued existence for the residents and water producers.

We do not raise this threshold issue for philosophical reasons. In some of the first interviews we conducted as part of the research for this report, individuals with extensive experience within the watershed raised and addressed this question, so strongly that we began to include it in subsequent interviews with other individuals.

The reasons that the need for the continued existence of the basin authority has been called into question are straightforward, and fairly easy to state clearly. As stated earlier, the basin authority has existed for more than 25 years, and few of the plans and projects it has pursued have come to fruition. Its member agencies have invested considerable resources in it—time as well as money—and can have difficulty describing the benefits received so far from those investments. There also have been complaints, suspicions, and rumors—some of which, to be frank, may have been spread for personal reasons—that basin authority financial resources have not been spent wisely and that some of the studies it has funded have been of questionable origin and quality.

The basin authority currently owns very few facilities. Its biggest asset—Reach 1 of the Basin Bypass Pipeline (a/k/a the "Lakefill Line")—has been transferred to Moulton Niguel Water District. Member agencies for the most part own and operate their own facilities, or have project-specific bilateral agreements for the ownership and operation of joint projects.

The basin authority's member agencies also belong and provide resources to other joint powers authorities (JPAs) in varying combinations, such as the South East Regional Reclamation Authority (SERRA), the South Orange County Reclamation Authority (SOCRA), and the Santiago Aqueduct Commission (SAC). Two individuals used the expression, "JPA'd to death," to describe how they sometimes felt about their agency's relationship to the basin authority plus these other entities. The existence of these other JPAs has, for some individuals, provoked speculation about whether one or more of them could absorb the functions of the basin authority and obviate the need for its continued separate existence.

Thus, the question whether the San Juan Basin Authority should continue to exist is an open one. On the other side of this question, there are the following

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observations, also made by individuals interviewed for this project.

The basin authority has provided, and continues to provide, a regular opportunity for the member agencies within the watershed to meet, discuss, and share information and views concerning issues of mutual interest and concern. Although there are other joint powers authorities that overlap part or all of the watershed, each of them has either a different purpose, or boundaries and membership that do not cover the whole watershed. Only the San Juan Basin Authority has water supply development as its primary purpose *and* is structured to include (at least potentially) the whole watershed.

The basin authority's efforts have produced items of value, even if some of them are intangible. On the tangible side, the "Lakefill Line" did allow the basin authority and its members to attempt some of the recommendations made initially in the California Department of Water Resources study of the area, published in Bulletin 104-7 in 1972. The department recommended pumping poor quality groundwater from the lower portion of the watershed in order to promote recharge with higher-quality water, and diverting non-storm flows in Oso Creek to the ocean. The basin authority temporarily implemented those recommendations using the pipeline, and in the process added important knowledge about the water-quality characteristics of the lower watershed area.

On the less tangible side, the studies funded through the basin authority, and its successful as well as its unsuccessful endeavors, have produced information about and knowledge of the watershed that might not have been gained or compiled through the individual efforts of water producers.

Also, there are some obligations that the authority is committed by contracts and agreements to fulfill. The basin authority is committed, by agreements such as its 1995 water rights settlement with Capistrano Valley Water District and the city of San Juan Capistrano and the 1998 protest settlement agreement with Capistrano Beach Water District, to undertake and perform certain functions and to keep certain obligations to and on behalf of its members. The protest settlement agreement with Capistrano Beach in particular states that it is "mutually desirable" for the San Juan Basin Authority "to act as 'Basin Manager' for the purpose of defining and managing the water supply available to CBWD and Authority from the Basin on an ongoing basis." The agreement states further that the "'Basin Manager' shall be the Authority."

Although its continued existence may not be unquestionably essential, this report recommends after considering the views on each side of the issue that the San Juan Basin Authority should remain in existence. Of course, that recommendation merely raises the next question: what should the basin authority do in order to

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provide sufficient value to the member agencies to warrant that existence?

**Part V. The San Juan Basin Authority as Watermaster
in the San Juan Creek Watershed**

As noted already, the San Juan Basin Authority recently established a new "project committee" consisting of all member agencies, for the purpose of mounting a new effort by the authority on their behalf. Project Committee 10 has been established to develop a form of "watermaster" function for the basin authority. As understood and detailed in this part of the report, a watermaster function would be appropriate and useful for the basin authority. Furthermore, that function can be translated into an agenda of achievable activities for the basin authority and the major water producers within the watershed.

A. The Watermaster Role

A watermaster role commits the San Juan Basin Authority primarily to contributing valuable services to the member agencies, rather than organizing and undertaking significant project or regulatory actions of its own. As such, the watermaster role is consistent with the basin authority's past and present capabilities, and with the prominent role of each major water producer within the watershed.

It is one thing for us to say and for others to agree that a watermaster role is appropriate for the basin authority. It is another thing to define that role. Even among neighboring southern California watersheds, the scope of activities and responsibilities performed by watermasters varies significantly. The appropriate watermaster role for the San Juan Basin Authority must be defined and accepted by the water producers in light of their watershed, their history, and their goals.

In watersheds north and south of the San Juan Basin, there are court-appointed "river watermasters" that perform very limited activities. The Santa Margarita River Watermaster, the Santa Ana River Watermaster, and the San Gabriel River Watermaster monitor and report annually upon the amount of usable water crossing from the upper areas to the lower areas of their respective watersheds. These watermasters do not operate any physical projects, provide imported or other water supplies, or monitor groundwater supplies or water quality conditions except as those factors enter into the definition of "usable water." Their staffing and other overhead arrangements are minimal.

Also surrounding the San Juan Basin are a number of "basin watermasters" with responsibilities relating to groundwater conditions. Some of these, too, perform very limited roles. The watermaster activities in the West Coast and Central groundwater basins in Los Angeles County, for example, consist entirely of monitoring and reporting annually upon groundwater levels and production, the

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exchange of water rights, and the collection of pumping assessments.

Other basin watermasters have been created with, or have developed, more extensive roles. In addition to basin monitoring, the activities of these watermasters incorporate elements of basin management, in some cases including supplemental water provision. The watermaster role in Raymond Basin in Los Angeles County has evolved to include providing the areawide water quality monitoring reports on behalf of the groundwater producers in that basin, and keeping track of water storage and water reclamation credits accumulated by them. The watermaster in the Main San Gabriel Basin establishes the basin's allowable safe yield each year based on anticipated water conditions. Each pumper's share can be calculated based on that safe yield estimate, and those who overpump their allocation pay a special assessment to purchase supplemental water for replacement. The Chino Basin Watermaster is developing an Optimum Basin Management Program, and is involved in the periodic reallocation of the basin's adjudicated safe yield as land uses shift among "pools" of pumpers. The watermaster for the Upper Los Angeles River Area basin has been heavily involved in addressing problems of groundwater contamination discovered there during the late 1970s and early 1980s. The watermaster for the groundwater basins along the Mojave River imports water to the area and has been constructing facilities for its distribution and basin recharge.

One model that individuals in the San Juan Basin have frequently considered and discussed is the Orange County Water District, which performs numerous functions with respect to the large groundwater basin underlying the northern half of the county. Even though Orange County Water District is not a "watermaster" in the same formal sense as the ones mentioned above, the attention given to it is understandable in view of the district's proximity and worldwide reputation. On the other hand, there are some important differences in the physical features of the San Juan Creek watershed and in the number of significant producers that should be taken into account when designing a watermaster role for the San Juan Basin Authority.

The Orange County groundwater basin exhibits a large water storage capacity but a limited recharge zone, a more nearly controlled surface inflow because of Prado Dam and Reservoir, and several significant producers. Under those conditions, having single entity—the Orange County Water District—acquire replenishment water and operate a recharge program in the forebay area for the benefit of all producers makes a great deal of sense. It has also made sense for the district to set basin production *percentages* without setting basin production *quantities*, because of the storage capacity and recovery resilience of the groundwater basin. The depth and area of the groundwater basin have also mitigated the impact each pumper has on the others' water levels and water quality.

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The circumstances of the San Juan Basin are different in some important respects. The number of significant producers is limited basically to five--Capistrano Beach Water District, Capistrano Valley Water District, Santa Margarita Water District, Trabuco Canyon Water District, and Rancho Mission Viejo--and appears unlikely to grow beyond six (assuming Moulton Niguel Water District produces water from the basin in the future). Furthermore, unlike the situation within the Orange County Water District, all but one of the major producers in the San Juan Basin is a public water district with its own access to imported water and water reclamation facilities. One implication of these differences is that the San Juan Basin Authority's function as watermaster does not have to include operating a basin recharge program or making water purchases on behalf of all producers. The watermaster function in San Juan Basin could focus primarily on collecting and disseminating information on basin water supply, storage, and quality conditions, while the individual producers adjust their own production of local water and purchases of supplemental water, store or retrieve water, and perhaps even engage in other aspects of water supply management such as exchanges or transfers.

Another important difference between the situations in northern and southern Orange County is that the San Juan watershed is essentially a stream system along which producers are arrayed sequentially rather than an underground basin over which they are spread out laterally. This fact, combined with the considerable differences in elevation within the watershed, the positive and negative impacts of producers' behavior and the benefits and burdens of a management program are not distributed evenly. Some producers (particularly those at the lower elevations) are highly exposed to everything other producers do, while those producers at the highest elevations may experience few effects from the production behavior of their downstream counterparts. Thus, the impacts of one producer's behavior on another's water levels or quality in the San Juan case differ from those in the northern Orange County basin.

These observations are not meant to diminish the significance of the Orange County Water District's functions, or to suggest that the San Juan Basin Authority and its member agencies ought not look to their northern neighbor for examples of sound water management practices. The point is that the watermaster role performed by the Orange County Water District has evolved based on the characteristics of the water resource to which it relates. By the same token, the watermaster role to be developed by the San Juan Basin Authority will and should evolve based on the characteristics of the water resource to which it relates, and those are not the same. Some functions performed by the Orange County Water District would be just as valuable in the San Juan Basin if performed by the San Juan Basin Authority, others less so, and still others even more so.

In fact, the differences in the characteristics of the basins--which also include the

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San Juan Basin's limited underground storage capacity, large variations in streamflow from season to season, rapid percolation of water through the streambeds, and differential water quality from one location to another—*enhance* the significance of the monitoring function of the watermaster role. The fullest development and use of local, imported, and reclaimed water supplies in the San Juan Basin, and the protection of water quality, will likely require greater sensitivity and precision with respect to timing and location than would be necessary in a broad, gradually sloping basin with controlled inflow and more consistent water quality.

B. Watershed monitoring in the San Juan Basin

If, as we believe based on our research, the two most important goals in the watershed are promoting water security and maintaining local control, then the proper focus for the basin authority as watermaster is on objectives that relate directly to the attainment of those goals. One such objective is to develop and disseminate improved information about basin conditions and capabilities. The achievement of that objective is also a prerequisite to the future development of any additional basin management initiatives. Therefore, achieving this objective should be the primary near-term focus of the San Juan Basin Authority.

1. Description of the program. The San Juan Basin Authority can provide a service of considerable value to its member agencies and their residents by developing and implementing a watershed monitoring program that collects and disseminates real-time data on basin inflows, storage, well production, outflow, and water quality. Fortunately, the technologies to support such data collection and dissemination exist. Water sensors can be installed in wells to measure water levels and TDS. A manufacturer of such sensors has made one available to San Juan Basin Authority for a trial. The City of San Juan Capistrano has a SCADA system that transmits information on its water distribution system to a reservoir via radio frequency. The test sensor has been installed at Capistrano Valley Water District's well No. 4, and tested to see if the water level and TDS information from the sensor can be beamed to the reservoir and to the city's computer. After a couple of weeks, the sensor will be moved to the city's Well No. 5, then perhaps to the San Juan Basin Authority well.

If the trial experience with the well sensor and data transmission equipment proves to be successful, then the San Juan Basin Authority and its member agencies could and should undertake a watershed-wide program of (1) installing sensors in the production wells of the major water producers, plus monitoring wells in key locations in the watershed, (2) acquiring the computing capacity to receive and

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store data transmitted from each sensor, and (3) developing a World Wide Web link to those data so that they can be accessed online in real time. Precipitation measures from one or more locations within the watershed and streamflow data from gauges within the watershed should be integrated with this system.

The well sensor and data transmission system measuring water levels, production, and quality, combined with the data on precipitation and streamflow, would create a highly advanced watershed monitoring system. Basin inflow conditions could be measured and distributed using the precipitation and streamflow data, basin production could be measured and distributed continuously using the information on everyone's pumping, while the data on water levels and TDS concentrations simultaneously provide information on how basin water throughout the watershed responds to changes in inflow and output.

Once the watershed monitoring system has been implemented and established, its data transmissions could be shared with Orange County's Emergency Management Agency as well as inter-agency bodies such as the Voluntary Emergency Preparedness Organization (VEPO). This organization was created by Orange County water agencies to expedite the exchange of information and facilitate mutual aid among water purveyors in the event of a major disaster.

2. Watershed-wide advantages of the program. The watershed monitoring program is in and of itself a worthy focus of the San Juan Basin Authority's efforts, because of the benefits it will yield for all participating entities in understanding the operation and response of the watershed under varying conditions and behaviors. In addition, the watershed monitoring program is a valuable element of the "institutional infrastructure" needed to fulfill the role the member agencies have in mind for the San Juan Basin Authority over the longer term.

Such a monitoring program would partially fulfill obligations undertaken by the basin authority in the water rights settlement agreements. Under the 1995 water rights settlement agreement among the basin authority, the Capistrano Valley Water District, and the city of San Juan Capistrano, the basin authority is committed to the development and implementation of a monitoring plan, the basic elements of which are outlined in Exhibit A of the agreement.

Exhibit A from the San Juan Basin Authority-Capistrano Valley Water District/San Juan Capistrano agreement was also attached to and referenced in the 1998 protest settlement between the basin authority and Capistrano Beach Water District. The text of the protest settlement agreement also obligates the basin authority to establish a basin monitoring program as outlined in Exhibit A.

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That outline calls for the basin authority to prepare and adopt an annual report by April 1 of each year, using information on water conditions within the watershed from the preceding calendar year. Exhibit A continues as follows:

The Annual Report shall describe the condition of the water resources within and affecting the Basin, proposing a Basin groundwater production and replenishment [sic] and/or direct imported water deliveries for the ensuing year and shall include, but not be limited to the following information:

1. Quantity of water storage within the Basin and the relative change of water storage from the prior year(s).
2. Water quality conditions within the Basin and the relative change in such conditions from the prior year(s).
3. An accounting of Basin water production, and to the extent possible other persons and entities producing water from the Basin.
4. An accounting of any and all imported water stored in the Basin during such year by Authority, including but not limited to the imported water storage by the Authority for purposes of banking and the conditions or circumstances under which such water was stored.
5. An accounting of any other imported water delivered by the Authority directly to a member or as in lieu water to a Basin pumper.
6. An assessment of the extent to which the Authority's Project program of the immediately preceding year was implemented and quality and quantity goals achieved with regard to Basin water.
7. A proposed Basin management program for the ensuing year based upon recommended water quality and water level goals. The management program should include, but not be limited to the annual project yield and other Basin groundwater production goals for the Authority and estimates of other parties' production of Basin water. Basin water storage goals for the Authority should include banking goals and the amount and timing of any anticipated imported water deliveries.

Looking toward the future, this type of monitoring program also has the potential to add flexibility to any basin management program the water producers may develop. Such flexibility has often been seen in other basins to be preferable to a static, fixed safe-yield approach.

Just as important in the San Juan Basin, this type of monitoring program can make basin production behavior within each agency and basin conditions throughout the watershed transparent. It therefore has the potential to raise the level of inter-agency trust and reduce the amount of inter-agency conflict. This does not mean

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that entities within the watershed will never again disagree over basin conditions or the impact one entity's actions are having on another's--hydrologists, engineers, and attorneys everywhere have demonstrated the ability to argue over the proper interpretation of data. Nevertheless, the frequency of those disagreements should decline and the range of alternative interpretations should narrow once anyone and everyone in the watershed can witness the same data at the same time.

3. Funding the program. The development and implementation of the monitoring system will involve substantial start-up costs and smaller annual costs for operation and maintenance. The start-up costs include (1) the acquisition and installation of the well sensors and additional data transmission (e.g., radio relay) equipment, (2) equipment needed to transmit data from one or more precipitation stations and streamflow gauges, and (3) acquisition of any additional computing capacity for storage and retrieval of the data and transmitting it online. The annual operation and maintenance costs include the personnel costs of checking and maintaining the sensors, making any needed updates or upgrades to the transmission (relay), collection (computer), and distribution (online) systems for the data, and repairing or replacing equipment according to a schedule or as needed.

As noted earlier in this report, the allocation of costs for basin authority projects has from time to time provoked disagreement and presented challenges to be overcome. For the time being, there is nothing wrong with proceeding to share the costs of Project Committee 10 on an "equal shares" basis, with fixed annual assessments collected from the member agencies. That method is simple, familiar, and "fair" in one sense of the term. The basin authority and member agencies should consider, however, whether PC 10 provides an opportunity to develop some alternative funding arrangements that might be perceived as fairer.

What follows is an example of such an alternative, recommended for the basin authority's consideration. With respect to the start-up costs, each member agency could be expected to pay the *separate* start-up costs of acquiring and installing the sensors and data transmission equipment on the wells within its district, with the exception that Rancho Mission Viejo should pay the costs of acquiring and installing the sensors and data transmission equipment on its production wells, even though they are located within Santa Margarita Water District. Trabuco Canyon Water District should pay to acquire and install the sensors and data transmission equipment on its wells, whether or not it rejoins the basin authority.

Shared start-up costs involve acquiring and installing the sensors and data transmission equipment on monitoring wells, wells owned by the basin authority, and precipitation and streamflow gauges, plus the acquisition of any additional computing capacity needed for storage and distribution of the data, and the creation

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of the web site for online distribution. These start-up costs, once approved by the basin authority's board of directors, should be divided equally and invoiced to the member agencies (including Trabuco Canyon if it is not a member but participates in the monitoring program).

Once implemented, the watershed monitoring program itself provides the data on which the allocation of the ongoing costs of operation and maintenance of the program should be based--namely, an assessment on basin production. This method of allocating program costs connects the share an organization pays with the degree of benefit it derives from the local water resource. This alternative abandons "equal shares" in favor of a different conception of fairness, relating burdens to benefits.

Under this approach to cost allocation, a watershed monitoring assessment (WMA) would be charged to each participating water producer in the watershed (including Rancho Mission Viejo and Trabuco Canyon as mentioned above) per acre-foot of subsurface water produced in the current year, using the basin production information transmitted from the well sensors.

There is (at least) one obvious problem with this suggestion. Moulton Niguel and Santa Margarita are basin authority members, but not currently producing water from the basin. Although the description above implies that Moulton Niguel and Santa Margarita would pay none of the ongoing costs of the watershed monitoring program unless and until they begin producing water from the basin, a legitimate argument can be made that both districts will benefit from the information gathered by the watershed monitoring program--at the very least, in shaping their decisions whether and where to initiate production in the future. The cost allocation scheme could include a relatively simple modification to address this matter. A modest 15% or 20% of the monitoring program's ongoing annual costs could be assessed to each of those two districts, with the remaining 60% or 70% divided among the water producers based on production. In this way, those two non-producing districts would contribute a substantial portion, but less than half, of the funding for the monitoring program. If in the future Moulton Niguel or Santa Margarita begins producing water from the basin, its WMA would be calculated and collected in the same fashion as that of the other producers, on the basis of water production.

If implemented in this fashion, the amount of the WMA per acre-foot will vary inversely with basin production, since the annual costs of operation and maintenance of the monitoring program can be expected to be relatively consistent from one year to another. Producing water from the basin will be somewhat more expensive in drier years (although undoubtedly not as expensive as treated imported water, which also may be in short supply), and less expensive in wetter years. That is not a bad feature, from a basin management standpoint.

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The basin authority and its members may choose to retain the more familiar equal-shares approach to funding PC 10 and the monitoring program. But taking the opportunity to re-design the cost allocation approach by instituting a production-based allocation may improve the perceived fairness of the funding of the program, reduce disagreements about who should pay how much (especially since the monitoring data itself will provide the basis for the calculating the assessments), and establish a foundation that can be used for other, as yet undetermined, basin management initiatives.

C. Institutionalizing the watermaster role and the monitoring program

Whether adopted or not, the watershed monitoring assessment idea begs the question of whether the San Juan Basin Authority currently possesses the formal authority to engage in these first steps of a basin management program—monitoring water production and imposing and collecting a form of "pump tax"—and to assume the role of basin watermaster. In order to proceed with its assumption of that role, the basin authority and its members should consider how to institute that formal authority.

There are three straightforward options for recognizing the San Juan Basin Authority as the legitimate "watermaster" in the basin, with the legitimate authority to collect water production and storage data throughout the watershed, and even levy assessments based on production (now or in the future). 1) Special legislation making such a designation could be obtained from the California legislature. 2) The basin authority could initiate the AB 3030 process, which already provides authority for a lead local agency within a basin to undertake basin management functions that include monitoring and the levying of pumping assessments. 3) The member agencies could amend the joint powers agreement that established the San Juan Basin Authority in order to give explicit recognition to the watermaster role and functions.

The third option is the simplest to execute, and could be accomplished in short order with the assistance of the basin authority's legal counsel. Its principal drawback is that the joint powers agreement, modified or not, has no binding effect upon non-member agencies or the private producers within the watershed. Separate side agreements would be needed in order to get a non-member district or a private entity to agree to install well sensors and submit data to the basin authority, or to pay assessments based on their water production. It should be noted that the experience of other southern California basins has shown that minimal producers can be left out with little or no consequence for the overall effectiveness of watermaster and other basin management operations, so agreements would not necessarily have to be worked out with every well owner in

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the watershed. Still, at least one and possibly more such agreements would have to be negotiated and approved.

The second option, the AB 3030 process, authorizes a local lead agency (which in this case would be the San Juan Basin Authority) to develop and implement a wide variety of basin management activities that would cover public and private producers alike, as long as the relatively simple procedures specified in the law for participation in the development of the groundwater management plan are followed. That advantage is offset, and probably outweighed, by two related disadvantages. First, AB 3030 applies to the management of groundwater resources within the state, and the basin authority's water rights application before the State Water Resources Control Board was premised on the view that the waters it intended to appropriate are not those of a groundwater basin but are instead underground streamflows which are treated in California law as "surface water" rather than "percolating water" or groundwater. Thus the basin authority's initiation of the AB 3030 process could be seen as conflicting with the theory underlying its water rights claim and those of others in the basin. Second, the basin authority board and staff already contemplated and, upon the advice of legal counsel, rejected the option of initiating the AB 3030 process as recently as November 1994.

The first option, special legislation, could provide the formal authority for the San Juan Basin Authority to undertake watermaster functions; the legislation could even be crafted to match closely the powers available to an AB 3030 lead agency but do so outside the groundwater context. Obviously, obtaining special legislation involves some commitment of the political capital of the basin authority and its member agencies, as well as the commitment of time and legal counsel work to draft a bill and enlist the help of the area's legislators to shepherd it through Sacramento. If there proved to be opposition from others in the local area (for example, one or more private producers who do not wish to install monitoring devices, provide production data, or be subject to assessments to support watermaster operations), the political costs to the basin authority and member agencies could prove daunting.

Clearly, each option has pros and cons, so evaluating them and recommending one turns upon other considerations. The third option--amending the joint powers agreement to recognize the basin authority as watermaster, and executing side agreements with non-members or private entities--is relatively simple to initiate and does not preclude resorting to either the first or second option if the third option bogs down or does not work. By contrast, either the first or second option essentially eliminates the need for the third.

Viewed in this light, the wisest course of action to institutionalize the basin authority's role as watermaster would be to start with the third option, especially if

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all five water districts are members of PC 10 (i.e., if Trabuco Canyon joins). The joint powers agreement could be amended to recognize the basin authority as watermaster within the watershed, with each member agency agreeing to participate in the watershed monitoring program by installing monitoring equipment and submitting data as needed by the basin authority, and perhaps even being assessed for all or part of the costs of the watermaster service on the basis of water production. The obvious private producer that should be approached about participating on an analogous basis is Rancho Mission Viejo. Other private producers within the watershed may be treated for now as "minimal producers" whose actions have negligible effects on basin conditions. If difficulties with this process prove too great, the first and second options can be revisited.

By whatever process it is achieved, formal recognition of the San Juan Basin Authority as watermaster for the watershed could prove very valuable in maintaining local control of decision making about watershed planning, development, and protection. Several planning processes already under way that involve the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, the Metropolitan Water District of Southern California, etc. If the participants or the lead agencies in any of those planning processes perceive an absence or inadequacy of local leadership and coordination in the San Juan Basin, they may be inclined to recommend alternatives that are inconsistent with maintaining local control.

D. Other useful services the San Juan Basin Authority could provide as part of its watermaster role

1. Representing member interests and concerns in, and provide opportunities for inter-agency communication about, county, regional, state, and federal planning efforts. As noted, there are numerous planning efforts under way that involve or affect the San Juan Creek watershed. The basin authority cannot participate in every one of them, much less fund every one of them, but it can and should be a forum through which the districts within the watershed keep each other apprised of the progress and implications of any regional, county, state, and federal planning efforts in which they participate.

Here are some examples:

- The State Water Resources Control Board has considered placing environmental restrictions on San Juan Creek, which may affect all of the agencies in the watershed.
- The local agencies are participating in the U.S. Army Corps of Engineers study of the San Juan Creek watershed, which will address preservation of the creeks, flood control, and other changes or improvements, in which each

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- agency has an interest.
- SOCRA and the U.S. Bureau of Reclamation are studying water reuse possibilities in South County. The basin authority members may participate in and benefit from the enhancement of reuse opportunities. For instance, the SERRA plant could be upgraded to advanced treatment, with purified water pumped back up for recharge.
- The Baker Pipeline could be used to convey well water from the northern or central part of the county, dropping it off in the creeks.

What follows is an exploration of one of these possibilities for a regional planning effort with potentially significant implications for water security in San Juan Basin. It is included here merely for the purpose of illustrating the point that the involvement of one or more districts in such planning efforts carries potential ramifications for all.

The Santiago Aqueduct Commission (SAC) is exploring and choosing among ways to expand the use of the V.P. Baker Aqueduct (also known as the Baker Pipeline or the Baker Line). This untreated water line extends from the Santiago Lateral near Irvine Lake in northeast Orange County to the site of an older treatment plant (not now in regular use) within the Los Alisos Water District. For several of reasons, most of the agencies with capacity allocations in the Baker Line have ceased using it, leaving it operating at less than 20% of its capacity. Baker Line water deliveries in 1996-97 were about 2,800 acre-feet, down from more than 10,000 acre-feet in 1989-90.

Within the San Juan Creek watershed, only Trabuco Canyon Water District and Santa Margarita Water District are members of SAC with capacity allocations in the Baker Line. And only Trabuco Canyon Water District still obtains water through the line, which it treats at its 6-cfs, DoHS-permitted surface water treatment plant that was completed in 1993 and is located within Los Alisos Water District. Despite the fact that only Trabuco Canyon is currently receiving water from the Baker Line, there is potential benefit for the whole San Juan Creek watershed to be gained from that line's increased use, depending on the options chosen by SAC.

The top options under consideration are using the Baker Line to convey additional untreated MWD water from the Santiago Lateral, or to convey groundwater brought to the line from wells in the Orange County groundwater basin. The alternatives evaluation performed by Boyle Engineering Corporation in 1997 identified groundwater conveyance from a dedicated wellfield at a site in the city of Orange as the best alternative.

If the Baker Line were used to convey groundwater from the Orange County basin to Trabuco or Chiquita canyon, a variety of water supply options would become

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possible within the San Juan Creek watershed, although these depend upon the outcome of annexation and basin management policy deliberations under way within the Orange County Water District. One option is that the Baker Line could be used to "wheel" water purchased from sellers in the upper or lower areas of the Santa Ana River.¹² Another option depends upon the approval of the currently pending requests by Irvine Ranch Water District, Los Alisos Water District, and El Toro Water District to annex to the Orange County Water District and thereby obtain access to groundwater from the Orange County basin. In that case, any of those districts might be able to sell some of the water conveyed through the Baker Line to Trabuco Canyon or Santa Margarita. Either way, if the groundwater obtained through the Baker Line is less expensive than or comparable in price to treated MWD water, it could be used for a variety of purposes within the San Juan Basin and reduce the area's dependence on treated imported supplies from MWD.

The San Juan Basin Authority should not become involved directly in the Baker Line plans. Another JPA--the Santiago Aqueduct Commission--is already supporting the studies involved and its member agencies are discussing the options. For now, it seems sufficient that Santa Margarita Water District (and Trabuco Canyon Water District if it rejoins) use the forum of the San Juan Basin Authority to keep the other basin authority members informed of Baker Line developments.

2. Discussing demand management and other options for enhancing water use efficiency. All five districts within the San Juan Creek watershed have an interest in enhancing water use efficiency. Efficiency improvements reduce water supply needs and related facility costs, may reduce runoff and flooding, and may reduce wastewater collection and treatment requirements.

The basin authority board should consider placing on the agenda for one meeting per year the following item: that each member agency will bring to that meeting descriptions of its water rate structure, wastewater rate structure, and other conservation programs in sufficient detail to be useful to the other members and with sufficient copies for the other member agencies to have one each. This modest annual practice may encourage the exchange of ideas among the members concerning methods and practices of promoting water use efficiency.

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If purchased from an upper-area seller, the water would be allowed to pass through Prado Dam to the lower area while Santa Margarita Water District or Trabuco Canyon Water District pumps a like quantity from the lower area and conveys it through the Baker Line to the San Juan Basin.

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3. Public education, outreach, and support. Currently, each local water district within the San Juan Creek watershed has its own public information campaign to promote public awareness of water supply, public acceptance and practice of water conservation, and public understanding of the district's activities. Such efforts are important and rewarding, but they do involve costs--personnel time, and materials prepared and presented to the public for educational and outreach purposes.

On the other hand, the San Juan Basin Authority itself seems to have little or no public profile or visibility among the general public within the watershed. This may represent a missed opportunity for public support, in light of the contemporary trendiness of such expressions as "watershed management," "watershed-based approaches" to problem solving. It is likely the case that a very small percentage of the residents within the watershed are aware of the existence of the basin authority, and many might be pleasantly surprised to learn that such an institution exists in their midst.

Perhaps there is an opportunity to bring the observations from both of the preceding paragraphs together. The water districts within the San Juan Creek watershed should consider whether some efficiency gains are possible from combining their efforts in the preparation of materials and in the presentations made to schools and community groups throughout each year. If the basin authority became a vehicle for producing some of those materials and making some of those presentations, the basin authority could itself gain some public visibility.

Public visibility is admittedly a two-edged sword. It can bring greater public and media scrutiny of one's decisions and actions. But the investments of time and money that the local water districts have made in the basin authority since December 1971 have been significant, and residents occasionally and district board members frequently desire accountability for the expenditure and effort they underwrite. Thus there may be some advantage for each district if the public has heard of the institution in which those resources have been invested than if the public has not.

4. Support for technological development. Institutional arrangements can help increase water security and support future development in the San Juan Basin or any other watershed, but their role is limited. Technological advances are also an essential component of an overall strategy of water supply development, water reclamation and reuse, water use efficiency, and water quality protection.

Investments in the research and development of water technologies are capital-intensive, and probably beyond the financial means of most local water districts in the United States, even those in the relatively prosperous area of southern Orange

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County. Through the San Juan Basin Authority, however, the local water districts in the San Juan Creek watershed have established a partnership with the National Water Research Institute (NWRI). The institute supports research and development of water technologies, especially the water reclamation technologies that have become so important in water-short areas such as southern California and will become more important still in the future. As partners with NWRI through the basin authority, the water districts in the San Juan Creek watershed are in a better position to share the fruits of that research and development, which may hold the key to still greater water security for them all.

Part VI. Issues of Governance and Administration
Concerning the San Juan Basin Authority

A. Governance

There are numerous water resource monitoring tasks to attend to in the San Juan Creek watershed, so devoting a separate part of this report to matters of the basin authority's governance and administration may seem peculiar to some readers. Others will recognize and remember, however, that many initiatives that have been considered by the basin authority since December 1971 have stalled over "institutional" considerations that involved or ended in problems or changes of its governance and administration. Therefore, this report includes a review of the basin authority's governance structure and its administrative staffing and operation.

1. The basin authority board–purpose. The board of directors of the San Juan Basin Authority, like the board of any joint-powers agency (JPA), exists primarily for the purpose of making formal decisions on the collective undertakings that the member agencies pursue through the institutional mechanism of the JPA. Three other purposes are closely related to that primary purpose.

- First, the basin authority board serves to represent the member agencies, and by extension their residents, and must perform this representation function well enough for its decisions on matters of joint concern to be informed and perceived as legitimate.
- Second, the basin authority board provides a means of communication and the sharing of information among its member agencies, and must perform this communication function well enough that the agenda of decisions it considers and makes appropriately reflects concerns and interests throughout the watershed.
- Third, the basin authority board serves as the mechanism through which member agencies establish, implement, and monitor their commitments to joint efforts, and must perform this commitment making function well enough that the decisions it makes are likely to be translated into concrete actions by the member agencies and staff.

2. The basin authority board–meetings. In the past and again while this report was being prepared, the basin authority board has been advised to change from a monthly to a quarterly meeting schedule. Although it may have occurred this very month, that change would have been recommended in this report even if it had not.

There was a general (although not unanimous) perception that the burden of meetings faced by board members was undesirably high. This burden posed some

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problems for the functioning of the board and for the basin authority, in addition to whatever degree of personal inconvenience it created for individual board members.

First, although the minutes of board meetings reflect commendably high attendance by board members overall, more frequent meetings do tend to be associated with a higher rate of absences. The effects of member absences are felt more greatly on a three-, four-, or five-member board, and there is some loss of continuity even when absent board members are replaced by alternates (as they almost were). Quarterly meetings, especially if they follow a regular schedule announced well in advance, may help to further assure the regular participation of all board members.

Second, some current and former board members questioned whether the activity of the basin authority warranted monthly meetings. Many monthly meetings consisted primarily of updates on the relative degree or lack of progress across the array of pending projects. Such information could be communicated almost as effectively via memoranda or through informal reporting to board members from the staff members who meet more frequently on the technical advisory committee (see below).

Third, and probably least important but worth mentioning briefly, the monthly meeting commitment can be a small barrier to the willingness of individuals to serve as board members or to the willingness of agencies to rejoin the authority. The knowledge that membership in the basin authority or membership on the board commits one to another set of monthly meetings (in addition to the monthly board meetings of each member agency) may add marginally to an individual's or agency's reluctance to participate. In light of some of the challenges the San Juan Basin Authority has weathered concerning membership during the 1990s, it seems appropriate to search out and remove any such barriers to participation.

3. The basin authority board--membership. Those interviewed for this report expressed strong opinions, but there was no consensus, concerning whether the basin authority board should be composed of members who are elected officials or staff from the member agencies. Each option has evident advantages and disadvantages.

Trabuco Canyon Water District and Capistrano Valley Water District began sending elected board members as their representatives to (directors) the SJBA board. This created a strange and somewhat strained composition on the board. While Santa Margarita Water District and Moulton Niguel Water District continued to have staff members (their general manager or their district engineer) serve on the SJBA board, TCWD and CVWD had elected officials representing them on the board.

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Thornton thinks the SJBA board probably ought to be one or the other—i.e., either a policy making board composed of member-agency officials who are authorized to commit their districts financially and organizationally (but may not be technical experts), or a board composed of staff with the technical expertise to review and discuss basin conditions, project proposals, etc., but who would need to check with their respective district boards before committing their districts to any particular project or policy.

By designating one of its own board members to serve on a joint-powers board, a member agency signals—at least symbolically—the importance or value it places upon its membership in the joint-powers agency (JPA). Representation by elected officials, who play a policy-setting role on their respective member agency boards, also reinforces the perception of the JPA board as the JPA's policy-setting entity. Finally, of course, only the member agency boards are in a position to commit financial resources to JPA undertakings, so board member representation places that formal authority closer to the locus of decision making.

On the other hand, with occasional exceptions elected officials are less likely to possess the technical background that is often useful in making well-informed choices among project or management options, or knowing whether cost projections for a proposed undertaking are reasonable. If elected officials serve as board members, they are likely to depend heavily upon the advice of the staff members from their respective agencies, so the alternative viewpoint is that staff member representation on a JPA board places the expertise closer to the locus of decision making.

The resolution of this question of board membership could follow either of the following paths. The first and easiest path is the one that has been followed lately—letting each member agency decide for itself whether to be represented on the basin authority board by an elected official or a staff member. This has produced a basin authority board composed of elected officials representing some members while staff members represent others. No one would reasonably describe that arrangement as unworkable—the board has met and functioned with such a composition for some years now. But it is also no secret that the difference in form of representation has been the basis for some underlying discomfort, so no one should pretend that continuation of the status quo has no costs.

Another path to resolution of this question is to view it in the context of other changes occurring in the governance, administration, and functioning of the basin authority, to see if one alternative emerges as more nearly preferable to the other. The changes with the plainest connection to this question are the change in the board's meeting schedule, and the creation of the technical advisory committee. The scaling back of the basin authority board's meeting schedule to once per

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quarter, and the establishment or renewal of a technical committee meeting more frequently and composed exclusively of staff members, seem to be consistent with a focus on the board as a policy-setting entity providing guidance, resources, and support for—but less closely involved in the day-to-day administration of—basin authority projects and programs. Since staff members will represent their respective agencies on the monthly technical committee meetings, the quarterly basin authority board meetings could be an opportunity for the member agencies to be formally represented by elected officials from their respective boards.

4. The basin authority board–voting. Left over from the period when some South County districts were created as landowner districts while others were one person-one vote is the question of whether voting shares in a watershed authority should be based on a one agency-one vote basis or proportioned to agencies' respective shares of some other variable (e.g., land within the authority boundaries, water production, etc.). Although the individuals interviewed for this report did not express views on the question of voting shares and budgetary responsibilities on the basin authority board, the issue is of sufficient importance that no thorough institutional study should leave it unaddressed.

Southern California contains examples of different arrangements. Some basin-wide water user associations apportioned both voting rights and budget assessments on the basis of members' reported water production. The five-member Santa Ana River Watermaster board was composed with one representative each from the three Upper Area member districts but two representatives from the Lower Area member. By contrast, the nine-member Main San Gabriel Basin Watermaster operated on a one member-one vote basis even though some members were elected and others appointed and the respective pumping shares and budget assessments of the organizations they represented differed significantly.

In the San Juan Creek watershed, there is no question that the local water districts vary a great deal on an array of measures—land, population, historical water production, and so on. Therefore, alternative assignments of voting shares on the San Juan Basin Authority board would certainly be possible in addition to the one agency-one vote practice.

This report recommends retaining one agency-one vote on the basin authority board, not because there are strongly compelling reasons in support of it, but mainly because none of the alternatives provides a sounder basis for allocation of votes. For instance, an allocation of voting shares on the basis of land would produce a very different distribution than an allocation of voting shares on the basis of historical water production, and there is no obvious reason to prefer one of those bases to the other. Neither population nor current water production provides a

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clearly preferable alternative, either, since the dynamic nature of the San Juan Creek watershed would require frequent readjustment of votes as the distribution of those variables shifts almost continually among the member agencies.

In the absence of a clearly preferable alternative, therefore, the basin authority board probably operates best as a JPA board on which the member agencies contemplate and act upon matters of mutual concern and mutual advantage if it continues to use a one agency-one vote allocation. Furthermore, the "project committee" system provides an option for subsets of basin authority members to pursue projects or programs affecting them alone.

Which brings us to another issue concerning voting on the basin authority–member agency recusal. The California enabling legislation for joint-powers agencies allows member agencies to recuse themselves from participation in JPA decisions on which their interests are adverse to those of the other members.

All member agencies, and their individual representatives on the basin authority board, need to be aware of this option. This is, however, an option that should be exercised rarely and with the following considerations in mind.

- First, recusal may not be the best option for representing a member agency's interests, since non-participation leaves the remaining agencies' representatives to take whatever action they wish. Even though being on the losing end of a vote may seem no different from not voting, there is a difference in terms of one's ability to make a formal presentation on the record of one's opposing view.
- Second, a member agency should not employ recusal strategically (e.g., to set the stage for a later challenge to a basin authority decision in which that agency did not participate) or selectively (e.g., to opt out of paying a share of the costs for a project or program from which the member agency will also benefit).
- Recusal, if exercised at all, should be reserved for situations where: (a) one member agency's interests concerning a proposal are adverse to those of *all* other members in a fashion that is (b) likely to delay action indefinitely but (c) unlikely to be resolvable through negotiation, compromise, or proposal revision.

B. Administration

1. The Technical Advisory and Coordinating Committee (TACC). A technical

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advisory committee for Project Committee 10 has been created and has met. In addition to the basin authority administrator and staff from the member agencies, it has included representatives from Trabuco Canyon and Rancho Mission Viejo.

This is a good step. We recommend that the TACC be expanded by four members. Because the issues of runoff, channel erosion, and flooding, of wastewater reclamation, reuse, and disposal, and of imported water supplies, prices, and county-wide water planning are so closely and essentially linked to the development and use of the other water resources within the San Juan Creek watershed, the TACC should include one staff representative each from AWMA/SERRA/SOCRA, the public works department of the city of Mission Viejo, the Orange County Flood Control District, and the Municipal Water District of Orange County.

2. The basin authority staff function. The focus and agenda described in this report for the San Juan Basin Authority would justify a full-time administrator, whose functions would remain project planning and liaison with the board and member agencies, and to which would be added liaison with the TACC and some public outreach. The watershed monitoring program may require some additional staff support on a part-time basis to support the data recording and distribution processes.

It does not yet seem that additional staffing and office space needs will necessitate a shift away from the current arrangement of housing the basin authority administrator in a member agency's space. It is certainly advantageous from a cost standpoint to share space, but the computer equipment needed for the watershed management program plus the prospect of some extra part-time help may strain a member agency's ability to provide. It also remains to be seen whether and how well the arrangement of having administrative services provided by Moulton Niguel Water District but financial functions performed by Santa Margarita Water District will operate.

One administrative matter that recently received needed attention was the development and use of policies and guidelines for purchasing, acquisition of services, and the approval of payments therefor, and of an investment policy.

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EPILOGUE

"In complicated negotiations where uncertainties loom large, there may be contracts that are far better for each negotiating party than the non-contract alternatives, but it may take considerable skill and joint problem solving to discover these possibilities. Without the right atmosphere and without some reasonably trustful communication of values, such jointly acceptable contracts might never be discerned."

–Howard Raiffa

In several of the interviews conducted for this report, individuals have shared sad stories of their experiences in the San Juan Creek watershed. Some told how an obstinate individual or agency had obstructed or foiled their dreams of progress. Others told how an excessively aggressive individual or agency had tried to railroad something through, trampling on their rights or manipulating matters to their disadvantage. Still others suggested that a "good ol' boys club" had used the basin authority to fund studies and projects for themselves or their friends and associates.

Past disappointments and past disagreements left behind a residue of mistrust. It would be bad enough if, as seems to be the case, that mistrust has impeded progress on decisions and actions that could yield real, significant, and lasting benefits for everyone in the watershed. Worse still, as the quotation from decision analyst Howard Raiffa suggests, mistrust can keep people whose current fates and future prospects are intertwined from even seeing some of the positive possibilities that lay before them.

The past has to be left in the past. There is no water project or institutional modification that can take the place of, or do as much good as, a commitment by each individual and agency in the watershed to start anew and continue forward together to achieve the highest quality and most reliable supply of water available at the lowest cost.

The San Juan Creek watershed is truly a wonderful place, from the beach through the valley, up the canyons to the mountains. Despite the surprising number of comments we heard about poor South County and what a struggle it has had, an outsider is struck by what a richly blessed location in which you live and work. The principal reason there are any water supply, water quality, and wastewater treatment or disposal problems to be dealt with in South County is that it is such a beautiful area, with such a desirable climate and advantageous location, that its development potential is and has been tremendous.

It is, in other words, your good fortune to be working with these challenges. South

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County isn't Paradise, but as places in this world go, it's a contender. Most people in the United States (to say nothing of most people on this planet) would trade places with you in a heartbeat.

With the human talent, financial resources, and beautiful setting found in the San Juan Creek watershed, there is every reason to believe that you can provide a model for the world. My hope is that twenty years from now, if not sooner, the San Juan Basin will be the place to show people how it is possible to develop and also protect a watershed, how to use and reuse water efficiently and also be surrounded by beauty and abundance, how to use the native water supplies and also maintain the stream channels and the ecology associated with them, how to preserve the identity of small local communities and yet work together as a watershed, and how to strike the balance between independence for the region and interdependence with the rest of California and the Southwest. These are ambitious aims, but in a place like the San Juan Basin, they can be achieved.

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APPENDIX ONE

We gratefully acknowledge the time given and information supplied by all of the persons below, whom we contacted and interviewed during the research for this report.

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APPENDIX TWO

In addition to various memoranda, agreements, and the minutes of San Juan Basin Authority board meetings, the following materials were used in the research for this report.

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APPENDIX THREE

Selected population and housing projections for San Juan Basin, 2000-2020

Census tracts partly or wholly within the watershed	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
320.18 population	13,539	13,583	13,212	13,110	13,011
320.18 housing units	4,831	4,955	4,955	4,955	4,959
320.19 population	9,581	9,238	9,344	9,138	9,132
320.19 housing units	3,451	3,946	3,946	3,946	3,950
320.20 population	6,155	6,136	5,982	5,948	5,849
320.20 housing units	1,915	1,915	1,915	1,917	1,919
320.21 population	14,568	15,069	14,817	14,890	14,724
320.21 housing units	4,846	5,286	5,286	5,286	5,291
320.22 population	6,310	6,278	6,453	6,459	6,466
320.22 housing units	2,305	2,368	2,434	2,478	2,523
320.23 population	5,690	12,215	15,653	15,805	21,822
320.23 housing units	2,096	4,686	5,927	6,014	8,845
320.24 population	18,999	20,190	24,266	25,273	25,966
320.24 housing units	7,100	7,610	9,193	9,667	9,996
320.25 population	24,466	25,813	27,038	26,832	26,821
320.25 housing units	10,449	11,058	11,488	11,488	11,552
320.26 population	20,994	33,309	38,611	50,208	56,597
320.26 housing units	9,117	14,634	17,181	22,710	25,958
422.01 population	6,601	6,839	7,091	7,392	7,661
422.01 housing units	2,921	3,058	3,199	3,288	3,388
422.03 population	6,330	6,698	7,088	7,078	7,033
422.03 housing units	2,587	2,757	2,935	2,953	2,959
422.04 population	9,585	9,743	9,711	9,692	9,759
422.04 housing units	3,488	3,662	3,700	3,720	3,740
423.10 population	8,316	8,744	9,188	9,204	9,180
423.10 housing units	2,964	3,144	3,302	3,319	3,323
423.12 population	7,090	7,515	7,963	7,950	7,901
423.12 housing units	2,103	2,244	2,393	2,408	2,414
Total population	158,224	181,370	196,417	208,979	221,922
Pct. change from 1995	+27.53	+46.19	+58.31	+68.44	+78.87
Total housing units	61,232	71,323	77,854	84,149	90,817
Pct. change from 1995	+27.99	+49.09	+62.74	+75.90	+89.83

San Juan Basin Institutional Study—October 31, 1998--95

APPENDIX FOUR

WATER RESOURCE MANAGEMENT IN THE SAN JUAN BASIN

by

YARA FISHER

PROFESSIONAL REPORT

Submitted in partial satisfaction of the requirements for

the degree

of

MASTER OF URBAN AND REGIONAL PLANNING

in the

Department of Urban and Regional Planning

of the

UNIVERSITY OF CALIFORNIA, IRVINE

Date: Spring 1998

EXECUTIVE SUMMARY

The purpose of this report is to develop a possible management course of action for the San Juan Basin Authority. The objectives are as follows:

- Provide a brief history of the San Juan Basin Authority, including its recent institutional infrastructure problems
- Characterize current problems within the San Juan Basin and the San Juan Basin Authority itself
- Offer possible improvements to its water quality and delivery system
- Identify the economic hurdles and costs that it must plan for in order to achieve a healthy water resource management strategy for the basin
- Recommend strategies for addressing organizational conflict while redefining the role of the San Juan Basin Authority.

Several methods were used to achieve these objectives. First, feasibility plans and reports from the U.S. Army Corps of Engineers and NBS/Lowry and Associates were used to compile technical data, such as storage and pumping capabilities, average groundwater withdrawals, water quality, and costs of projects. Second, meeting minutes, internal memos, and interviews with local water agency members were used to help explain the current role of the San Juan Basin Authority and its current institutional crisis. These meeting minutes and interviews also provided insight into the likelihood of certain member agencies' support for projects and their funding. Finally, water resource management strategies used in the Chino Basin Water Association and the Orange County Water District were studied in order to understand which water management strategies might work for the San Juan Basin Authority in the future.

In conclusion, the report includes recommendations and water management strategies that will help the San Juan Basin Authority achieve its goal of helping its member agencies supply quality water to its customers. First, in addition to its current role in the basin, the SJBA should assume the role of "Watermaster." In this role it should continue to work on a Project Committee basis with its member agencies. This expanded role will necessitate improved monitoring of the basin pumping and water quality. This monitoring will allow the SJBA to decide water allocations by an "available safe yield basis." Second, in accordance with the settlement agreement, the SJBA should approve the rejoining of the Capistrano Beach Water District to the SJBA, including it in Project Committee 8- "Participation in the N.W.R.I" and Project Committee 10- "The Basin Management Committee."

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INTRODUCTION

This report, entitled Water Resource Management in the San Juan Basin, is meant to help guide the San Juan Basin Authority in implementation of its recently adopted mission statement, which reads:

"to develop and maintain a reliable, good quality and economical local water supply for the residents in the San Juan Basin by maximizing use of local ground and surface water, the San Juan Creek and its tributaries, with due consideration for the preservation and enhancement of the environment, including, but not limited to, the natural resources, fish and wildlife, infrastructure improvements, and the cultural heritage of the area" (San Juan Basin Authority, 1997).

The San Juan Basin Watershed covers more than 111,000 acres of land in Orange County. Its communities include Mission Viejo, San Juan Capistrano, and Dana Point. Its main sources of water are precipitation, imported water from the Metropolitan Water District, surface water, and groundwater.

The goals of the SJBA's water management strategies have been to:

1. Provide short-term drought water supplies
2. Provide long-term new water supplies for the region
3. Provide additional summer peaking capacity.

The main variables in the SJBA's water management strategy thus far have been the following:

1. Length of the groundwater withdrawal period and the amount of withdrawal
2. Initial groundwater storage in the lower basins
3. Feedwater quality leading to the proposed desalter facility

4. Amounts and timing of recharge in the basin (NBS/Lowry and Associates, 1994).

Currently, the thirty-year-old SJBA faces many significant problems in its water management strategy role in the basin. Some of the problems that face the agency include a dwindling and more costly water supply in Southern California, the need for new treatment facilities to aid the delivery of fresh water, an institutional infrastructure riddled with infighting, lack of agreement on goals, and funding disagreements and shortfalls. These problems and the recommended methods to resolve these problems will be addressed in this report.

This remainder of this report will focus on the resources in this basin, the institutional problems facing the San Juan Basin Authority, and the economic issues that need to be considered in any water management authority. Following that discussion, this report outlines a possible new role for the San Juan Basin Authority, that of "Watermaster."

HISTORY OF THE SAN JUAN BASIN AUTHORITY MEMBERSHIP AND GROUNDWATER MANAGEMENT STRATEGIES

San Juan Basin Authority Organization and Goals:

Founded in 1971, the San Juan Basin Authority was organized to enhance the local groundwater supply in a "viable groundwater basin now unused" (Meadows, 1998).

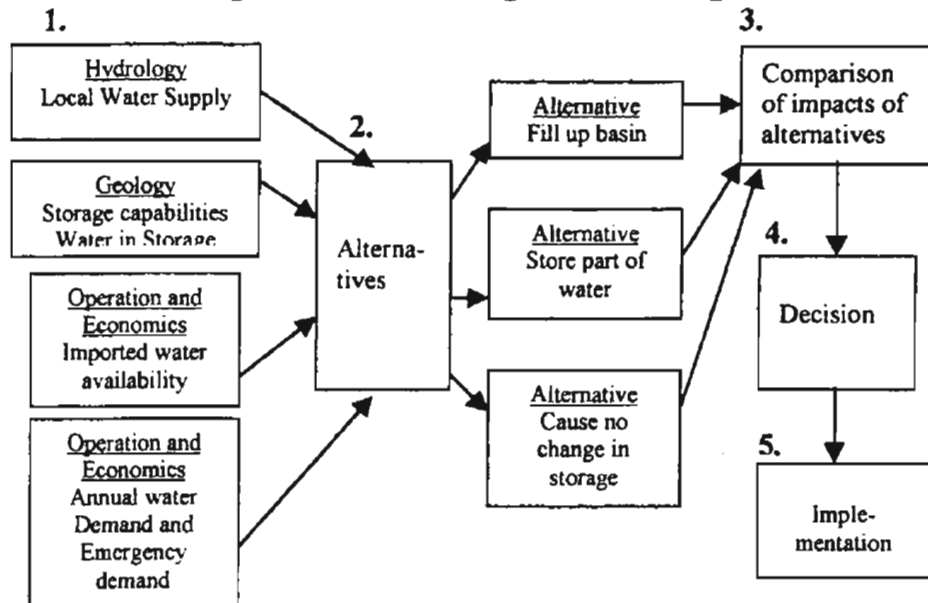
The SJBA has outlined three main goals; first, provide short term drought water supplies; second, provide long-term new water supplies for the region; and third, provide additional summer peaking capacity.

In order to achieve these goals, the SJBA must take into account these variables:

1. The length of the groundwater withdrawal period and the amount of withdrawal
2. Initial groundwater storage in the lower basins
3. Feedwater quality leading to the proposed desalter facility
4. Amounts and timing of recharge.

Currently, the San Juan Basin Authority employs management strategies commonly used in other water management agencies. The following figure shows a common management strategy for water organizations (State of California Department of Water Resources, 1972).

Figure 1. Water Management Planning

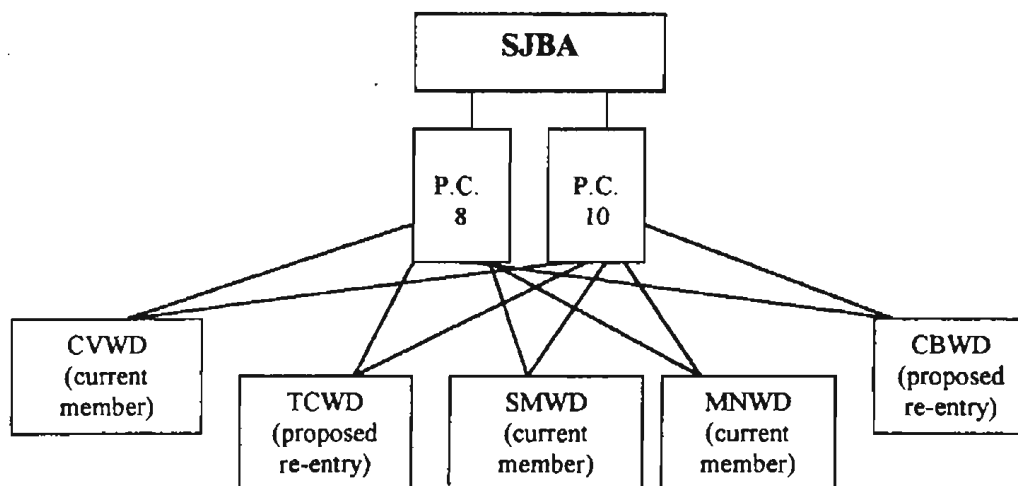


This management strategy involves the following, moving from the left to the right on Figure 1 (see previous page):

1. Inventory of demand, supplies, and associated facilities
2. Formulation of alternative schemes of meeting those needs
3. Evaluation of advantages and limitations of alternatives
4. Selection of a plan
5. Implementation of selected plan.

The SJBA uses Project Committees in the aforementioned process. Through Project Committees, the SJBA also organizes and funds proposed projects (Figure 2). In the SJBA, member agencies join Project Committees (PC's) which directly affect their stake in the watershed. Member agencies are also asked to join and help fund the PC's that concern basin-wide management. The two most important PC's in the SJBA at this time are PC-8- "Participation in the NWRI" and PC-10- The "Basin Management Committee".

Figure 2: SJBA Member Agency Organization Chart



In this organization, it is the responsibility of the SJBA to share its technical and monitoring data with the other organizations. As it makes its water management decisions, it is also the responsibility of the SJBA to develop Project Committees to finance and implement these decisions. It is then the responsibility of the member agencies to share their technical data with the SJBA. As a member agency joins a Project Committee, it is then responsible for contributing its share of funds to that Project Committee. This also grants the member agency the right to vote on final project approval.

Current Institutional Crisis:

The SJBA currently faces an institutional crisis, hampering its ability to properly manage the basin. The institutional concerns have arisen from many different sources. First, balkanization has occurred as the member agencies, concerned over the Metropolitan Water District's pricing policies, have tried to protect their own resources at the expense of the basin as a whole. This is apparent in the current water rights application dispute, which began in 1992, when the SJBA, in its quest for a desalter facility for the entire basin, applied for a permit to appropriate up to 12,500 acre feet per year of water in the basin. Despite the fact that the SJBA was a joint powers agency, which had the filing approved by its remaining member agencies, the water rights application "precipitated an almost immediate falling out among the parties" (Blomquist, 1998). The Capistrano Beach Water District (CBWD), no longer a member agency in the SJBA, filed its own water rights application, as did Capistrano Valley Water District (CVWD) (still a member) and Rancho Mission Viejo. These competing claims for water in the region have divided the stakeholders and member agencies in the San Juan Basin Authority. As of now, if the CBWD, CVWD, and Rancho Mission Viejo receive their requested allotment of water per year, the SJBA would be left

with approximately 1,500 acre feet of water per year for itself. This is not nearly enough to operate the proposed desalter facility for the entire basin.

Many of these issues grew out of the inherent differences among the member agencies in the basin. For example, while the CBWD and CVWD are downstream agencies that are for the most part built out, Rancho Mission Viejo and the areas served by the upstream Santa Margarita Water District (SMWD) are expecting future growth and development. Thus, their concerns and demand for water vary significantly. Also significant is the perceived strength of the SMWD in its dealings with the authority because it controls 60 percent of the land in the region and also serves a part of Rancho Mission Viejo, which owns nearly 100 percent of the undeveloped land in the watershed. This has caused many agencies to perceive that the SJBA serves mainly the SMWD's and Rancho Mission Viejo's interests.

Another issue which has divided the participants in the Basin is the role of the SJBA in water management in the San Juan Creek Watershed. Currently, as in the past, the SJBA has played the role of project developer. Unfortunately, many of its projects, such as a proposed dam in Caspar Regional Park and a proposed desalter facility have been halted due to noncompliance of environmental regulations and member agency disagreement. This has caused the SJBA to look ineffective at best, and useless at worst. Current member agencies and those which have recently dropped out, see a new role for the authority (one which the authority has not yet fully embraced), that of "Watermaster." The role of Watermaster includes monitoring of the basin pumping, storage, quality, and capacity. It would also serve as a warehouse of technical data and management strategies which the member agencies could use. Finally, this Watermaster role would include the obligation to include all parties in decision-making, which is important to the water management process in the basin.

In order to make any decisions regarding its current and future role, the SJBA must understand the history and positions of the various stakeholders. This includes the goals of the various organizations, the future plans of the various stakeholders, and the motivations leading them to adopt their particular stance in the current institutional crisis. The following two sections will outline the membership of the SJBA and the historical development of the authority.

Past and Present Member Agencies and Interested Parties (Figure 3)

Capistrano Beach Water District (CBWD)- The CBWD developed when the Buchheim family moved into Capistrano Valley and dug a well to supply water to their beach house. This quickly became the Buchheim Water Company, which in turn, became the Capistrano Beach Water District. The CBWD was one of the founding member agencies of the SJBA in 1971, but the CBWD has not always been supportive of the SJBA's projects. In 1988, as a result of a disagreement over support of a proposed dam, the CBWD withdrew from the SJBA. It is currently involved in a water rights dispute with the SJBA. The CBWD has applied for water rights of 1,300 acre feet per year in order to construct its own desalting plant. This plant would add 1,000 to 2,000 acre feet of usable water to its supply annually. For a small district like CBWD, this accounts for 25 percent of their annual supply. As of now, the CBWD currently depends entirely on imported water.

The CBWD, also a member agency of the South East Regional Reclamation Authority (SERRA), has many institutional constraints and issues of its own, such as violations of the Clean Water Act and a recent shutdown of its treatment facilities. Because of this, the CBWD may rejoin the SJBA to take part in Project Committee 10, whose plan is to build a desalting plant in the Capistrano Valley area.

Capistrano Valley Water District (CVWD)- Capistrano Valley Water District was another founding member agency of the SJBA in 1971. The CVWD grew out of the Orange County Water Works District Number 4, which was created in 1930. It became the CVWD in the mid-1960's, a subsidiary district of the City of San Juan Capistrano. Because the CVWD's service area extends into Dana Point, the district remains a separate organization, which contracts with the two cities to perform water management tasks. Currently, the CVWD

serves all of San Juan Capistrano, with an additional 1,000 hookups in Dana Point. This totals over 10,000 water connections, expected to reach 13,000 in the near future (Amirani, 1997). The CVWD is currently the only member agency which pumps water for domestic delivery, pumping 1,000-1,500 acre feet per year. Total water supplied by the district is close to 9,000 acre feet per year. Eighty-five percent is imported; the remaining 15 percent comes from the groundwater basin. The Capistrano Valley Water District is currently a member of the San Juan Basin Authority, sending elected officials to SJBA board meetings.

Moulton Niguel Water District (MNWD)- This water agency was created in 1964 to support development in the area and to obtain access to imported water from the Metropolitan Water District (MWD). About 15 percent of the San Juan Basin Authority area is in the MNWD. The MNWD serves part of the city of Mission Viejo. It became interested in the local water supply in the late 1970's, but did not join the SJBA until 1988 (Smith, 1997). Moulton Niguel had a reputation for being an aggressive agency that might seek to merge the San Juan Basin water supply in its service area. This has not been the case, as the MNWD's interest in the watershed has had more to do with wastewater treatment and disposal than with the native water supply (Smith, 1997). This interest led to the agency purchasing rights to the Lakefill Line, which it currently shares with the Santa Margarita Water District. The district is in current discussions to purchase the entire line. The Moulton Niguel Water District is currently a member agency of the SJBA. It sends staff members from its district to the monthly SJBA board meetings.

Santa Margarita Water District (SMWD)- The Santa Margarita Water District was another founding member agency of the SJBA. The O'Neill family created the district in 1964, the same time they created Rancho Mission Viejo. The SMWD was obviously a means to

develop the infrastructure for planned development by Rancho Mission Viejo (Kymila, 1998). Its purpose then was to increase independence from the Orange County Flood Control District. The SMWD accounts for 60 percent of the land within, and funding for the San Juan Basin Water Authority (Martinson, 1997). It currently serves approximately 70,000 people. This customer base is expected to grow to 90,000-100,000 in the next twenty years. Most of the population served by the Santa Margarita Water District lives in Mission Viejo. The district is currently interested in a storage reservoir and developing reclaimed water. It supported the SJBA water rights application in return for its own appropriative rights to 3,500 acre feet of water a year. It is currently a member of the SJBA, with staff members attending the SJBA's monthly meetings.

Trabuco Canyon Water District (TCWD)- The TCWD serves the top of the watershed. It currently serves approximately 3,800 households, and will serve about 7,000 when the remaining areas are built out (Boner, 1997). Trabuco Canyon Water District did not join the SJBA until the late 1980's. It did so at this time in order to be "part of the big water picture in Orange County" (Martinson, 1997). By the late 1990's TCWD figured that the TCWD sat so high up in the watershed that "few, if any feasible SJBA projects (would) be likely to yield any real water for the district" (Boner, 1997). At this time, they began sending elected officials instead of staff members to the SJBA board meetings. This caused a strain in the meetings. For this and other reasons, the TCWD effectively pulled out of the SJBA in 1997.

Other Important Players in the Basin:

The Metropolitan Water District (MWD)- The MWD currently supplies nearly all of the imported water to the basin at a price of approximately \$450 per acre foot.

National Water Research Institute (N.W.R.I.)- The N.W.R.I. is the third largest water research organization in the United States (SJBA, June 3, 1997). The mission of N.W.R.I. is fundamentally to create new sources of water through research and technology. The SJBA has been a member of the N.W.R.I. since 1991 and is currently re-thinking its membership with the organization.

Rancho Mission Viejo- Rancho Mission Viejo is the development company for the land owned by the O'Neill and Moiso families. It was started in 1964 along with the Santa Margarita Water District. It still owns approximately 34 percent of the land in the San Juan Creek watershed and close to 100 percent of the undeveloped land in the watershed (Staley, 1997). Rancho Mission Viejo has applied for an appropriative right to 3,500 acre feet of water per year, which the SJBA did not contest during the water rights application process. Because the SJBA did not protest this action, Rancho Mission Viejo supported the SJBA's application. Finally, Rancho Mission Viejo participates in the Natural Communities Conservation Plan which is a federal-state private cooperative effort to advance development while preserving habitat (Staley, 1997).

The State of California Department of Water Resources (DWR)- The DWR published a baseline study of the watershed in 1972 (State of California Department of Water Resources, 1972). The study that produced this Bulletin influenced the decision to start the SJBA in 1971. In fact, this study still guides the understanding of the watershed today.

The Army Corps of Engineers- The Corps is currently working on a project study plan including recommendations and proposals for action in the San Juan Creek Watershed. The Corps pays for half of the project costs of research.

The County of Orange- The County of Orange is currently involved with the Army Corps of Engineers study. Representatives from the County feel that it is the County's responsibility to take the lead as a primary funding source for studies on water management and local cooperation. The County also has a role in gathering all stakeholders in the water management process and keeping them involved in the decision-making process in order to minimize conflict (Wellborn, 1998).

South East Regional Reclamation Authority (SERRA)- SERRA is a joint powers authority whose members include San Juan Capistrano, the SMWD, MNWD, Dana Point Sanitary District, CBWD, and the city of San Clemente. Like the SJBA, SERRA uses project committees for member agency participation in projects. Its main focus is treatment and disposal of wastewater.

History of the San Juan Basin Authority and its Management Strategies in the Watershed

The SJBA was created in the early 1970's by the main players in the watershed at the time, the SMWD, the CVWD, and the CBWD. Its purpose then was to enhance the local water supply of "a viable basin currently unused" (Meadows, 1997). It planned to do this by providing a joint decision-making forum for improving the management of groundwater supplies in the San Juan Basin watershed. Early management strategies centered around the report by the state DWR Bulletin 104-7, which made recommendations on how to make better use of the basin (State of California Department of Water Resources, 1972). The SJBA's plan then was to implement the recommendations made by the DWR.

The 1972 DWR Bulletin 104-7 claimed that the water quality problems in the basin were largely due to low flows of water from Oso and Horno Creeks (State of California Department of Water Resources, 1972). In order to increase the water quality in the basin, it was essential to divert water from these areas to the ocean (Figure 4). This natural recharge plan centered around the Lakefill Line developed by the Rancho Mission Viejo Company. This line was to lift groundwater from San Juan Capistrano up to Lake Mission Viejo. This was consistent with the authority's goal of removing poorer quality water from the basin; the member agencies agreed to this management strategy. Later, the Rancho Mission Viejo Company donated the wells and most of the line to the SJBA.

When the Authority received this line, it implemented the strategy recommended by Bulletin 104-7. The SJBA began using the Lakefill Line to send water the opposite direction, out to the ocean, to remove poorer quality water from the basin. Soon, the SJBA realized the quantities being removed were not having a significant impact on the water supply and quality (Martinson, 1997).

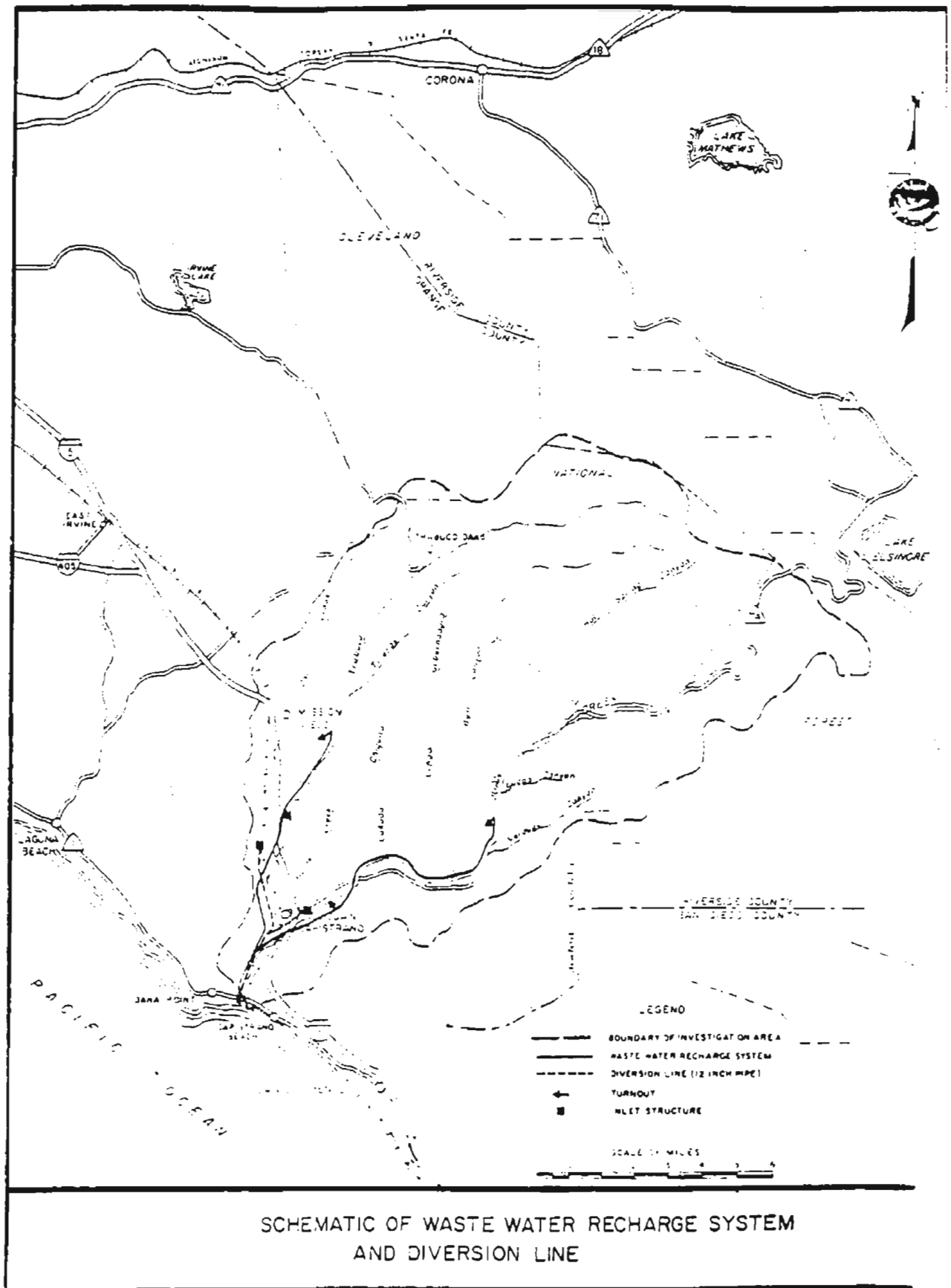
At this time, the SJBA hired Camp, Dresser & McKee (a private consulting firm) to conduct a study of the basin water quality problems. The study concluded that the DWR had been wrong about the origin of the water quality problems in the basin (Martinson, 1997). Instead of low flows from Oso and Horno Creeks being the source of the problem, this study found that the indigenous soils were more likely contributing to high TDS of iron and manganese.¹ Therefore, natural recharge, being used as SJBA's primary strategy, was unlikely to improve the quality of the groundwater. In effect, the groundwater supply was unsuitable for potable uses until it had been treated. This led to the SJBA's subsequent pursuit of a desalter facility to serve the basin.

During this time, the SJBA continued to use the Lakefill Line for pumping and effluent disposal. By the mid-1980's, the MNWD became interested in leasing some of the Lakefill Line capacity for its own effluent disposal. This relationship led to the MNWD joining the SJBA in 1988.

As the SJBA continued its process of water management in the basin, it began to consider the process of surface water capture and impoundment. It was estimated that 10,000 acre feet of water was being "wasted", allowed to flow out to the ocean without being put to use, annually (Martinson, 1997). This led to a decision to seek a possible dam site in the watershed. The SJBA spent over \$1 million between 1984 and 1988 on proposals for dam sites and storage reservoirs. Unfortunately, the proposal selected by the SJBA for siting of the dam and reservoir failed to gain the support of the County Board of Supervisors, because the proposed siting was in Casper Regional Park, a park protected by numerous environmental regulations.

¹ TDS is Total Dissolved Solids. It is a measurement of water quality measured in mg./l. High TDS indicates "hard" water. Low TDS indicates "soft" water.

Figure 4



At this time, just as Moulton Niguel was joining the SJBA, and the SJBA was working on its proposals for dam sites and reservoirs, the CBWD resigned from the San Juan Basin Authority. This was in part due to the reluctance to pay for a dam which the CBWD never really supported. The CBWD also resigned because it thought it had the resources to build its own treatment and storage facilities.

Soon thereafter, the SJBA applied for a water rights application to build the desalter facility recommended by Camp, Dresser & McKee. This sparked a rush of protests by the CBWD, which in turn applied for its own water rights of 1,300 acre feet per year. The CBWD also planned to use these rights to build its own desalter facility. The CVWD also protested on the grounds that it had a pueblo water right with which the SJBA's application would interfere. In addition to this, Rancho Mission Viejo filed its own application for a right to appropriate water in the basin.

At this time, the SJBA continues its water rights application process, asking for 12,500 acre feet per year in order to build a desalter facility in the watershed. Only three member agencies remain in the SJBA: CVWD, MNWD, and SMWD. The SJBA continues to work with these members on a Project Committee basis, dividing the costs of projects by their water demand in the Basin. The two most important projects to be discussed here are Project Committee 10- the Basin Management Committee, and Project Committee 8- Participation with the N.W.R.I.

Description of the Available Resources in the San Juan Basin Region

The managers of water agencies today, as in the past, are facing complex supply problems that include: supplying water to a growing population, storing uneven rainfall, and improving the water quality of their groundwater (State of California Department of Water Resources, 1972). The main sources of water for the region are precipitation, surface water, ground water, and imported water. Each of these sources brings different water quality, pumping and storage issues.

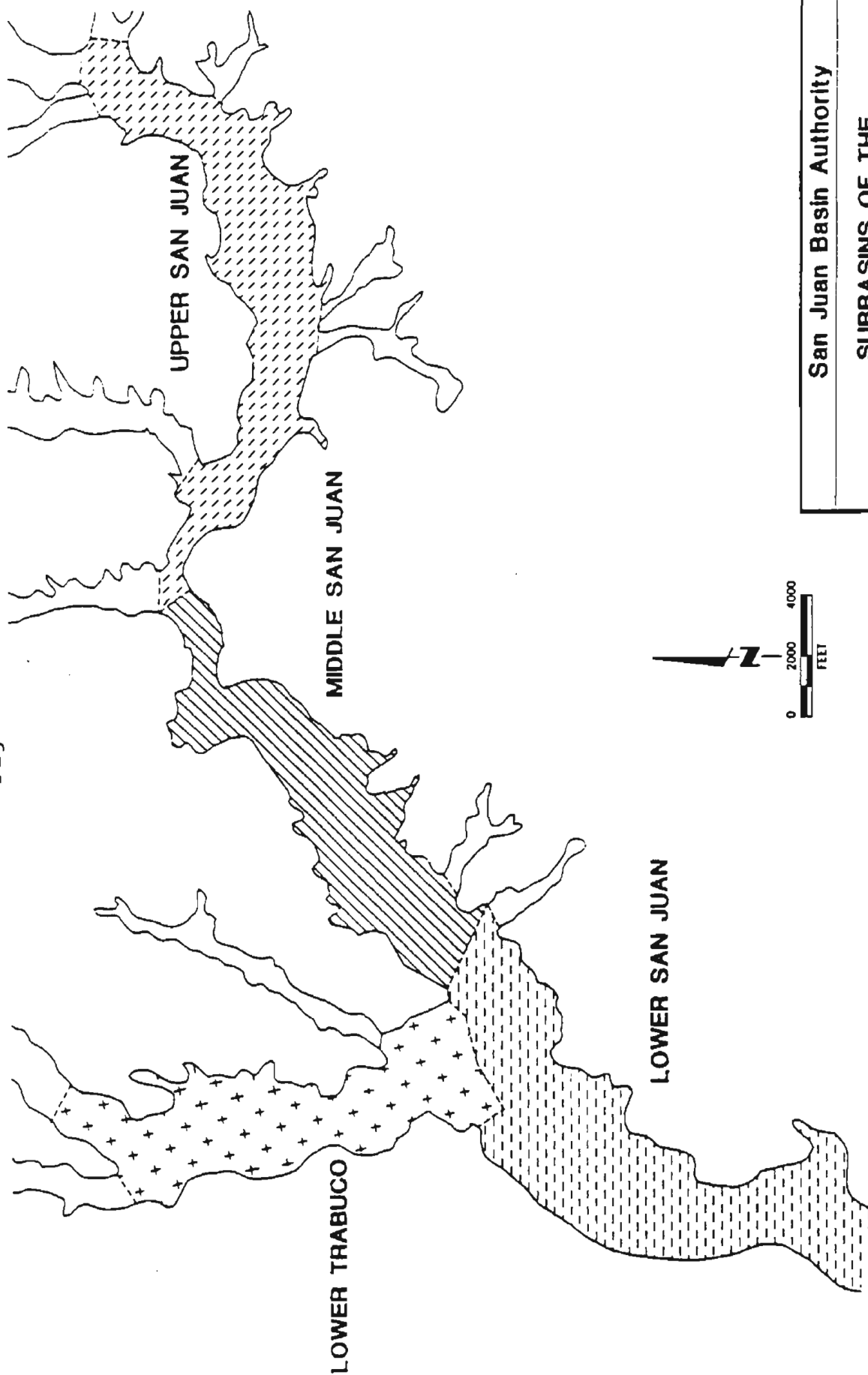
Water Supply:

Imported: Since Colorado River water became available in 1964, most of the water demand (85 to 90 percent for the member agencies in the San Juan Basin) has been met by imported water. The MWD currently supplies water to the agencies in the region at an average cost of \$450 per acre foot.

Precipitation: Another source of water in the region is precipitation. Annual precipitation accounts for approximately 150,000 acre feet per year. Much of this water enters the stream flow, where it either percolates or flows out to the ocean (State of California Department of Water Resources, 1972).

Surface water: The main sources of surface water are the San Juan Creek, Oso Creeks, and Arroyo Trabuco. The minor ones are Tijeras, Bell, Canada Gobernadora, Canada Chiquita, and Horno Creek (State of California Department of Water Resources, 1972). As the following table shows, the quality of the surface water decreases as it flows downstream towards the ocean. (Figure 4 shows the locations of the tributaries and their sampling

Figure 5



San Juan Basin Authority

SUBBASINS OF THE
SAN JUAN BASIN

NBS

LOWRY

SCALE: AS SHOWN

stations). Both the sediment in the area (mineral matter from weathered creekbeds and evaporites in the creekbeds) and differing flow rates affect the salinity of the surface water. Even San Juan Creek, with a relatively low TDS, has a high salinity (NBS/Lowry and Associates, 1994).

Table 1.
Estimated Average Water Quality TDS Values for
Tributaries to the San Juan Basin

<u>Tributary</u>	<u>Storm TDS</u>	<u>Non-Storm-TDS</u>
Upper/Middle Trabuco	150	500
Oso Creek	600	2,193
Canada Gobernadora	200	750
Horno Creek	600	5,200
Canada Chiquita	200	800
Bell Canyon	150	350
Upper San Juan Creek	150	300

* Provided by Nolte and Associates and NBS/Lowry and Associates, 1994

Groundwater: According to the DWR Bulletin 104-7 (1972) and NBS/Lowry and Associates (1994), the ground water supply in the basin is divided into three parts: the upper, middle, and lower sections (see Figure 5). The upper section offers the best long-term groundwater storage capacity because of its natural construction and water quality. Similar to the surface water, the quality of the groundwater becomes degraded as it moves down the basin (NBS/Lowry and Associates, 1994). Although the DWR estimated in 1972 that the basin could store 90,000 acre feet of water, NBS/Lowry and Associates (1994) estimated that the basin currently stores approximately 60,000 acre feet in its subbasins (see Table 2 on the following page).

Table 2.
Groundwater Storage Capacity of the San Juan Basin

<u>Subbasin</u>	<u>Storage Capacity</u> <u>(in acre-feet of water)</u>
Middle San Juan	9,640
Lower Trabuco	11,940
Lower San Juan	20,020
Lower Basins	41,600
Upper San Juan	21,620
Total	63,220

* Provided by NBS/Lowry and Associates, 1994.

Pumping Data: Average annual pumpage between the years 1979 and 1990 has been approximately 6,000 acre feet per year. Most of the water pumped has been from Lower Trabuco. Table 3 outlines the estimated groundwater pumpage in the San Juan Basin from the years 1979-1990.

Table 3.
Estimated San Juan Basin Groundwater Pumpage, 1979-1990

<u>Basin Division</u>	<u>Avg. Annual Pumpage (Ac-ft/yr)</u>	<u>Description of Users and Consumers</u>
Upper San Juan Basin	887	Various nurseries
Middle San Juan Basin	1,250	CVWD, City of San Juan Capistrano
Lower San Juan Basin	870	CBWD, City of San Juan Capistrano
Lower Trabuco	2,637	CVWD, City of San Juan Capistrano
Total	5,644	

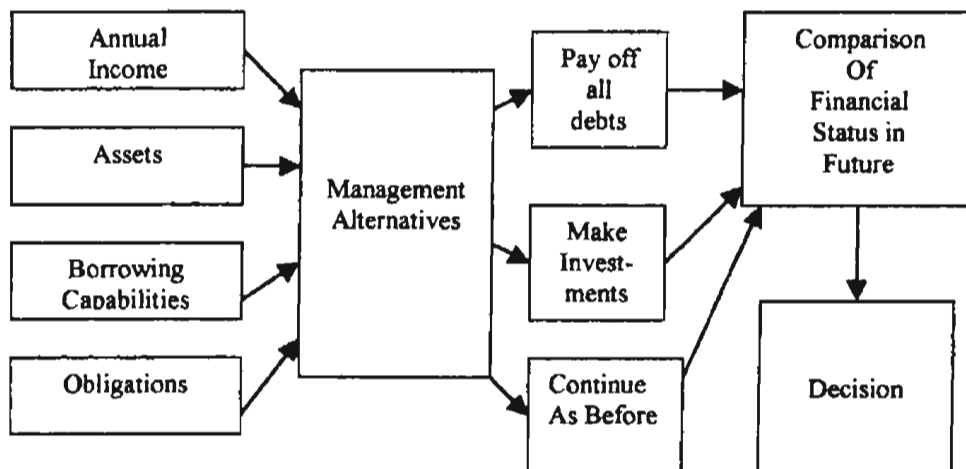
* Provided by NBS/Lowry and Associates, 1994.

Costs and Funding

In order to make use of these available resources, specifically the groundwater and storage capacity in the basin, the SJBA requires a clear funding and cost-sharing approach. This section will explain the annual costs of operating the agency and its projects, including how it currently funds Project Committee 8- N.W.R.I. and Project Committee 10- the Basin Management Committee. It will further explain funding sources within the agency and outside of the SJBA. Finally, this section will include the processes that the agency must undertake to secure funding from various sources.

A common financial management planning process for a water management agency is as follows (State of California Department of Water Resources, 1972):

Figure 6. Financial Management Planning



The San Juan Basin Authority follows this basic approach on an annual basis. Moving from the left to the right in Figure 6, the SJBA receives its general funds from its member agencies, divided equally between each member agency. Its assets include the leasing of storage capacity in the Lakefill Line to SMWD and MNWD. Its borrowing

capabilities come from loan programs operated by the federal government, and its obligations are to organizations such as the N.W.R.I. and others. Annually, the SJBA develops a budget and different management alternatives can be discussed for the upcoming year.

When alternatives are decided upon, the SJBA and its member agencies fund any capital improvements or programs through existing reserves or bonding capacity. These reserves generally come from the sale of potable and non-potable waters. Here pricing is key. As debts are paid off and projects are completed, management agencies often invest in other projects hoping to maximize future returns. These can include stocks, bonds, and other investment opportunities.

At the end of the year, the SJBA appraises its future financial status, making decisions as to what projects to fund. This is currently occurring as the SJBA decides on what level to continue with the N.W.R.I. and the desalter facility. Recommendations for plans of action on these two projects will be included in the Recommendations Section of this report.

Current funding of Project Committees 8 and 10:

Project Committee 8- For the past seven years, the SJBA has contributed \$50,000 annually to the N.W.R.I. In turn, the SJBA has received helpful research and recommendations from the N.W.R.I. To pay for these services, the SJBA charges member agencies on the basis of water demand within the watershed with CVWD paying 30%, MNWD paying 30%, and SMWD paying 40%. An alternative that the agency has discussed is to have each member agency pay 33-1/3%.

Project Committee 10- Currently, the SJBA continues to pursue a desalter facility in the San Juan Basin. At this time the cumulative costs for the feasibility studies have approached \$2 million over two years, with the U.S. Army Corps of Engineers paying half, or \$1 million.

This has meant a cost of \$500,000 annually for the last two years from the local parties, including SERRA, the cities, the County of Orange, and the SJBA. Future costs for this project will be split 65% from the federal government and 35% from non-federal entities, including the SJBA itself.

Funds Available to the SJBA: The Metropolitan Water District of Southern California is a main source of funding for projects ranging from groundwater storage recovery to a Local Projects Program. Another source of funds is the State of California Water Resources Control Board, which funds the following programs:

1. Water Reclamation Loan Program
2. State Revolving Fund Loan Program
3. Water Quality and Control Loan Program

Other sources for funds include the water users and the state and federal government. In order to receive state or federal money, the SJBA must engage in the following process. There is a three-step process that the SJBA must use when applying for federal or state funds. The first step is to obtain a California Water Commission recommendation for project approval. The next step is to have the project authorized by federal legislation. If federal legislators can be convinced of the merits of a SJBA water resources project, it may be possible to obtain special legislation that could provide capital funding (NBS/Lowry and Associates, 1994). This, of course, includes lobbying at the federal or state level for assistance. Finally, after legislation is obtained, the funds will be approved with completion of CEQA and NEPA regulations. This process can take anywhere from five to ten years. In addition to these funds, the SJBA will need a local funding program to fund the portion of the project not covered by these funds. This can be done according to Figure 6 and through the use of Project Committees.

Recommendations

In assessing the current institutional crisis facing the SJBA, its management strategies, available resources, and funding mechanisms, recommendations to resolve the current dilemma concern two main issues: the future role of the SJBA, and the decision-making process to be followed by the SJBA. These recommendations call for a new role for the SJBA as "Watermaster" in the San Juan Basin Watershed, which will also affect the decision-making process.

A. The Future Role of the SJBA:

Role: Currently, the San Juan Basin Authority has been viewed as lacking direction. Past and present member agencies and interested parties such as Rancho Mission Viejo have recommended a new role for the SJBA, that of Watermaster for the area. This Watermaster role would entail new duties and a new direction in the workings of the authority. One example of this type of management strategy is in the Chino Basin Municipal Water District (CBMWD). This management strategy includes the development of an optimal basin management plan to serve the interests of all users in the basin. Included in this strategy is extensive monitoring of pumpage and quality, a review of socioeconomic conditions within the basin, and a facilities equity assessment (Blomquist, 1998). For example, this Watermaster role would focus less on project development and more on monitoring of the basin and storage of water for member agencies and other interested parties.

The SJBA, as Watermaster, would also have policymaking powers, especially the power to set "an operating safe yield tied to changes in basin conditions" (Blomquist, 1998). Operating this safe yield each year would require significant monitoring by the authority, including pumping, quality, and available capacity. Allocations would be decided upon on

an "available safe yield" basis. The Watermaster role would also entail managing the storage capacity in the basin, allowing water users to be represented in storage decisions (Blomquist, 1998). This control over the storage capacity brings with it certain monetary benefits and some water quality drawbacks to be discussed below.

Projects:

1. Project Committee 8- Participation with the N.W.R.I.- In the six years that the SJBA has been a member of the N.W.R.I., nearly half of the \$17 million contributed by the SJBA and other agencies has stayed in the County of Orange to address water management issues within the County (SJBA, June 3, 1997). This extensive research will be very helpful to the Authority in the years to come, especially with the need to develop an optimal basin management plan like that of the Chino Basin Municipal Water District (CBMWD). Member agencies are also highly supportive of the N.W.R.I.
2. Project Committee 10- Basin Management Committee- With the granting of 80 percent of the water rights to the SJBA, up to 12,500 acre feet per year (Protest Settlement Agreement, 1998), the SJBA should pursue a new expanded Watermaster role. Pursuant to the settlement agreement, the member agencies should "expeditiously approve" the re-instatement of the CBWD into the Authority (Protest Settlement Agreement, 1998).
3. With the granting of water rights of up to 12,500 acre feet per year, the SJBA should pursue a desalter facility in a separate Project Committee. Currently, the SMWD, and the CVWD are involved in Project Committee 4- the Proposed Desalter Facility. Membership in this Project Committee should expand as the CBWD and TCWD rejoin.

4. The SJBA should investigate the feasibility of managing the groundwater in a way that would allow the Authority to not only store water for local member agencies, but also be authorized to enter into agreements with other parties leasing groundwater storage space. This is an exceptional revenue producer for the CBMWD. One drawback to this strategy is the fact that TDS levels of the water rise over long periods of time. In order to plan for this in the San Juan Basin, frequent monitoring and water quality plans should be implemented and made known to the public. The CBMWD did not do this regularly causing contention and dissatisfaction among the water users. Therefore, any conjunctive use plan including water storage must also include extensive monitoring of water quality and plans for future water treatment.

Funding:

The SJBA continues to have the many resources discussed in the funding and cost-sharing portion of this report. In addition to these funding sources, the SJBA should research the economic feasibility of pursuing the leasing of groundwater storage to member agencies and outside sources. As discussed previously, this is an exceptional source of funding for the CBMWD.

B. The Decision-making Process of the SJBA:

The SJBA should pursue a Watermaster role in the basin subject to the review of the Authority Board of Directors. This Authority should have broad discretion to do the following:

1. Monitor of the basin pumping, quality, storage, and capacity.
2. Work with the N.W.R.I. to research new management strategies that will affect the entire basin.

3. Search for funding sources from both the federal and state governments.
4. With this information, develop a basin management plan which includes monitoring of the basin, operating criteria, and an operating agreement between the members if necessary (Protest Settlement Agreement, 1998).
5. Serve as a committee that works to improve the relationship between agencies and other important stakeholders within the County.

Funding of Project Committees:

Currently, the SJBA funds its Project Committees on the basis of water use in the basin. Usually this leads to a split of 40% from the SMWD, 30% from CVWD, and 30% from MNWD. With the possible inclusion of the CBWD and the TCWD, these figures should still be based on water use for Project Committee 10. Obviously, the percentages will change to fit the new membership.

On the other hand, due to the overwhelming support for the N.W.R.I. within the Authority and the N.W.R.I's attention to basin-wide monitoring and issues, the costs of membership in the N.W.R.I (P.C. 8) should be divided equally among the members. With the five current members, this would amount to \$10,000 each per year.

With most state and federal funding paying 65 percent of project funding, this leaves the SJBA and its member agencies responsible for the remaining 35 percent. Funding within the SJBA should remain on a project-by-project basis. Those agencies which do not participate in the Project Committees should not be responsible for paying, as they will not have a vote on project approval.

CONCLUSION

The San Juan Basin Authority has played a notable role in the development and management of water in the San Juan Basin for the last thirty years. In order to continue this role, the SJBA should consider expanding its role to include the water management strategies of a Watermaster agency such as the CBMWD. Current and past member agencies have voiced strong support for this type of role.

With the continuing rise in cost of imported water and the proposed scarcity of water in the coming years, the SJBA could play a central role in the monitoring of the basin resources while also acting as a forum to bring members of the basin to the bargaining table. This report has meant to aid this role by providing a history of the stakeholders in the region and identifying possible management and funding strategies that have worked elsewhere. Although the days of project developer may be waning for the SJBA, the new proposed Watermaster role might bring some exciting and beneficial results to the San Juan Basin.

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Wellborn, Mike, Orange County water specialist, interviewed February 5, 1998 by Yara Fisher.