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THE PUBLIC DISTRICT IN INTEGRATING GROUND AND SURFACE WATER MANAGEMENT:

A Case Study in Santa Clara County

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PREFACE

This report is one of a series published as a result of research under Agricultural Experiment Station Project 1406 entitled "Economic and Institutional Aspects of Ground Water Utilization." The initial decision to study the water conservation districts in Santa Clara County was made by Professor S. V. Ciriacy-Wantrup and Dr. Patricia Bartz prior to my joining the staff. Santa Clara County was selected as the case-study area because of past experience with the use of the public district in integrating the management of ground and surface water. Also, many of the physical and economic characteristics of the Santa Clara County situation were evidenced in other localities and in larger contexts. The data collected by Dr. Bartz were very helpful in initiating the research. Discussions with Professor S. V. Ciriacy-Wantrup about the political economy of water are appreciated. Interviews, file data, and comments of Robert Roll, Chief Engineer and Manager of the Santa Clara Valley Water Conservation District, along with many others in Santa Clara County are gratefully acknowledged. The comments of M. F. Brewer have been of assistance. The efforts of Mrs. Carol Baker in preparing the manuscript were very helpful.

THE PUBLIC DISTRICT IN INTEGRATING GROUND AND SURFACE WATER MANAGEMENT: A CASE STUDY IN SANTA CLARA COUNTY

by

Stephen C. Smith[1/]

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Chapter 1

THE FUNCTION OF THE PUBLIC DISTRICT

Public districts have filled many governmental vacuums. They have provided an organizational form for reaching a common interest in situations where general government was not active or where local interests did not want general government to perform. Their use has been particularly important, for example, in supplying a public service whose areal dimension did not conform to, or whose activities were functionally separable from, general government.

How have districts performed in relation to organizing the integrated management of ground and surface water? Are they useful for only special local situations, or may they be adapted to larger problems affecting the interregional transportation of water? Although answers to these questions are rooted in over a century of California's history, their significance has grown as underground reservoirs have become a major source of water. Today approximately 50 per cent of the water used in California is pumped.

Individuals who owned land above the underground reservoirs developed water to meet their own needs and gave little thought to the future consequences of their actions upon others or upon themselves. Surface water also was developed by individual action but, more importantly, by group action with only occasional thought of the impact upon, or relationship to, the gound water reservoirs.

From this pattern of use, two legal, economic, and political fabrics--one for ground water and one for surface water--have been woven in an effort to put water to beneficial use. Conflicts of interest have arisen among ground water users and between ground and surface water users. Also, important economic opportunities for increasing the available quantity of water and for improving its seasonal and cyclical distribution have been foreseen by integrating the management of ground and surface water. To reach decisions in these situations of conflict and to manage surface and ground water in relationship to each other requires the use of an organizational structure which will permit decisions which bring the two fabrics together. An examination of the role of the public district in accomplishing this task is the reason for studying the Santa Clara County case. Such an inquiry has a direct bearing upon questions of regional and national water policy as well as upon general issues in the political economy of natural resources.

The Meaning of Organization

Individuals, acting as individual citizens of Santa Clara County, recognized the possibility of relating surface and ground water management. They

suggested a variety of solutions, but each necessitated collective action of a public character. The ability to take such action required the formation of an organization with a structure which could relate the interested individuals to each other and to the resource problem.1/ In other words, the problem of organization is the problem of defining the relationships between the individuals--or groups--so a common interest may be decided, so a balance between the incidence of benefits and costs may be struck, and so the accepted activities may be executed.

Within this framework of meaning, the public district is analyzed, and the district structure2/ is studied as an institution3/ used in organizing diverse interests for group action. Initially, no organized structure existed. Therefore, the question of how the district idea and structure were used to transform the unorganized situation into an organized situation becomes relevant.

As will be shown, the force of the idea antedated formal creation by 17 years. For such a transformation to take place, the interests must agree upon goals and means of attainment. Since these goals were reached through the use of the public district form of organization, it becomes important to understand the organization's role in reaching these decisions. In fact, the formal creation or rejection of the district meant a simultaneous acceptance or rejection of both the means and the ends of group action.

Attention is centered upon those aspects of the district's experience which have been significant in deciding upon and executing the integrated management of surface and ground water in Santa Clara County. Other phases

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1/ "An organization is defined as a social system oriented to the attainment of a relatively specific type of goal . . ." and "primacy of orientation to the attainment of a specific goal is used as the defining characteristic of an organization. . . ." Talcott Parsons, "Suggestions for a Sociological Approach to the Theory of Organization," Administrative Science Quarterly, vol. 1, no. 1, June, 1956, pp. 63-64. I would argue that the goals are defined through the process of organizing. In a real sense, this is a continuing process.

"The term organization refers to the complex pattern of communication and other relations in a group of human beings." Herbert A. Simon, Administrative Behavior (New York: The Macmillan Company, 1957), p. xvi.

2/ S. V. Ciriacy-Wantrup, Resource Conservation, Economics, and Policies (Berkeley: University of California, 1952), pp. 38-41.

3/ Philip Selznick, Leadership in Administration (Evanston, Illinois: Row, Peterson and Company, 1957), pp. 5-22.

John R. Commons, Institutional Economics (New York: The Macmillan Company, 1934), 921p.

of this experience are not explored at this time but are reserved for those situations in which they are the dominant problems of the organizing process. For example, the issuance of bonds was a well-established procedure by the time the public district was considered for use in Santa Clara County. The question of whether the district could be given the legal authority to take such action was not an issue nor did it become an issue of financial management. However, the enabling authority to sell bonds did become a point of controversy with respect to project selection. Therefore, this aspect of bond issuance is pertinent.

A Common Interest

The attainment of organizational viability depends upon the definition of a common interest or goal by the internal constituent units.1/ The process of goal definition by the group cannot be assumed away or minimized.2/ Individual goals are often conflicting. The problem of reaching decisions in situations where the interests have competing and/or complementary goals

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1/ David B. Truman, The Governmental Process (New York: Alfred A. Knopf, Inc., 1951), pp. 33-34.

Gunnar Myrdal, The Political Element in the Development of Economic Theory (London: Routledge & Kegan Paul, Ltd., 1953), pp. 196-200.

Truman does not distinguish the definition of attitude and interest but says, ". . . all groups are interest groups because they are shared attitude groups . . . the shared attitudes, moreover, constitute the interests." On the other hand, Myrdal gives "interest" a specialized meaning. In the field of economics, interest "means the desire for higher incomes and lower prices and, in addition, perhaps stability of earnings and employment, reasonable time for leisure and an environment conducive to its satisfactory use, good working conditions, etc. . . . Attitude means the emotive disposition of an individual or a group to respond in certain ways to actual or potential situations." He further states that "a technology of economics should not be built upon economic interests, but upon social attitudes." But, "in order to make economics into a practical technique or technology, we should have to analyze in detail the field of economic interests, and [such] an inquiry into economic interest would treat the whole institutional set-up as a variable." (The preceding quotations from Myrdal are taken out of context and rearranged, but I believe his intent has not been changed.)

2/ Robert A. Dahl and Charles E. Lindblom, Politics, Economics and Welfare (New York: Harper & Brothers, 1953), p. 21. "Goals are postulated that will command wide agreement so that the dispute over goals themselves will be minimized in the subsequent analysis of the political-economic prerequisites for the achievement of these goals."

is of fundamental economic importance. The decisions of which goals to follow result in the determination by the group of what "products" will be "produced" and the method of financing the "production."

The acceptance of a common interest by the group does not mean that conflicts are eliminated and that there is an underlying principle of harmony or equilibrium. Conflicting interests are taken as a "condition of life"1/ thus creating the necessity for organization. A central part of the problem is to examine these points of conflict--to examine the use of the public district in arriving at the common interest. The district structure is evaluated on this basis. The required facts are the actions and beliefs of the participant constituents. Both interests and attitudes are pertinent.

Organizing such an interest is not an easy or quickly accomplished task. In fact, combining a public and a project in a workable way is largely a sequential choice situation rather than choosing from a number of alternatives at any given "interval" of time. The technicians and interest groups proposing different projects generally consider alternatives, but the voter is presented with a "yes" or "no" choice. If a negative answer results, the next alternate is considered at a later time. Frequently, the basic plan is unaltered but incremental changes are made.

In Santa Clara County the increasing cost of obtaining ground water and the uncertainty with respect to the duration and the extent of the lowering water table served as foci for the formation of a common interest. As the County's economy has developed, this situation assumed increasing importance to the County's residents. Farmers, householders, and businesses have increased their use of water on a per-user and an aggregate basis. The water users tapped the ground water reservoir as a dependable, accessible, and economical source of water. But problems resulting from the increasing depth to water shook the community's satisfaction with this source.

Since individual private action could only dig deeper wells and could not correct the basic problem, citizens' committees were created to represent the local interests and to formulate a plan for taking collective action. These committees provided a means for expressing common interests and for reconciling the initial conflicts. Farm, domestic, and business water users were represented on these committees, and the basis for committee recommendations was the negotiation of an agreement among these interests. The recommendations suggested the use of a public district as the means for structuring

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1/ For a critique of the concept of harmony in economic thought and its particular reference to welfare economics, see Myrdal, op. cit.

collective action. In order to activate these proposals, however, a wider representation of interest than existed in the citizens' committees had to be obtained. Elections were held within the area of the proposed districts as the means for making these determinations.

Many factors play a part in shaping the attitudes of the electorate about a particular issue. No simple theory of causation can adequately explain the complex process of economic and political adjustment. The attitudes with regard to water at times coincide with other interests; however, this is not always the case. Within the context of "the water problem," private interests may align a farmer with other farmers in opposition to urban water users. On the other hand, a farmer living near a stream may have a water interest which is in conflict with another farmer living several miles from the stream. Transcending these conflicts are the common problems associated with the increasing depth to water. The freedom to express these conflicts of interest is a part of our national democratic tradition, and the process of conflict resolution is a function of our mode of political and economic organization.

A decision must be reached among the interests as to whether group action will be supported or rejected. A common interest among the constituent supporting interests must have enough cohesive force to provide sanction for the program if group action is to be possible. This does not mean that every private interest will be satisfied with the group action, but the creation of a common interest does imply that the interests comprising the group will permit and support group action and not obstruct it. Such assent is relative to a particular situation and must be reaffirmed at appropriate intervals of time; the very act of reaching agreement creates a new situation with new opportunities for dissenting interests to arise.

The fact that a district is officially created does not mean that the organizational task has been completed. Organizing involves the never-ending process of find an affirmation of interest concerning the succession of problems about which no routine procedure for handling has been devised.

Attention is centered upon the main points of conflict about which consent of a common interest was necessary. Although these situations are considered in the microcosm of Santa Clara County, the issues are of the same order as those evidenced in larger "worlds." The issues over which conflicts arose may be grouped into three categories: (1) conflicts centered over the proposed plan for action; (2) conflicts over the terms of organization; and (3) conflicts over the acceptance, as the environment changed, of new interests as internal to the district.

The Plan for Action

The proposed plan for action is a focal point for conflicting as well as common interests. The process of organizing a public district provides a means for bringing these interests together so that the electorate may render a positive or negative decision with respect to the plan. The decision will depend, in part, upon the expected distribution of benefits from the plan. The plan is instrumental in determining the incidence of benefits; that is, the water user expects to benefit because he anticipates that the depth to water will decrease, due to the plan for capturing and spreading flood water. This expectation of benefit forms one of the bases for directing interests or attitudes of the water users toward the plan. At the organizational stage the plan is frequently general in character; that is, the district will spread water or the district will make surface delivery. The specific locations of the spreading ponds, of the canals, or of the dams frequently are not determined until after the district is formed. Therefore, the benefits to be derived from such operations can be thought of only in terms of general expectations.

The choice presented to the electorate is whether or not to create an organization to carry out the proposed general plan. In other words, the electorate decides upon the products and services (the plan for action) which it is expecting to purchase through the creation of the organization. Alternates to the referendum plan may receive public discussion prior to the election, but these alternates can be considered by the electorate only in a negative way at any one election. The alternate selected for public vote represents the negotiation of an agreement among the interests favoring action. This process of pre-election negotiation may encourage the examination of alternative plans, but it does not insure such an examination. Of course, the defeat of one plan at the polls may mean that a revised plan for action will be presented to the voters at some later date. By this method of incrementally changing the core of the plan, sequential adjustments can be made toward the achievement of an agreement.

Terms of Organization

The terms of organization present major issues over which conflicts center. Terms of organization are the agreed-upon basis which internally defines the relationships among the constituents within the group and externally between the organized group and nonmembers. The internal conflicts came to a focus, in the case of the Santa Clara Valley Water Conservation District, over such decisions as the method of assessment and the maintenance of project control. External conflicts largely arose with interests other than ground water recharge (flood control and recreation, for example), although the relationship to the State Department of Public Works and other organizations created some problems in executing the recharge program.

Incidence of Benefits and Costs

An examination of the District's role in organizing the plan for action and the terms of organization bears directly upon the incidence of benefits and costs.1/ The acceptance or rejection of a particular district structure involves a choice between particular distributions (incidence). In other words, private criteria affecting individual constituent expression of view (in votes or by other means) include the individual's assessment of the benefit-cost relationship as it is incident to him. He acts with this belief in mind whether it is founded on scientific investigation or on some fanciful concept, and the choice made through the district institution reflects this belief. Inevitably, conflicts in beliefs do exist. These conflicting beliefs are pertinent to an assessment of the organizing role of the district.

Handling New Interests

After an initial plan for action has been put into operation for a number of years and experience has been gained with particular terms of organization, new and unforeseen interests frequently arise. If the original organizing process were to be repeated, these new interests undoubtedly would have been taken into account. However, since they are--at the later date--external to the existing organization, a major question is posed as to how best to integrate these interests. Shall the old organization be broadened to provide internal representation for the new interests, or shall a new organization be created for the new interests?

At times a choice is possible between these two alternatives. This is the case if a new interest is recognized by some of the representatives already internal to the organization. However, the first initiative is often taken outside the organization because the original internal interests, at times, "blind from view" possible new interests. If the new organization takes shape, a competitive political power situation may be created making reconciliation difficult and perhaps rendering integrated management impossible. This aspect of the role of the district is important in influencing its survival over time.

The Public District

Public districts vary greatly in their characteristics, but basically they are public corporations having the power to own property, to sue and

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1/ For a discussion of the problem of the incidence of social revenues and costs, see Ciriacy-Wantrup, op. cit., pp. 235-238.

be sued, to hire employees, and to engage in other specified activities. Other corporate characteristics often are delegated to them, such as the public authority to condemn property rights by eminent domain; to levy and collect ad valorem assessments on real and personal property; to levy and collect excises; to issue bonds upon the security of the assessment, excise, or revenue base; and to exercise selected police power.1/ The translation of all of the relationship into the formal organization of a public district is accomplished by the state legislature in passing an enabling act followed by specified local action.

In California these acts are of two types: (a) general or (b) special. The general acts set forth the purposes and the terms of organization which may be used by citizens in any locality within the state, provided they qualify to the specific provisions. These laws are generally applicable throughout the state and are not restricted to a particular section or locality. Special acts differ from the general laws in that they can be used by the citizens within a specified locality only. Characteristically, special acts are passed by the legislature if they are sponsored by the local representatives with local citizen support, and if the more general public interest is safeguarded. Illustrative of this interest is the requirement that the plans for dams be approved by the State Department of Water Resources and that their operation be subject to state control under specified conditions of public danger.

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1/ For a general description of public districts in the United States, see John C. Bollens, Special District Governments in the United States (Berkeley: University of California Press, 1957), 280p.

Chapter 2

THE GROUND WATER AND ITS USE

An assessment of the functioning of the district form in integrating the management of ground and surface water is partially dependent upon an understanding of the physical environment of land and water. This environment was important in affecting such attributes of the district as the location of boundaries, the method of raising revenue, and the proposed plans for action. Further, to understand the economic interest, the background of agricultural and urban development of water use must be examined. Economic income and interests are generated from these uses. This background material is the subject of this chapter.

Land and Water

Santa Clara Valley: A Two-Part Valley

The Santa Clara Valley resembles an hourglass lying in a southeasterly direction some 30 miles from the Golden Gate with about 217,000 acres of valley floor within the county.1/ The southern edge of San Francisco Bay borders the Valley on the north. From the Bay's edge, the valley floor begins to rise at the rate of 5 feet per mile and increases to a rate of 25 feet per mile at Morgan Hill some 30 miles to the south. Thence, the Valley extends southeasterly to the Pajaro River for approximately 15 miles with a decline in elevation from Morgan Hill of about 15 feet per mile.

The Santa Cruz Mountains on the west, the Gabilan Range to the southwest, and the Diablo Mountains on the east form the Santa Clara Valley walls. At the northern end, the valley floor is some 14 miles wide; but the mountains converge at Morgan Hill, making the Valley about 3 miles wide with a narrow point, 1,200 feet in width, near Coyote Station. The narrow central area is known as "Coyote Valley." The Valley's southern extension reaches a width of some 5 miles and ends in the vicinity of Hollister in San Benito County.2/

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1/ California Department of Public Works, Santa Clara Valley Investigation, by J. M. Haley, Water Resources Board Bulletin No. 7 (Sacramento, 1955), p. 16.

2/ Ibid., Plate 1.

William D. Clark, Ground Water in Santa Clara Valley, California, U. S. Geological Survey Water Supply Bulletin No. 519, 1924, p. 12.

The Valley Walls

The steep and densely wooded eastern slope of the Santa Cruz Mountains forms the western wall of the Santa Clara Valley. In addition, this range separates the Valley from the Pacific Ocean, which is some 10 to 15 miles to the west. The crest of the ridge rises from the Golden Gate to a high point at Mount Loma Prieta--3,798 feet above sea level--and thence declines to the south with the range ending at the Pajaro River Gap some 15 miles to the south.1/ Four major gaps break this protective chain: (1) the Golden Gate, (2) Merced Valley, (3) Los Gatos Gap, and (4) Pajaro River Gap.

The eastern valley wall is formed by the Diablo Range which extends to the north and to the south of Santa Clara County. These mountains are generally higher than the Santa Cruz Mountains, with the intermountain valleys sloping mainly to the north and to the south from the high peaks of 4,209-foot Mount Hamilton; 4,223-foot Mount Isabel; and 4,372-foot Copernicus Peak. The slopes of this eastern range are predominantly grass covered.

County Boundaries Generally Coincide with Natural Water Boundaries

Streams draining the northern Valley originate in both the Diablo and the Santa Cruz Mountains. The Coyote Creek group of streams drain the central section of the Diablo Mountains, the western slope of the Diablo Mountains, and the eastern side of the valley floor. Coyote Creek has the largest watershed in the county, with 192 square miles lying in the mountains2/ to the south of Mount Hamilton. From its point of debouchment near Madrone, this creek flows northward into San Francisco Bay. The divide between the northern and southern parts is low, and evidence suggests that in earlier ages Coyote Creek's gradient was toward the south and the Pajaro River.3/ In the northeast corner of the county, surface water flows out of the county into the Alameda watershed and thence to San Francisco Bay.

The west side of the northern Valley is drained by the Guadalupe River group and by minor west-side creeks. These streams head in the Santa Cruz Mountains with the main group originating around Mount Loma Prieta. All of the stream basins in the northern Valley drain into San Francisco Bay.

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1/ The Gabilan Range encloses the southern tip of Santa Clara Valley and is located in San Benito County.

2/ California Department of Public Works, Water Resources of California, by Carl B. Meyer, Water Resources Board Bulletin No. 1 (Sacramento, 1951), p. 98.

3/ Clark, op. cit., p. 20.

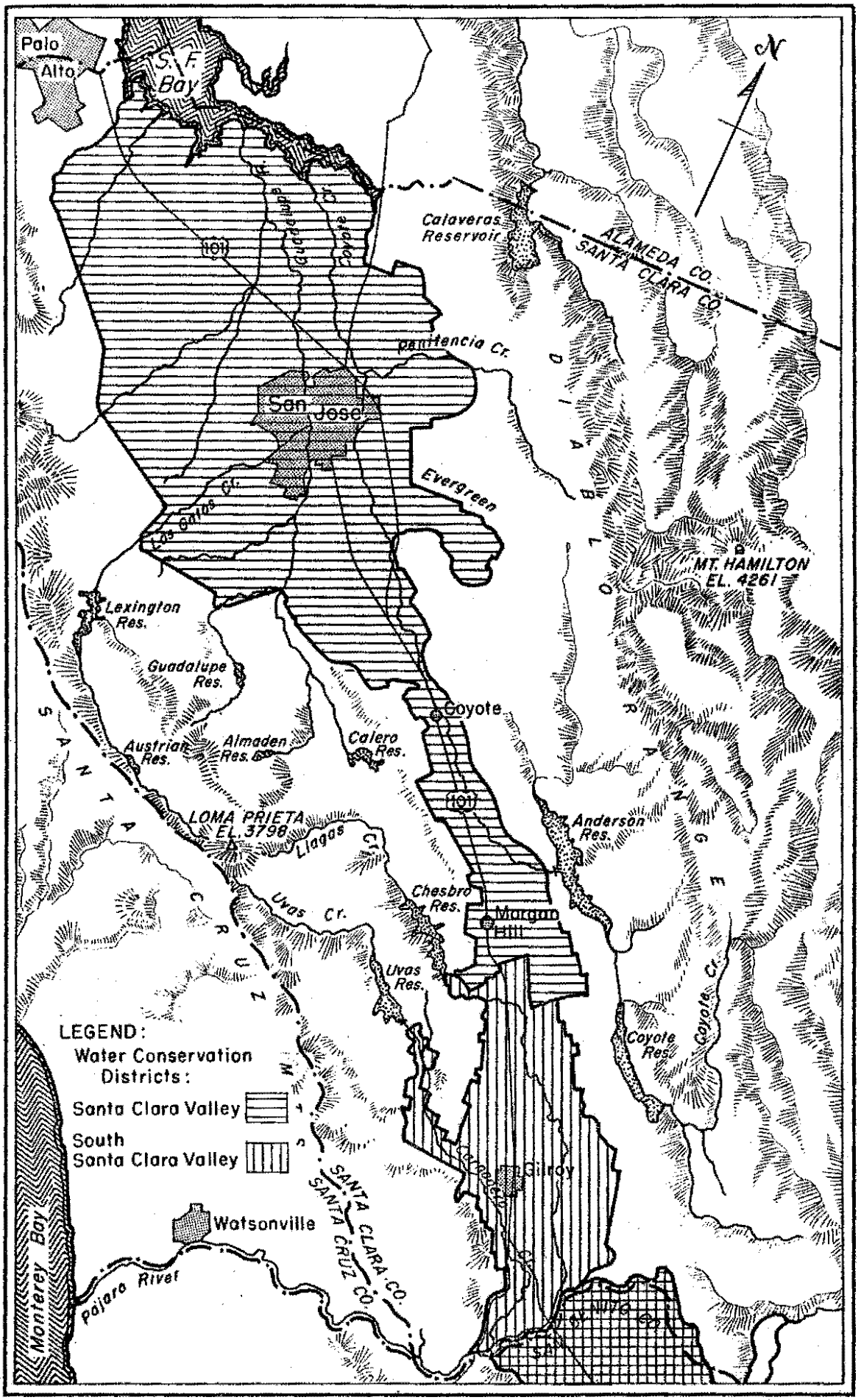

Figure 1. Water Conservation Districts in Santa Clara County

Three creek systems carry water from the southern part of the county: Pacheco Creek, originating in the Diablo Mountains; the Llagas Creek; and the Uvas Creek-Carnadero Creek, starting in the southeastern slope of Mount Loma Prieta. These creeks drain from the north into the Pajaro River and thence into Monterey Bay.

In general, the outer boundaries of the stream basins have been used as the eastern and western county lines. The northern boundary intersects the streams draining into Alameda Creek in Alameda County but incorporates most of the other stream systems in the northern Valley. The southern boundary is the Pajaro River for part of its length, and the remaining portion includes most of the Pacheco Creek drainage area.

The Hollister section is the southernmost extension of the Santa Clara Valley and is in San Benito County. The Pajaro River's subdrainage units do not cross the county lines for the most part. The Santa Clara County streams are independent of those in San Benito County with the exception of a small portion of Pacheco Creek--and this exception is not relevant to the study area.

Structure of the Ground Water Basin

Hard rock formations constitute the valley walls and underlie the floor of the Valley and the water-bearing alluvia or aquifers. Faults and folds in the rock formations make a complex structure of "variously tilted, uplifted, and depressed blocks, forming ridges and valleys."1/ Overlying these rock formations are several deposits of alluvium. Part of the older alluvium is lying horizontally, and other beds dip at angles from 3 degrees to 30 degrees or more.2/ In general, its water-yielding capacity is low. The depth of the series varies but extends to 4,000 feet.3/

The more recent deposits--upper quaternary series--are of three types and include the main aquifers.

1. One type of deposit originated as alluvial fans from mountain streams and contains the coarse materials carried to the valley floor at flood time. These readily permeable materials were generally laid along the edge of the valley floor; however, some coarse deposits are found as gravel lenses throughout the basin.

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1/ Ibid., pp. 23-24

2/ California Department of Public Works, Santa Clara Valley Investigation, p. 101. These deposits were laid down in the Plio-Pleistocene series.

Clark, op. cit., p. 24.

3/ California Department of Public Works, Santa Clara Valley Investigation, p. 101.

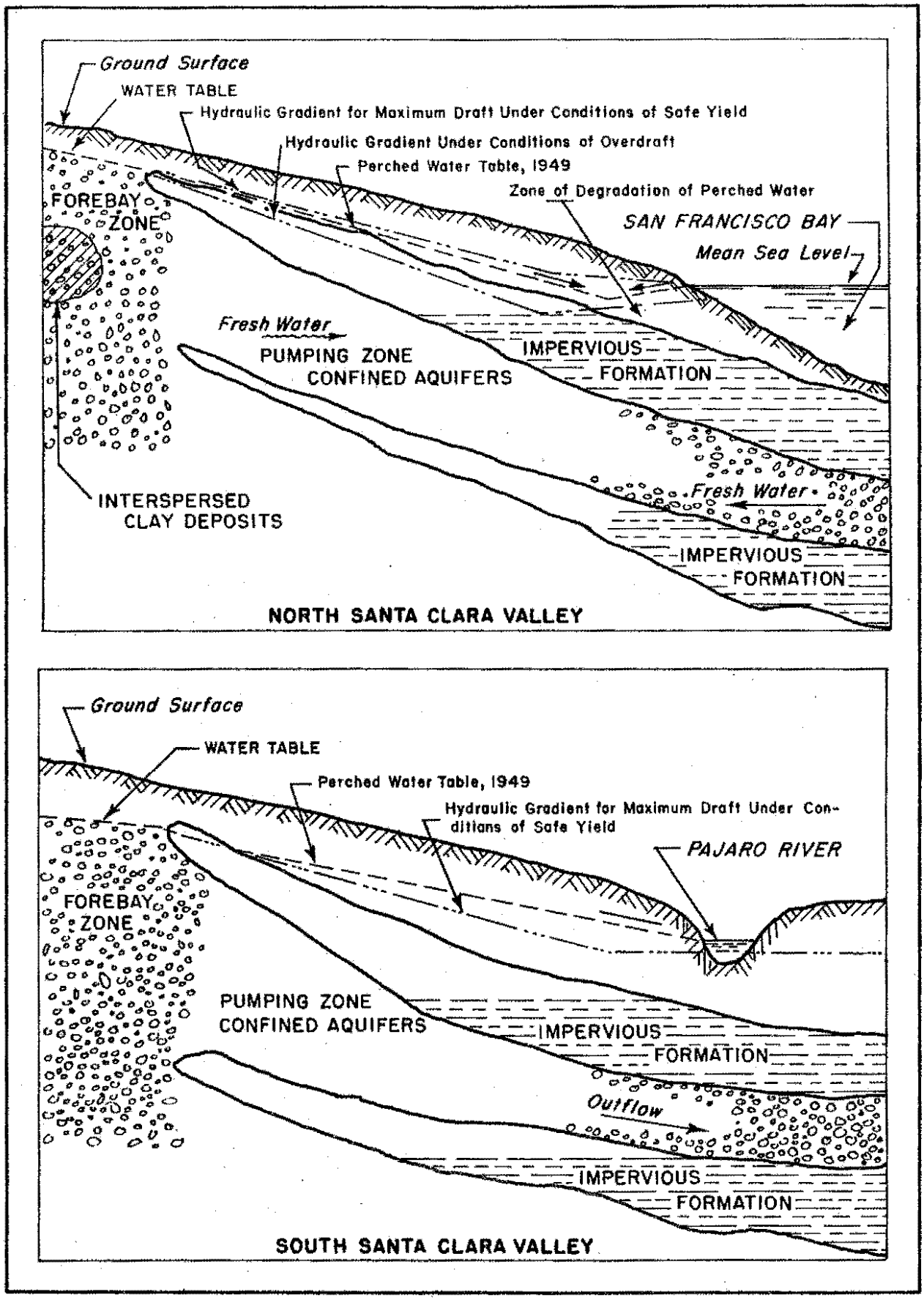

Figure 2. Cross Section of Ground Water Reservoir

Source: California Department of Public Works, Division of Water Resources, Santa Clara Valley Investigation. (Sacramento: State Print Off., June, 1955) (Water Resourses Board Bulletin No. 7.)

2. The basin or flood-plain alluvium is less water permeable as it represents the finer materials deposited as stringers or fingers toward the Valley center. At the end of these stringers, the sands and gravels become mixed with clay-like materials known as aquicludes.1/

3. Marine and swamp sediments are found in the lower portions of the northern and southern Santa Clara Valley, respectively. These deposits form an impervious cap over high-yielding aquifers.2/

The alluvial deposits were laid down at different times and from different directions, according to the location of the streams. As a result of this building-up process, there are no large areas of homogeneous materials; but gravel, sand, and clay are mixed in varying proportions. The areas with a high proportion of gravel generally are good sources of water or aquifers, and the predominantly clay portions of the basin have a low water yield.

Santa Clara County Has a Mild Subhumid Climate

The prevailing westerly winds carry highly moist air to the Pacific Coast areas of the United States. The resulting precipitation is heaviest on the Pacific Northwest and lightest in the arid Southwest. Santa Clara County is located on the dividing line between subhumid and arid in this north-south array. The range in average annual rainfall in the agricultural portions of the county is between 10 to 20 inches. The counties surrounding Santa Clara fall into the same precipitation class with the exception of Santa Cruz County on the coast. Santa Cruz County, most of the Peninsula, and a large part of northern California have between 20 to 50 inches of annual rainfall and a few locations receive over 50 inches.3/

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1/ David K. Todd, Ground Water Hydrology (New York: John Wiley and Sons, Inc., 1959), p. 15.

C. F. Tolman, Ground Water (New York: McGraw-Hill Book Co., 1937), p. 557. Aquiclude--"A formation which, although porous and capable of absorbing water slowly, will not transmit it fast enough to furnish an appreciable supply for a well or spring."

2/ Ibid., p. 371.

California Department of Public Works, Santa Clara Valley Investigation, pp. 32, 102, and 103.

Clark, op. cit., p. 25.

3/ California Department of Public Works, Water Resources of California, Plate 3.

The prevailing westerly winds strike the coastal range of mountains and funnel through the gaps to the intermountain valleys. The cool moist air comes to Santa Clara County through the Golden Gate and Merced Valley to the north, through Los Gatos Gap near the midpoint of the county, and up the Pajaro River Gap at the south. As these air currents contact the Santa Cruz Range and the Diablo Mountains, moisture is precipitated.1/ The Santa Cruz Range, being closer to the ocean, has the highest average annual rainfall with 46 inches at Wright. The quantity of precipitation descends as the mountain slope descends.2/ The average annual rainfall at San Jose on the valley floor is 14.2 inches. Rainfall increases on the east side to as high as 28 inches at the University of California's Lick Observatory on Mount Hamilton.

Santa Clara County can be divided broadly into three precipitation areas. Between the San Francisco Bay and San Jose is the area with the lightest rainfall--from 10 to 15 inches annually. The main agricultural areas of the county receive between 15 to 20 inches of annual precipitation, while the mountain regions on either side of the Valley have a higher rainfall--from 20 to 40 inches. Thus, topographic features play a material role in determining the location of light and heavy rainfall.3/

The Santa Cruz Mountains and the Diablo Mountains have other climatic effects than those directly affecting the rainfall. The Santa Cruz Mountains shield the county from the raw coastal climate with its high winds and with its extended periods of fog. However, the gaps in the mountains provide air drainage which gives the county virtually a frost-free climate. Across the Valley the Diablo Mountains form a protective barrier from the intense summer temperatures of the great Central Valley. Likewise, they hold back the cold winter weather and give Santa Clara Valley residents a mild temperature and climate the year round.4/

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1/ Clark, op.cit., p. 35.

2/ U. S. Weather Bureau, Climatological Data, annual issues, 1885-86 to 1953-54. The average seasonal precipitation at Los Gatos is 30 inches. The rainfall season is from July 1 to June 30.

3/ California Department of Public Works, Water Resources of California, pp. 32-33.

Clark, op. cit.

U. S. Department of Agriculture, Climate and Man: The Yearbook of Agriculture, 1941, 1941, p. 795.

Walter W. Weir and R. Earl Storie, Soils and Santa Clara County, California, California Agricultural Experiment Station Manual No. 3 (Berkeley, 1947), p. 1.

4/ Clark, op. cit., p 30.

TABLE 1

Monthly Distribution of Precipitation for Selected Locations in Santa Clara County

Month	Wright[a]	Los Gatos[b]	San Jose[b]	Lick[c]	Wright[a]	Los Gatos[b]	San Jose[b]	Lick[c]
	inches				per cent			
October	2.10	1.343	.669	1.227	4.61	4.45	4.71	4.39
November	5.28	2.801	1.379	2.806	11.58	9.29	9.70	10.04
December	9.08	5.705	2.613	5.013	19.92	18.91	18.39	17.93
January	8.24	6.736	2.824	5.659	18.07	22.33	19.87	20.24
February	8.43	5.546	2.486	4.687	18.50	18.39	17.49	16.76
March	6.61	4.825	2.352	4.566	14.50	16.00	16.55	16.33
April	3.64	1.862	1.013	2.247	7.98	6.17	7.13	8.04
May	1.27	.825	.491	1.153	2.78	2.73	3.45	4.12
June	.38	.109	.085	.025	.83	.36	.59	.90
July	.02	.004	.004	.011	.05	.01	.03	.04
August	.05	.028	.028	.020	.11	.09	.19	.07
September	.49	.384	.270	.320	1.07	1.27	1.90	1.14
Total	45.59	30.170	14.210	27.960	100.00	100.00	100.00	100.00

a/ 1918-19 through 1953-54--N = 36.

b/ 1885-86 through 1953-54--N = 69.

c/ 1885-86 through 1953-54 (excluding 1948-49)--N = 68.

Source: U. S. Weather Bureau, Climatological Data, annual issues, 1885-86 to 1953-54.

The Seasonal Precipitation Pattern: Dry Summers and Wet Winters

During the winter months the Pacific cyclonic storm pattern moves along the southern route, while in the summer the path lies to the north. This shift between summer and winter is primarily responsible for the summer dry period which is characteristic of the Pacific Coast climate.1/ Thus, the average precipitation from May through September in northern Santa Clara County has ranged from 4.45 per cent of the year's precipitation at Los Gatos to 6.27 per cent at Lick Observatory, with the remaining 95.54 per cent and 93.73 per cent falling from October through April. Not only is this pattern characteristic throughout the Valley but it is common to all phases of the precipitation "cycle" for the years of record.

The "Cyclical" Precipitation Pattern: Some Years Are Dry and Some Years Are Wet

The precipitation data published by the U. S. Weather Bureau dates back to 1874 for San Jose in the valley floor, to 1881 for Lick Observatory (Mount Hamilton) in the Diablo Mountains, to 1885 for Los Gatos in the lower Santa Cruz Mountains, and to 1918 for Wright high in the Santa Cruz Mountains.2/ The fluctuations in precipitation show the typical high degree of variability from year to year; that is, a wet year will be followed by one or more dry years. Exceedingly wet years have not occurred in sequence, but the precipitation during a span of years may be higher or lower than the average for the years of record. These so-called "cycles" vary in length. The 69-year record at Los Gatos evidences a rather long cycle between 1900 and 1936, with the years between 1900 and 1915 being generally wetter than average years. The following 20 years were drier than average. These characteristics are evidenced generally throughout the Valley.3/

The precipitation which falls is the only source of water for the county; as yet no major volume of water is imported.4/ The water disappears in accordance with the accepted ground water equation.5/ Part

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1/ California Department of Public Works, Water Resources of California, p. 32.

U. S. Department of Agriculture, Climate and Man . . . , p. 199.

2/ For our purpose precipitation time series start with 1885-86 for San Jose, Lick Observatory, Los Gatos, and Wright.

3/ The principal exception is that the precipitation at Lick Observatory on the east side of the Valley does not always follow the same pattern as that in the west and central portions of the Valley.

4/ A small amount of water is imported by the city of San Francisco and is sold to municipalities in the county.

5/ Todd, op. cit., pp. 5-9 and 203-204.

Tolman, op. cit., p. 34.

is evaporated and transpired, part finds its way in stream flow to the ocean, and part enters the ground water reservoir.

Rainfall--Stream Flow

The stream-flow component of the water falling in the Santa Clara Valley goes to the sea via three main stream groups: The Coyote River Basin, the Guadalupe River group in the northern Santa Clara Valley, and Uvas-Carnadero Creek and Llagas Creek as tributaries to the Pajaro River Basin in the southern Valley.

The flow in these streams is quite naturally related to the precipitation. As a consequence, many of the smaller streams are normally dry during the summer, while the larger creek beds carry only a negligible quantity of water during this season (see Figure 3). Stream flow increases in the wet years, but the relative increase is at a more rapid rate than is the increase in precipitation. This relationship evidences some variability due to factors such as the seasonal timing of rainfall.

Stream Flow and Influent Seepage

The stream beds carry their flow across beds of highly permeable gravels which come to the surface near the rim of the valley floor. Through these permeable gravels a portion of the stream flow seeps into the underground reservoir. This influent seepage adds the largest increment of natural replenishment to the ground water reservoir.1/ During the rainy season of the year, the volume of water entering the valley floor is about 207,500 acre-feet. Approximately 111,300 acre-feet pass the forebay area and go on toward the sea from the northern Valley. About 57,100 acre-feet enter the southern Valley's forebay and 49,000 acre-feet leave.2/ Thus, part of the surface flow recharges the underground reservoir, and part flows to the sea if not artificially detained.

Flood flows are not as conducive to influent seepage as flows produced by more moderate sustained rains.3/ Therefore, the type of storm pattern crossing the area will affect the degree to which rainfall will replenish the ground water supply. The "cyclical" fluctuations in precipitation are reflected in ground water recharge as evidenced by depth to water.

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1/ California Department of Public Works, Santa Clara Investigation, by Everett N. Bryan, Division of Water Resources Bulletin No. 42 (Sacramento, 1933), pp. 38-39.

2/ Ibid., pp. 31 and 70.

3/ Tolman, op. cit., p. 93.

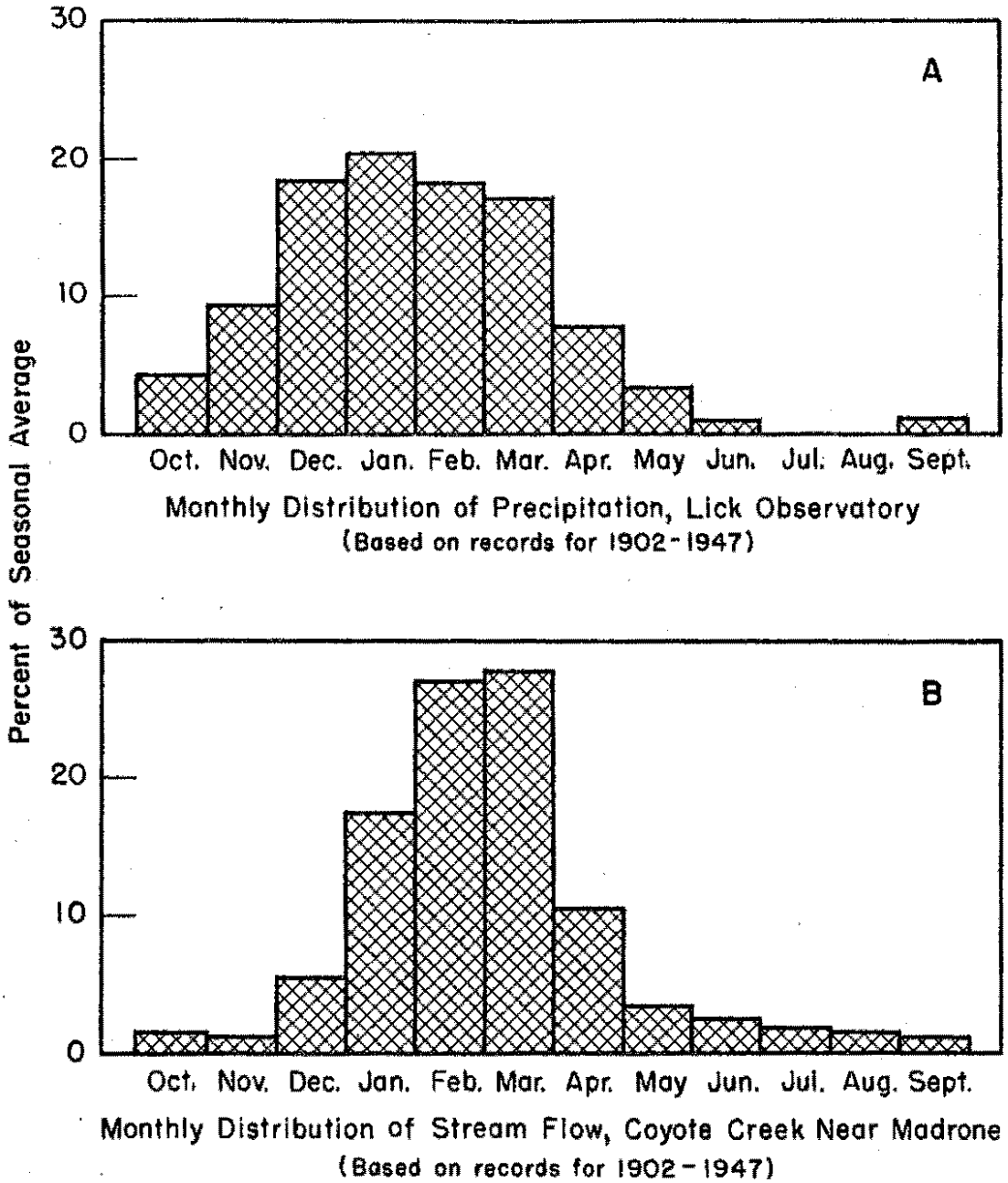
30
20
10
0
A
Oct. Nov. Dec. Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sept.
Monthly Distribution of Precipitation, Lick Observatory
(Based on records for 1902-1947)
Percent of Seasonal Average
30
20
10
0
B
Oct. Nov. Dec. Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sept.
Monthly Distribution of Stream Flow, Coyote Creek Near Madrone
(Based on records for 1902-1947)

Figure 3.

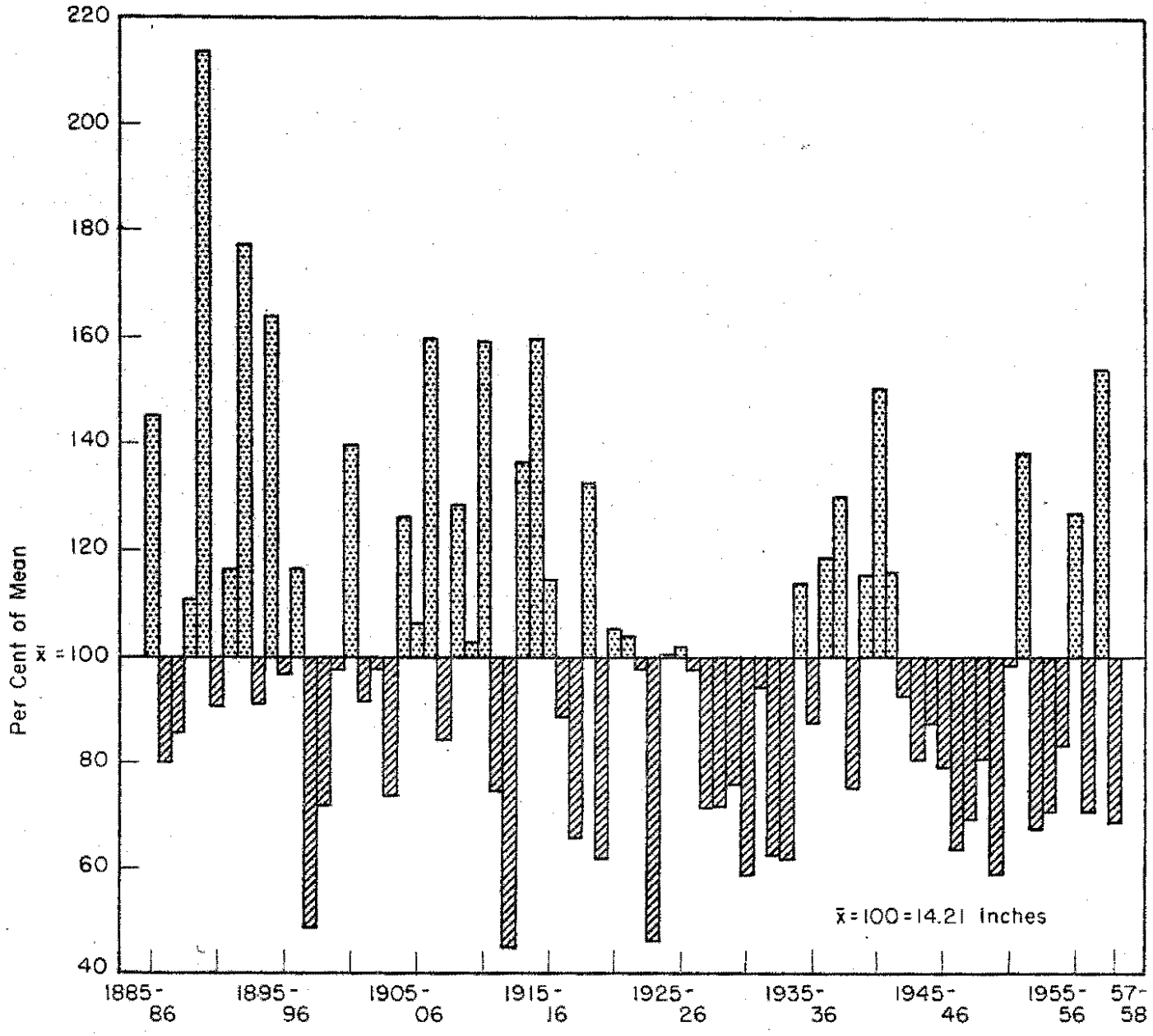

Figure 4. Annual Precipitation Index, San Jose
Per Cent of 1885-1958 Mean

The Ground Water Basins

Each part of Santa Clara County--the northern and the southern--has an underground reservoir. As with the surface drainage area, these two basins divide in "Coyote Valley." The Coyote River cone slopes both to the north and to the south turning most of the subsurface flow into the aquifers of the northern reservoir but sending about 2,400 acre-feet into the aquifers which lie to the south.

Each of these reservoirs is divided into two major subareas--the forebay and the pressure zone. In the forebay or free ground water zone, water moves freely from the surface sources to the water table. Thus, the forebay acts as a catchment basin for supplying water to the aquifers. This zone is located as an outer band around the valley floor, and it comprises about 52.4 per cent and 51.0 per cent of the valley floor in the northern and southern sections, respectively.

TABLE 2

Areas of Valley Floor Land in the Forebay and Pressure Zones in Santa Clara County

Area	Northern Santa Clara County		Southern Santa Clara County	
	acres	per cent	acres	per cent
Forebay zone	86,500	52.4	26,000	51.0
Pressure zone	78,600	47.6	20,400	49.0
Total, valley floor	165,100	100.0	52,200	100.0

Source: California Department of Public Works, Santa Clara Valley Investigation, by J. M. Haley, Water Resources Board Bulletin No. 7 (Sacramento, 1955), p. 53.

The area extent of the northern forebay is subject to some dispute. Tolman and Poland state that the nonpressure area is very small and limited to "a narrow marginal zone" of the valley floor.1/ They do not believe that the boundary of the original artesian zone is the boundary of the confined water area since confining clay deposits are evident throughout the Valley. These clay deposits may serve as caps which will create pressure in the underlying aquifer; or if the drawdown is sufficient, the reservoir may act as a free water reservoir.

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1/ Tolman and J. F. Poland, "Ground-Water, Salt-Water Infiltration and Ground-Surface Recession in Santa Clara Valley, Santa Clara County, California," Transactions of 1940, American Geophysical Union (Washington: National Research Council, July, 1940), Part 1, p. 28.

The pressure zones comprise the central and lower portions of each valley. These zones are overlaid with impervious materials which act as a confining blanket, excluding the penetration of surface water and holding the subsurface inflow within a confined volume. The subsurface inflow originates in the forebay and percolates[1] along the gradient of the confined aquifers to form pressure. This pressure is not uniform throughout the pressure zone since the aquifers are not homogeneous.

For many years the pressure was strong enough for some wells to flow continuously, while others flowed only in the winter and spring months. Although a few wells flowed between 1940 and 1947, increased draft has reduced the pressure so that water has not flowed regularly to the surface for about 40 years. But pressure effects are evident in the measurements of the depth to water. Changes in the depth to water will reflect the changes in pressure as well as changes in the volume of water in the underground reservoir. In part, this variability in pressure accounts for the variation in the depth to water from one well to another. Thus, one well may exhibit a substantial rise in its water level, while another, tapping a less confined aquifer, may be unaffected by the pressure.

Both the northern and southern ground water basins extend beyond the boundaries of the county. The northern pressure area extends under the San Francisco Bay, and the southern basin extends in San Benito County beneath the Pajaro River. The Pajaro River acts as a divide creating two ground water units--one in each county. Factors which affect the ground water in San Benito County do not affect water uses in Santa Clara County and vice versa.[2]

Ground water basins vary in their ability to yield water. This ability is affected by the nature of the water-bearing sediments--composition, size, shape, and arrangement. A measure which is used to quantify these relationships is called the specific yield. The specific yield is calculated "as the rates expressed as a percentage of the volume of water which, after being saturated, can be drained by gravity to its own volume."[3] Gravels and coarse sand have a higher (31.5 per cent)

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1/ Tolman, op. cit., p. 562. "Percolation--A type of laminar flow occurring in interconnected openings of saturated granular material under hydraulic gradient commonly developed underground."

2/ California Department of Public Works, Santa Clara Valley Investigation, p. 38.

3/ Todd, op. cit., p. 23.

Tolman, op. cit., p. 114.

specific yield than clays (3.2 per cent).1/ The heterogeneous dispersement of these materials throughout the basin accounts for part of the variability in the yield of water from one well to another.

The specific yield is also important since "ground water storage is estimated as the product of the specific yield and the volume of material in the depth intervals considered."2/ Estimates of this type have been made for each of the four major ground water studies of the county. Each study has used a lower estimate, indicating a lower water-yielding capacity of the underground reservoir.

The Development of Ground Water Use

Ground Water: The Principal Source of Water

The family household, the irrigated farm, the commercial business, and the industrial enterprise in Santa Clara County depend primarily upon ground water to meet their varied demands. But the underground reservoir has not always been the principal source. The Spanish settlers in the last half of the 18th century located their missions and pueblos close to surface streams. In fact, one of the criteria for selecting the sites for Mission Santa Clara (1777) and Pueblo San Jose (1778) was their proximity to the Guadalupe River and the Coyote River. The early domestic and irrigation requirements were met by the construction of simple diversion works and a canal system adequate for mission gardens, orchards, and vineyards.

By the latter half of the 19th century, a large diversion works had been constructed on Los Gatos Creek to bring water to the city of San Jose; and ditch companies were supplying water for domestic and irrigation purposes.3/ The development of surface water for direct use continued during the first half of the 20th century with the construction of the Austrian Dam by the San Jose Water Works and with the limited use of surface water imported from the high Sierra Mountains through the city of San Francisco's Hetch Hetchy aqueduct. Although this reliance upon surface water was important, the development of Santa Clara County's ground water resources played a more significant role in the development of the county's economy from 1854 until the present time.

The boring of the first artesian well in 1854 marked the beginning of the development of the underground reservoir as a source of water.

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1/ Clark, op. cit., p. 30.

2/ Ibid.

3/ Frederic Hall, The History of San Jose and Surroundings (San Francisco: A. L. Bancroft and Company, 1871), p. 262.

TABLE 3

Estimates of Specific Yield in Northern Santa Clara County

Source of estimates	Year	Applicable area	Estimates of specific yield
			per cent
Tibbetts-Kieffer	1921	Average for Valley	11.1
Clark	1924	Average for Valley	12.0
Division of Water Resources[a/]	1933	Average for zone groups varies between	7.3-12.1
Division of Water Resources[b/]	1955	Average for forebay zone	7.4

a/ Tibbetts in 1931 reports the Division of Water Resources to have estimated the specific yield as 10.6 per cent.

b/ Estimates for southern Santa Clara County forebay zone are 6.5 per cent.

Sources:

Fred H. Tibbetts, Report on Waste Water Salvage Project, A Report to the Board of Directors, Santa Clara Valley Water Conservation District (San Jose, California: The District, 1931), p. 17. Also, Tibbetts and Stephen E. Kieffer, "Report on the Santa Clara Valley Water Conservation Project," A Report to the Santa Clara Valley Water Conservation Committee, San Jose, California, 1921 (in the files of the Santa Clara Valley Water Conservation District).

William D. Clark, Ground Water in Santa Clara Valley, California, U. S. Geological Survey Water Supply Bulletin No. 519, 1924, p. 30.

California Department of Public Works, Santa Clara Investigation, by Everett N. Bryan, Division of Water Resources Bulletin No. 42 (Sacramento, 1933), p. 37.

California Department of Public Works, Santa Clara Valley Investigation, by J. M. Haley, Water Resources Board Bulletin No. 7 (Sacramento, 1955), p. 33.

The confined aquifers were tapped by municipal water suppliers, householders, farmers, and businessmen. As stated in an 1872 report, water could be obtained from any part of the valley floor; and "artesian wells are on nearly every block in town (San Jose) and at every farm house outside." In the same year, it was not uncommon to see water rising from a 6-inch pipe 2 or 3 feet above the ground surface. As a consequence of this apparent abundance, artesian wells were used as a source of water for irrigating orchards, gardens, and a few other crops. But by the turn of the century, primary reliance upon artesian and surface sources began to give way to the use of pumps.

At this time pumps were producing water from wells in the forebay and from nonflowing artesian wells. With the advent of this practice, water became available to the overlying landowner if he could sink a well. By 1910 the Bureau of the Census reported that 42 per cent of the irrigated acres in the county were supplied with water from pump wells and 20 per cent from flowing wells, while 38 per cent of the irrigated land relied upon water from the diversion of surface stream flow. The trend toward the use of the ground water reservoir has continued with the 1950 Census of Irrigation reporting 95 per cent of the irrigation water coming from pumped wells. In 1955 the Division of Water Resources stated that about 96 per cent of all of the water used in the county was pumped from the ground water basin.

Agricultural Use of Ground Water

From Surface Water to Ground Water.--The transition from irrigating with surface water to irrigating with ground water was underway by 1900 and was nearly complete by 1920. Prior to the late 1890's, some irrigation water was obtained from flowing wells[1] but stream diversion of flood flows for winter irrigation was the common practice in 1900.[2] The readily available flood flows were diverted to provide water for irrigating the orchards in the winter and the spring. In fact, this practice was developed more highly by Santa Clara County farmers than by farmers in other parts of northern and central California.[3] The use of

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1/ Hall, op. cit., p. 264.

George Hare, Hare's Guide to San Jose and Vicinity (San Jose, California: By the author, 1872), pp. 66 and 75.

2/ Frank Adams, Irrigation Resources of California and Their Utilization, U. S. Department of Agriculture Bulletin No. 254, 1913, p. 92.

S. Fortier, Irrigation in Santa Clara Valley, California, U. S. Department of Agriculture Bulletin No. 158, 1904, p. 78.

3/ Adams, op. cit., p. 92.

flowing wells continued to be a factor during the first two decades of the 20th century. Their use, however, was rendered impossible as the artesian pressure was reduced due to the development of the basin. By 1920 Clark estimated that over 80 per cent of the irrigated land in the Valley used water from pumped wells.1/

Seasonal Use of Ground Water.--The climatic characteristic of seasonal wet winters and dry summers played a major role in shifting the source of irrigation water from streams to the ground water reservoir. The direct diversion of water from the streams could be accomplished only during the winter and spring months. The irrigation of orchards in the early 1900's was judged to be helpful.2/ Rainy season irrigation was more applicable to Santa Clara County's orchard economy than to the production of vegetables, tomatoes, and similar crops. But the ability of soils to hold more moisture than supplied by the normal winter precipitation was limited to field capacity. As a consequence, winter irrigation contributed to ground water recharge rather than increasing the quantity of water available to the trees. This practice, however, did not provide the trees with water during the dry summer and fall.

The ground water reservoir was an available source of water for overcoming the summer and fall precipitation deficiency. By irrigating with ground water, the farmers could maintain the soil moisture throughout the year. The only seasonal factor to be taken into account was the summer drawdown in the water level. This eventuality was guarded against by sinking the well below the seasonal low point. Also, the extent of this drawdown was lessened by artificially spreading surface water into the ground water reservoir. The increased depth to water in the summer is generally known as seasonal overdraft.3/

Cyclical Use of Ground Water.--Uncertainty of annual precipitation caused many irrigators to shift from surface to ground water. For example, the three dry years of 1897-1900 were followed by one wet year, three dry years, three wet years, two dry years, and so on in a fashion typical of weather uncertainty. This variability was damaging on future crop production as well as upon the output of a particular year. Orchard production responses to water illustrate this effect. These responses come primarily through tree growth. Thus, one or two dry years

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1/ Clark, op. cit., p. 84.

2/ Fortier, op. cit., p. 80.

3/ For a detailed definition of seasonal overdraft, periodic overdraft, and long-run overdraft, see J. Herbert Snyder, Ground Water in California: The Experience of Antelope Valley, University of California, Giannini Foundation Ground Water Studies No. 2 (Berkeley, 1955), pp. 81-85.

TABLE 4

Estimated Average Monthly Distribution
of Seasonal Demands for Water
in Santa Clara Valley

Month	Irrigation	Urban
	per cent of seasonal total	
October	12	8
November	5	6
December	1	5
January	0	5
February	1	5
March	2	6
April	3	7
May	10	10
June	19	11
July	18	13
August	13	13
September	16	11
Total	100	100

Source: California Department of Public Works, Santa Clara Valley Investigation, by J. M. Haley, Water Resources Board Bulletin No. 7 (Sacramento, 1955), p. 62.

could produce serious damage in the given year and affect future production by retarding growth. On the other hand, one or two wet years might not materially enhance production since water in excess of field capacity would be present. However, if the proper soil moisture is maintained throughout the life of the tree, growth and production can be more favorably influenced. The uncertainty of intermittent dry years could not be guarded against by winter irrigation; consequently many farmers turned to the use of the available ground water basin.1/

The development of well technology played its part in making the use of ground water more attractive. For example, the deep well turbine was developed and became generally available between 1890 and 1910.2/ During this same period, gasoline engines were displacing the use of steam power; and by 1910 the newer installations were using electricity.3/ One factor encouraging the use of electric power was the special rate adopted by the local utility.

The individual irrigator also found it convenient to turn to the readily available ground water. No large-scale storage and distribution systems were necessary for the farmer to make this decision. Ditch companies can transport water on a limited scale. But if large-scale surface delivery were desired, extensive irrigation development requiring the organization of an irrigation district or a proliferation of ditch companies would have been called for. Since the individual farmer could meet the seasonal cycles and the annual precipitation uncertainties with ground water, pumping became the predominant method for supplying irrigation water.

Expansion of Irrigation with Ground Water.--The adoption of ground water irrigation was coincident with the expansion of irrigated farming throughout the county. Surface irrigation was judged to be a beneficial practice in 1904, and ground water irrigation incorporated these benefits plus the favorable points previously noted. In 1904 Fortier stated that the benefits from irrigation were: "(a) superior quality of fruit produced, (b) greater regularity in bearing, and (c) large increases in yield."4/ Over the succeeding years, these general conclusions have been sustained and have been primary reasons underlying the

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1/ The following writers noted the shift to irrigation following dry phases of the weather cycle:

Adams, op. cit.

Clark, op. cit., p. 3.

Fortier, op. cit., p. 79.

2/ E. W. Bennison, Ground Water, Its Development, Uses, and Conservation (St. Paul: Edward E. Johnson, Inc., 1947), pp. 380-381.

3/ Adams, op. cit., p. 69

4/ Fortier, op. cit.

TABLE 5

Number of Farms, Number of Farms Irrigated, and Number of Acres Irrigated 1890-1954 in Santa Clara County

Year	Farms				Acres	
	Total	Number irrigated	Per cent of total farms	Per cent change from previous census	Number irrigated	Per cent change from previous census
1890	2,177	184	8.5	--a/	6,686	--
1900	3,995	1,129	28.3	513.60	40,097	499.72
1910	4,731	1,101	23.3	- 2.50	37,637	- 6.14
1920	5,016	2,649	52.8	140.60	70,312	86.82
1930	6,237	3,708	59.5	40.00	96,130	36.72
1940	5,608	3,432	61.2	- 7.40	95,959	- .18
1950	5,282	3,449	65.3	.50	105,721	10.17
1954	4,953	3,337	67.4	- .03	114,677	8.47

a/ Dashes indicate no information available.

Sources:

U. S. Bureau of the Census, Census of the United States: Agriculture, various years.

U. S. Bureau of the Census, Census of the United States: Irrigation, various years.

TABLE 6

Acreage of Potentially Irrigable Crops, 1890-1950, in Santa Clara County

	1890	1900	1910	1920	1930	1940	1950	1954
	acres							
Orchards, bearing[a] (apricots, apples, peaches, cherries, pears, plums, and prunes)	16,304	71,362	67,028	67,811[b] / 69,806[c]	101,528	88,968	75,030	71,660
Walnuts, bearing[d]	--[e]	298	636	1,700	3,438	6,489	10,706	11,310
Grapes, bearing[f]	10,000	15,785	12,410	8,684	8,987	6,615	6,710	5,687
Strawberries	--	295	460	440[g]	419	214	1,349	2,253
Vegetables	--	1,787	4,241	8,914	12,577	15,606	25,537	25,438
Alfalfa	--	721	3,073	7,958	8,798	5,211	2,576	3,695
Sugar beets	--	4,214	1,135	95	110	6,169	4,078	6,210
Total	26,304	94,462	88,983	95,162[b] / 97,597[c]	135,857	129,272	125,986	126,253

a/ Computed with an average of 75 trees per acre.

b/ Data for cherries not available for 1920.

c/ Includes estimate for cherries, assuming 50 per cent of the reduction between 1910-1930 was made in each decade.

d/ Computed with an average of 30 trees per acre.

e/ Dashes indicate no data available.

f/ Computed with an average of 450 vines per acre with exception of 1890 when the acreage was reported.

g/ Data for strawberries not separately classified for 1920. Estimated on the assumption that 50 per cent of the reduction between 1910-1930 was taken in each decade.

Sources:

U. S. Bureau of the Census, Census of the United States: Agriculture, various years.

U. S. Bureau of the Census, Census of the United States: Irrigation, various years.

subsequent irrigation development. Between 1900 and 1954, 74,580 acres were brought under irrigation. This expansion has led to the continued growth in the demand for water for agricultural use and is responsible for the continuance of agriculture as the largest user of ground water. According to the estimates by the Department of Water Resources, 77 per cent of the draft in the northern Valley is due to irrigation, while 95 per cent of the draft in the southern Valley goes on irrigated crops (Table 7). Earlier studies likewise estimated the irrigation draft upon the ground water reservoir to be greater than 80 per cent. None of these estimates, however, is directly comparable; consequently, they do not provide a basis for showing the increasing relative importance of non-irrigation uses.

TABLE 7

1948 Estimate of Draft in Santa Clara County

Draft	Northern Valley		Southern Valley	
	acre-feet	per cent	acre-feet	per cent
Agricultural draft	145,600	77	44,200	95
Total draft	188,200	100	46,400	100

Source: California Department of Public Works, Santa Clara Valley Investigation, by J. M. Haley, Water Resources Board Bulletin No. 7 (Sacramento, 1955), p. 33.

A direct agricultural interest in irrigation involved over 50 per cent of the county's farmers since 1920. By 1954 the Census of Agriculture reported 67 per cent of the farmers irrigating and this took place on a larger acreage than reported by any previous census.1/ After the initial introductory period prior to 1900, the farmers' interest in irrigation grew most rapidly during the decade 1910-1920.

Between 1900 and 1910 the number of acres of potentially irrigable crops declined by 5,479 acres; and the number of acres irrigated declined by 2,460 acres. The reduction in irrigated acreage is in part a reflection of the poor economic conditions which affected the orchard industry and the prune growers in particular. During this decade prune prices for California reached a low of 4.1 cents per pound in contrast to the high wartime price of 20.0 cents per pound in 1918.2/ Although the high

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1/ Preliminary reports for the 1959 Census indicate a decline in acres irrigated. This would be consistent with the rapid urbanization of the northern Valley.

2/ S. W. Shear, Prune Supply and Price Situation, California Agricultural Experiment Station Bulletin 462 (Berkeley, 1928), pp. 13 and 50.

price of the second decade contributed in an expansion of the industry in California, the acreage in Santa Clara County continued with a minor decline.

The practice of irrigation gained, however, with the addition of 32,675 acres of irrigated land by 1920. The increase indicates the rapid expansion of the practice of irrigation even though the acreage of potentially irrigable crops was only 8,614 acres greater than in the previous census. Consequently, the increase in the acreage of irrigated land cannot be associated entirely with an increase in potentially irrigable acreage and not at all with an increase in prune production since no increase occurred.

Several factors probably contribute to the expansion of irrigation during the decade. But the often stated hypothesis that farmers turn to irrigation only in the dry years is not relevant to this situation. The cumulative rainfall during the decade was 4.48 inches greater than for the preceding 10 years, and its distribution did not differ greatly. Farm prosperity was the general order of the day with World War I prices marking the high point. In addition, electric lines spread over the county between 1910 and 1920 making electric power readily available. Using special agricultural rates, this source of power combined easily with the turbine pump to meet the varied requirements of individual water users.

The next period of rapid growth in irrigation came between the prosperous years of 1940 to 1954. During the depressed decade of 1930 to 1940 the acreage of irrigated land actually declined. Growth in recent years has been at a slower rate but has continued in the face of strong competition with urban land uses. In fact, this very competition has been a factor in forcing an increasingly intensive land-use pattern.

The expansion of irrigation has been only one factor leading to greater use of ground water. The relative importance of crops requiring larger volumes of water has been growing. Truck crops which take higher water applications than other crops except alfalfa are of major significance today. Consequently, demands placed upon the ground water basin per acre of irrigated land have tended to rise. For example, the number of acres of irrigated vegetables made up only .05 per cent of the potentially irrigable acres in 1910; while by 1954 this percentage had increased to 20 per cent. The significance of this shift becomes apparent when the amount of water applied to truck crops is compared to orchards: truck crops--2.4 acre-feet in the forebay and 2.7 acre-feet in the pressure zone; and orchards--2.1 and 1.4 acre-feet, respectively. These shifts in agricultural production have tended to increase, not lessen, the farmers' interest in the ground water basin.

Municipal Use of Ground Water

The municipal use of water includes household, industrial, commercial, park, and similar uses. These activities originally relied upon

TABLE 8

Estimated Weighted Mean Seasonal Application
of Ground Water to Principal Crops
in Santa Clara Valley

Crops	Applied water	
	Forebay zones	Pressure zones
	depth in feet	
Alfalfa	2.7	2.8
Beans	1.1	1.1
Deciduous orchards	2.1	1.4
Permanent pasture	2.6	2.6
Sugar beets	1.8	1.3
Tomatoes	1.5	1.5
Truck	2.4	2.7
Vineyard	1.2	1.0

Source: California Department of Public Works, Santa Clara Valley Investigation, by J. M. Haley, Water Resources Board Bulletin No. 7 (Sacramento, 1955), p. 16.

surface water as it crossed the central part of the northern and southern Valley. The shallow ground water was not developed since it was perched and brackish in quality. Since the urban areas were overlying the pressure zone, an attempt was made in 1866 to use artesian wells. But within two and a half years they proved to be inadequate. Major diversion works were constructed in 1870 to store and transport water from Los Gatos Creek to the cities of San Jose and Santa Clara.1/

Surface delivery was supplemented by pumping from deep wells as early as 1886, and the use of wells has continued to increase. By the second decade of the 20th century, the San Jose Water Works, the City of Palo Alto, and the People's Water Company were all relying upon deep wells.2/ In fact, the San Jose Water Works drilled 25 wells in 1915,3/ and in 1952 they were using wells to pump about 60 per cent of the water which they distributed. Some of the smaller municipalities have relied entirely upon ground water.

The increase in population in the county has not only increased the municipal need for water, but it has concentrated the area of withdrawal. The companies or municipalities providing this water have sunk deep wells within the boundaries of their service areas to depths ranging from 200 feet to 1,500 feet. New municipal wells average about 800 feet in depth. Most of these wells tap the pressure zone since they are located within the urban areas which are located in the central part of the Valley. They have not been distributed throughout the Valley as have the smaller irrigation wells. However, the sprawling pattern of urban growth would indicate that future development of the deep municipal wells will probably be in the forebay.4/

The changing character of household water use is another factor tending to increase the quantity of water used for municipal purposes. The automatic washer, the electric dishwasher, the garbage disposal unit, and an expensive yard and garden are symbols of present-day living which were nonexistent or of less significance 30 to 40 years ago. Such factors as these are common today, whereas, draft animals and family livestock were commonplace in earlier times.

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1/ Hall, op. cit., p. 305

2/ Clark, op. cit., pp. 87-88.

3/ California Department of Public Health, "San Jose, Los Gatos, Saratoga and Vicinity" (Sacramento, November, 1952), p. 3. (In the files of the Department.)

4/ Santa Clara County Planning Commission, Hearing in Re Request of San Jose Water Works for Permit to Operate a Public Utility Use, Northwest Corner of Piedmont and Penetencia Creek Roads (San Jose, California, April 6, 1955), unpaged. Processed.

TABLE 9

Total Population, Urban Population, Nonagricultural Population and Rural-Farm Population in Santa Clara County

Year	Total population	Urban population[a]	Nonagricultural population	Rural-farm population
1890	48,005[b]	[c]		
1900	60,216[b]	25,150[d]		
1910	83,539[d]	37,780[d]		
1920	100,676[e]	53,624[f]		
1930[f]	145,118	94,844	118,353	25,761
1940[g]	174,949	107,412	148,884	25,335
1950	290,547[h]	158,707[h]	279,784[i]	28,233[j]
1959	627,700[k]			
	per cent change			
1890				
1900	25.4[b]			
1910	38.7	50.2		
1920	20.5	41.9		
1930	44.1	76.9		
1940	20.6	113.3	25.8	- 1.7
1950	66.1	47.8	87.9	11.4
1959				

a/ Old urban definition used consistently.

b/ U. S. Bureau of the Census, Twelfth Census of the United States: 1900. Population, 1901, vol. 1, Part 1, Table 15, p. xxxix.

c/ Blanks indicate no information available.

(Continued on next page.)

d/ U. S. Bureau of the Census, Thirteenth Census of the United States: 1910. Population, 1913, vol. 2, Table 1, p. 176.

e/ U. S. Bureau of the Census, Fourteenth Census of the United States: 1920. Population, 1922, vol. 3, Table 9, p. 116.

f/ U. S. Bureau of the Census, Fifteenth Census of the United States: 1930. Population, 1933, vol. 3, Part 1, Table 13, p. 253. Non-agricultural population obtained by adding rural-nonfarm population to the difference between urban population and urban-farm population.

g/ U. S. Bureau of the Census, Sixteenth Census of the United States: 1940. Population, 1943, vol. 2, Part 1, Tables 21, 26, and 27, pp. 542, 571, and 586.

h/ U. S. Bureau of the Census, Seventeenth Census of the United States: 1950. Population, 1952, vol. 2, Part 5, Table 5, p. 5-12; Table 42, p. 5-164.

i/ Ibid., Table 43, p. 5-172.

j/ Ibid., Table 50, p. 5-190.

k/ California Department of Finance, Division of Budgets and Accounts, Financial Research Section, California's Population in 1959 (Sacramento, 1959), p. 12.

The domestic use of water has tended to increase. This in part has been a replacement of orchard and other irrigated uses as noted. On the other hand, some of the subdivision development has taken place on land not previously irrigated; and thus, total domestic water use has risen.

The business uses of water have increased with the addition of new firms, through the wide application of air conditioning, and other water-using processes. At the time of the survey of the Division of Water Resources in 1948-49, business and industry had a gross annual draft of 4.4 and 8.8 acre-feet per acre, respectively. Average urban water use per acre, however, was estimated to be lower than for agriculture--urban areas, 1.7 acre-feet; and irrigated land, 2.5 acre-feet.1/

Not only have these secular increases in urban draft been evident, but seasonal and cyclical fluctuations are also apparent. The seasonal reduction of draft during the winter months is less evident for urban uses than for agriculture. However, urban water use in December, January, and February is 5 per cent of the average annual urban draft, while it is 13 per cent for July and August. Thus, for the cities with surface sources, the ground water reservoir may be used in a complementary fashion with the abundant winter surface water.

Urban ground water development also has had its "countercyclical" aspects in reducing the physical uncertainty of precipitation. As the urban centers began to grow, it became evident that storage capacity would be needed to furnish water during frequent dry years. For this purpose, the underlying ground water basin was an accessible source which was available in both the dry and the wet years.

Legal Freedom to Develop Ground Water

Not only was ground water physically and economically accessible, but it was legally available to individual water users, municipalities, and water companies. One foundation of the investment in water development was the landowner's property right to use the water underlying his land and his expectation that the ground water source would meet his demand.

The legal basis for the development of the ground water basin was the correlative rights doctrine (1902).2/ Under this doctrine the water right is appurtenant to the overlying land, and the landowner may develop the right within the reasonable beneficial use concept without a specific

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1/ California Department of Public Works, Santa Clara Valley Investigation, p. 57.

2/ Katz v. Walkinshaw, 141 Calif. 116, 70 Pac. 663 (1902); 74 Pac. 766 (1903).

For an excellent discussion of California's water law, see Wells A. Hutchins, The California Law of Water Rights (Sacramento: State Printing Office, 1956), p. 571. The section on ground water starts on page 418.

quantitative definition. The right is coequal among the landowners utilizing the basin. It is not dependent upon the "first in time, first in right" rule or state procedures for appropriation. Consequently, the irrigation farmer's decision as to the advisability, the timing of adopting the irrigation practices, and the quantity of water to be developed is not limited by legal procedures.

Water pumped by the public utility water companies and the municipalities does not come under the correlative rights rule. This use is considered to be a nonoverlying use and "is therefore an appropriative use."[1/] The right to appropriate attaches to the "surplus" waters in the basin. However, if all of the users continue to pump and if an overdraft condition is brought about, a prescriptive right may be established by the appropriators.[2/] Thus, the quantities of water which the holders of these appropriative rights may pump is not effectively restricted by legal procedures unless an adjudication procedure is initiated in the courts or unless other users restrain pumping by injunction via a showing of injury.[3/] But these actions are not free from legal uncertainties since the courts have not ruled on many relevant points.[4/]

People throughout the valley floor were not faced with legal water rights restrictions if they wanted to develop the water underlying their land. Priorities of time in use and preferences of uses have not stood in their way. If a farmer wanted to irrigate his orchard, he was not confronted with complicated legal restrictions or procedures, nor did he have to participate in an irrigation district. The water was generally available to him if he could afford to sink a well.

The Problem: Organizing the Integrated Management of Ground and Surface Water

The Seasonal, the Cyclical, and Secular Problems

The extent of the seasonal problem is clear from Figure 5. Ground water has been used to overcome the lack of precipitation during the

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1/ Hutchins, op. cit., p. 458.

2/ Pasadena v. Alhambra, 33 Calif. (2d) 908.925-927, 207 Pac. (2d) 17 (1949).

3/ Mt. Eden Township Water District v. City of Hayward, 218 Calif. 634.

Orange County Water District v. City of Riverside, City of Colton, City of San Bernardino, and City of Redlands, District Court of Appeal, Fourth Appellate District, State of California, Civil No. 5717, October 20, 1959. Processed.

4/ Hutchins, "Ground Water Problems: Legal," California Law Review, vol. 45, no. 5, December, 1957, pp. 688-697.

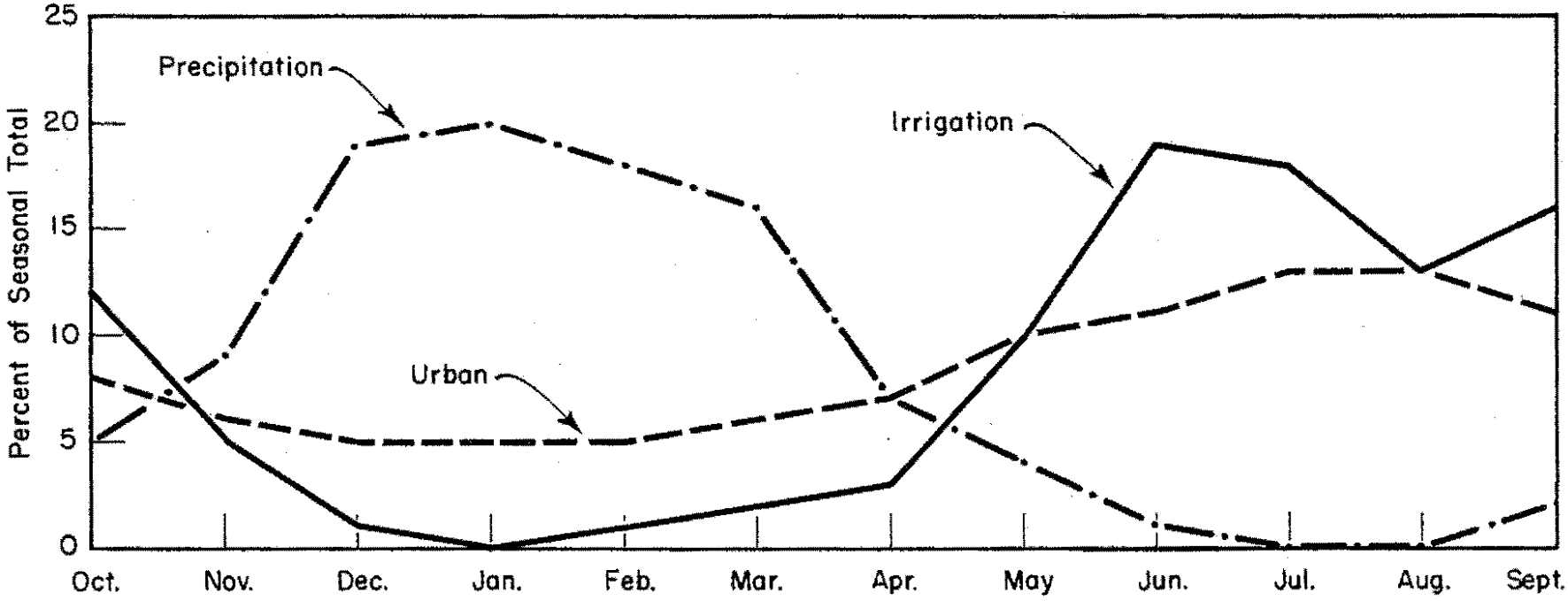

Figure 5. Monthly Distribution of Precipitation, Irrigation Use of Water and Urban Use of Water

Source: Department of Water Resourses, California

summer months with the result that the depth to water has not remained constant during the year. The water level drops with summer pumping and reaches a seasonal low during the latter part of September or the early part of October. Recharge from winter rains usually reduces the depth to water with a high point in early spring. Many parts of California and the West commonly face this summer drawdown, and it usually is met by the installation of wells and pumps adequate to reach water during all times of the season. In addition, the impact of these declines may be decreased by artificially recharging the ground water reservoir.

The "cyclical" pattern of precipitation means that at the extremes some years will be drought years whereas others will be flood years. These surface water fluctuations result in fluctuations in the depth to ground water. A severe drop in ground water levels may follow a succession of dry years. Not only is natural seepage into the ground water reservoir decreased but draft is increased by both the agricultural and municipal users. In the wet years, ground water levels generally rise; but under natural conditions, there are losses of surface water to the ocean. By capturing and storing the flood water, it may be held over for use in the dry portions of the "cycle" for surface delivery or for artificial recharge.

The secular growth of the county increased the pressure upon the ground water resources. Due to this pressure, draft began to exceed the natural seepage and the stock component began to be mined. The extent to which this condition should be permitted to persist became a question of major concern because of the increasing costs of producing water. Benefits could accrue by reducing these costs.

Another factor which is a part of the secular expansion of draft is the nature of the competition for water. As the depth to water increases, the cost of obtaining this water also increases. Individuals or organizations with an ability to install deep, high-capacity wells and pumps are competitively in a favored situation. The probability that the water level will drop below their economic depth is less than for the users of the more shallow wells. But the shallower wells are more numerous, and they generally have been owned by the farm irrigators; and the farmers with the older wells frequently did not tap the deepest aquifers.1/ Consequently, conflict frequently appears between the farm and nonfarm users of the ground water reservoir.

The Problems of Compaction and Land Subsidence

The dewatering of an aquifer due to secular overdraft reduces the water pressure thus compressing the aquifer and the aquiclude by the weight of the overlying material. Most aquifers have an elastic quality

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1/ Farmers have been drilling deeper wells through the years.

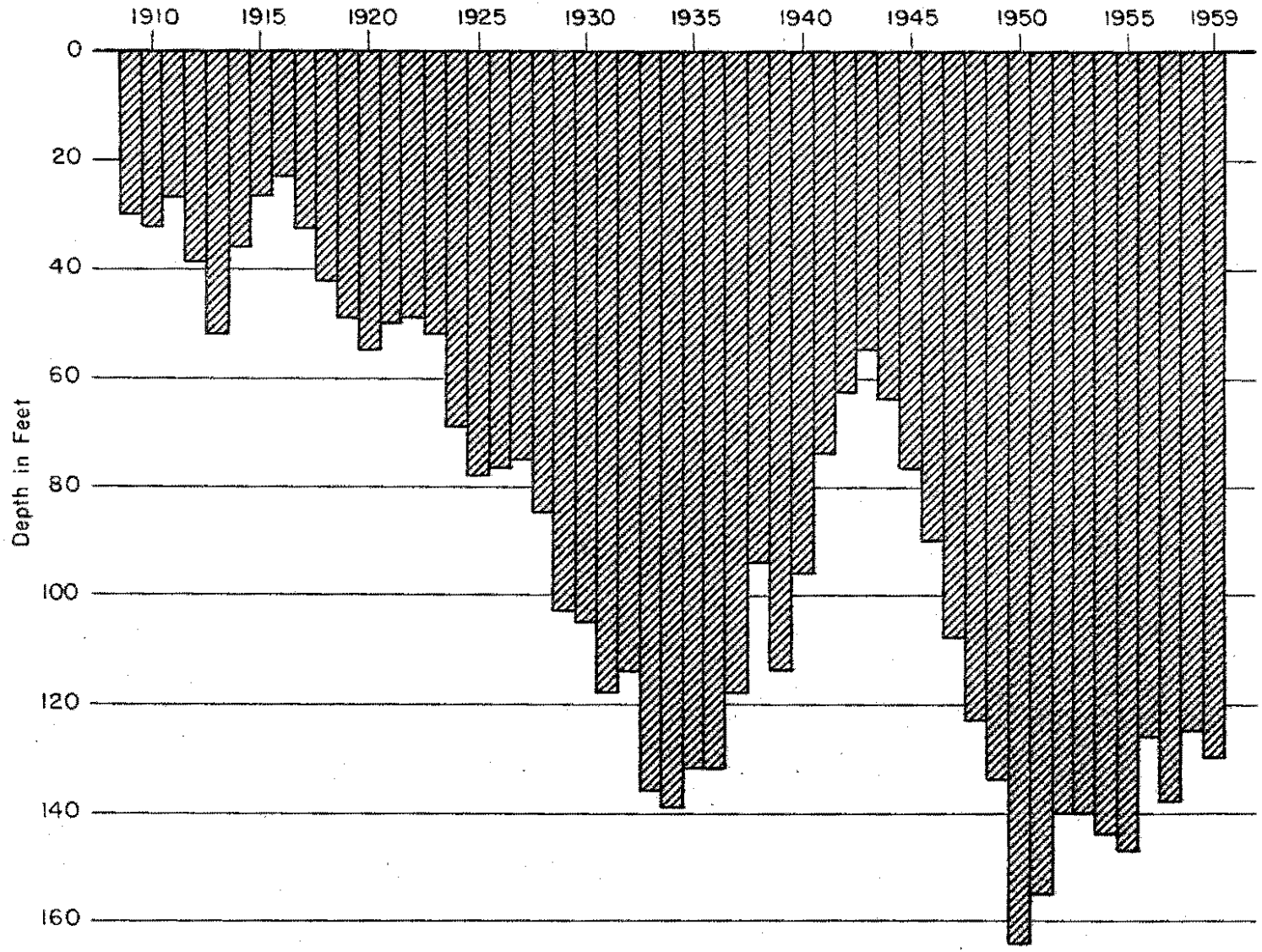

Figure 6. Average Depth to Water from Ground Surface, Santa Clara Valley Water Conservation District September 30, 1908–1959

Source: Supplemental Water Requirements of Alameda-Santa Clara-San Benito Counties. (San Jose: Santa Clara, Alameda, San Benito Water Authority, May 1, 1957)

which permits them to expand when water re-enters the reservoir. On the other hand, aquicludes have an extremely low ability to absorb water. Therefore, once these clays and silts have been compacted[1] into a smaller volume by the process of dewatering, they do not expand readily when water returns. This inability to expand is due to the fact that the pore spaces which formerly held water have been destroyed.

Compaction also may come about because of the inelasticity of the conduit walls which confine some water-bearing sediments. As water is withdrawn from the confined aquifers, the conduit walls may constrict, thus leaving a smaller reservoir volume for future use. The ability to store water has been lost in the sections of the ground water reservoir which have been subject to the types of compaction described. To the extent that an elastic quality remains in the aquifer and in its walls, some compacted areas may be restored.[2] On the other hand, the reservoir may pass the critical zone[3] if water is unable to re-enter. The compacted portion thus has been lost as a potential site for the future storage of water.

A frequent consequence of compaction is the subsidence of the ground surface overlying the compacted area. Subsidence was the first evidence of compaction in Santa Clara County. Between 1911-12 and 1918, routine releveling surveys in the San Jose area showed discrepancies, and subsidence was suspected. By 1932-33 another leveling showed a drop of 4.13 feet in the land surface,[4] and by 1954 the maximum subsidence

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1/ Compaction may set in during any stage of overdraft, or it may result from the reduction of pressure when real overdraft does not exist.

2/ Tolman and Poland, op. cit.

The extent to which compaction is reversible is not yet determined. See, for example, the article mentioned above and the following article. James Gulluly and U. S. Grant, "Subsidence in the Long Beach Harbor Area, California," Bulletin, Geological Society of America, vol. 60, no. 3, March, 1949, pp. 461-529.

3/ Ciriacy-Wantrup, op. cit.

4/ Tolman, op. cit., p. 341.

Tolman and Poland, op. cit.

in the San Jose area was 7.75 feet.[1] The lowered land surface is evident in an area of about 200 square miles.[2]

Subsidence in Santa Clara County has not resulted in major property damage as has been the case in other areas of the state.[3] The lowering of the surface, however, has reduced the gradient of the streams which carry flood waters to San Francisco Bay. Consequently, the velocity of discharge of the storm waters is reduced, thus increasing the possibility of flooding.[4]

These areas affected by subsidence are the areas containing some of the deepest wells in the county. Wells at Moffet Field and the city of San Jose range between 1,000 feet and 1,500 feet in depth. It is in these areas where water has been withdrawn from several strata, both above and below the clays, that subsidence has been most severe.[5] Although enough is not known about the physical relationships which are involved, the question could certainly be raised as to what is the effect of concentrating the location of deep wells within a small area in a reservoir susceptible to compaction.

Problems of Salt Water Intrusion

Increasing draft has led to salt water contamination of ground water. Contamination was observed in 1920 along the edge of San Francisco Bay in the Palo Alto area.[6] The ground water lying above the impervious clay layer which blankets the northern part of Santa Clara County and extends under the Bay was most severely affected. As water was pumped from these upper sediments, the pressure from the Bay exceeded the landward pressure

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1/ Interagency Committee on Land Subsidence in the San Joaquin Valley, Proposed Program Investigating Land Subsidence in the San Joaquin Valley, California (Sacramento: State Printing Office, 1955), p. 4. Data were supplied for each subsidence check between 1911 and 1954 by Dr. Joseph F. Poland, District Geologist, U. S. Geological Survey, Sacramento, California.

2/ Poland and G. H. Davis, "Subsidence of the Land Surface in the Tulare-Wasco (Delano) and Los Banos-Kettleman City Area, San Joaquin Valley, California," Transactions, American Geophysical Union (Washington: National Research Council, June, 1956), vol. 37, no. 3, p. 287.

3/ Ibid.

4/ Santa Clara County Planning Commission, Flood Problems in Santa Clara County, Monograph No. 3 (San Jose, California, 1952), pp. 65-69.

5/ Ibid.

6/ Tolman and Poland, op. cit., p. 28.

and salt water intruded. However, the fact that the main water-bearing materials lay below the clay barrier has not eliminated salt-water intrusion.

Wells close to the Bay also tapped the lower aquifers and pumped from the zone of confined water. Many of these wells contained intake perforations both above and below the impervious clay, others did not properly seal off contact between water in the two zones, while old wells were allowed to go without repairs and to deteriorate. As water use reduced the pressure in the confined water zone, the pressure from the overlying saline water was able to force salt water through the perforations, cracks, and breaks so that the lower aquifers became contaminated. This source of intrusion became serious enough for local officials and leaders to take public action. Through an educational program, the well owners were instructed in the proper methods of sealing off their old wells and of protecting the confined aquifers when drilling new wells.1/

Pumping from the pressure zone has caused a trough to be formed with a hydraulic gradient extending under San Francisco Bay. If pressure is to be released and the hydraulic gradient of the trough is extended far enough beneath the Bay, contact may be reached with a break in the confining aquifer. The Division of Water Resource's investigation states that the "early reports of boils of fresh water in San Francisco Bay were undoubtedly attributable to discharge of fresh water" at points where the lower aquifers came into direct contact with sea water.2/ And the opinion is held that the construction of the Dumbarton Bridge and the Hetch Hetchy aqueduct has caused such breaks.3/

The management of the Santa Clara Valley Water Conservation District, however, believes such intrusion is not a major danger as long as proper precautions are taken when new wells are dug and when old wells are sealed off. The judgment is based upon water quality tests which were made from water in wells adjacent to the Bay.4/

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1/ Ibid., p. 29.

2/ California Department of Public Works, Santa Clara Valley Investigation, p. 44.

3/ Tolman and Poland, op. cit.

4/ Interview with the Chief Engineer and Manager of the Santa Clara Valley Water Conservation District, San Jose, California, December, 1959.

Patrick J. Creegan and Elmer M. D'Angelo, North Santa Clara Valley Basin Investigation: Report on Land Subsidence, Sea Water Invasion and Aquifer Transmissibility, Pacheco Aqueduct, Preliminary Feasibility Report (San Jose, California: By the authors, 1959), Part III, Chap. 3.

Remedial Actions

The water users of Santa Clara County were faced with uncertainties in their future water supply. To combat these uncertainties and their economic effects, detention dams, canals, and spreading areas were constructed to capture winter runoff and operated to release water for infiltration into the underground reservoir.

By 1960, 140,350 acre-feet of reservoir capacity had been constructed in the northern Valley and 17,500 acre-feet in the southern Valley. In the northern Valley, winter storage is released through 65 miles of natural stream channels for percolation as well as through 50 miles of canal to 502 acres of spreading ponds. In the words of Fred Tibbetts, the engineer who made the first major water study in Santa Clara County, the detention dams were constructed "to detain the heavy flood flows until they can be transferred through canals of feasible capacity into the porous Valley marginal creek bed areas which will in turn transfer them to the underground storage reservoir."1/ These were the main features of the plan which was proposed and which was developed through the organization of the Santa Clara Valley Water Conservation District and the South Santa Clara Valley Water Conservation District.

The operation of this sytem could give partial relief for the problems noted. Although not specifically designed for meeting the seasonal problems, the annual drawdown would be reduced by storing water in the winter months and releasing it for spreading purposes during the spring and summer months.

During the periods of wet years, the dams and spreading areas put "excess" water into the underground reservoir. The water was stored underground until needed during a "cyclical" dry period or for a secular increase in draft. In addition, part of the flood waters would be detained behind the dams, thus lessening their destructive effects. This action alleviated the long-run problem since water artifically recharged would be available for use rather than discharged to the ocean. The problem of irreversible compaction can be guarded against by percolating enough water into the underground reservoir to prevent its occurrence. And if the increased influent seepage would cause the pressure to be maintained in the confined aquifers, salt water intrusion would not be a problem.

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1/ Fred H. Tibbetts, Report on Waste Water Salvage Project, A Report to the Board of Directors, Santa Clara Valley Conservation District (San Jose, California: The District, 1931), p. 8.

This plan was recommended to the residents of Santa Clara County by experts and by local leaders and was put into effect. At least 10 major ground water studies have been made in the northern portion of the county[1] and several additional reports have been prepared dealing with the selection of a route for water importation.[2] Although these studies differed

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1/ California Department of Public Works, Santa Clara Investigation.

California Department of Public Works, Santa Clara Valley Investigation.

Clark, op. cit.

Creegan and D'Angelo, op. cit.

George W. Hunt, "Description and Results of the Operation of the Santa Clara Valley Conservation District's Project," Transactions of 1940, American Geophysical Union (Washington: National Research Council, July, 1940), Part I, pp. 13-23.

Hunt, Proposed Lexington Dam and Water Conservation Works, A Report to the Board of Directors, Santa Clara Valley Water Conservation District (San Jose, California: The District, 1947), p. 29.

Robert J. Roll, 1956 Waste Water Salvage Project, A Report to the Board of Directors, Santa Clara Valley Water Conservation District (San Jose, California: The District, 1956), p. 20.

Roll, Revised 1956 Waste Water Salvage Project, A Report to the Board of Directors, Santa Clara Valley Water Conservation District (San Jose, California: The District, 1956), p. 20.

Tibbetts, op. cit.

Tibbetts and Stephen E. Kieffer, "Report on the Santa Clara Valley Water Conservation Project," A Report to the Santa Clara Valley Water Conservation Committee, San Jose, California, 1921 (in the files of the Santa Clara Valley Water Conservation District).

2/ Roll, Preliminary Design, Cost Analysis, Imported Water Distribution, Santa Clara Valley, A Report to the Board of Directors, Santa Clara Valley Water Conservation District (San Jose, California: The District, 1959), 39p.

Samuel B. Morris and S. T. Harding, Report on Supplemental Water Supplies for North Santa Clara Valley and Related Service in San Benito and Santa Cruz Counties, A Report to the Santa Clara-Alameda-San Benito Water Authority and the Santa Clara County Flood Control and Water Conservation District (San Jose, California: By the authors, 1960), 22p.

Morris and Harding, Material Supporting the Conclusions and Recommendations of the Board of Review in its Report of December 1960 on Supplemental Water Supplies for North Santa Clara Valley and Related Service in San Benito and Santa Cruz Counties, A Report to the Santa Clara-Alameda-San Benito Water Authority and the Santa Clara County Flood Control and Water Conservation District (San Jose, California: By the authors, 1960), 184p.

in detail and emphasis, their combined effect has been to encourage the adoption of the plan to integrate the management of ground and surface water.

The Problems of Organization

The physical occurrence of water in Santa Clara County has been outlined, the development of water use has been sketched, problems which grow as results of ground water development have been identified, and the general remedial actions have been indicated. This is all essential background to the problem posed in Chapter 1--the problem of organization.

How did the people of Santa Clara County organize themselves to decide upon a plan and to carry it out? The individual farmers and businessmen could not execute the suggested solution. A few leaders could develop the ideas, they could pay for some study of the problems, but by themselves they could go only part of the way toward a solution. Conflicting interests had to be resolved and decisions had to be made within some organizational context. The problem for this study is: How was the public district used to make the decisions concerning the physical and economic problems mentioned?

Chapter 3

THE DISTRICT INSTITUTION IN THE SANTA CLARA VALLEY 1913-1960

A knowledge of the status of the district idea at the time its use was being considered is necessary for an assessment. Was the suggestion for its use unique? How were similar water problems throughout the state being attacked? How did the local people define their problem? What use did they make of the district idea? By understanding the origin of the district idea, its intended purpose will be clearer.

Santa Clara County's Water Conservation Districts: Part of the California Water Development Tradition

The 1913 suggestion by state legislator, Herbert C. Jones, to form an irrigation district in Santa Clara County[1] may be characterized as the normal reaction of a California citizen conversant with the state's water policies. By that date various types of public districts had been in existence for over 60 years. They were used to organize attacks upon specific problems whose geographic dimension fell outside the existing governmental patterns. Thus, many governmental vacuums were filled and services were provided to demanding publics. During the three decades following 1849, mining districts filled a governmental vacuum in the provision of such services as determining filing fees, limiting the size of claim, and establishing rules of operation.[2] The 1851 California legislature[3] patterned the state's school system after the Massachusetts and New York plans by enabling the organization of school districts.[4] Ten years later permission was granted to the State Board of Reclamation Commissioners to authorize the formation of districts to reclaim swampland and to meet the requirements of the Federal Swamp Land Act.[5] By 1868 debris from mining operations

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1/ The San Jose Herald (California), June 13, 1913, p. 8.

2/ Charles H. Shinn, Mining Camps, A Study in American Frontier Government (New York: Charles Scribner's Sons, 1884), pp. 123-297. According to Shinn, there were 500 organized mining districts reported in California in 1866.

3/ California, Statutes (1851), c. 126.

4/ California Legislature, Report of the Special Legislative Committee on Education, 1920, p. 32.

5/ California, Statutes (1861), c. 353.

clogged stream channels causing serious flood problems. The result was the creation by the legislature of levee districts1/ and drainage districts to provide flood protection.2/

Irrigation presented another type of water management problem which the individual farmer could not handle. Again, the public district in the form of irrigation districts was used to overcome this inability. The 1865 law in the Territory of Utah was the first act enabling the creation of such districts in the United States. Under this law the district could levy assessments against the land in order to finance construction. California's first irrigation district act was passed in 1872,3/ and between that date and 1887 numerous special acts of the legislature created districts. The ideas developed in this period resulted in the enactment of a general enabling law--the Wright Act in 1887.4/ The "irrigation district movement"5/ in California and the West is based upon the ideas incorporated in this legislation.

The Wright Act is distinguished because it enabled districts to issue bonds and secure their indebtedness by levying assessments against the value of the real property within the district, thus making the land and improvements liable for paying indebtedness. By use of the district, an agreed-upon proportion of the electorate could commit the whole district even though a minority were in opposition. The major provisions of this act were subsequently revised in 1897 to incorporate, among other items, sections requiring the approval of a higher proportion of interests favoring organization and bond issuance than had been the case under previous legislation.6/ Due

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1/ Ibid. (1868), c. 293.

2/ Ibid. (1868), c. 381.

3/ Ibid. (1872), c. 634.

4/ Ibid. (1887), c. 34.

5/ Adams, Irrigation Districts in California, 1929. California Department of Public Works, Division of Engineering and Irrigation Bulletin No. 21 (Sacramento, 1929), p. 320.

6/ California, Statutes (1897), c. 189. Under the Wright Act, 50 or a majority of landowners within a proposed district would petition the county board of supervisors to organize a district. This was amended to require a signature from "a majority in number of holders of title, or evidence of title to lands susceptible of irrigation from a common source and by the same system of works . . . representing a majority in value of land." In addition, the power of the board of directors to initiate a bond election was withdrawn in favor of a requirement that bond elections should be initiated only upon petition signed by a majority of the landowners representing a majority of value of the land.

to these new restrictions very little new activity was initiated under these enabling laws during the following decade.1/

Notable among the amendments during the decade 1900-1910 was the limitation of assessments to an ad valorem rate against land, exclusive of improvements.2/ Thus, the district procedures of elections, assessments on the value of land exclusive of improvements, and the issuance of bonds were a part of the irrigation district tradition by 1913.

In fact, 1913 was a very active legislative year with problems of irrigation and water supply receiving particular attention. The supplying of water for municipal uses was approved as an appropriate activity for districts with the passage of the County Water District Act.3/ Also, the Water District Act4/ permitted irrigation, while the County Water Works Act5/ enabled the district to supply both domestic and irrigation water. Problems of district operations also received the attention of the 1913 legislature by transferring the centralized supervisory control of irrigation districts to the state rather than leaving it at the county level. The State Engineer was given the power to report ". . . whether any conditions existed . . . /justifying/ him in reporting against the organization of the proposed district."6/ Another aspect of state control dealt with the certification of district bonds. The 1911 act creating the State Bond Certification Commission was amended and re-enacted in 1913.7/ Under this act the Commission could examine proposed bond issues before they were approved by the voters. A negative report by the Commission did not prohibit bond issuance, but such

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1/ Adams, Irrigation Districts in California, 1887-1915, California Department of Public Works, Division of Engineering Bulletin No. 2 (Sacramento, 1916), 151p.

2/ California, Statutes (1909), c. 303. "The term improvements . . . includes trees, vines, alfalfa, and all growing crops and all buildings and structures of whatever class or description erected or being erected upon said lands or city or town lots."

3/ Ibid. (1913), c. 592.

4/ Ibid. (1913), c. 387.

5/ Ibid. (1913), c. 370. According to Adams, Irrigation Districts in California, 1929, this act was passed at the request of the city of Los Angeles to utilize the Owens Valley water in the San Fernando Valley. The act originally provided for the creation of county irrigation districts. However, the irrigation district bond market was poor between 1913 and 1915, and the title of the act was changed to the County Water Works District Act. California, Statutes (1915), c. 623.

6/ Ibid. (1913), c. 578.

7/ Ibid. (1913), c. 366.

a report provided a difficult hurdle for poorly planned districts to overcome since the financial interests weighted such approval heavily. Without it the bonds were not legal investments of investment and banking institutions. A further act of the 1913 legislature was the passage of the State Water Commission Act[1] which set forth formal procedures for establishing appropriative water rights.

The public district was an institution with a tradition in water development by the time Santa Clara County residents began to seriously discuss its use for their problems. But experience in using such districts was not limited to the field of water development and management alone. The creation of these "special governments" in the absence of an appropriate local government was a characteristic of the milieu of California's development. No adequate governmental unit existed to provide services outside the usual geographic orbit of county or city responsibility.[2] California conditions were not conducive to establishing town or township government as had been done in the settlement of farming communities in New England and the Midwest. In lieu of intermediate governments covering the area, the environment favored the organization of special districts to represent special interests[3] in solving problems they deemed to be of a public service character.

This procedure proved to be more expedient than attempting to adjust the functions and boundaries of county government. County boundaries were not established on the basis of providing specialized services but included large geographic areas with populations of greatly varying density and of highly diverse needs. In addition, persons interested in special problems were reluctant to submit their problems to the play of forces converging upon the county board of supervisors. Part of this attitude stemmed from a desire not to mix the water problems into the same decision-making framework which dealt with questions of roads, police, and other general governmental activities.

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1/ Ibid. (1913), c. 586

2/ Adams, Irrigation Districts in California, 1929, p. 13. California Statutes of 1854 placed the responsibility for regulating water courses, assessing liability to work on ditches, and assessing taxes according to benefit upon county boards of commissioners. This statute was used to a limited extent in southern California, but subsequent irrigation district legislation superseded it.

3/ James D. Thompson and William J. McEwen, "Organizational Goals and Environment: Goal Setting as an Interaction Process," American Sociological Review, vol. 23, no. 1, February, 1958, p. 23. Thompson and McEwen stress the interrelationship between the environment and the organization in goal setting.

The California tradition in using the district has relied generally upon voter consent as the act of creation rather than on legislative fiat. Consequently, a public must become articulate and organized so that activity can be supported. The creation of this degree of a favorable common interest calls for community leadership which is aware of the problem and which can, through the use of leading ideas,1/ present the issues so as to gain public acceptance. In the case of Santa Clara County, this process was begun in 1913 but the first district was not organized until 1929.

The idea of creating a public district for water development required 8 years of maturing before it was placed on the ballot and 17 years to come to fruition. These were important years--years of formulating and testing alternative plans of action and terms of organization. County residents began to see their various interests in water management and to formulate problems and solutions.

The first potential interest group concerned with Santa Clara County's water development problems made its appearance in 1913. The nucleus of this group was composed of orchardists who worried over the 24-foot drop in water level during the dry years of 1911-1913. The nonirrigating orchardist was concerned because the spring soil moisture was low; the surface irrigator, because of reduced stream flow; and the well irrigator, because of an increase in the depth to water. These interests were instrumental in bringing farmers to a meeting at Campbell in 1913 to discuss alternative suggestions for supplementing their supply of water.2/

Although this potential interest group was never organized to take action, speakers at the meeting made several suggestions which were forerunners of important ideas in the future water development of the county. Before the meeting a few farm leaders had understood from A. R. Kanaga, a public lecturer of San Francisco, that $20,000,000 of financial aid was available for land and water development3/ under the provision of a federal law--presumably the Reclamation Act of 1902.4/ However, only arid federal lands could receive such assistance, and Santa Clara County did not meet the qualifications.

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1/ Stephen C. Smith, "The Process of County Planning," Land Economics, vol. XXVI, no. 2, May, 1950, p. 162. The identification of leading ideas is important to the analysis of social processes.

2/ The San Jose Herald (California), June 13, 1913, pp. 9 and 11.

3/ Ibid.

4/ One of the provisions of the Reclamation Act of 1902 stated that revenues from the sale of public lands, except those receipts allotted to land-grant colleges, should be placed in a reclamation fund. These moneys would be used to finance irrigation projects.

Two positive suggestions were made at the Campbell meeting. One idea proposed the formation of a committee to raise money to finance a survey of the county's water situation.1/ Interest in this idea did not develop until 1920 when a committee was formed to arrange the financing of the Tibbetts-Kieffer Report on water conservation.2/

The second idea suggested the organization of an irrigation district as a means of raising money to pay for the construction of storage dams and water distribution systems. The first test of whether a common interest could be built around this idea was the attempt to organize an irrigation district in 1921.

These were not isolated events, but they were important first elements in the organization of a common interest acceptable to carrying out a public water conservation program. These two ideas, making a water resource study and using a public district, were implemented into action during the four decades following 1913 by the two men who suggested them. L. D. Bohnett, the man who suggested that studies be made, was a leader of the sponsoring committee in 1920. Bohnett accepted the responsibility of analyzing the then existing water district laws to determine if they were applicable, and he also drafted two district enabling acts. Senator Herbert Jones proposed the use of the district and subsequently participated in the early group efforts. Senator Jones drafted the law which was used in 1929 and also served for over 20 years as legal counsel for the Santa Clara Valley Water Conservation District.

Two other statements made at the Campbell meeting indicate that the local people were aware of some of the important issues confronting them. One of these comments related to the hydrologic situation, and the other dealt with potential conflicts of interest. One hydrologic factor in the county was plainly observable to the local citizenry. ". . . It did not seem reasonable that storm water should be allowed to go to waste and do damage in the winter and the orchardists and farmers suffer from a lack of rain in the summer. . . ."3/ Although further investigation was not necessary to determine this situation, the expression of this relationship into specific quantities and the more complete integration of ground and surface water concepts awaited subsequent studies. The fact that surface water could be seen rushing into the Bay was used in many campaigns to demonstrate the need for proposed conservation measures. The second observation noted that

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1/ Two surveys of the extent of irrigation in Santa Clara Valley had been made in the preceding decade:

Adams, Irrigation Resources . . ., pp. 67-70.

Fortier, op. cit.

2/ Tibbetts and Kieffer, op. cit.

3/ The San Jose Herald (California), June 13, 1913. pp. 9 and 11.

the utilization of Los Gatos Creek water would be fraught with difficulties since ". . . The San Jose Water Company was in that section and constantly extending its holdings. . . ."1/ Thus, the multiplicity of interests in making water available for use was recognized as a problem to be overcome. The specific conflict of interests between the Santa Clara Valley Water Conservation District and the San Jose Water Works2/ in Los Gatos Canyon were not settled until 1954.3/

The proposal to study the county's water situation and to form an irrigation district did not generate an immediate general county-wide interest. The lack of interest can be attributed in part to the increased rainfall in 1913, 1914, and 1915 and to the concurrent rise in the water level.

Although the feeling of urgency in regard to taking public action about the county's water supply problem was diminished, it did not die. Interest in irrigation grew rapidly. Farmers expanded the number of irrigated acres in the county by 87 per cent between 1910 and 1920. During this decade, the irrigation farmers in the Morgan Hill area became interested in the problem of more fully utilizing the area's water resources; and they requested ". . . a report (from the U. S. Geological Survey, S. C. S.) on the possibility of obtaining ground water for irrigation before a final decision was reached in regard to plans based on a water supply to be obtained by storage on Coyote River. . . ." These plans contemplated the formation of an irrigation district. No district was formed, however, since the report concluded ". . . that by judicious use, the supply of ground water will be practically sufficient to meet the needs of irrigation, especially if most of the area is planted to orchard. . . ."4/

Based upon the records in existence in 1920, the period 1916-1920 was judged to be dry.5/ As during 1912-13, the depth to water increased and exceeded the former low by 2 feet. The consequences of this decline were more widely felt than those of 1912. Among the reasons contributing to this changed impact were the 87-per cent increase in the number of irrigated acres

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1/ Ibid.

2/ The San Jose Water Company was a locally owned utility. In 1929 the Company was purchased by a firm and its name was changed to the San Jose Water Works. San Jose Mercury (California), October 22, 1929, p. 1.

3/ San Jose Water Works, Annual Report (San Jose, California, 1955), p. 16.

4/ Clark, Ground Water for Irrigation in the Morgan Hill Area, California, U. S. Geological Survey Water Supply Paper 400-E, 1917, p. 61.

5/ According to calculations up to 1920, the rainfall recorded at San Jose between 1916 and 1920 was 82.25 per cent of the long-term average. Adding the 34 years following 1920 to the long-term average changed the 1916-1920 percentage of the long-term average to 90 per cent.

TABLE 10

Average Depth to Water in the Northern Valley
at End of Water Year, September 30

Year	Average depth to water
	feet
1908-09	37
1909-10	39
1910-11	35
1911-12	46
1912-13	59
1913-14	42
1914-15	33
1915-16	30
1916-17	39
1917-18	49
1918-19	55
1919-20	61
1920-21	56
1921-22	55
1922-23	58
1923-24	76
1924-25	85
1925-26	84
1926-27	82
1927-28	91
1928-29	109
1929-30	110

Source: George W. Hunt, "Description and Results of the Operation of the Santa Clara Valley Conservation District's Project," Transactions of 1940, American Geophysical Union (Washington: National Research Council, July, 1940), Part 1, p. 21.

between 1910 and 1920, the abandonment of the practice of winter irrigation from surface sources in favor of summer irrigation from wells, and the 141-per cent increase in the number of irrigated farms. With this increase, 52.8 per cent of the farms in the county were using irrigation in contrast to 23.3 per cent in 1910. Thus, the impact of increasing depths to water fell upon more farmers in 1920 than in 1912, creating a larger potential interest group in finding supplemental sources of water.

Finding a Workable Combination Via Sequential Decisions

During the 1920's interest in taking public action heightened. As a result studies were made, proposals were voted upon, and demonstrations were performed. In making these decisions, the alternatives were not considered by the voting public as simultaneous alternatives but rather in series or sequence. By such procedure, alternatives really could not be considered because the proposal to be voted upon a few years hence was nonexistent. However, various plans were considered by the interest groups prior to bringing them to the stage of a public vote.

The Farm Owners and Operators Association was the first organized interest group.[1] It took the leadership in selecting the Water Conservation Committee in January, 1920. The function of this farmer committee was to plan a program of action.[2] A statement was issued immediately to the press and the county board of supervisors condemning the waste of water. As a result of their activities, business leaders in San Jose expressed a desire to have their interests represented on the committee. The county's business and nonfarm residents argued that they were primarily dependent upon the underground reservoir for water. In addition, the urban community wanted to maintain a healthy agriculture because the community functioned largely in a service capacity to the farmers. The request was granted, and the farm-nonfarm interests agreed to the formation of a new committee, the Santa Clara Valley Water Conservation Committee. The new group represented the San Jose Chamber of Commerce, the county board of supervisors, the Grange, and Farmers Unions.[3]

The Conservation Committee congealed a common interest around a program of action. It spearheaded the raising of $21,000 to finance a study of the county's water supply,[4] the successful efforts of the California legislature in 1921 and 1923 to pass two district enabling laws, and two campaigns in 1921 and 1925 favoring the establishment of a special water district. The work of the committee during this six-year period, however, did not result in creating a common interest favorable to organizing an irrigation district. Therefore, following the defeat of the 1925 proposal, the committee disbanded.

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1/ Richard G. Martin, "Water Conservation in the Santa Clara Valley" (unpublished Master's thesis, University of California, 1950), 111p. Martin quotes from an interview with Charles E. Warren, an active member of the Farm Owners and Operators Association, "There was lots of talk of conservation and we (the Farm Owners and Operators Association) decided to take the bull by the horns," p. 23.

2/ San Jose Mercury-Herald (California), January 22, 1920, p. 1.

3/ Ibid., February 1, 1920, p. 1.

4/ Tibbetts and Kieffer, op. cit.

These defeats dampened but did not extinguish interest in water conservation. In 1926 another committee was organized.1/ This committee decided that a demonstration of water spreading would be the best way to convince the electorate that a water conservation program could be carried on successfully. To administer this demonstration on a business basis, the Valley Water Conservation Association was incorporated to "save water." Under the direction of the Association, monies were collected and small water-spreading facilities were constructed and operated. The financial obligations of the Association were met by an assessment of 50 cents per acre upon farmers and "as much as could be secured" from others interested in the program.2/

Efforts of this type were not enough. Since the Association could spend monies only for "saving water," an auxiliary committee was organized in 1927 to lead the review of district legislation, to secure the passage of district enabling legislation, and to conduct a campaign to organize a conservation district.3/ This campaign was successful and the Santa Clara Valley Water Conservation District was approved by the electorate on November 5, 1929.

The 17-year period between the suggestion to Santa Clara Valley orchardists that they form an irrigation district and the 1929 elections was a period typical of resource development activities.4/ It was a period of continued effort to develop a plan of collective action which would win sufficient support to put it into operation. At no time was the over-all plan discarded or revised in a major way; only incremental changes were effected. Several rounds of activity may be noted: the first suggestion, which was followed by a general lack of interest; the continuance of localized interests in the Valley; and the resurgence of a more general interest which culminated in the third attempt to organize a public district. Each of these rounds of activity aided in more clearly defining the common interest and in reducing the elements of conflicting interest. In part, this is a process of: (1) identifying the incidence of benefits and of costs, (2) educating the public regarding program proposals, and (3) adjusting program features to reduce the extent of conflicting interest. The process is typical of the way public policy is formed. It is the process of gaining acceptance and adoption of an idea by an organized group.5/

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1/ LeRoy Anderson, "A Brief History of the District," in Tibbetts, op. cit., p. 1.

2/ Ibid.

3/ Ibid., p. 2.

4/ Similarly, years of controversy preceded national activities such as the St. Lawrence Seaway Project, the Tennessee Valley Authority, the Central Valley Project, the Columbia Basin Project, and the Boulder Canyon Project.

5/ Social scientists concerned with agricultural problems have done considerable research in the field of the acceptance of technological innovations. This involves studies dealing with the acceptance of farm practices and with the decision-making process of the farmer. However, the acceptance of new patterns of social organization has received less attention.

District Form of Organization, the Basis for Organizing

The voters' approval in 1929 of the Santa Clara Valley Water Conservation District permitted the first of three such districts to be organized within the county. This district included the major portion of the northern Valley floor. The area it incorporated was the result of a whittling-down process. The boundary of the proposed 1921 irrigation district encompassed major parts of all of the Valley floor within the county. The decision to create one large district was deliberate.

Although the difficulties in achieving a favorable common interest in a large area with differing water supply problems had been perceived,[1] they were judged to be less significant than problems associated with multiagency management of the county's water resources.[2] Acting upon this assumption, two unsuccessful attempts were made in 1921 and 1925 to organize irrigation districts which would have included parts of the southern and Coyote valleys and the Coyote Valley, respectively.

These two areas, however, did not remain unorganized. The people in the southern portion of the Valley voted to establish the Southern Santa Clara Valley Water Conservation District in 1938. Under the auspices of this District, studies have been sponsored and works have been constructed to conserve flood water by means of detention dams and spreading facilities. A third district was organized in 1949 to encompass Coyote Valley--the Central Santa Clara Valley Water Conservation District. This District functioned as a legal protective and bargaining association until it was annexed to the Northern Santa Clara Valley Water Conservation District in 1952.

The creation of these districts followed the pattern prevalent in California. In general, public districts were organized to perform specific functions relating to a rather narrow range of common interests. The nature of the common interest in these functions was expressed in the powers which were granted to control and develop water.

By 1920, the powers which were granted to water districts were specific because of the process of adapting to new needs, and state controls over district operations were increasing. Because of this method of restriction, of state supervision, and of voter approval, the local groups predominantly interested in particular district activities could exercise operational control. This control was operative within the limits of the common interest and as a result of reaching agreement among conflicting interests.

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1/ San Jose Mercury-Herald (California), January 25, 1920, p. 1.

2/ Ibid., September 19, 1921, p. 2.

In the process of reaching agreement, conflicting interests came to a focus in these situations: (1) the plan for action as a means of distributing benefits, (2) the terms of organization as a means for maintaining project control and for assessing costs, (3) the authorization of projects and of bonds as a means of determining the degree of common interest in specific works and the extent of bonded indebtedness and financial liability, and (4) the incorporation of new interests into existing organizations.1/

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1/ The foci of conflicts are distinguished for analytical reasons. However, in any particular conflict, these influences are intermingled and interrelated.

Chapter 4

CONFLICTING INTERESTS AND THE PLAN FOR ACTION

The district's ability to organize conflicting interests in order to make decisions is an important test of performance. One of the most important areas of conflict which existed in the Santa Clara County situation was that of the proposed plans for action. The district was related to these plans through the boundary delineation within which the plan could function. Many of the public discussions as to whether a particular district organization should be established involved conflicts of interest over the expected benefits from the plan of action in relationship to the boundary of the district since this prescribed the area within which a major portion of the costs would be incident.

The delineation of the boundaries of the ground water basin and the district is of particular significance to the overlying landowners when plans for action include ground water management. This is so because the landowners, under the correlative rights doctrine, hold the rights to use ground water, and they want to know the area of expected benefit from the plan. Benefits may be in several forms--such as reduced pumping costs due to a rising water level, or reduced uncertainty against cyclical precipitation variations.

Such expectations may not be shared equally by all ground water pumpers. Their location with respect to the physical characteristics of the basin greatly influence benefits. The nonhomogeneous aquifers, slope, faults, or areas of confinement are illustrative of physical factors which distributed benefits unequally among the pumpers. Also, neighboring basins may have some common and some independent sources of recharge. Thus, ascertaining the degree of interrelationship is important for assessing the incidence of benefit.

Typically, only those water users with an expectation of benefit will desire inclusion within the district. Careful examination is given this expectation since the taxpayers within the district usually defray part if not all of the costs of the project. Thus, the physical characteristics of the ground water basin, the incidence of benefits from the plan for action, and the incidence of costs are all related by inclusion within the district boundary. The location of this boundary may mean that conflicts of interests will be strong enough to inhibit the execution of the plan, whereas another boundary may yield a common interest.

One District but a Plan for Two Basins: The Plan and Organization Rejected

The voters of Santa Clara County turned down the initial water development plan. The interested parties did agree, however, that a public water

problem existed. No further agreement was necessary during the early stages of organizing the Santa Clara Valley Water Conservation Committee in 1920.1/ But the creation of a public district demands more than this, and the committee's first task was to reach an internal agreement upon the definition of the water problem and upon means for overcoming it.

Several alternate proposals were considered by subcommittees: the construction of a dam on Calaveras Creek and piping the water from the Niles Valley region of Alameda County into the Santa Clara Valley,2/ the building of detention dams across the Valley's streams to hold water for infiltration into the underground reservoir,3/ and conveying water from large wells near San Francisco Bay to high portions of the Valley to be released for surface use and ground water recharge.4/ As a result of these subcommittee studies, support of the Santa Clara Valley Water Conservation Committee was given to the detention dam and water-spreading proposal with particular emphasis upon Coyote Creek and Uvas Creek.

The use of a public district was suggested as the appropriate form of organization for carrying out the plan. However, the difficulties in creating one large district were noted in the expression of doubts as to whether "the people of the county could be induced to work together."5/ One of the bases for this comment was the belief that it might be difficult to obtain cooperation between ground water users living near Coyote Creek and Uvas Creek. The doubt was based on the fact that these streams drained to the north and to the south, respectively, and overlay separate ground water basins. On the other hand, the creation of several districts coterminus with the Valley's many small streams was rejected. Organization on this basis would raise difficult problems of integrating surface and ground water management.6/

The plans formulated by the 1920 committee were general and lacked specific content which could be supplied only by a professional water study. Therefore, the committee raised $21,000 for an engineering survey of the

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1/ See page 57 for the composition of this committee.

2/ San Jose Mercury-Herald (California), January 25, 1920, p. 1.

3/ Ibid., January 6, 1920, p. 1.

4/ Ibid., January 25, 1920, p. 1.

5/ Ibid.

6/ Ibid., September 19, 1921, p. 2.

county's water situation. This thorough study (the Tibbetts-Kieffer report, 1921) resulted in a proposal to construct 17 reservoirs, a canal system to deliver water to central points in the Valley, and limited water-spreading facilities.1/

The plan for the northern Valley called for the diversion of water from the east--Coyote Creek--to the west side. This feature of the plan was based upon the large volume of water discharged from Coyote Creek and the need for water on the west side. Tibbetts and Kieffer estimated Coyote Creek supplied about 47 per cent of the water which "wasted" into San Francisco Bay. But the increase in the depth to ground water was considered to be most serious around Campbell on the west side.

Interwatershed diversion of water also was called for in the southern Valley. The flow of Uvas Creek on the west was to be transported to Llagas Creek on the east side. The low percolating ability in the Uvas Creek watershed, in contrast to the higher percolating capacity of the Llagas and the east side, was the reason for the recommendation. The question of how the water would be made available, however, from the terminus of the central canal system to the indivdual water user was left unanswered in the proposal. Local community groups were to be responsible for organizing this aspect of the activity.

Following the completion of the engineering study, the Santa Clara Valley Water Conservation Committee sponsored the enactment of special legislation which would enable the creation of an irrigation district within the county.2/

A special act was passed because existing district laws were not thought to be appropriate for the local situation. In particular, the irrigation district law was held to be inadequate since it stated that the water for the district should come from "a common source." Because of this provision, the leaders felt it could not be applied to the multistream, two-basin situation in Santa Clara County.

The special act set forth the procedures of organization and delineated the boundaries of the proposed district. Boundaries were drawn in accordance with the notion that water management would be more effectively administered by a large district rather than by several small districts.

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1/ Tibbetts and Kieffer, op. cit.

2/ California, Statutes (1921), c. 822.

Consequently, the Valley floor below the 250-foot contour and north of the town of Gilroy was included within the district.1/ Most of the land overlying the northern ground water basin and the upper portion of the southern ground water basin was incorporated into one district.

Several stream systems included within the district were independent with respect to their surface flow; but as sources of ground water, the characteristic of independence shifted to one of interdependence. In addition, the proposed district included both the large centers of population overlying the northern basin and more sparsely settled and rural southern area. The impact of this aspect of including the northern and southern portions of the county into only one management unit will be noted at a later point.

The 1921 enabling act vested over-all management responsibility in a board of directors who represented the whole district. Special divisions, however, were to be created with their boundaries coincident with topographic and stream watershed features. Within these areas local residents would plan and finance the distribution of water from the main canal to the users. Their decisions of locality planning were to come after the organization of the large districts.

The issue placed upon the ballot in 1921 was whether or not to create the large special irrigation district. No direct commitment was placed before the electorate to follow the Tibbetts-Kieffer plan. On the other hand, the belief was widely held that this particular plan would be carried out. The opposition claimed the district would immediately become saddled with a $10,947,495 burden as outlined in the Tibbetts-Kieffer report.

On September 27, 1921, the electorate narrowly rejected this plan, with 3,062 votes in favor and 3,363 against.2/ The main source of opposition to the district came from the people living along the eastern margin of the Valley, in the Coyote Valley, and in the southern Valley. Because of their location within the proposed district, these voters judged the incidence of benefits from the plan to be in conflict with their own interests.

The proposal to divert water from Coyote Creek to the western portion of the Valley antagonized the downstream farmers on the east side. They feared the plan to divert water would reduce the influent seepage into the section of the ground water reservoir from which they pumped.

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1/ The area between Gilroy and the Pajaro River was excluded from the district since it was swampy and in need of drainage rather than irrigation.

2/ According to the 1921 Enabling Act, all persons eligible to vote at the preceding gubernatorial election were eligible to vote. This term of organization will be discussed on pages 85-88.

The farmers in the Coyote Valley not only questioned the diversion but also questioned the use of detention dams. They believed the storage of flood waters might adversely affect the availability of ground water. One of the campaign arguments was that the ground water supply was replenished only during times of flood. If the flood flows were reduced by detention dams, ground water recharge might be diminished in portions of the reservoir, while an extension of stream flow for several months into the summer might aggravate the drainage problems in the Coyote Valley section.1/

The negative vote in the southern Valley was based on two points. In part, dissatisfaction arose with the proposal to divert water from Uvas Creek and Llagas Creek. The Tibbetts-Kieffer plan called for water from these creeks to be diverted to the east side of the Valley, in the area east and north of Morgan Hill. The residents in the San Martin-Gilroy electoral district feared their water would be cut short by this diversion, as Llagas Creek was their main source of surface and ground water. And the downstream farmers along Uvas Creek were fearful the diversion would reduce the amount of water available to them.

The lack of support for the plan was due also to the inability of the people in the southern Valley to identify themselves with benefits from conservation works in the northern Valley. Although an effort was made to counteract this point by calculating repayment upon the basis of benefit zones, their fears were not reconciled. The incorporation of all of these conflicting interests within the district boundary contributed to the first-round defeat.

Boundary Revised Under 1923 Act

Efforts to create a public district continued. Santa Clara County's conservation leaders successfully steered a new enabling act through the 1923 California legislature.2/ An election under this act was not called until March 10, 1925. The second plan differed from the 1921 proposal in two main respects: The Tibbetts-Kieffer report had been released only a few months prior to the 1921 election, and the voters felt they were voting for or against this specific proposal. By 1925 this report had been thoroughly discussed and the district proponents made a greater effort to focus attention upon the single issue of creating a district and to deemphasize any specific water management plan. The initial purpose of the proposed organization was to levy a low tax in order to finance a comprehensive water development study. In an effort to find a geographic common interest favorable to district formation, the area to be included was reduced. Localities were excluded in which the residents expressed the belief

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1/ San Jose Mercury-Herald (California), March 1, 1925, p. 14.

2/ California, Statutes (1923), c. 479.

that the incidence of benefit could be in conflict with the general purposes of the proposed district. As a result of these incremental changes, the San Martin-Gilroy area and the City of Palo Alto were eliminated.

The negative feeling of residents in the southern Valley toward being included in a district with the northern portion of the Valley persisted for the reason already explained. Palo Alto's request for exclusion from the 1923 District Act was based upon the City Board of Public Works' study of the Tibbetts-Kieffer report. The latter report proposed a special project for Palo Alto since the main system of works would not benefit the area. Accordingly, pumps were to be installed parallel to the edge of the marsh along the shore of San Francisco Bay and water would be transported to the city. This arrangement was required since the planned major surface distribution system would not extend as far north as the city, and the limited water-spreading facilities to the south of the city were intended primarily for local benefit. Thus, the Palo Alto area would be serviced by a special project not physically tied into the rest of the Valley's program. The judgment to exclude Palo Alto has never been reversed by subsequent proposals. In fact, water service is now provided in part by the City of San Francisco's Hetch Hetchy aqueduct.

With the exception of these boundary changes, the 1923 Irrigation District Act was similar to that of 1921.1/ Reducing the size of the district removed an element of conflict to district formation. Other factors, however, were overriding. The proposal was defeated, 6,084 to 900. This election, however, did not change the judgment of the conservation leaders that these periphery localities should not be organized into the same district with the main portion of the northern Valley.

Boundary and Plan Revised, Artificial Recharge Emphasized

The failure to win voter approval under the 1923 Act led to a change in the organizations representing the local interests and to a change in the general plan for action. Feeling that their usefulness would end with the 1925 election, the original committee announced prior to the campaign that it would disband following the election. Thus, the defeat left the conservation interests unorganized and with no effective means for taking collective action.

In 1926 as in 1913 and in 1920, the farmer interests initiated efforts to take group action by calling a water problems conference. This conference proposed a plan which emphasized the benefits of water spreading as the

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1/ The subdivisions in the 1923 Act were to be delineated on a political basis rather than a topographic basis as in the 1921 Act.

central feature. Such a proposal was not new to Santa Clara County residents as it had been discussed in the local press as early as 1920.1/ Artificial recharge also had been studied and tried in other parts of the state for over a quarter century.2/ In fact, the Tibbetts-Kieffer report included water spreading as a benefit to localities which they considered would not benefit from storing flood water for surface delivery. Water spreading had never before been given exclusive or paramount consideration.

In order to create a favorable common interest in the "new" plan, the committee decided to operate demonstration spreading ponds constructed in the stream bed.3/ Before selecting this method of recharge, however, the advice of several experts from outside the county was sought. Paul Bailey, State Irrigation Engineer, recommended the use of pits in stream beds as one method of artificial recharge.4/ The problem was also discussed with engineers at the University of California and Stanford University. The program itself was started in the fall of 1926 with the construction of low sack dams across Guadalupe Creek. Stream bed infiltration was increased at this point and additional recharge was obtained by converting an old irrigation ditch near Los Gatos Creek into a spreading pond.

These demonstrations were used to show how the "invisible underground reservoir could be used." The physical possibility of storing flood water for later release had been plainly observable; however, widespread belief in the possibility of artificial recharge was not so easily established. The new policy proposal was given a measure of concreteness by the committee's program. The testimony of nearby well owners as to the success of the spreading operations in decreasing the depth to water was used in the 1929 campaign5/ for the creation of the Santa Clara Valley Water Conservation District.

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1/ San Jose Mercury-Herald (California), January 6, 1920, p. 1, and September 17, 1920, p. 10.

2/ For example, water spreading was started in San Antonio Creek in 1895. Harvey O. Banks, et al., Artificial Recharge in California, Paper Presented to the Hydraulic Division, American Society of Civil Engineers, Austin, Texas, September 8, 1954 (Sacramento: State Printing Office, 1954), p. 5.

Also, this practice was discussed by residents in the Santa Ana River area in 1884. George W. Beattie, Origin and Early Development of Water Rights for the East San Bernardino Valley, San Bernardino Valley Water Conservation District Bulletin No. 4 (Redlands, California, 1951), p. 32.

3/ Anderson, op. cit., p. 1.

4/ San Jose Mercury-Herald (California), February 16, 1926, p. 1.

5/ Ibid., October 7, 1929, p. 1.

Backing for the new plan was obtained by splitting the Tibbetts-Kieffer plan into two parts and thus changing the incidence of costs and benefits. The first part--surface delivery--was abandoned, while the second portion--artificial recharge--became the prime consideration. This shift removed an uncertainty inherent in the original proposal of leaving final distribution up to each locality. By limiting the power of the proposed district to recharging the ground water reservoir, the interests of those opposing surface delivery would be "protected." If this "protection" were not forthcoming, the incidence of cost was expected to fall heavily upon the well owners who had made investments in their wells and well equipment. They anticipated a large part of this investment would have to be written off. In addition, if they expected to benefit from surface delivery, new investment in canals would have to be made. Therefore, the change in plan gained the support of "prominent Valley growers . . . /who/ were in the main owners of deep, costly wells"1/ and did not alienate other important segments of the Valley's economy. Thus, a conflict of interest which had existed in the first two plans was eliminated. These growers did not sponsor full-page advertisements opposing this plan as they had done in previous elections. Artificial recharging, claimed its proponents, was not only an alternative to surface delivery but would also reduce operating costs of wells and increase their life expectancy. Case examples were cited showing the increase in operating costs as water was lifted from deeper and deeper depths, and the short life of wells was illustrated by cases of farmers who had had to put in deeper and larger wells to reach water.2/ The district's change in plan made it possible to emphasize the benefits which were expected to accrue to existing patterns of water development rather than adopting a new pattern. An important expectation of the new plan was to reduce the physical uncertainty of ground water supply.

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1/ Ibid. Data are not available indicating the power structure as it relates to local water policy decisions. However, it may be surmised that the "prominent Valley growers" were an important influence in the success of the 1929 election, whereas they opposed the earlier plans.

2/ Ibid., October 17, 1929, p. 17. The cost of electricity to pump water from a well in the Morland District was $7.02 per acre-foot in 1918. Two years later the depth to water had increased 30 feet and the cost of electricity had increased to $8.60, and by 1926 this cost had increased to $13.00. This type of evidence was cited in the 1929 campaign.

Ibid., November 2, 1929, p. 1. In 1911 a farmer was using two 70-foot pit wells and one 150-foot drilled well. By 1917 the pit wells had been deepened to 125 feet, and by 1929 the drilled well was down to 415 feet. The precise conditions under which these wells were operated were not ascertainable from the newspaper; but from our point of view, it is important to note that this type of argument was used.

Benefits and District Boundaries

A third attempt to organize a water management district was made in 1929. A new general enabling bill was written by Senator Herbert Jones with the sponsorship of Santa Clara County legislators. With the passage of this bill, water conservation districts could be created to conserve water by spreading.1/ On the basis of a plan emphasizing recharge, a smaller district was proposed. The new boundary generally conformed to those of the northern ground water basin.

The conservation leaders continued to believe that the exclusions made in the prior attempts to organize a district were justified. This judgment was based upon a canvass of voter opinion in the Valley and the localities were excluded in which strong opposition was expressed to the proposal. The Palo Alto and the southern areas were omitted for the reasons noted as in the previous attempt. "Coyote Valley" also was excluded.

Since the boundary of the ground and surface water basins did not coincide2/ and since the influent seepage from Coyote Creek flowed both to the north and to the south (page 21), residents in the Coyote Valley area disagreed as to the incidents of benefits from water storage, spreading, and diversion. The opinion expressed following the 1921 election (page 65) was still firmly held by many. The depth to water north of the divide would not be affected by water spreading at more northerly locations, but, on the other hand, changes in Coyote Creek's stream flow do affect the depth to water in this locality. Similarly, water spreading north of the divide would have no beneficial effect on the southern slope, but changes in Coyote Creek's flow would affect the depth to water in this section. These physical relationships had been reported by the U. S. Geological Survey in 1917 and 1924. By 1929 these findings had been discussed in the press and at local meetings of Valley residents in contrast to previous elections. Consequently, it is not surprising that the 1929 voter canvass showed Coyote Valley residents opposed to being included within the district.

Two additional factors reinforced this opinion. First, the 1917 report gave assurances that the water supply was ample for the development of an orchard agriculture.3/ This statement was the basis for not proceeding with the formation of an irrigation district prior to 1920. Second, the depth to water had never been excessive in this area with few wells dropping to the 100-foot level.

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1/ California, Statutes (1929), c. 166.

2/ Clark, Ground Water for Irrigation . . . , p. 81. The ground water divide is believed to be in the neighborhood of Cocheran Road north of Morgan Hill, while the area called Coyote Valley extends from Coyote to Morgan Hill.

3/ Ibid., p. 87.

The people of Coyote Valley were opposed to joining the district to the north, and in 1935 they refused to join a district to the south--the Llagas-Uvas Conservation District. The interests of the water users of this section were centered around the belief that the proposed plans for action would interfere with the present distribution of water resources and that benefits would not accrue to them but they would be charged with a tax levy.[1]

The relationship between the 1929 district boundary and the physical situation was further emphasized by the decision to include no area above the 250-foot contour. Irrigation farming was not generally practiced above this contour, and it was believed that farms higher than this would not benefit from the water-spreading activities. Because of their high elevation (between the 240- and 250-foot contour), some residents of the Cupertino area requested their exclusion from the district.

Expressing a differing point of view, the only voice dissenting from the proposed boundary at the hearings of the county board of supervisors came from an Evergreen[2] resident. The opinion was expressed that the district should be enlarged to include this east side area. However, water spreading would not benefit this section. The conservation leaders prior to the 1929 election[3] generally agreed that the incidence of benefit from water spreading would fall upon the water users within the proposed boundaries. The electorate approved a district based on this opinion by voting 5,389 to 604 opposed.

With this election the general plan for action was approved. The Santa Clara Valley Water Conservation District could "conserve and store water by dams, reservoirs, ditches, spreading basins, sinking wells, sinking basins, etc. . . ."[4] A common interest in this plan had been achieved within a geographic area which approximated the area of the northern ground water basin.

No specific plan had been formulated, however. Valley residents were uncertain with respect to the specific location of the dams, the spreading areas, and the effects of spreading. These decisions were to be formulated under the direction of the new board of directors.

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1/ San Jose Mercury-Herald, (California), March 1, 1925, p. 14.

2/ The Evergreen area lies along the east side of the Valley. It is a small subvalley coming from the Diablo Mountains.

3/ Numerous newspaper articles in the San Jose Mercury-Herald (California) during the month of October quote leaders of business and agriculture as favoring the creation of the district.

4/ California, Statutes (1929), c. 166.

The other areas could be benefited if the specific plan made provision for them; for example, locating spreading areas in Coyote Valley or transporting water to the Evergreen area. But these specific provisions would have specific benefits to the areas rather than generalized benefits. For this reason, the special areas were excluded because of the uncertainty of winning support within the district framework; their inclusion would have added uncertainty into a situation which required its minimization. In addition, the land in the special areas would be charged with the uniform ad valorem tax to pay for works in other portions of the Valley. As a result of the uncertainties of benefit from the generalized plan and the certainty of bearing the uniform tax, the residents of these areas asked to be excluded from the district. The idea of improvement districts as a method of equitable cost participation was not applied at that time but was eventually used to service the special areas such as Evergreen.

The Southern Santa Clara Valley Water Conservation District

The plans for action in the Southern District were basically the same as in the Northern District. Water spreading was to be used to recharge the ground water reservoir with the expectation that the depth to water would be reduced. In order to benefit from such a plan, the water user would have to be within an area which would benefit from the spreading operations. Therefore, the boundary of the benefited area was directly related to the physical characteristics of the ground water reservoir.

The residents of the area rejected the 1921 plan (page 65), and they were not included in the subsequent organizing efforts in the northern portion of the Valley. Not until 1932 were efforts renewed to form a public district in the sourthern portion of the Valley. The Gilroy Chamber of Commerce viewed the previous season's 51-foot depth to water with concern and took the leadership in sponsoring the formation of the Llagas-Uvas Water Conservation District. The proposal called for the construction of a dam and reservoir on Uvas Creek with a diversion of the water to Llagas Creek for percolation.1/ The boundaries of the proposed district extended to the north of Morgan Hill and south to the county line, including the town of Gilroy and the lowlands to the south. But a common interest favorable to this proposal was not achieved, and the proposal was defeated by a 240-vote margin.2/

The incidence of benefits did not unite the interests of the residents. Although enthusiasm for the project has been shown at a pre-election meeting in Morgan Hill, this apparent support did not carry over into the voting. The negative attitude was founded in part upon the realization that the plan would not influence one of their sources of ground water, namely, Coyote Creek. In

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1/ Gilroy Evening Dispatch (California), April 7, 1934.

2/ Gilroy Advocate (California), January 18, 1935, pp. 1 and 3. Negative vote, 865; affirmative vote, 625.

addition, the 320-foot elevation of the Valley floor in the northern section of the southern Valley was higher than the percolating area to the south, thus precluding the possibility of benefit from spreading facilities planned for a lower gradient.

The riparian owners along the narrow valley of the Uvas feared any diversion of water would be detrimental to their interests, and the farmers to the east and south of Gilroy were not interested in percolating water in Llagas Creek. They argued their ground water was supplied from east side streams and not from the Llagas and that their water level was high rather than low.1/

As with the Northern District, this defeat served to outline and to define the geographic area containing a common interest favorable to water spreading along Llagas Creek. The boundaries for a new district were proposed in 1938, and they included just one half of the area which had been incorporated in the 1935 plan.2/ The reduction in size of the district eliminated some of the localities opposing the plan, and the election of July 26, 1938, approved the creation of the district by a 150-vote majority. This victory, however, was won in the city of Gilroy, with the majority in the outlying rural areas opposing the conservation district.3/ This rather "unstable" common interest meant that public action to conserve water could take place only after enlarging the extent of agreement as a two-thirds majority was required to issue bonds to pay for special projects.

The District Boundary and the Plan for Action

One of the important functions which the public district performs is to provide an organizational framework which will permit the various local interests to come together to register their preferences with respect to a proposed general plan for action. The preferences of the electorate may conflict over many issues, and among these is the geographic area to be included within the district. The geographic boundary is important because it is the area within which the proposed plan for action will operate. The water user within the proposed district is in the position of appraising the expected benefits which will come from the plan, and the specific nature of the plan will determine the incidence of these benefits.

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1/ These arguments opposing the formation of a conservation district were printed in the local press; note the November and December, 1934, and January, 1935, issues of the Gilroy Evening Dispatch and Gilroy Advocate (California).

2/ The district proposal of 1935 included 36,000 acres, and the 1938 proposal contained 18,000 acres.

3/ See the discussion of conflicts of rural-urban interests.

The plans for action which were submitted to the electorate in Santa Clara County were general plans and did not relate to the construction of specific engineering works. During the years, however, specific engineering studies had been made and proposals put forward. Although these specific proposals were not a direct issue in the elections, they assumed this position in the minds of many voters. On the basis of these expectations, the residents in a few localities reacted negatively toward the formation of the public districts. The 1923 and the 1929 proposals eliminated localities from inclusion upon the basis that the water users in these areas believed they would not share in the benefits. Thus, during the 1920's, the water conservation leaders attempted to propose a plan which would win common support and to delineate a geographic area of benefit within which the plan could operate. The plan shifted from a combination of surface and underground water delivery to exclusive emphasis upon artificially recharging the underground reservoir. This change won support because the water users anticipated that they could continue to use their investment in wells and well equipment and that the cost of an extensive canal system would not have to be incurred.

Since the incidence of benefit from water spreading would depend upon the location of the water user with respect to the ground water reservoir, the relationship between the boundary of the ground water reservoir and the boundary of the district was particularly significant. Arranging district boundaries to concur with the ground water reservoir boundary did not take place until the third attempt to form the district. The lack of such concurrence can be a stumbling block to the organization of ground water management districts and can result in delaying the initiation of a program.

Under the Water Conservation District Act, the hearings before the county board of supervisors is the only mandatory procedure which attempts to insure this concurrence. At these hearings the residents opposing the boundary or the formation of the district may present their case, but provision is not made for the technical determination of the area of benefit by competent ground water specialists. The district procedure used in the attempts to form ground water districts in Santa Clara County were weak on this point. Today technical competence is available in the California Department of Water Resources and the engineering profession. Recent enabling legislation has given this Department the responsibility for determining the district boundary and the area of benefit from ground water recharge if the Water Replenishment District Act is used.

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1/ California, Water Code, Div. 18, c. 1514.

Chapter 5

TERMS FOR ORGANIZING A DISTRICT STRUCTURE

In the process of district organization, interests come into conflict over the terms of organization. The organizing process yields a decision on these conflicts and an effective organization is or is not formed. By means of these terms, the constituents define their relationships to each other for the fulfillment of the plan for action. A decision must be made concerning several types of terms, such as who can vote, what interests are to be grouped together, and who will pay the costs of the project. The conflicts which were particularly important in Santa Clara County concerned those terms of organization dealing with project control and with the incidence of project costs.

Project Control

Local Control

One of the traditional features in the use of the public district has been the placing of responsibility for project control primarily at the local level,[1] as distinguished from state and federal levels. This is accomplished by the passage of an enabling act by the state legislature authorizing the creation of a district. The enabling act states the general purpose for which the district is to be organized, specifies who is to control the project, and states the terms, such as taxation and the issuance of bonds, upon which the district will operate. Although the state legislature enables the organization, the initiative for the creation of the district resides with the local people.[2] They must select the enabling

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1/ In the case of California's water districts, some elements of control are placed at the state level; for example, the state engineer must pass upon the construction of dams, and the bonds of many water districts must be approved by the District Securities Commission. Federal requirements must also be met by districts contracting with a federal agency and by soil conservation district units.

2/ The responsibilities of the local people vary greatly depending upon the legislative procedure used. Some laws have required that only a petition be filed with the county court, while other acts prescribe that a two-thirds majority vote be cast by the electors within the district; and in some cases the district may be created by the legislature. In the latter case, the legislature generally will not act if there is serious disagreement among the legislators from the local area.

act they want to use, and they must carry out the responsibilities prescribed in the act. Local control, in the case of the water conservation districts in Santa Clara County, took the form of the local people securing the passage of three enabling acts,1/ holding seven organizing elections and voting upon the issuance of bonds.

The use of local districts does not mean that other levels of government do not have an interest in water management and in district operations. Interests not organized within the district may find expression by being represented through state and federal units of government. Irrigation district enabling legislation requires state supervision, from the organizing process to the expenditure of funds raised by bond issues.2/ For example, the District Securities Commission must approve the issuance of bonds. "No expenditure shall be made from the proceeds of the bonds nor shall any liability to be met from the proceeds be incurred until there has been filed with and approved by the Commission a schedule of proposed expenditures of the proceeds setting forth to the satisfaction of the Commission the plan proposed for carrying out the purposes for which the bonds were authorized (sec. 20081). . . . No expenditures from the proceeds of certified bonds shall be made . . . for any purpose not specified in the approved schedule (sec. 20082). . . ."3/ Also, water management organizations which construct and operate dams come under state supervision for the "construction, enlargement, alteration, repair, maintenance, operation, and removal of dams for the protection of life and property as provided in this part."4/ In addition, water district acts generally provide for cooperation with federal or other units of government.5/

Control or participation of state or federal units of government depends upon the extent to which interests can find better representation through them. These intergovernmental relationships may shift certain aspects of project control away from the local group. But the major responsibility for managing local resources need not be shifted from the local level.

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1/ California, Statutes (1921), c. 822 and c. 479, and (1929), c. 91.

2/ California, Water Code, Div. 11, secs. 20500-29978. The water conservation districts do not come under this act.

3/ Ibid., Div. 10, secs. 20000-20107.

4/ Ibid., Div. 3, secs. 6000-6501.

5/ California Department of Water Resources, General Comparison of California Water Districts Acts, by James M. Carl (Sacramento, 1958), 77p. Twenty-one of the 31 general enabling acts provide for cooperation, while all 45 of the special enabling laws contain these provisions.

Local Control and Ground Water Use Rights.--The exercise of local control is particularly important when problems of ground water management are considered. The nature of the legal rights to the use of ground water in California are conducive to the use of local organizations. As pointed out (pages 37 and 38), the overlying landowner has a correlative right to pump ground water. Thus, these water users are interrelated to each other through their physical use of an aquifer and through their legal rights to water. The latter interrelationship comes about because the rights to a reasonable beneficial use of the underlying water are coequal among the overlying owners. Thus, these property rights place the control of the ground water reservoir in the hands of the local overlying landowners as individuals rather than in a state agency deciding upon appropriations. If ground water management is to be initiated, the responsibility rests with the holders of the rights.

The district form of organization has been adapted to this situation in Santa Clara County and in other counties.1/ It has provided a means for these overlying owners to organize for ground water management without affecting their present use rights and without having them adjudicated. Ground water management has been maintained at the local level.

Local Control and Geographic Flexibility.--The process of the local group deciding whether to institute ground water management or what type of enabling act to use provides an illustration of part of the elements of local control common to the district form of organization. The fact that these decisions can be made at the local level means that the ground water management plan and the terms of organization may be worked out to meet the local conditions. Thus, ground water management is given an element of geographic flexibility. This type of flexibility is particularly important in integrating the management of surface and ground water because of the wide dissimilarity in the characteristics of the ground water reservoirs and of management problems. For example, in one area ground water recharge may be called for to alleviate an increasing depth to water; but in another area water quality, compaction, or an excessively high water table may be the problem demanding collective action. Or counterseasonal or countercyclical storage may be the desired management plan. In these situations the district as a form of organization is sufficiently flexible to handle differing management situations.

Two types of district enabling legislation are in use in California (pages 1 and 8). One type is a special act which is passed by the legislature for use in a specific local area. These individual special acts apply to a specific locality only and cannot be used in other areas. However, if these acts are considered as a whole, they are geographically flexible since the act authorizing a district in one area can be quite different from the act used in another area. But if this type of enabling

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1/ Seventeen public districts are engaged in artificial recharge. Banks, et al., op. cit., p. 5.

legislation were used exclusively, the number of acts which would be required to fit every situation would be large,1/ thus increasing the state legislature's burden with local affairs. Nonetheless, 45 such acts dealing with water problems were used in California in 1958.2/

The enabling acts passed for the Santa Clara County delegation in 1921 and 1923 were special acts. Thus, since the election in each instance failed to organize a district, a new act had to be passed by the state legislature before another formation could be attempted.

The 1929 Water Conservation Act, however, was a general law, although it was written for the conditions in Santa Clara County by Senator Herbert Jones. This act could be used by other localities. Thus, the abortive attempt to organize the Llagas-Uvas Water Conservation District in 1934 and the organization of the South Santa Clara Valley Water Conservation District in 1938 did not have to be preceded by the passage of new legislation.

Most of the water management districts in California are formed under one of the general acts. For example, according to the 1959 reports on financial transactions of districts, there are 115 reporting irrigation districts3/ and 417 water districts.4/ The fact that these districts are organized under general enabling acts means that each district using the same act is subject to the same types of state regulations and that each is authorized to carry on similar water management programs. Each locality, however, is free to execute the management program to fit its own particular situation. Thus, geographic flexibility is obtained and the resource administration is maintained at the local level, although many districts may be using the same enabling law.

In addition to this element of local control, local groups desiring to conduct a water management program may select which of the 31 general acts best fits their needs.5/ This selection in itself gives a large degree of flexibility as to the terms of organization which may be adapted to fit the particular situation. Also, a new general enabling law may be

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1/ For example, in 1929 California's state controller reported the existence of 3,153 special districts and irrigation districts exclusive of school districts.

2/ California Department of Water Resources, op. cit., pp. i and ii.

3/ California Controller, Annual Report of Financial Transactions Concerning Irrigation Districts of California, Calendar Year 1959, by Robert C. Kirkwood (Sacramento, 1960), p. 3.

4/ California Controller, Annual Report of Financial Transactions Concerning Special Districts of California, Fiscal Year 1958-59, by Robert C. Kirkwood (Sacramento, 1960), p. xv.

5/ California Department of Water Resources, op. cit., p. i.

passed by the legislature which is primarily for one locality. The people in the northern Santa Clara Valley followed this course in 1929.

The ease with which enabling acts have been passed has resulted in a large number of enabling laws, each with its own peculiarities. But this very fact has given the district form of organization flexibility to meet special problems and to be responsive to local water resource development needs.1/ Some acts, such as the Irrigation Districts Act, have been developed over a long period of time, and their amendments represent many years of experience in using the form of organization. Other acts are of more recent origin, and they often attempt to provide for situations not taken into account in the older laws. This very fact makes possible adjustment to new situations. On the other hand, the significance of a particular provision may be overlooked in drafting the new laws because of the lack of experience.

Two additional disadvantages may result from the ease with which district laws are passed. The first is related to the involvement of the legislature in local affairs and the resulting maze of district legislation. At the state level, this may be a rather minor problem resulting in a rather large number of statutes and the expenditure of legislative time on local problems. More important, the resulting concentration upon special and particular problems of a locality may create difficult management problems as the economic importance of water continues to increase and as the economic area of water management continues to expand. In this situation, some local ground water management objectives may be in conflict with the management objectives of the larger region. The equating of local management objectives with local management control may create problems for the objectives of interregional water management.

Combining Interests and Project Control

Conflicts of interest arose over the ability of one interest to obtain representation in the organization so that it would have a voice in the affairs of the district in determining the incidence of benefits and costs. Thus, one group was concerned with how it was related to another group in controlling the project's activities. The residents in the areas of water deficit wanted to know their relationship to the area of surplus, the political minority area was fearful of the majority area, the newer interests

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1/ The function of the district as a bargaining and an administrative agency will not be considered at this time. However, it is significant to note that the Santa Clara Valley Water Conservation District played a very active part in the creation of the Santa Clara-Alameda-San Benito Water Authority. California, Statutes (1955), c. 1289. One of the reasons for the creation of this authority was that it would act as a bargaining agency with respect to the importation of water into the south Bay region.

desiring flood control did not believe they would be adequately represented in the older conservation district, and farm-nonfarm interests vied for control of the district organization.

The question of how many interests to combine within one decision-making organization in order to execute a program of ground water management has been continually in the forefront. Traditionally, districts have developed as agencies for organizing local interests[1] to deal with special or particular problems rather than with multiple resource use problems.[2] Development of this type has permitted the interest involved to maintain a high degree of project control rather than diffusing control among many and possibly varied interests. This specialization of interest and program will be discussed more fully in a later section dealing with resource management. Forces tending to broaden the range of activities have played an important role in the last decade and a half but not earlier.

Project Control and the Water Deficit Area.--The initial opinion that it would be impossible to organize one district to encompass the whole Valley or county was based upon the belief that "the people of the county could [not] be induced to work together"[3] across stream watersheds. Thus, public discussion in 1919 and 1920 centered upon dividing the interests in the county's water prblem into the narrow confines of each of the individual streams. As previously noted, the accepted position between the extremes of one district per stream and one district for the whole county finally was a reason for the defeat of the first plan. But this early concept of centering attention upon each stream system has persisted to affect the district operations. The diversion of water from Coyote Creek to the western part of the Valley was not sanctioned by the voters of the northern Valley until 1952.

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1/ The term local, as used in this context, may cover a large or a small geographic area. For example, the problem of supplying water to the heavily populated areas of southern California is a local problem as far as the activities of the Metropolitan Water District of Southern California are concerned, although these local activities involve state, federal, and international relations.

2/ It should be noted, however, that the multipurpose approach was not unknown in the district tradition. For example, California passed "an act to provide for the development of electrical power by irrigation districts" in 1919. Adams, Irrigation Districts in California, 1929, p. 46.

In addition, Texas has provided for the creation of multipurpose water control and improvement districts and master districts in 1925. Hutchins, Summary of Irrigation District Statutes of Western States, U. S. Department of Agriculture Miscellaneous Publication No. 103, 1931, p. 5.

3/ San Jose Mercury-Herald (California), January 25, 1920, p. 1.

The idea, however, that agreement could not be reached among residents in the east and west of the Valley was confronted with the physical plan of Tibbetts-Kieffer calling for the integrated management of the northern streams and of the southern streams. The report made clear the advantage of considering the whole northern and southern Valleys as management units and also made clear the difficulties of basing a project on the individual streams. For this reason, the committee which was assigned the task of reviewing the existing district enabling acts rejected the terms of the Irrigation District Act as the basis of organization. The wording of this act required that lands in the district had to be "susceptible of irrigation from a common source and by the same system of works."

The Irrigation District Act was interpreted as not permitting the creation of a large district to cover major portions of both the northern and southern valley floor.1/ Since several different streams supplied surface water to the Valley, it was believed the common source requirement of this general enabling law would necessitate the organization of an irrigation district around each of the individual streams. However, this phrase in the Act did not stop the formation of other irrigation districts from using water from two or three streams.2/ In addition, the necessity of building independent systems of works--one for the northern Valley and one for the southern Valley--was another reason "requiring" more than one district. Thus, the leaders in Santa Clara County felt that if the Irrigation District Act was used, project control would have been diffused among several (too many) districts.

Two differing positions as to the extent of diversity of interest to be included within a district were considered. The decision was made that the diverse interests of each stream system should be included within one district in order to provide "the complete and harmonious development of our waters."3/ This conclusion was reached because "there would be a tendency for each district to appropriate to its own use as much water as possible."4/ If such a division of interests had been established, a major road block would have been placed in the way of the orchardists in the western part of the northern Valley from obtaining a supply of water from Coyote Creek to the east.

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1/ Ibid., September 19, 1921, p. 2.

2/ Adams, Irrigation Districts in California, 1929. For example, the following irrigation districts were organized in the 1920's, and they used more than one stream as a source of water: Butte Valley Irrigation District, p. 53; James Irrigation District, p. 233; and Corcoean Irrigation District, p. 257.

3/ San Jose Mercury-Herald (California), September 19, 1921, p. 2.

4/ Ibid.

The difficulties between the Coyote Valley area and the remaining part of the northern Valley are an indication of the conflicts which would have ensued had several districts been formed. In addition, the creation of several districts according to the surface drainage pattern would have been unsatisfactory from the point of view of integrating the management of surface and ground water. Since the ground water reservoir underlies the whole Valley, benefits from the recharge operations in one of the small districts would have been diffused to benefit water users in other districts. In fact, this argument was used in 1934 to support the construction of a detention dam and percolating facilities along Coyote Creek. The district engineer noted that the wells in the immediate vicinity would rise rapidly, and water "should soon begin to overflow into the main underground pool toward the west."1/ If several districts had been formed, the tendency would have been for each district to limit its surface water use to its own water requirements, thus continuing the "waste" of water. In addition, each district would have attempted to hold its water right for possible future use for fear of inhibiting the future development of their portion of the Valley.

For these reasons, the combining of these interests into one district seemed to be the best method for the orcharding interests in the western portion of the Valley to obtain control of the surplus water from Coyote Creek. By incorporating the whole northern Valley into the district, they were able to obtain initial benefit through the interrelationship of the ground water reservoir and later by direct surface diversion. Thus, the use of one district facilitated the more populous water deficit area's ability to obtain use of the surplus water by making it possible to vote in projects to benefit the whole area overlying the ground water basin.

The Fear of Dominance.--The northern portion of the county always has been the most populous section of the Valley with the city of San Jose being the major city in the south San Francisco Bay region. This voting majority has resulted in the people of some areas desiring to organize on a small scale rather than be a minority in a large organization. The people in Coyote Valley and the people in the southern Valley did not want their interests combined into a district with the Northern District. The people in each of these areas organized a district to maintain project control rather than have it diffused with other interests. Although other reasons for this lack of cooperation have been cited, the southern area's desire to be independent of the Northern District was an underlying element in the various elections and proposals.

The distribution of the population was the focal point of the argument in the election compaigns. Because of the distribution, control would be exercised by the people of the north over the water resources of

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1/ Tibbetts, 1934 Well Replenishment Project, A Report to the Board of Directors, Santa Clara Valley Water Conservation District, Project No. 17, (San Jose, California: The District, 1934), p. 7.

the south. Partly upon this basis, the voters of the Southern District refused--as in 1921--to be incorporated into a general district representing a wide variety of interests. And in 1955[1] they refused to merge with the Northern District in order to carry on a joint project which would have allocated 60 per cent of the water in Uvas Creek Reservoir to the Northern District while spreading the cost over the tax base of both districts.[2] This action was taken in the face of the fact that on April 28, 1953, a joint plan was overwhelmingly approved.[3] Under the 1953 plan, a 34,000 acre-foot reservoir was proposed with 40 per cent of the water going to the south, which was to bear 40 per cent of the cost; the independence of the two districts would have been preserved and the division would have been a matter of contract. These terms of organization subsequently were changed with the Northern District proposing that the two districts merge into one organization and spread the tax burden. In the 1955 election, pamphlets were circulated which called upon the people to "Keep Control of Our Natural Resources." This point was further emphasized following the election when one of the directors of the Southern District stated, "We are elated with the results of the election on a go-it-alone plan which keeps control of our own watersheds for the benefit of all the district."[4] A local editorial commented, "The voters . . . left no doubt for anyone by Tuesday's election that they want to keep control of their runoff water supply in their own hands."[5]

Throughout this entire period, no terms of organization were devised which were acceptable to the Southern District. For example, the 1921 proposal provided for subassessment divisions as a means for distributing costs and determining project approval. And in the 1950's, two proposals were considered: (1) the annexation of the Southern District to the Northern District and (2) the sharing of the project costs on a contractual basis. But the terms of organization did not have sufficient strength to unite the two areas. The special interests in the south would not accept a merger under general terms of organization which they felt would inhibit their project control, while the north did not actively negotiate on the contractual arrangements.

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1/ The election was held February 1, 1955. The electorate approved a proposal for the southern District to go it alone on the Uvas project--1,686 yes; 213 no. Minutes of the Board of Directors, South Santa Clara Valley Water Conservation District, Gilroy, California (in the files of the District).

2/ Blackie and Wood, Uvas Creek Dam, Reservoir, Conduit and Well Replenishment Project Proposed to be Constructed Jointly with Santa Clara Valley Water Conservation District and on Proposed Llagas Creek Dam, Reservoir and Well Replenishment Project, Project Report No. 15 (San Francisco: By the author, 1953), 7p.

3/ There were 2,398 yes and 289 no votes. Minutes of the Board of Directors, South Santa Clara Valley Water Conservation District, Gilroy, California, May 4, 1953 (in the files of the District).

4/ San Jose Mercury-Herald (California), February 2, 1955, p. 1.

5/ Ibid., February 4, 1955, p. 10.

Annexation would have placed the Northern District in control of the approval of bond issues because of its excess voting power. And in the election of members to the board of directors, the south could hardly hope for more than one director since the electoral divisions were to be equal in area.[1] The contractual proposal would have insured the southern District of 13,600 acre-feet of storage space, but the potential of developing the remaining storage capacity would have been lost to the control of the northern District. By independently initiating the 10,000 acre-foot Uvas Project, the Southern District became prior appropriators of the water. In fact, their application was filed three days before the northern District filed for 30,000 acre-feet of water on Uvas Creek.

Coyote Valley residents, as previously noted, also preferred to remain independent of larger districts to the north or the south. The lack of common interest in the plans for action of the other districts has been discussed. Because of their minority position, the people of this area initially concluded that their interest could best be served by remaining an independent area. In this way, they felt they could best serve the common interest in the Coyote Valley, namely, by maintaining the status quo with respect to the flow of water in Coyote Creek. This interest, however, was seriously threatened when the voters in the Santa Clara Valley Water Conservation District approved a $3,000,000 bond issue in 1949 to construct a 75,000 acre-foot reservoir on Coyote Creek (Anderson Dam) and when the Northern District filed an application to appropriate surplus water from Coyote Creek for the purpose of spreading. Coyote Valley residents countered this action by forming the Central Santa Clara Valley Water Conservation District.[2]

In accordance with its defensive purpose, the Central District was a defensive plan. The district was organized to protect water rights against the expected adverse action of the Northern District. The water users in the Central District did not want others to exercise a superior degree of resource control in their section. Consequently, they formed a district to represent this interest. To carry out this interest, the Central Santa Clara Valley Water Conservation District and the town of Morgan Hill protested the water right application of the Northern District; and Morgan Hill filed, in its own right, an application for Coyote Creek water.

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1/ The Southern District contains 34,000 acres and the Northern District has 151,000 acres. If the two districts were annexed, the total acreage would be 188,900 acres. The division of this area into seven divisions would yield a size of 26,414 acres per division. Although this acreage is somewhat smaller than the present Southern District, it is doubtful that the division lines would be drawn to give this area two directors.

2/ The formation election was held December 6, 1949, and the vote carried with 547 favorable votes and 17 unfavorable votes.

In addition to contesting the water right, the Central District, together with the Northern District, requested the State Engineer to determine the source of local water. The two districts then discussed whether the Central District could purchase storage space in Anderson Reservoir. This investigation and the negotiations were not productive. No common interest was established, nor was the water right decision favorable to the Central District.

Since the Central District had lost the right to control the flow of Coyote Creek, it contacted the Northern District's board of directors to determine whether an annexation agreement could be worked out.1/ These negotiations were successfully completed August 19, 1954. The terms of this agreement specified that the Central District would (1) pay the Northern District the amount of money which would have been levied against the property in the area had the two areas originally been incorporated into the same district (this amounted to $65,000) and (2) purchase land for a percolation pond to "service" the area south of the divide.

The Northern District agreed to:

1. Release water from Anderson Dam into Coyote Creek for percolation purposes.

2. Flush Coyote Creek stream channels to improve the rate of percolation.

3. Construct and operate the new percolation pond south of the divide.

4. Divide the district for purposes of electing the board of directors so that the electorate of Coyote Valley would be the majority influence in one division.

For over 25 years the people of this small area opposed being included within the boundary of a larger district to the north or to the south. Their local water levels were declining, but the depth to water was seldom over 100 feet. Water supply studies since 1917 had shown that the Coyote Valley straddled the water divide, and the residents anticipated no benefit from works toward the lower end of either portion of the Valley. In addition, they feared that the operation of detention dams in the mountain canyon would lessen the influent seepage to their underground water supply by diminishing the flood flow. Coupled with this physical situation was the belief that their interests would be in such a minority position within a larger district that they could not be protected.

On the other hand, it was desirable for the Northern District to use the stream channel rather than a lined canal for water releases from Anderson Dam, although such use would mean benefiting the Coyote Valley area

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1/ Minutes of the Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, May 7, 1951, and June 5, 1951 (in the files of the District).

which was outside the Northern District's boundary. The upper portion of Coyote Creek was an excellent percolation area. Water released in the channel would benefit the Coyote Valley area before passing on to the lower portions of the northern Valley. Annexation was in the operating interest of the Santa Clara Valley Water Conservation District.

In this situation the question of minority interest was not handled within the Northern District's organizational framework. A common interest was established only after each area had formed a corporate entity--a district to represent its own interests. These opposing interests did not come together until the Northern District's application to appropriate water from Coyote Creek was approved by the state. After this decision, it was clear that Coyote Creek would be under the control of the Northern District. If the Central District residents desired to share in utilizing Coyote Creek's "surplus" flow, agreement with the Northern District would have to be reached. Thus, a common interest of the "majority" area and the "minority" area was established by the annexation of the Central District into the Northern District.

These two examples--the Southern Santa Clara Valley Water Conservation District and the Central Santa Clara Valley Water Conservation District--emphasize the function of the district as an organization to represent local interests and the desire of these interests to maintain control over their natural resources. The 1921 election made the conflicts of interests among these areas explicit, and separate districts were organized to represent each point of view. The Central District was used by the residents in the minority area as a bargaining agency to gain as much project control as possible when it was annexed. The Southern District was used as an independent resource management organization. Thus, one of the factors determining whether a common agreement will be reached among the electorate is the degree to which minority areas desire to maintain resource control and thus reject terms of organization which do not give it.

Project Control and the Farm-Nonfarm Interests.--The division between the farm and nonfarm interests in the Valley was a conflict which ran through several aspects of the use of the public district. It was focused primarily upon the control and financing of the water organization. Many farmers feared urban dominance, and they opposed organizational efforts where they though they were not adequately represented, particularly in 1921 and 1925. The conflict was not strictly rural versus urban interests. The distinction was more of a farm-nonfarm conflict when the farm interests are included to mean the urban businesses closely associated with agriculture and the nonfarm interests to include the rural residents who are supplied by urban systems. Because of the business interest in water and its economic relationship to agriculture, the San Jose Chamber of Commerce and other business groups were strong supporters of water conservation in the early 1920's as well

as in 1955.1/ But not all nonfarm businesses took an equally active interest in water conservation--in part, because of their lesser dependence upon water or because of their superior ability to obtain plentiful quantities of water.2/

The conservation movement was initiated by the orchardists in 1913, and agriculture has continued to be the most active interest--generally favoring the program but at times opposing it, as noted. The power of this interest has been maintained following the creation of the District by furnishing the leadership for the board of directors.3/ Since no important recent policy conflict centered over the election of members to the board of directors, these positions have been filled until 1959 with no contest. The agricultural interests selected the new man to "run" for the board. During this period project control was in the hands of the farm groups who sought to protect their interest in the Valley's water supply. The farm position was first challenged in February, 1959, with nonfarm candidates unsuccessfully opposing the incumbents.

The early opponents, including many farmers, to the organization of the Northern District played the farm and nonfarm interests against each other. Antagonism was created by publishing statements such as "city people will put the burden on the orchardists"4/ and "The boundaries of the various divisions of the proposed district . . . had been drawn for no other reason but to permit the voters of the city to saddle upon the farmers a huge burden they were unwilling to assume and to enable the city of San Jose to elect upon the board of directors men opposed to the

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1/ Members from the San Jose Chamber of Commerce were appointed to the first committees which were organized "to do something about the County's water situation," San Jose Mercury-Herald (California), February 1, 1920, pp. 1 and 16. On October 5 and 6, 1955, a member of the Chamber of Commerce spoke for the district at a hearing for a subcommittee of the state legislature. However, in some elections they maintained a neutral position, such as in 1925. San Jose Mercury-Herald (California), February 27, 1925, p. 15. However, industrialist Max Watson was a leader of the district advocates at this time and remained in this position until 1928.

2/ For example, some real estate interests opposed water conservation because of the increased taxes and a fear that detention dams would injure the value of property below the dam. Other realtors--for example, the president of the San Jose Real Estate Board in 1925--favored conservation on the grounds that an improvement in water conditions would attract people to the area and act as an insurance for the maintenance of land values. The San Jose Water Works was never an aggressive supporter of conservation.

3/ The board of directors of the Santa Clara Valley Water Conservation Committee has been composed of farmers or of those closely associated with farming until 1959.

4/ San Jose Mercury-Herald (California), September 14, 1921, pp. 11 and 13.

interests of the farmers."[1] Tactics with a similar emphasis were used in 1925. On the other hand, the proponents of water conservation attempted to identify the interests of the farmers and nonfarmers as being the same,[2] indicating that both should favor district organization. In terms of voting experience, this issue has not been sharp, with the exception of an election in the Southern District.[3]

The farm-nonfarm issue of project control was handled through the terms of organization by specifying the qualifications for voting and in determining the boundary locations of the divisions for electing the board of directors. The original act of 1921[4] created six divisions with their boundaries being drawn along topographic lines. In order to give somewhat equal representation to the population, two of the districts--the central section of the northern Valley around San Jose and the Los Gatos area--were to elect two directors each, while the other divisions were to be represented by one director. Thus, there was some cause for feeling that the farmers might not control the project if the divisions with two directors should take divergent points of view from the other divisions. In an attempt to "equalize" the areas for electing the board of directors, seven divisions were created in the 1923 act[5] with each division electing a representative. However, this provision did not resolve the conflict as the city of San Jose was divided among four of the divisions. Thus, the possibility of the nonfarm voters in San Jose being the decisive influence in each district was a factor which was used to turn farm sentiment against the district in the election.

The qualifications for voting in the different types of elections were also important in achieving balance between the farm-nonfarm groups. Under the 1921 or the 1923 act, persons qualified to vote in the previous general election could vote for members of the board of directors; however, only property owners could vote for the approval of projects and for the issuance of bonds. Each owner was entitled to one vote for each dollar of assessed benefits. In addition, voting on these issues would take place in special districts which would be delineated according to the area benefited from the individual works. Thus, farm groups would be in control of this aspect of district operations.

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1/ Ibid., September 23, 1921, p. 1.

2/ Ibid., November 1, 1929, p. 16.

3/ Palo Alto did not favor incorporation into the district, but the issue was not farmer versus nonfarmer.

4/ California, Statutes (1921), c. 822.

5/ Ibid. (1923), c. 479.

The 1929 act simplified the procedure and reversed the balance from the two previous acts. The seven electoral districts were supposed to be equal in area without respect to population. However, the plan submitted to the county board of supervisors did not follow the act. The city of San Jose was included within one district of smaller acreage, thus giving it one vote on the board. By making the remaining districts approximately equal in size, the farm interests were given a heavier weight than they would have had if the divisions had been designated on the basis of equal population.

Because of this arrangement, there has been considerable farm strength on the board of directors. On the other hand, the nonfarm interests possessed a stronger potential in the project bond issue elections, since these elections were on a district-wide basis and the property benefit qualifications of the previous legislation were eliminated in 1929.

These procedures were used as the basis for project control until the annexation of the Central District in 1952. One of the terms of the annexation agreement was that Coyote Valley residents would be granted representation upon the board of directors. Since the district could, by law, have no more than seven directors, the division lines were redrawn to make the central area the major portion of one division. The remaining division lines were redrawn so as to equalize the size of all of the divisions as specified in the enabling act. In doing this, the city of San Jose was divided into three parts so that the city residents could be potentially strong in the election of three directors.

The effect of such a change, however, was less important in 1955 with regard to maintaining a balance of farm-nonfarm interest than it was in 1929. During the intervening years, the incorporated areas within the county have expanded rapidly, and nonfarm residents have moved at a rapid rate into the agricultural areas of the Santa Clara Valley Water Conservation District. For this reason the potential voting strength of the nonfarm residents within each division has changed the balance of control. Therefore, drawing new electoral division boundaries with respect to the city of San Jose was not of great consequence with respect to the farm-nonfarm balance of control. The general change in the economy of the Northern District already had brought this shift about in terms of potential voting strength.

During the organizational stages, this conflict between the farm-nonfarm points of view with respect to project control was an issue. The conflict was resolved by means of adjusting the shape of the electoral divisions. The farm interests were placed in control of the board of directors, while the decisions with respect to the issuance of bonds and the approval of specific projects were made in general elections where the interests could be counted on a per-registered-voter basis. In this situation, the district form of organization provided a means for organizing the farm-nonfarm interests so that their respective influence upon overall district policy was acceptable to each interest. The farmers who used over 90 per cent of the district's water for irrigation were initially in control of the district administration. On the other hand, the nonfarmers

who used less than 10 per cent of the water but who bore approximately 50 per cent of the tax burden were in a controlling position with respect to approving bonded indebtedness and, thus, the size of the tax levy.

The question of project control between the farm and nonfarm interests will take on new meaning as the proportion of voting strength of the non-agribultural interests increases. The farm groups may advocate stronger action to insure their continued control over the water conservation activities and their interest in the ground water reservoir. At the October 5 and 6, 1955 hearings of a legislative interim committee, an engineer representing farm interests pressed the point that the farm group had started using the ground water first and so should continue to have this priority; increased nonfarm use should not be allowed to add to the existing and increasing demand of the farmer. On the other hand, a representative of the nonfarm group pointed out that nonfarm property owners were paying 51 per cent of the district's taxes. Thus, the leaders of the two interested groups continue to press their individual points of view. However, both groups benefit from the district's program; a more drastic adjustment in the district organization to accommodate these interests will probably await an increase in pressure upon the Valley's water resource.

An example of the type of action which brings the farm-nonfarm conflict into the open was the request of the San Jose Water Works for a permit from the County Planning Commission to construct facilities for a deep well (1,000 feet) near the Penetencia Creek percolating ponds.1/ The farmers in this area immediately protested the request, and the Planning Commission decided not to issue the permit because the structure would be an "undesirable change in land use."2/ It held that a land use of this type would tend to change the character of the adjacent exclusively agricultural zone (see page 112).

The water conservation district was not drawn directly into this controversy, but it illustrates the forces which are at work. For example, a farmer-controlled district might take a dim view of expanding project percolating facilities in this or other areas if the primary benefits were to go to a nearby large well serving municipal-industrial water users.

The district form of organization has been able to adjust to handle the competitive desire for project control by changing the terms of organization. Also, a direct effort has been made to broaden the representation

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1/ Minutes of the Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, April 5, 1955 (in the files of the District). The Planning Commission does not issue permits to drill but the buildings used in drilling and housing the pump did require the issuance of a permit.

2/ The San Jose Water Works is seeking to have this decision reversed by court action.

to the board of directors by appointing an advisory committee consisting of representatives of the city councils of the major cities, the county board of supervisors, the Chamber of Commerce, organized labor, and agriculture. In addition, in the predominantly urban electoral divisions, efforts are being made to obtain interested citizens as candidates for the board of directors.

The Incidence of Project Costs

The terms of organization deal not only with the question of project control but also with the question of who shall bear the incidence of project costs. Since the latter question was answered through the organizing procedure, this experience will be examined in order to aid in assessing the implications of using the public district for ground water management. It will be recalled that the plan for action was instrumental in directing the incidence of benefits.

One aspect of the organizing process involves deciding who shall pay the project costs. As previously noted, the Wright Act of 1887 contributed to water development by permitting irrigation districts to issue bonds and to use district levied property assessments to pay the obligations. For this reason property owners were particularly concerned with estimating the magnitude and the geographic distribution of project benefits. What was the incidence of project benefit with respect to the incidence of project cost? The plan for action was instrumental in determining project benefits, while the incidence of project costs was determined by the assessment procedures. Since the procedure is decided at the time that the district is organized, it was the focal point of organized conflict.

Selecting a Method of Assessment

Assessment According to Benefit.--The 1921 and 1923 enabling acts contained similar provisions for repaying project costs. The proposed districts were divided into several zones. The water users within these zones were to decide upon the method for distributing the water from the central canal system. Following this determination, each tract of land within the zone would be assessed an amount equal to an estimate of the project benefits going to that tract.1/

Information from two sources led the conservation leaders to believe assessment according to benefit would be acceptable to their conditions. Reclamation districts assessed benefits to individual tracts of land, and the Nevada County Irrigation District followed a similar procedure.2/

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1/ California, Statutes (1921), c. 822, and (1923), c. 479.

2/ San Jose Mercury-Herald (California), September 20, 1921, p. 10.

Accordingly, they argued that this would be an equitable procedure for repaying project costs. The irrigation district procedure of taxing land, exclusive of improvements, was considered inapplicable because of the assumed inequality of benefits and land values. In addition, the argument was made that the farmers who do not need the irrigation water should not be taxed to supply it to their neighbors.1/

Opposition to the benefit assessment scheme was generated and was a factor contributing to the defeat of these two district proposals. The opposition pointed out that not only would it be difficult to estimate the benefits from the surface delivery of water but that it would be impossible to estimate the benefits to each tract of land from the artificial recharge operations. In fact, this same opinion is currently held by the engineering staff of the Santa Clara Valley Water Conservation District. Of course, wells nearby a percolation pond respond quickly when water is released into the pond. However, as the water percolates further and comingles with water from other sources and is distributed among strata of gravel, it becomes impossible to relate the effect of percolation to a specific tract of land. Therefore, this proposal died with the negative vote of 1921 and 1925.

Assessment According to Pump Draft.--The second proposal was discussed but discarded by the interested parties through the process of informal discussion and negotiation. According to this plan, a levy would have been placed upon the quantity of water pumped. The theory of this proposal was that it would be equitable and according to benefit since those using the largest quantities of water would pay for it.2/

The "pay-as-you-pump" plan was supported by many who felt the tax would be in accordance with benefit. However, if it was impossible to estimate benefits from artificial recharge to an individual tract of land, it likewise would be incorrect to assume that benefits occur in direct relationship with the volume of water pumped from a particular well. Distance from a percolation pond, the characteristics of the strata tapped, the confined or unconfined nature of the particular aquifer, and the economic importance of a particular volume of water are among some of the important factors which would cause benefits to individual wells to vary in a different ratio than the volume of water pumped.

Arguments in favor of taxing pumped water stressed the interconnectedness of the aquifers. These arguments held that the large users contribute more to the need for artificial recharge and therefore should pay for the recharge operations in proportion to use. However, such users would receive benefits only from the fact that the life expectancy of their wells

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1/ Ibid.

2/ Max Watson, "Outline of Plan for a Water Pumping District for Santa Clara Valley, California," Western Construction News, vol. III, no. 21, November 10, 1928, pp. 685-686.

and pumps would be increased. Of course, the users of these wells would question whether this were an immediate benefit since their wells and pumps are deep well construction. In addition, the pumping tax was supported by some agriculturists who held the mistaken belief that nonagricultural draft exceeded agricultural draft.[1] These two propositions, however, did not have to be examined upon their merits. The large-volume water users--mainly the suppliers of municipal water and the canneries--were able to keep the proposal from being voted upon. Because of this conflict, the secretary of the Santa Clara Valley Water Conservation Association, who was an active proponent of the pay-as-you-pump idea, resigned.[2] These large users did not want to pay the pumping tax even though the possibility of shifting at least part of the tax to their customers existed.[3]

Assessment on the Land and Improvements.--The placing of a tax on land and improvements was considered as a result of reviewing water district legislation. The Water Conservation Act of 1927[4] followed this procedure, and its provisions were written "primarily in the interests of the landowners along the Santa Clara River in Ventura County who desired to conserve water by spreading."[5] However, these terms of organization were not suitable for the Santa Clara County interests since the nonfarm groups would not accept the payment of a tax upon imporvements.[6] An assessment on all real property was dropped by the committee because certain nonfarm interests always had been active in the conservation movement, and the leaders desired to maintain a tax base which would include them. The incidence of such a provision upon nonfarm groups was heavier than they would accept.

Assessment Upon Land Exclusive of Improvements.--The term of organization which finally won approval of the interests was developed within the irrigation district tradition. In the 1909 Statutes,[7] an amendment

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1/ Even in 1955 agricultural draft was 81 per cent of the total ground water draft. California Department of Public Works, Santa Clara Valley Investigation, p. 58. In 1959 the Santa Clara Valley Water Conservation District staff estimated that between 65 and 70 per cent of the water was used by agriculture.

2/ Martin, op. cit., p. 40, citing telegram from Max Watson (in the files of LeRoy Anderson). Watson resigned from the board of directors, February 8, 1928.

3/ The extent to which shifting would be possible would depend upon the cost and revenue structure of the individual firms and the size of the tax.

4/ California, Statutes (1929), c. 240.

5/ Adams, Irrigation Districts in California, 1929, p. 27.

6/ Anderson, op. cit., p. 2.

7/ California, Statutes (1909), c. 303, sec. 35.

to the Irrigation District Act provided for the taxation of land exclusive of improvements. This procedure was considered to be a fair[1] method for distributing project costs when water spreading was to be the main activity of the district and when the main use of ground water was the irrigation of crops. It was reasoned that the use of ground water for irrigation should be one of the elements which is reflected in the value of the land. Thus, a poor well would be reflected in the lower value of the land. By applying the tax to nonfarm properties, these water users would share in paying project costs. This was justified because a very high percentage of the county's residents use ground water. But the urban property owners would not be taxed for improvements which resulted from income often indirectly associated with water development. Therefore, the committee sponsoring water conservation achieved a common interest, and the attorney preparing the Water Conservation District Act of 1929 included a clause placing an assessment upon the land exclusive of improvements. Final agreement of the interests was achieved with the voters' approval of the Santa Clara Valley Water Conservation District, November, 1929.

The Form of Organization and Incidence of Cost

The district delineated the area within which the incidence of project costs would fall. Within this area, the interests vied with each other with respect to apportioning the incidence among themselves. The function of the organizing process of the district was to provide the procedures for reaching a group decision on the method of distribution to be employed. These procedures were the committee system for the formation of a proposal to place before the Valley's electorate and the election process.[2]

These procedures provided an opportunity for various interests to participate in making the decision. But limits were set to the area of acceptability, and within these limits the public district proved to be a flexible form of organization for distributing project costs. As already noted, other districts followed different plans in different situations. In fact, the Santa Clara County Flood Control and Water Conservation District taxes land and improvements on the basis of zones of benefit although its main interest is flood protection where improvement values are of particular importance.

The district is flexible in this sphere of operation as in many other spheres. This form of organization does not set limits upon the procedure to be followed for distributing the incidence of costs. In essence, these

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1/ San Jose Mercury-Herald (California), October 7, 1929, p. 1.

2/ The areas of choice are frequently not as broad if other methods of organization are used. For example, the state legislature may create a district without a local election. In this situation, the ability to influence this term of organization may be less direct.

limits are set by the form of the local political and economic power structure. For example, a balance or agreement was reached among the influential large water users opposing a pumping tax, the smaller but numerous nonfarm users opposing a tax on land improvements, and the farm interests desiring a low tax which would be spread over as wide a base as possible.

Project Selection and the Size of Payment

The terms of organization adopted in 1929 made no provision for the adoption of large projects nor the issuance of bonds. In fact, the assessment ability was limited by this act to one and one-half mills on every dollar of assessed value. The authority to engage in large-scale projects was granted by amendment to the original act. It specified that projects should be approved by two-thirds favorable vote of a general district-wide election, thus eliminating the zones of benefit concept of the previous acts.1/ These elections did two things--they gave the electorate's approval to the distribution of benefits from particular engineering projects and they gave its approval to the issuance of a specified amount of bonds to be paid from the levying of a special assessment. Although the conflicts which came to play in deciding these issues were similar to those which have already been noted, the controversies were brought more sharply to focus upon specific costs and benefits. However, with the exception of the 1931 election, the conflicts centering around special projects have been rather minimal in the four elections from 1934 through 1952.2/ This does not mean that the identified interests were not operative during this period but that a common area of interest existed with respect to the major purposes of the district.

The Size of the Bonded Debt

The question of bonded indebtedness was raised in the 1929 organizational election. At that time, district supporters pointed to the enabling act and said it did not provide for the issuance of bonds and that

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1/ California, Statutes (1931), c. 1020. The passage of this amendment was the subject of severe conflict, as will be noted.

2/ The conflicts with respect to Lexington Dam certainly cannot be called minimal; however, these conflicts were not the result of competing interests from within the district. The major group contesting the approval of this dam in the 1947 election was the real estate interest in a town between the dam and the district boundary. However, the vote was 16,443 favorable to 6,442 unfavorable. Difficulties were also encountered in settling damage claims of the San Jose Water Works for properties in the flooded area. These negotiations were not settled until 1952. In addition, extended controversy ensued between the district and the State Highway Department over the relocation of State Road 17.

the maximum levy which could be permitted under the act was .15 per $100 of land valuation exclusive of improvements.1/ However, the enabling act could be amended by the legislature if the local delegation supported the change. Thus, with the backing of district officials, the 1929 act was amended in 1931[2]/ to authorize the issuance of bonds upon the favorable vote of two-thirds of those voting.

The electorate reacted negatively toward this proposal by refusing to approve a bond proposal for $6,000,000.3/ One of the issues responsible for this defeat was the negative reaction to the bonding amendment. This reaction was strengthened by the fact that the voters had been given assurances in 1929 that the district could not incur bonded debt.

The district form permitted this basic change in the terms of organization without voter approval although, as demonstrated in the 1931 election, the voters could refuse to implement the authority. The passage of an amendment in this manner is more characteristic of the special acts than of the more widely used general acts. Because the special acts essentially affect no other areas of the state, the legislative logrolling machinery permits passage of these acts and their amendments. On the other hand, the amendment of a general act usually would need substantial support from the districts using the act. In fact, the need to coordinate district activities along lines of this type was recognized in the formation of the Irrigation District Association.

The various interests within the district were not segregated in electoral districts for purposes of approving bonds. This term of organization forced them to contend among each other in order to present their views before the voters. Because voter approval was to authorize the issuance of district bonds for the construction of a specific project, the interests could focus directly upon the expectations of costs in relationship to the expectation of benefits. Thus, the opponents of the district organized their attack to show that the project was expensive[5]/ and that

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1/ San Jose Mercury-Herald (California), October 18, 1929, p. 21. During the month preceding the election, this point was emphasized many times in speeches and newspaper articles.

2/ California, Statutes (1931), c. 1020.

3/ The proposal was defeated: yes--2,195; no--14,888; and total--17,088.

4/ The Water Conservation District Act was a general act passed at the request of the Santa Clara County legislators, and it had not been used in other parts of the state; therefore, it was in effect a special act.

5/ In meeting after meeting, the opponents of the project were able to get orchardists to testify that the costs would be too great. For example, see the San Jose Mercury-Herald (California), November 5, 1931, p. 10, and November 6, 1931, p. 1. On the other hand, the supporters of the district argued that the existing percolation facilities demonstrated the benefit of the proposal and that the expected tax would be relatively small, averaging 1.12 per $100 of assessed land value.

the expectation of benefit would be minor, while the proponents presented the opposite point of view. By this process the voters could consider the merits of each individual project with respect to its cost and relate individual project additions to the whole undertaking.

The bond elections put the voters in the positions of having to evaluate the pro and con claims of each project. However, there was no procedure for checking these claims. Bond buyers recognized the need for an outside check with the passage in 1911 of an act creating the Bond Certification Commission,1/ later to become the District Securities Commission.2/ The Commission's function was to certify to the "feasibility and economic soundness of the project" and submit its findings in a written report to the district.3/ The intent of the legislation was to reduce the uncertainty of prospective bond buyers. However, the electorate is in a similar position and needs the benefit of the appraisal of a disinterested party as well as the prospective bondholders. Legislation does not provide for such a project appraisal.

If such appraisals were available, the electorate could reasonably be expected to relate expected project benefits to expected project costs and to evaluate the expected incidence of both. In contrast, the actual procedure for determining which public expenditure to make--and the size of the expenditure--did not facilitate the ability of the voters to relate their approval of one public expenditure to alternate expenditures. For example, other units of government, such as school districts, etc., have bond proposals which must be voted upon. Each item of expenditure thus is considered independently and generally at separate elections. Because of this competition for favorable votes from the same electorate, special district management carefully considers the timing of an election with respect to the dates of other bond elections. The purpose is to isolate each bond issue from the other issues which would place a financial burden upon the district residents. Since the water districts were interested primarily in a single water use, this procedure tended to reinforce single-purpose management, to the possible neglect of other interrelated water uses, and possibly, to the neglect of other public expenditures.

Bond Elections and the Valley-Wide Basis for Water Management

Voting for special projects was on a Valley-wide basis, thus providing opportunity to consider ground and surface water problems for the whole area within the district. The ground water basin, with the exception of

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1/ California, Statutes (1911), Extra Sessions, c. 3, and (1913), c. 366.

2/ Ibid. (1931), c. 1073.

3/ California, Water Code, Div. 10, secs. 20000-20107.

the Coyote Valley portion, could be considered initially as a unit. Surface water could be transported from its most plentiful source to areas receiving a relatively small volume of water but capable of increased percolation. This would mean that infiltration could take place more rapidly, leaving less water in surface storage[1] and reducing the volume of water going into San Francisco Bay. The district-wide basis for project approval would not necessarily restrict project planning to the individual stream systems and to the percolation capacity of the streams plus nearby beds. Since these special district-wide elections required a two-thirds majority, project approval would tend to be on a broad basis rather than narrowly conceived for a small portion of the Valley.

The 1931 engineering proposal attempted to scale down the original Tibbetts-Kieffer plan by proposing 5 detention dams instead of 17 dams and thus unify the interests of the whole Valley. According to this plan, the Valley's streams would be connected by a canal so that surface water could be transported from each of the streams to the northwest and, in the case of Coyote Creek, to the east and west.[2] The proposal, however, failed to perform the intended function, as the defeat of the bond issue indicates.

The opposition to the plan emphasized the costs of the project. In addition, attempts were made to undermine the validity of the engineering report and thus to create the impression that the costs would be even higher than the estimates. These issues were complicated by questioning the district's legal right to divert Coyote Creek water. This contention was supported by 17 lawyers in San Jose and was based upon a spurious interpretation of the Herminghaus Case.[3] The raising of the question of the legality of diverting water was not basically an effort on the part of riparian Coyote Creek water users to press a water rights claim against the rest of the Valley. The opposition's main purpose was to bring another cost-increasing issue into the picture. Newspaper advertisement stressed the point by asking, "Can you afford to pay millions for water litigation and lawyers' fees?"[4] In fact, some of the farmers in the Coyote watershed approved the plan; but on the basis of its cost, they suggested that diversion works and instream percolation ponds could be constructed to handle a portion of the flood flows without the necessity of constructing the dam.[5]

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1/ The reduction of time in surface storage would mean that less water would be evaporated and that additional storage capacity would be available for capturing additional runoff.

2/ Tibbetts, Report on Waste Water Salvage Project.

3/ San Jose Mercury-Herald (California), November 14, 1931, p. 16.

4/ Ibid., November 4, 1931, p. 3, and November 14, 1931, p. 16.

5/ Ibid., November 4, 1931, p. 14.

Even if some of these riparians were genuinely concerned with holding their rights, the appeal to the voters was directed to the questions: Could the plan be executed because of the litigation? If so, would the people in the district want to shoulder the costs of litigation? The term of organization specifying district-wide bond elections encouraged the construction of issues with a Valley-wide impact. The effect was to focus attention upon the benefits and costs with respect to the whole Valley rather than to its particular segments.

Following the voters' rejection of the $5,500,000 proposal of 1931, the plan was scaled down to $2,683,000. A 30,000 acre-foot reservoir replaced the 60,000 acre-foot reservoir on Coyote Creek, the cross-Valley canal and other smaller works were omitted. Only the works were included which "seem economically justified at the present time for salvaging waste water individually from each of the main streams entering the district."1/ Thus, the ability to percolate the water crop within the watershed of origin set an upper limit upon the capacity to store the flood waters.

Although surface water management was limited to individual streams, the term of organization calling for special project elections upon a district-wide basis was not inappropriate. The existence of this term tended to focus attention upon the management of the whole underground reservoir. Since the streams debouched on all sides of the valley floor, works could be included to provide some benefit to each section and to obtain the support of the voters of that section. In addition, the fact that the ground water users were interrelated by the underground reservoir was emphasized. The district engineer pointed out, "The results to be expected from conservation works on each stream are of course not confined to the natural watershed of that stream, especially on the Valley floor . . . additional induced stream-bed percolation on the Coyote, for example, will . . . in time . . . affect the western portion of the Valley . . . similarly overlapping benefits will come in time from water conservation on the Guadalupe."2/ Thus, the engineer continued the process of attempting to educate the voters about the behavior of the ground water resource. He wanted the underground reservoir to be considered as a unit, and he wanted to make clear that surface diversion for purposes of percolation would not necessarily limit the benefits to the immediate percolation area. The operating engineer was attempting to create a common interest in the problem of utilizing waste water from the whole Valley for the benefit of the whole Valley. And the term which organized the special project elections on the basis of the whole Valley was conducive to the concept of unifying the Valley's water.

This pressure to consider the whole Valley was evidenced in the supporting justification for each of the succeeding projects. The 25,000 acre-foot Lexington Reservoir was justified upon the basis of supplying water immediately to the area of greatest need without the construction of a diversion

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1/ Tibbetts, 1934 Well Replenishment Project, p. 16.

2/ Ibid., p. 11.

canal. By supplying water to this central area, water levels in the surrounding areas would be benefited[1] because of the reduction in the cone of depression. In 1949 the proposal to construct the 75,000 acre-foot Anderson Reservoir went further and again suggested the necessity to break the individual stream concept.

The continued decline in the depth to water, the inability to conserve all of Coyote Creek's water, plus the district's responsibility to consider the whole northern Valley, resulted in the district's proposing that Coyote water be transported to areas where it could be percolated. For this purpose, a large dam was proposed to provide temporary storage for impounded water.[2] The initial phase of this effort to bring the projects under a Valley-wide management plan was accomplished in 1952 with the approval of the cross-Valley canal to transport water to the western areas of the Valley.[3] The need for the canal had become strikingly apparent if the 100,000 acre-feet of storage in Coyote Creek was to be utilized. For example, in July before the September election, it appeared that 75,000 acre-feet of water would remain in storage in 1952 because of the lack of percolation capacity on Coyote Creek. Thus, the construction of the two Coyote dams dramatized the extent to which excess water was immediately available for percolation purposes.[4]

Since 1931 when the amendment to consider special projects on a district-wide basis was passed, the district management has had the responsibility of considering the needs of the whole Valley.[5] This resulted in the ambitious proposal of 1931 for constructing dams and canals to manage the surface water so that it could be transported from its point of debouchment to the areas suitable for percolation. Although the voters refused to approve this plan, the necessity to take basin-wide opinion into account remained, and the justification of each succeeding proposal emphasized how

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1/ Hunt, Proposed Lexington Dam . . . , p. 24.

2/ Hunt, Proposed Coyote Dam No. 2, A Report to the Board of Directors, Santa Clara Valley Water Conservation District (San Jose, California: The District, 1949), pp. 4-5.

3/ Hunt, Proposed Cross-Valley Canal, A Report to the Board of Directors, Santa Clara Valley Water Conservation District (San Jose, California: The District, 1952), pp. 1-2.

4/ Between 1955 and 1959 new percolating facilities have been added to reduce the dependence upon surface storage.

5/ The argument could be made that this responsibility was granted when the district was formed. Of course, this was true, but the responsibility was severely limited by the low levy (.15 per $100) which restricted the number of alternative management proposals which could be made.

each project was related to the others in order to provide basin-wide management. Within this context a wide range of proposals could be adopted, but this provision would require a broad distribution in project benefits[1] to insure the required two-thirds majority.

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1/ In order to provide benefits to a particular locality within the district, improvement districts have been organized.

Chapter 6

THE DISTRICT AND MULTIPURPOSE MANAGEMENT

The district served as an executive organization in the construction and operation of works, in accordance with the plan as determined through the organizational process. The board of directors was vested with the power of making contracts, hiring employees, and making other decisions necessary to carry out the purposes of the district.1/ The execution of these decisions was delegated to engineers and lawyers who were hired by the board. The engineers and lawyers not only carried out the board's policy but were also active participants in policy formation, although final authority resided with the board.

The board developed ideas and carried them to its constituency while representing the interests of the constituency. In this way interests internal to the district were handled. But over the years new ideas and interests were developed which could not find internal representation. Interests desiring change could use the legislature as a channel for making some adjustments, but for the most part new interests sought to bring external pressure through other units of local government.

The district was a legal entity with corporate status. It could sue and be sued, make contracts and own property; and since it served a public purpose, it was granted the right of eminent domain. Most of these legal characteristics were firmly established as district functions by precedent prior to the creation of the public districts in Santa Clara County, although the privileges of eminent domain were expanded to facilitate the district operations.2/

The district was expected to serve as an agency capable of supporting the issuance of bonds necessary to finance the construction of the works and to supply funds for district operations. The districts in Santa Clara County did not "break ground" in this respect (see pages 49 and 94). But a group's, rather than an individual's, financial resources and point of view were utilized. A governmental unit with the power to tax secured the bonds, and the life expectancy of a public corporation was substituted for that of individuals.

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1/ California, Statutes (1929), c. 166.

2/ An amendment in 1935 gave the district power to take possession of property upon filing the case rather than to wait until a court decision had been rendered. And in 1951 the district was given the power to condemn land and turn it over to a public utility as a replacement of the property required for the district. This authority, however, is not unusual and is possessed by other governmental agencies.

In these respects, the operations of Santa Clara Valley's water conservation districts are not unique.1/ However, the nature of the policy which was administered and the problems this form of organization has encountered in carrying out this policy did test certain aspects of using the district form of organization. The new water management problems which have arisen since the organization of the district and their effect upon management have raised questions of special concern. In particular, the problem has become one of integrating ground water management into the whole water management economy of the area. How have water management problems which were external to the organization at the time of creation been integrated into the management activity?

The Water Management Problem

Resolving of conflicting interests into a common internal interest as expressed in a policy decision does not mean that conflicting interests are eliminated nor that they do not play an important part in the management of district affairs. In fact, the execution of the program itself gives rise to new interests which may in turn conflict with the original purposes of the organization. These new interests demand that the water management activities accommodate them in addition to the original interest which gave rise to the creation of the organization. However, the form of organization may be one of the reasons such accommodation is difficult. Only to the extent that management responds to the pressure of these conflicting interests, or has the foresight to anticipate future conditions, is it able to arrive at policy decisions which are representative of the new, larger public.

If the organization is single purpose in character, adaptation may be difficult. New interests often are not incorporated readily into district policy. In fact, this particular management problem has strained the water management districts in Santa Clara County; it is the most difficult management problem with which they have had to deal.

Other conflicts have been important to these districts, and they have been difficult to resolve. These conflicts, however, did not relate directly to the structure of the organization. They dealt with the district acting in its capacity of representing internal interests to external interests rather than dealing with the question of whether new

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1/ Smith, "Problems in the Use of the Public District for Ground Water Management," Land Economics, vol. XXXII, no. 3, August, 1956, pp. 259-269. (University of California, Giannini Foundation Paper 152.)

interests should be considered as internal or external.1/ For example, the construction of Lexington Dam involved years of negotiation between the Santa Clara Valley Water Conservation District and the Division of Highways. The central issue in this instance was whether the Division of Highways would recognize the local district's desire to create a reservoir in the proposed area. The Division planned the construction of Highway 17 through the reservoir site. This state agency would not adjust its plans to fit into local plans unless the legislature voted special funds for rerouting purposes. By following this bargaining procedure, the Division of Highways was voted $2,470,000 in additional appropriations2/ and thus did not have to use gasoline tax or other motor vehicle revenues.

Another conflict in this same area arose with the San Jose Water Works, a private utility, which owned pipelines and water distribution facilities covering 342 acres of the Lexington watershed area. The settlement for compensation required four years of out-of-court negotiations. A compensation price of $155,938 was finally agreed upon.3/ These negotiations were long, involved, and important; but they did not affect the basic structure of the district as a form of organization.

The primary impetus for organizing the water conservation districts was to insure a continuing low-cost water supply for the irrigation farmers in the Valley. However, the construction of reservoirs gave rise to a recreational and fish-wildlife interest in water management. The continued expansion of nonagricultural land use on the valley floor has increased the potential property damage which is affected by floods. These events pose a fundamental organizational problem for water management: Can the single-purpose water conservation district accommodate

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1/ For a discussion of the internal-external relationship, see Smith, "The Role of the Public District in the Integrated Management of Ground and Surface Water," Water Resources and Economic Development of the West: Ground Water Economics and the Law, Report No. 5, Conference Proceedings of the Committee on the Economics of Water Resources Development, Western Agricultural Economics Research Council (Berkeley, 1956), pp. 81-91.

2/ Herbert C. Jones, Water for the Valley, A Report to the Board of Directors, Santa Clara Valley Water Conservation District (San Jose, California: The District, 1954), p. 7.

3/ San Jose Water Works, op. cit., annual issues, 1952-1955. Of course, this raises the interesting question of whether the state's proposal represents the "state's interests." On this basis, the "shortest route" would be paid for by gasoline tax revenues, and changes proposed by local communities would be borne from other sources.

the new interests internally within the framework of its organization? Will the organizational structure have to be changed? Or will the problem be handled through multiorganizational management?

In order to discuss these questions, each of the major interests will be examined singly, in combination, and in relationship to the district form of organization.

The Water Conservation Interests

Little more need be said concerning the water conservation interests in Santa Clara County. The main point to be emphasized is that water conservation was the original water interest, and it has been the predominant interest up to the present time. However, as subsequent sections will show, other interests are becoming more prominent.

The Recreational Interest

Experience throughout the country has amply demonstrated that the construction of a reservoir provides a recreational resource which people desire to use.1/ The experience in Santa Clara County has been no different. The availability of services such as fishing, boating, swimming, water skiing, and scenic surroundings has attracted people to the reservoirs as the south Bay area has become increasingly urban during the post-World War II years. The magnitude of the recreational pressure was much greater than anticipated during the district's formative stage. In fact, it is a new interest as compared to water conservation. Both the 75,000 acre-foot Anderson Reservoir and the 25,000 acre-foot Lexington Reservoir have been particularly accessible to Santa Clara County's increasing population. Thus, another interest in the Valley's water management was created. The attention of this interest has focused upon the district's board of directors and upon the regular county government.

Pressure to take specific action with respect to recreation has come from many sources. The following presentations to the board of directors of the Santa Clara Valley Water Conservation District illustrate the variety of requests and problems associated with the recreational use of the water resource.

1/ Marion Clawson, Statistics on Outdoor Recreation (Washington: Resources for the Future, Inc., 1958), 165p.

1. February 6, 1951--A sportsmen's club wanted to investigate the feasibility of establishing a fingerling trout pond at the base of Anderson Dam.

2. Repeated requests to operate concessions which would involve the use of the reservoir, such as renting boats, establishing swimming facilities, etc.

3. October 16, 1951--A request for exclusive use of a reservoir by a water ski club.

4. February 5, 1952--A request to hold Easter sunrise services on the lake shore of a reservoir.

5. February 5, 1952--A request for an exclusive long-term lease on a reservoir to operate the boats of a speedboat club.

6. March 4, 1952--A request by a concessionaire to close a reservoir to public use for one day, thus permitting him to charge admission to a one-day motor boat race.

7. May 19, 1952--A request from the county board of supervisors to require all boat operators to carry life preservers.

8. November 6, 1952--A complaint about the unsanitary conditions around one of the reservoirs and the report of the County Health Department. Agreed with the County Health Department that a proposal should be developed for submission to the county board of supervisors which would recommend the creation of the Department of Recreation in the county government to supervise the recreational areas.

9. April 23 and June 2, 1953--Boats were being operated at excessive speeds on the reservoirs. The board stated they had no penal authority to enforce rules, nor had they the authority to spend money for this purpose. On the other hand, the sheriff maintained the reservoirs were owned by the district and that he had no authority to enforce rules and regulations on the water. As a solution, the district promulgated the rules and regulations to be enforced and granted the sheriff regulatory power on the water. A deputy sheriff was paid by the county and the district.

10. August 4, 1953--The district adopted a policy with respect to leasing land to concessionaires.

    a. The district is a public project supported by taxation.

    b. Therefore, the project facilities should be made available to the public for inspection and for recreational use.

c. Points of access to the reservoir should be made available to the public without charge.

d. Provision should be made for developing the recreational potential by private concessionaires since the public desires these facilities.

11. August 10, 1953--A representative of agricultural interests examined the recreational facilities of the district and urged that more action be taken. However, the district maintained the position that its function was artificial recharge and that this function should not be mixed with recreation.

12. July 5, 1953--Responded to a request from the County Parks and Recreation Commission with respect to cooperation between the two agencies. The district board indicated it was willing to cooperate but that it should be clearly understood that the district must retain control of the operations of its reservoirs for the primary purpose of water conservation.

In addition to these decisions, the County Planning Commission and the County Recreation Commission agreed on June 16, 1956, to present a plan to the county board of supervisors for developing the recreational potential of the district's reservoirs. However, some opposition was expressed at this meeting to the preparation of such a proposal because of the extreme variability in the level of the water in the reservoirs.1/

This series of events illustrates the increase in the pressure which was being put upon the board of directors to consider the recreational interests. Throughout the span of years, the questions which were being asked of the board came closer and closer to a specific request for a change in water management policy. At first the recreational interests only wanted access to the reservoirs. But the fulfillment of this desire led directly to major questions of who was responsible for the public health, safety, and welfare on and around the reservoirs and who should develop the recreational potential.

As a result of these pressures, the Santa Clara Valley Water Conservation District backed the creation of the County Recreation Commission (1955).2/ But this action in turn presented the question of whether, due

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1/ San Jose Mercury-Herald (California), June 16, 1956, p. 8.

2/ Following the creation of the Department of Parks and Recreation, the district leased shore property to the county for recreational use. This Department now supervises the recreational use of this leased land and the reservoirs. In addition, an active development program is being pursued, including the construction of new facilities.

to the extreme fluctuations in the water level of the reservoirs, a developmental program should be prepared. After answering this by preparing a program, the question is raised for the future: If the pressure for recreational use for the reservoirs continues and if water is imported, should not the operating policy of the district be changed so that the minimum drawdown level of the lake would permit year-round recreational activities?1/

The recreational interests desire security in the quantity and quality of water which is stored in the reservoirs. Their insecurity is the result of an operating policy to increase the security of the well operators.

The Flood Control Interest

The construction of detention dams for the conservation of winter storm waters has not eliminated a mounting property damage due to floods. The estimated property damage for the 1951-52 flood was $426,151 2/ and $5,415,500 for the record flood of 1955-56.3/ Thus, a new water management problem was placed before the public. Floods were not identified as serious problems until the early 1940's4/ when it became evident that residential and industrial land use would expand over the valley floor. The people interested in these developments recognized they were faced with two types of uncertainties: (1) uncertainty from the weather and (2) uncertainty from the method of water management in other localities in the Valley which would affect the flood problem in their particular locality. With this basis for a common interest, the Santa Clara County Flood Control and Water Conservation District was formed by special act of the California legislature in July, 1951.5/

1/ Of course, such a policy might include the construction of small dams to establish small recreational pools in selected portions of the reservoir.

2/ Santa Clara County Planning Commission, Flood Problems in Santa Clara County, p. 30.

3/ U. S. Department of the Army, Corps of Engineers, Report on Floods of December, 1955, and January, 1956, in Northern California Coastal Streams (San Francisco, 1956), p. 133.

4/ Santa Clara County Planning Commission, "Report on the Problem of Storm Water Drainage in Santa Clara County, California," Flood Problems in Santa Clara County, Supplements (San Jose, California, 1952), Supplement II, p. 31.

5/ California, Statutes (1951), Amended, 1952, c. 1405, and (1951), Amended, 1953, c. 1405.

The seasonal and cyclical uncertainties of the weather have been noted. A commonly recognized characteristic important to flood control is that the intensity of rainfall within a specific storm varies as does the distribution of storms throughout the season. Flood control works are designed to reduce these uncertainties; however, to these uncertainties must be added the effects which other water management activities have upon the behavior of flood waters. For example, the planning for downstream flood control must consider the upstream management of conservation dams. Subdivisions must be located so they will receive adequate drainage so the discharge from one subdivision will not be detrimental to another subdivision.

The primary objective of the flood control activities is to provide for the healthful disposal of storm waters so that life and property will be protected. In performing this function, several factors require special attention in the Santa Clara County situation. In the first place, the Santa Clara Valley Water Conservation District has constructed seven detention dams with a combined capacity of 140,396 acre-feet.1/ These detention dams were planned to capture flood and storm waters which drain from the mountain areas. As noted in Chapter 2, the volume of rainfall is over twice as high in the mountains as on the valley floor. The operating objective is to capture the flood flows during the rainy season and to have the reservoirs empty by November so that they will have their entire capacity to capture the next season's water crop.2/

For storms which come early in the season, reservoir space is available to store winter flood water. In fact, it was this very fact which saved the Valley from even worse flood damage in the 1955-56 rainy season. However, if storms strike in close succession or if they build up from a light rainfall to a heavy rainfall, these reservoirs would be filled prior to their greatest need and would thus provide reduced flood protection. Single-purpose flood control dams are operated to release the captured water after each storm so that maximum storage can be available. Flood control releases would not be geared to percolation ability but to channel capacity in the drainage ditches and streams.

The pressure area, and more recently the forebay, has been subject to increased urban development. The disposal of storm waters from the housing projects presents a major problem today whereas it was only of minor concern 15 years ago. Land formerly in orchards, pasture, and other agricultural uses has been covered with roofs, sidewalks and streets. The rapid runoff from these subdivisions must be disposed of

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1/ California Department of Public Works, Santa Clara Valley Investigation, p. 49.

2/ Anderson Dam has stored water from one season to the next. The Dam held over 50,000 acre-feet of water in 1956-57. Roll, Revised 1956 Waste Water Salvage Project, p. 5.

without creating a flood situation within the project and in such a manner that the drainage from an upstream development does not overtax the channel and flood downstream properties. This change to nonagricultural land use not only raises the potential property loss from floods but also increases the rapidity of runoff and reduces the ability of the soil to absorb water.

Methods are not developed whereby the water falling on urban developments in the forebay can be utilized more fully and economically for conservation purposes. The locating of physically accessible percolating ponds is a limiting factor, along with problems of public health. For example, the County Health Department has opposed the use of drainage wells as a disposal technique upon the basis of possible ground water contamination.1/

A different problem is presented in the pressure area, since the aquifers are not recharged from overlying gravels. In fact, the perched water table causes drainage problems near San Francisco Bay. Thus, the disposal of storm runoff must consider the interrelationship of discharge locations and the level of the perched water table.

Land subsidence, due to ground water pumping, is related also to the flood problem. The gradient of the streams flowing into the Bay is reduced as a result of subsidence. The effect of this drop is that the water moves more slowly and the stream channels are unable to handle as large a volume of water as they were prior to the decline. Overflowing of the channel banks is the result of this situation.

Another effect of subsidence has been the increased flood hazard due to tidal flooding of the land close to the Bay. As a protection from this tidal action, part of the bay shore has been diked. Other portions have been diked in conjunction with the construction of evaporation ponds which are used for the production of salt. When large volumes of water are moving from the inland toward the Bay, these dikes have a reverse effect and retard the discharge of water into the Bay. This damming effect of the dikes contributes materially to the flooding of the bay shore area.

Municipal and Industrial Water Supply Interest

Urban development needs a secure water supply much as does agriculture, although its seasonal distribution is different. In fact, the

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1/ Santa Clara County Planning Commission, "Policy of State Water Pollution Control Board Regarding Water Pollution in the Bay Region," Flood Problems in Santa Clara County, Supplements (San Jose, California, 1952), Supplement I, sec. D, p. 41.

average volume of water used by an acre of urban development in Santa Clara County is somewhat less than the "requirement" for irrigation--urban areas, 1.7 acre-feet per acre; irrigated land, 2.5 acre-feet per acre.1/ The total volume of water used for municipal and industrial purposes has been increasing, as noted in Chapter 2, with the influx of population and with the increased level of living.

At the present time, municipalities obtain their water from local surface sources, wells tapping the ground water reservoir, and the purchase of water from the city of San Francisco. The cities being serviced by the city of San Francisco feel that the wholesale price of $70 an acre-foot is high. They would like to find less expensive sources. The further use of ground water is not feasible for communities such as Palo Alto because of their location, and other localities are keenly aware of the existing overdraft conditions. The further development of new surface sources for the towns in the northern portion of the Valley is limited. For these reasons, pressure has been building up to find other sources of water, primarily importation of water and the elimination of annual carry-over storage in existing reservoirs by using it for surface delivery.

New Interests in Conflict with Old Interests

Agricultural Versus Nonagricultural Water Supply Interests

Agricultural and nonagricultural ground water interests have come into conflict with each other over questions of ground water management. This conflict has been particularly vocal in the northern Valley because both groups have been increasing the total volume of water which they require, with nonagricultural use expanding more rapidly during the last decade and a half. To counter this expansion, the agricultural interests have advocated policies which would reduce the ground water draft of nonagricultural users, and both groups have advocated the importation of water.

One source of this conflict is the overdraft condition which exists. The agencies pumping municipal and industrial water are in a position to dig deeper wells and to purchase and to operate larger pumps than most

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1/ See Chapter 2.

California Department of Public Works, Santa Clara Valley Investigation, p. 57.

Santa Clara Valley Water Conservation District, Preliminary Design Cost Analysis, Imported Water Distribution, Santa Clara Valley (San Jose, California, 1959), p. 9.

existing agricultural users.1/ Thus, agricultural ground water users see the rapidly increasing nonagricultural use as a major factor threatening the security of their investment in well, pump, and motor and thereby bringing the cost of water closer to the economic limit which agricultural users are willing to pay. The agricultural interests have advocated a change in the current policy which permits unrestricted drilling and pumping.

This conflict has become increasingly acute as nonagricultural use has assumed a larger proportion of the total draft. Before the current urban expansion, the deep municipal wells tapped the pressure aquifers from a concentrated position in the central portion of the northern Valley. The effect of this concentration was to cause land subsidence in the central portion and to increase the central cone of depression. With the expansion of urban development, municipal wells are being placed in the forebay area. These locations will be closer to the area of natural and artificial recharge; thus, the water will be captured before it has time to disperse throughout the basin. This fact again places the nonagricultural users in conflict with the agricultural users, because the heaviest agricultural draft is in this forebay area. For this reason the agricultural interests have attempted to control the location of these deep wells.

The desire to control the location of the deep wells is not tied necessarily to a situation of increasing draft but rather to the change from agricultural to nonagricultural water use. Such a change may not result in an increase in the volume of water used as previously noted. This does not mean, however, that ground water management will be unaffected. Typically, wells which were formerly pumped for irrigation purposes are no longer used. In their place, the domestic consumers receive water service on a metered basis from water mains supplied by wells tapping the deeper aquifers. Thus, a few deep municipal wells replace a larger number of shallow irrigation wells.2/ One result is lessened direct public interest in water conservation. Also, the remaining agricultural wells are now in competition with large municipal wells. The competition may be viewed with alarm depending upon the large well's ability to outlast the more shallow wells and upon the extent of the cone of depression from the deep wells. These wells may

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1/ This is one of the primary characteristics for classifying water users into these two groups. Such a classification does not imply that agricultural wells are not in conflict among themselves. It only implies that the abilities of these two groups to secure ground water is different. In fact, the elimination of urban draft would hardly eliminate overdraft today and would not be adequate for the future. In addition, conflict between users would not be stopped.

2/ As urban water service is expanded, a few of the best agricultural wells can be adapted for supplying water to subdivisions.

service people residing on land which was not irrigated, and such service will increase the total draft.

Because of these possible effects, the interests desiring to locate deep wells (mainly water service agencies supplying municipal users) come in conflict with the shallow-well operators (mainly agricultural users). An exemplification of the conflict may be seen in the request of the San Jose Water Works to the County Planning Commission to "operate a public utility use" in an exclusive agricultural zone.1/ The Water Works was going to use this land to construct a well which would have been between 700 and 1,000 feet deep "to a depth common for wells supplying municipal needs."

The farmers in the area protested this change in land use. It is evident from the testimony that their real objection to the well was their belief that it would increase the depth to water in the area. Whether this location was in the public interest was questioned for another reason. It was to be constructed on "a strip of land some 200 feet wide which lies adjacent to a right of way owned by the Water Conservation District." The district has one of its best percolation ponds at this location along Penitencia Creek.

The Water Works' request for a permit was denied, and the denial was upheld in the court2/ with the statement that "the plaintiff [the public utility] presented nothing more than a case of economic convenience." Such an argument is not enough, as "other property owners in the district, too, perhaps, desire to put their properties to some profitable uses. But all must yield to the general good as it has been declared and established by the ordinance." Thus, as a part of this conflict, the agricultural interests attempted to limit the nonagricultural draft by restricting the location of the deep wells.

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1/ Data referring to this case may be found in the sources listed below:

Santa Clara County Planning Commission, <u>Hearings in Re Request. . . .</u>

Santa Clara County Planning Commission, Opinion of the County Counsel to the County Board of Supervisors, San Jose, California, April 20, 1955 (in the files of the Commission).

<u>San Jose Water Works</u> v. <u>County of Santa Clara and Board of Supervisors of the County of Santa Clara</u>, Calif., Memorandum Opinion 94630 (1956).

2/ <u>Ibid</u>. In support of their refusal to issue a permit, the Planning Commission was careful to point out that they were not concerned with the question of water rights. Their contention was that an issuance of the permit would contribute to the change in land use of the area, zoned as agricultural, to residential and industrial. Thus, this public utility use would break the intent of the zoning ordinance.

This conflict also took the form of the agricultural interests supporting legislation for the state issuance of permits to pump ground water. These permits would be issued upon a time priority basis and thus exclude the later nonagricultural users if the ground water basin were once appropriated.1/ In another effort to divert nonagricultural interests from using ground water, a meeting was sponsored on June 20, 1955, to urge the cities to purchase water from the city of San Francisco's Hetch Hetchy aqueduct.2/ The agricultural interests have attempted to limit the draft of the nonagricultural users and to protect their own present status.

Water Conservation Versus Flood Control

Potential conflict exists between flood control and ground water management. In fulfillment of the water conservation objective, the reservoirs are filled as rapidly as possible, and they are operated so as to percolate the maximum volume of water. This method of operation provides some flood protection, but it is only incidental to the artificial recharge program.3/

In fact, the Santa Clara Valley Water Conservation District was sued because it did not draw down one of its dams to provide more flood protection. The conservation district protested against assuming such an obligation. Its defense was that district "facilities for such reduction had been used to the fullest extent consistent with safety and the avoidance of waste."4/ And conservation was the primary operating objective.

This conflict also places "urban" interests in general conflict with the agricultural interests. Agricultural interests have not been

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1/ Ibid.

Notes taken at hearings of the Legislative Interim Committee on Water, San Jose, California, October 5 and 6, 1955.

2/ Minutes of the Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, June 20, 1955 (in the files of the District).

3/ California Department of Public Works, Santa Clara Valley Investigation, p. 61. This was the case in 1955. In addition, one or more of the reservoirs filled early during the years 1950-51, 1951-52, and 1952-53; and water was spilled.

4/ Santa Clara Valley Water Conservation District, Annual Report, 1958 (San Jose, California, 1959), p. 22. Also, Santa Clara Valley Water Conservation District, Annual Report, 1960 (San Jose, California, 1961), p. 28.

vocal with respect to floods in the lower northern Valley. Although orchards, field crops, and farm buildings have been damaged,[1] the total damage has been light compared to urban and industrial damage. Urban encroachment upon the flood plain and city runoff conditions from large surfaces of roofs and streets have materially aggravated this problem.[2] Differences in points of view have been sharpened, since urban dependence upon ground water is acknowledged, but the interest in artificial recharge has been more remote.

Water conservation and flood control are not completely competitive, as has been pointed out. Until the reservoirs are filled, incidental flood protection is provided in the early part of the season;[3] additional flood water storage capacity becomes available if satisfactory percolating conditions prevail during the remainder of the rainy season.

Another area of decision between flood control and water conservation is in the disposal of storm waters in the forebay area. Although good percolating facilities are limited, management attention should consider the potential of using storm waters which originate in the forebay for percolation purposes. Such an operation would involve an integration of the two purposes--flood control and water conservation--so that no public health hazard would result. In this decision the urban development interest would desire the rapid removal of storm waters to minimize the flood hazard, and the conservation interest would desire the transport of all or a portion of the water to areas suitable for percolation. These two activities are not in direct conflict, but their integration will require the active participation of both interests.

Water Conservation Versus Recreation

The water conservation interest in spreading all stored water within one water year means that reservoir levels must be drawn down as soon as

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1/ Santa Clara Planning Commission, Flood Problems in Santa Clara County.

2/ Ibid.

Minutes of the Advisory Committee, Santa Clara County Flood Control and Water Conservation District, San Jose, California, May 18, 1956 (in the files of the District). The flood problem in the Southern District was more serious for the farm interests, and the flood problem of this area has been studied in greater detail. For example, an army engineer flood control study was made in the southern Valley. Such studies are not made unless there is considerable local interest. On the other hand, interest in such a study has not been strong in the Northern District, and a full-scale study has not been completed.

3/ As noted, this incidental flood protection can be very important, as the December, 1955, flood proved.

percolation conditions are favorable and before the new rainy season. This is in conflict with the recreationist's desire for full reservoirs with minimum fluctuations. There are several reasons for this point of view. First, a full reservoir is aesthetically more appealing. Second, boat launching is more difficult and launching facilities are more expensive to construct if the water level is subject to a high degree of fluctuation. Third, if reservoirs are emptied during the summer months, fish life cannot be maintained; and even with a provision for a minimum pool, water temperatures and other environmental factors are subject to great variability. Such variability limits the types of permissible aquatic life. A fourth, and most important conflict, exists in the management of the rate of discharge. A major question is: Will water be available for any recreation during the summer months? Fifth, recreational use of the reservoirs means that certain minimum standards of health and safety must be maintained to develop the recreational potential. And in addition, other investments--such as parks, campsites, etc.--must be made for recreational development. Can a water conservation agency be reasonably expected to assume responsibilities of this type?

Recreation Versus Flood Control

The recreational and the flood control interests are frequently conflicting with respect to their objectives of reservoir management. The flood control interests desire an empty reservoir at the beginning of the winter rainy season.1/ After each storm, water would be released in accordance with channel capacity, thus making storage space available for the next storm.

On the other hand, recreational users desire the pool to be restored during the spring months for use in the peak recreational months. For this purpose water should be stored during the winter and spring months as the probability of heavy rains decreases. During this period a conflict might be encountered between the flood control objective and the objective of establishing lake fisheries and good wildlife habitats. This would be particularly true if the reservoirs were empty during most of the winter and spring months. With this method of operation, the opportunity for developing an abundant lake fishery would be largely foregone unless adequate dead storage were planned.2/

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1/ Santa Clara Planning Commission, Flood Problems in Santa Clara County, p. 14. "A flood control dam needs to be always as nearly empty as is practically possible in order to collect recurring storm runoff waters and to forestall floods on the Valley floor."

2/ The provision for such storage was the subject of discussion between the California Department of Fish and Game and the South Santa Clara Valley Water Conservation District. The Department recommended standards for a minimum pool. (From the files of the Department, San Francisco.)

Municipal Water Supply Versus Conservation, Flood Control, and Recreation

The importation of surface water will pose several areas of conflict in the management of the county's water resource. Reservoir space will be needed for terminal storage and reregulation. For public health reasons, the use of reservoirs for recreation is precluded in the final storage pool. The type and amount of prior use naturally will affect the costs of treatment. These storage facilities have less value for flood control purposes since a permanent pool must be maintained; however, they could provide a valuable assist to ground water management if properly located and if operated in conjunction with the ground water reservoir. The achievment of this goal requires coordinated management with respect to surface delivery, recharge, and draft. This area of complementarity will be most significant for the future economic development of the county.

The Interests' Organizations

Each of the enumerated interests currently has an organization of its own. Unlike the interests at the time the water conservation districts were created in the 1920's and 1930's, the new interests have not been represented internally within the water conservation districts' structure. The decisions of how the new interests should be organized have placed stress upon the existing districts and upon the management of the county's water. The agencies which are primarily concerned with these interests are the Santa Clara Valley Water Conservation District, the South Santa Clara Valley Water Conservation District, the Santa Clara County Flood Control and Water Conservation District, the County Department of Recreation, the municipalities, and the San Jose Water Works--a private utility company.

As previously noted, the Santa Clara Valley Water Conservation District and the South Santa Clara Valley Water Conservation District have been used to organize conflicting interests for the purpose of integrating the management of surface and ground water and to alleviate the problems associated with an increasing depth to water. Both organizations have continued to enlarge their physical operations since their creation, but the basic purposes have remained the same, although some adaptation to new interests has taken place.

County government has been used to provide a framework for making public decisions with respect to flood control. The Santa Clara County Planning Commission, in its role of approving street plans with respect to design and to traffic flow, was confronted with the problem of flood control and storm water drainage. The Commission was aware of the potential flood hazard involved in draining storm waters from these projects, but no legally or technically competent agency existed to pass judgment upon these plans. This was one of the reasons the Planning Commission

took an active interest in the creation of the Santa Clara County Flood Control and Water Conservation District.[1] The legislature passed a special enabling law in 1952 which organized the county-wide Flood Control and Water Conservation District[2] with the county board of supervisors as the official board of directors.

Municipal water supply is organized mainly as a function of city government or as a private utility supplying water service. The largest such utility is the San Jose Water Works. Since it is not a publicly owned corporation, its activities come under the jurisdiction of the California Public Utilities Commission.

Water management decisions by these public agencies in Santa Clara County involve a complex set of interrelated interests, some of which have been outlined in the previous sections of this chapter. Many of these decisions involve joint relationships between interrelated aspects of water management. The decisions of the water conservation districts are of concern to the Recreation Commission, the Planning Commission, the Flood Control District, and the municipal water suppliers; and many of the decisions of these latter agencies involve the water conservation districts. To this web of interest must be added the decisions of the irrigator, the domestic water user, the industrial water user, the cities in the county, the subdivider, the industrial developer, and others. The emergence of this interrelatedness of interest in ground and surface water use has raised major questions of integrated management. This problem poses for the water conservation districts the most important issue which has confronted them with respect to the form of organization.

The Water Conservation Districts and the Organization of New Interests

Coordination and the Role of Third Parties

The independence of the Flood Control District and the water conservation districts was made explicit in the Flood Control District's enabling act by forbidding it from exercising the power of eminent domain against the properties of the water conservation districts.[3] But conservation involved flood control, as was attested to by the historic

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1/ Santa Clara County Planning Commission, "Policy of State Water Pollution . . . ," pp. 31 and 46.

2/ California, *Statutes* (1952), c. 1405.

3/ *Ibid.*, "Nothing in this act shall authorize the district to condemn any of the properties, structures or works now owned or hereafter to be constructed or acquired, by any water conservation district within the County of Santa Clara."

flood of December, 1955. The near-empty Lexington Reservoir was able to store 13,400 acre-feet of water to "avert a disaster of major proportions in the town of Los Gatos and in a part of the city of San Jose."1/ Furthermore, the Santa Clara County Flood Control and Water Conservation District stated in its call for a bond election in its northeast zone, "The Water Conservation District has constructed two large dams, Coyote and Anderson, on the Coyote Creek itself that impound virtually all the runoff from the mountainous area of the upper Coyote watershed. The Coyote River downstream from the dams has reasonable capacity for present runoff to carry the flow of its large valley tributaries . . . to a point in the vicinity of Alviso-Milpitas Road."2/

Experience of this type clearly shows that complementarity does exist between the operations of the two organizations, although their

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1/ California Department of Public Works, Division of Water Resources, Floods of December, 1955, in California (Sacramento, 1956), pp. 3-11. Between December 21 and December 25, Lexington Reservoir held back 13,400 acre-feet of water, while Coyote Dam and Anderson Dam stored 30,250 acre-feet, p. A4.

U. S. Department of the Army, Corps of Engineers, Report on Floods. . . . "The December 1955 flood at San Jose would undoubtedly have surpassed all previous records and caused much greater damage had it not been for the control exercised by new conservation reservoirs," p. 81.

"A very serious flood situation in the vicinity of Los Gatos and downstream thereof, was averted during December 1955 by recently constructed Austrian and Lexington Dams. These two dams very effectively stored a total of 24,900 acre-feet of water between December 21 and December 25. Without this control, the waters of Los Gatos Creek would have caused untold damage through its highly developed flood plain. Austrian Dam filled and spilled during the December period. Lexington Dam did not spill during December but was subsequently filled," pp. 4-27.

"Existing conservation reservoirs materially reduced flood damage in the area, but such storage should not be depended upon for that purpose. Limited local water supplies and reservoir sites preclude integrated operation to include firm flood control," p. 27.

"Coyote Creek discharge above the Leroy Anderson Dam was fully controlled by conservation reservoirs. Below the dam, the discharge was of minor importance," p. 92.

2/ Santa Clara County Flood Control and Water Conservation District, Engineers' Report on Proposed Improvements for Zone E-1, Santa Clara County (San Jose, California, 1956), pp. 1 and 2.

guiding operating rules are designed to achieve different objectives. Flood waters are caught in the conservation reservoirs, but the purpose is to accumulate as large a volume of water as possible for recharge purposes.1/ On the other hand, the purpose of the Flood Control District is to have water storage space available and to provide channels to move the water rapidly to the Bay instead of holding it back for percolation purposes.

Since each of these interests has its own organization, the value of conservation and flood control has been expressed within separate organizational structures. Coordination has been incidental rather than through procedures of integrated management. Following the major floods of 1955-56, heavy pressure was exerted by third parties to achieve greater management integration. These third parties were represented mainly by the northern Valley cities, which feared severe flood losses if an integrated plan was not worked out. Although pressure for integration has been strong and sustained, effective integration has not been achieved by interdistrict organizational arrangements.

The realization that the activities of the two districts would have to be coordinated resulted in their drafting an agreement in June, 1955.2/ The preliminary report on the Water Conservation District's October, 1955, expansion program, however, did not specify that such coordination would be carried out, although flood control was listed as a benefit from the construction of the proposed new dams.3/ Financing was to be handled entirely by the issuance of bonds by the Santa Clara Valley Water Conservation District with no contribution from the Flood Control District.

Following the historic flood in the last ten days of December, 1955, another proposal was submitted in March, 1956. Because of this flood and because of the flood control benefits attributed to the existing dams,

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1/ The South Santa Clara Valley Water Conservation District built some flood control capacity into its reservoirs, as previously noted.

2/ Minutes of the Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, June 20, 1920 (in the files of the District). The board was urged to work out a cooperative financial arrangement between conservation and flood control as early as October 6, 1953. On September 17, 1954, the Flood Control District Advisory Committee was urged to cooperate with the Water Conservation District.

3/ Letter from Robert J. Roll to the Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, October 3, 1955, p. 15. (Mimeographed.) Flood control benefits were attributed to dams on the following creeks: Penetencia, Calabazas, and Silver.

the flood control aspects from the new conservation works were highlighted.[1] The second report did discuss the relationship between the two districts and concluded that the entire project should be financed by the Santa Clara Valley Water Conservation District, with the Flood Control District repaying the Water Conservation District from its normal tax revenue.[2] The plans for these proposals were worked out by the Santa Clara Valley Water Conservation District.

Concurrently, the Flood Control District was preparing a flood control program for the Northern Valley. There was some communication between the two districts in this planning process.[3] But each district had independent responsibility to pursue its independent goals rather than a responsibility to look at the whole water economy of the Valley and to integrate their activities in the planning process. As a result of pursuing these "independent but interrelated" goals, the impression was created that the two staffs were not fully cooperative[4] although the two chief engineers stated cooperation existed. However, the proposal[5] which was submitted for public consideration did not evidence that the two organizations were supporting the joint projects, and the fact that the Flood Control District did not include the Calabazas Dam[6] indicates they did not favor it. On the other hand, the Loupe Avenue cutoff was eliminated as a flood control project because the Water Conservation District was planning to construct the Silver Creek Dam.

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1/ Roll, 1956 Waste Water Salvage Project. "Due to this same urbanization there is an ever-increasing need for flood protection," p. 2. "Here again this /Silver Creek/ dam would serve a dual purpose. The Santa Clara County Flood Control and Water Conservation District had plans for a canal to divert the flood water. . . . By constructing a dam that would impound the maximum anticipated runoff of both Silver Creek and Dry Creek the necessity for this Loupe Avenue cutoff will be eliminated," p. 8.

2/ Ibid., p. 18.

3/ Minutes of the Advisory Committee, Santa Clara County Flood Control and Water Conservation District, San Jose, California, March 16, 1956 (in the files of the District).

4/ Ibid., December 17, 1954; April 18, 1955; March 16, 1956; and May 18, 1956.

5/ Roll, 1956 Waste Water Salvage Project.

6/ Santa Clara County Flood Control and Water Conservation District, Engineers' Report on Proposed Improvements. . . . This report recognizes that this dam might be built and states that the Flood Control District will cooperate to the extent of "the lesser improvement costs which would result from construction of such a dam," p. 21.

The December storm injected a strong third party into the decision-making process; namely, the cities of the northwestern half of the Valley. Several of these cities were largely dependent upon ground water and so were interested in the program of the Santa Clara Valley Water Conservation District. Also, they appreciated the fact that they were saved from severe flood damage because of the existing conservation dams. Consequently, they were strongly in favor of coordinating these aspects of water management. During the months of January and February, the cities made these views known to both districts. A delegation from the city of Saratoga urged that flood control be coordinated with percolation, the city of Santa Clara requested that conservation and flood control be studied jointly, and the city of San Jose wanted the construction of new dams and the raising of existing conservation dams.1/ The March, 1956, plan of the Santa Clara Valley Water Conservation District was essentially in response to this pressure to consider conservation and flood control as one problem.

Strong opposition developed, however, with respect to some of the proposed west-side projects of the Santa Clara Valley Water Conservation District. Opposition was expressed to both districts. The main argument was that these projects were too expensive and ineffective for flood protection.2/ The Flood Control District gave this point of view support to the extent that funds for these projects were not included in the September, 1956, call for a bond election. In addition, in March, 1956, when the Water Conservation District issued its plan, specific methods of cooperation between the two districts were not spelled out. Consequently, presentations before the boards of both districts stressed the need to coordinate flood control with conservation.3/ Because of this pressure,

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1/ Minutes of the Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, February 8, 1956 (in the files of the District).

2/ Minutes of the Advisory Committee, Santa Clara County Flood Control and Water Conservation District, San Jose, California, March 16, 1956 (in the files of the District).

Minutes of the Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, February 24 and March 6, 1956 (in the files of the District).

3/ Minutes of the Board of Directors, Santa Clara Valley Water Conservation District, San Jose, California, March 27, 1956 (in the files of the District).

Minutes of the Advisory Committee, Santa Clara County Flood Control and Water Conservation District, San Jose, California, May 18, 1956 (in the files of the District).

the Santa Clara Valley Water Conservation District did not call a bond election but instead restudied their plan. The election was delayed until March 26, 1957. In the meantime, the Flood Control District submitted a bond proposal on October 2, 1956.

The use of two districts has provided a means for the interests to organize themselves and to reach decisions within their respective groups. Within this organizational framework the groups desiring coordination had no assurance that their point of view would be represented. Primary pressure for coordination was exerted by forces "outside" of each district. Functionally, the original plan of the Santa Clara Valley Water Conservation District attempted to coordinate some phases of flood control and conservation. Organizational coordination was not spelled out, however, and, in addition, there was no indication that the flood control features had the engineering approval of the Flood Control District. Although it was stated that the management of the districts had consulted with each other, project planning was not integrated. As a consequence of third-party pressure, the Flood Control District's plan provided for coordination in terms of working out cost-sharing contracts between the two districts. To the extent that specific cost-sharing proposals were recommended and approved by the two districts, it might be presumed that there would be some degree of concurrence in their engineering plans. However, this procedure does not present the voters with a plan which has been coordinated through all stages of planning. The division of responsibility means that no responsibility exists for assuming over-all responsibility. Having one district represent both water conservation and flood control interests would not mean necessarily that a different decision would be reached. If some water management functions were neglected, there would be no question of knowing where to go for remedial action.

At the present time, no agency can perform this function. Nor has the existence of third-party pressure resulted in the integration of water planning within the county. The issues which were evidenced in the controversy previously noted are still active, although the current issues center upon problems of water importation. Third-party pressure still exists, but to date it has been difficult to bring important issues to public attention and public debate. The division of planning responsibility has limited the alternatives which could be considered because the objectives of the organization differed.1/

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1/ Steps have been taken in the direction of coordination as evidenced by the appointment of a review board. This joint board was retained to examine the engineering aspects of alternative plans for importing water into the county. The Flood Control District and the Tri-County Water Authority, to which the Santa Clara Valley Water Conservation District belongs, agreed to finance the review. This board, however, could not deal with questions of organization.

Differences in Objectives Result in Differences in Organizational Structure

As previously noted, each of these interests has organized separate districts which fit the specialized management tasks they were to perform. In each the district performs the function of organizing the interests to make decisions, and in each the attempt is made to relate the incidence of benefits and costs by means of the district structure.

The Santa Clara Valley Water Conservation District is organized on a basin-wide basis with an assessment falling upon the value of the unimproved land within the district. This procedure was adopted on the assumption that benefits would be reflected in the value of the land as the water was used in combination with the land. In addition, the benefits would be reflected in wells throughout the basin; therefore, a district-wide assessment was appropriate.

On the other hand, the benefits from flood control accrued not only to the land but to the improvements upon the land. For this reason, the Flood Control District was organized on different terms and placed the incidence of cost upon the land and improvements within the district. However, the costs were not distributed uniformly throughout the district as in the case of the Water Conservation District but were distributed on the basis of five zones within the district. The boundaries to these zones followed the stream watershed, thus dissecting the land overlying the northern ground water basin into four zones and treating the southern Valley as one zone. Projects could be initiated for the benefit of a single zone, or two or more zones could participate jointly in projects, with the costs being distributed among the cooperating zones.1/ By using the zone procedure, the zone residents brought the entire stream watershed within their control. With this arrangement an upstream structure would be in the same zone as the downstream flood plain. Thus, the northern Valley was not considered as a unit for the purpose of executing a flood control management plan. But for purposes of flood control planning, the entire county could be viewed as a single developmental unit.

These differences in structure between the two districts resulted from the different problems which they are seeking to solve, but these differences do not stand as insurmountable to the problem of physical water management. However, the use of flood control zones versus the whole valley floor for water conservation created difficulties in reaching water management decisions and in determining the repayment procedures.

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1/ California, Statutes (1952), c. 1405.

Since the electorate in each flood control zone must vote upon the projects which affect the zone, joint projects between the two districts must receive a concurring vote from the cooperating zone or the Water Conservation District, as the case may be. This procedure has the merit of separating these interests and affords the opportunity for the interests to be voted, but it means substantial delays in project initiation. For example, the proposal between the Northern District and two of the zones of the Flood Control District was made in March by one district, and it was September before the other district could hold an election. And it was not until the following spring, 1957, that the Water Conservation District held its election. Delays of this type were due in part to the fact that the Water Conservation District wanted to adjust the size of its bond request to fit the outcome of the Flood Control District's election. This was one reason the Flood Control District's election was prior to the Water Conservation District's election. In this instance, the Flood Control District voters did not accept the plan.

The fact that two elections must be held presents problems of timing. The voters are subjected to the demands of voting for or against bond issues for schools, city government, city waterworks, sewage disposal, and for many other types of expenditures. The officials who set the dates for bond elections prefer to have their election independent of other elections because of fear that the electorate will not vote increased taxes because of the size of the combined bond issues. For reasons such as these, the timing of bond issue elections is partly a matter of strategy, and this may mean that the reaching of a decision may be drawn out over several months or years.

Another difficulty with the differences in organizational structure is that the electorate does not have an opportunity to vote upon the joint project as a joint project. These coordinated undertakings are presented as small portions of a flood control project or a water conservation project. If the bundle of flood control projects is disapproved, the flood control benefits from the construction of a conservation dam would not be chargeable to the Flood Control District. Nonetheless, the dams with joint benefits might be approved and built as water conservation dams. In this fashion, the flood control benefits would accrue to the locality, but their costs would be spread over the entire Water Conservation District. Such an approach could result in the shifting of a portion of the incidence of flood control costs to the Water Conservation District and thereby to the taxpayers throughout the Valley rather than in the benefited area. As a historical fact, the joint projects were not instituted.

The structural difference between the two districts is suggestive, however, of a method for assessing the costs of a project to the areas which are benefited. The boundaries of the Water Conservation District encompass the area to be benefited by artificial recharge, and the zone lines of the Flood Control District are intended to encompass the areas

of flood control benefit from flood control works on specific streams. A formula for allocating the costs between the two districts was agreed upon, and these costs were assessed to the areas benefited through the district structure. By proceeding in this fashion, it is possible to assess costs to specific areas benefited; the fact that two districts are involved need not be a requisite for using this procedure. The Flood Control District is empowered to "establish zones within said district without reference to the boundaries of other zones, to set forth in such resolutions descriptions thereof by metes and bounds and to entitle each of such zones by a zone number, and to institute zone projects for the specific benefit of such zones."1/ Also, the Santa Clara Valley Water Conservation District has used a procedure of long standing--improvement districts within a larger district. Existent districts thus have the power to create within their jurisdiction many zones of benefit, irrespective of the extent to which they overlap. These zones of benefit become repayment zones as each zone has an assessment rate which is calculated upon the zone's share of total cost. In this fashion, an attempt can be made to have the incidence of cost coincide with the incidence of benefits not only as to geographic area but also with respect to the type of assessment which is levied.

Still another benefit area has been delineated with the county's assumption of responsibility for recreational development of the reservoirs. The objective is to utilize the reservoir and other lands for recreation within the county. The main objective is not water management, although as recreation has become more important this water management interest has been considered. The Recreation Commission and the Water Conservation District both stress the point that each concentrate upon its own interest; consequently, danger that interrelated management issues may not be taken into account at the planning stage is present. Despite this, the separate organization of these objectives has made it possible to pursue both, while if recreation had remained a side line to water management, it might not have been so thoroughly developed.

Another aspect of special organization approach is that each levies an assessment independently of the other. The levy structure within the county becomes highly complex, with many rates being applied against a particular piece of property, thus complicating the administration of the local assessment system. But the existence of many jurisdictions of benefit enables each taxpayer to determine his contribution to each governmental activity, and the taxpayer is able to compare his tax with each of the services rendered to his particular property.2/ In other

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1/ Ibid.

2/ The ease with which the taxpayer is able to make this determination depends upon the method used to distribute publicly a detailed breakdown of the rate structure.

words, the individual taxpayer serves as a point for "integrating" overlapping areas of benefit. The county board of supervisors serves as another vantage point for viewing the whole assessment, as many of the county's financial problems must be passed on by them. The county board sitting as the Flood Control District board is thus familiar with this activity as with other activities which must be supported by a county property tax. This organizational arrangement can provide a focal point for weighing the relative importance of many competing and complementary alternative public expenditures.

The water conservation districts are independent, with respect to formal ties,1/ from other governmental units, and therefore the expenditures of other units of local government do not come before their review. After their own projects are judged financially feasible and of economic benefit to the community, the relationships to other local expenditures are examined mainly from the point of view of winning voter approval. The total amount of the levy, the relationship among the levies of other local governments, and the date of election are important considerations.

Control of Draft

One of the conflicts in ground water management emanated from the competitive nature of draft from the ground water basin. Although competition for water is pervasive in the use of the basin, the conflict has centered between the agricultural and the nonagricultural users. The agricultural users have been particularly opposed to the expansion of the number and location of deep wells supplying the growing nonagricultural needs. These wells are being sunk in the predominantly agricultural forebay area rather than in the location of the older deep wells in the pressure zone.2/ This location places the wells closer to the Santa Clara Valley Water Conservation District's percolation ponds and

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1/ Many important informal and some formal relationships exist which relate the activities of the "independent Water Conservation District with the activities of other units of county government." For example, the county treasurer's office and the county assessor's office perform administrative functions for the water conservation districts, but the county government does not exercise a control function. This point was clearly illustrated during the summer of 1959 when the county board refused to approve a budget for the Tri-County Water Authority. Such a failure, however, had no effect on the Authority other than to publicly record the county board's dissatisfaction.

2/ An increase in draft in the forebay will also decrease the volume of water percolating into the pressure zones, thus adversely affecting the deep nonagricultural wells in this area. However, the deep wells will be better able to withstand this adverse effect.

in more direct competition with surrounding agricultural wells. Because of this competition, there has been group pressure for some type of control of ground water draft.

Within this area of conflict, neither the water conservation district nor any other agency has the power to control draft unless damage can be shown.1/ Their only policy is to increase and develop additional water for percolation or for surface delivery. However, the district could be empowered to institute various means of controlling draft if constitutional guarantees were not violated and if the district electorate consented to their imposition.

Local effort has been mainly expended in attempting to secure imported water from other sections of the state or in advocating a state law which would provide for the appropriation of ground water rather than attempting to establish local means for regulating draft. Local controls could take several forms--from intensive educational programs to the offering of technical assistance, the imposition of a pumping tax, or to the passage of ordinances regulating pumping.

Persuasion has been attempted in urging nonagricultural users to refrain from pumping and to contract for Hetch Hetchy water. This alternative has been rejected in large part because of the high cost of water. These users could not be induced to contract for water at a higher price than they could pump it, although purchases have been made in limited areas as noted. Public education, with respect to other facets of water management, has been carried on by the Santa Clara Valley Water Conservation District since October, 1956, when the board of directors retained the services of a public education director.2/ But real problems concerning the spacing of wells, and similar activities, still exist.

The direct control of draft has not been faced or discussed as yet, largely because of the good prospects which exist for importing water. These prospects are largely based upon the county's inclusion in the California Water Plan through the South Bay Aqueduct and/or the U. S. Bureau of Reclamation's Pacheco Pass tunnel and canal systems; applications to appropriate water from Santa Cruz County; other proposals for developing additional water from within the county, particularly lower Uvas Creek; and the reclamation of waste water.

Such importations do not preclude the possibility for continued pressure to control draft. This will depend upon the type of management

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1/ As noted, injunctive action may be taken in certain cases.

2/ An active and successful educational program of capping and sealing wells was carried out in the bay shore area of the northern Valley.

plan which is adopted and how the imported water is used. For example, to fully integrate the basin management with importation, plans could call for controls with respect to time and volume of pumping and to the necessity of deliberately drawing down portions of the basin below the current economic depths of pumping. If such a situation develops, the districts could be utilized as the appropriate management agency. However, for a district to acquire this degree of control would require an extended period of local discussion to formulate an acceptable plan. The problems in using the district for this purpose require extended study to insure that all local interests have an opportunity of expression.

Integrating Recreational Water Management with Conservation and Flood Control

The performance of the function of developing the recreational potential of the conservation reservoirs has not been incorporated into the operations of the water conservation districts or the Flood Control District. These boards have recognized the public nature of their operations, and they have allowed people to have access and to use their reservoirs for recreational purposes. As noted, the Santa Clara Valley Water Conservation District board of directors has been forced to make an increasing number of decisions with respect to the recreational management of the reservoirs. But their position has been stated repeatedly: The job of the Water Conservation District is conservation management and not recreational development of the reservoirs. This attitude has been based upon the philosophy that recreational development was a broad county problem which should not be attacked on a piecemeal basis by persons without authority and competence in the field. They therefore urged the assumption of this responsibility by the county. The effort was consummated by the county board of supervisors in 1955 with the creation of the Santa Clara County Parks and Recreation Commission as a part of the county government[1/] and with contracting for a detailed study of the county's recreational needs.

The district's single function was maintained. That function was to collect levies from the area benefited by artificial ground water recharge while the incidence of cost for developing these reservoirs for recreational purposes was placed upon the taxpayers throughout the county. The Santa Clara Valley Water Conservation District maintained the responsibility for reservoir management, however. If the recreational interests want to change the present water management policy, their point of view will have to be presented to the Water Conservation

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1/ California, Santa Clara County, Board of Supervisors, Ordinance N.S.-300.10 (1955).

District board for consideration and execution. But the diverse recreational interests can coordinate their program through the Parks and Recreation Commission and present a plan with county-wide support to the Water Conservation District with their recommendations. For example, such a request could be made with the backing of the recreational interests--both city-wide and county-wide--and with the concurrence or active support of the county government and city governments and the interests represented therein. The final decision, however, would be left with the Santa Clara Valley Water Conservation District board, which itself is an interested party. Such a situation could result in the reaching of an amicable agreement if the interests were appreciative of the position of one another.1/ On the other hand, the situation could result in a "standoff" if recreational interests were not adequately represented to the conservation board.

The Recreation Commission has taken a positive attitude and has proceeded to develop the recreational potential of the reservoirs. It has developed county facilities, and the state has designated one area on the east side of Coyote Creek reservoirs for state park purposes. The Recreation Commission also plans to invest in permanent buildings and lease the space when the concessionaire contracts signed with the Santa Clara Valley Water Conservation District expire. Since the Recreation Commission maintains its control over buildings and fixtures, it will be in a strong position to manage recreational development.

In addition to the water management conflict over reservoir pool levels between recreation and conservation and flood control interests, there is the future problem of utilizing the reservoirs for recreation and municipal water storage. Such use would immediately place some recreational reservoir use in conflict with public health standards unless adequate investment in water treatment plants was made. This conflict is in the offing and would have to be taken into account in planning recreational development.

Resolving of the municipal water supply-recreational conflict might be complicated by the decision-making structure. Several municipalities have contacted the Santa Clara Valley Water Conservation District about furnishing direct surface delivery,2/ and the district has included these proposals in its planning. Because of the way interests are represented, however, this particular interest may never become clearly incorporated into planning and decision making of future water development. Such a situation is due in part to the fact of each specialized interest having its own official organization. Thus, coordination is

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1/ The evidence supports the position that such an agreement might be worked out in Santa Clara County.

2/ Santa Clara Valley Water Conservation District, Preliminary Design Cost Analysis . . . , p. 9.

achieved mainly as the result of public pressure rather than being built into the decision-making framework by insuring representation.

Municipal Water Supply and Water Importation

The fact that two major districts are operating over the same area in the northern portion of the Valley has resulted in a struggle for control over imported water. The Santa Clara County Flood Control District favors the State Department of Water Resources proposal to import water via the South Bay Aqueduct through Alameda County, while the Santa Clara Valley Water Conservation District, as a member of the Tri-County Water Authority, has been backing the Pacheco Pass route and the use of its existing reservoirs for terminal storage. The struggle for power between these two districts is active and unresolved.1/

The Santa Clara Valley Water Conservation District has planned toward the day importation would be needed. This future necessity was taken into account when 75,000 acre-foot capacity was built into Anderson Dam. In addition, the management of the district was active in the creation of the Tri-County Water Authority (Alameda, Santa Clara, and San Benito counties). The main purpose of the Authority has been to promote the importation of water.

With respect to organizational structure, the controversy as to which agency will import water is significant. Two large specialized districts have grown within the county and are now vying for control of water importation. The addition of this function to existing operating objectives will mean in one instance that surface municipal water supply will be related to flood control, while in another it will be related to ground water management and the supply of limited surface water for irrigation. Based upon the existing history of experience with the use of the public district within the county, it would seem that a higher degree of integrated management could be achieved through bringing ground and surface management into one decision-making unit.

The centralization of water management has advantages as noted; for example, it places responsibility clearly upon one decision-making unit. The danger inherent in this form of organization is the possibility that decisions will be made without regard to the public. But an alert citizenry can forestall this eventuality; and, if deemed

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1/ According to information received after this study was completed, the two districts jointly recommended on October 11, 1961, that both routes be approved. Water would be delivered via the South Bay Aqueduct by 1964, and the federal Pacheco Pass route would be used after 1970. The U. S. Bureau of Reclamation is currently studying the latter route. Water Conservation News (San Jose, California: Santa Clara Valley Water Conservation District), vol. 5, no. 10, October, 1961, pp. 1 and 3.

desirable, procedures for making a full public accounting can be developed. Further, management's actions will be carefully examined--by the municipalities on the one hand and by the state on the other. This situation could leave to the single organization the prime function of integrating local surface and ground water management.

Chapter 7

CONCLUSION

The basic question addressed by this study--"Can the public district serve as a form for organizing the integration of conflicting interests in the management of ground and surface water?"--must be answered affirmatively. Pitfalls are apparent, however, and should be guarded against.

Were the people in Santa Clara County able to define a common interest in a plan for action through district procedures? This common interest was achieved through a process of making sequential decisions on one plan at a time and incrementally altering the plans until agreement was obtained. In this pattern, proposals were made in 1921, 1925, 1929, and 1931 in the Northern District. A similar sequence occurred in the Southern District. Each plan differed from the preceding in an effort to achieve agreement.

As a result of this process, the relationship between the district boundary and the plan for action became clear--namely, agreement could not be reached until the area of benefit was incorporated within a single unit. Thus, the areas overlying the ground water basins were the major units. As other areas demanded special services, improvement or special assessment districts were organized around these areas.

The problem was one of relating the organization to the plan and the benefiting interests. Needless delay was caused by the fact that too many unrelated or nonfunctionally related interests were incorporated into one proposal to achieve agreement upon a common interest; earlier determination of the relationship between the plan for action and the organization would have alleviated much of this difficulty. The present Water Replenishment District Act provides for such technical determination by the Department of Water Resources.[1] Such determination should facilitate the identification of the incidence of benefit from the plan.

The experience in Santa Clara County reinforces the observation that goals (ends) of policy are not established before means for execution are provided. The leaders had both ends and means of policy in their minds, and these concepts served as their guiding principles. In the act of making public policy, ends and means were decided simultaneously. In fact, the basic question the voters were asked to answer was: Shall a specific organization be created? Since this situation is often true, it places added importance on the prior determination of the relationship between the plan for action and the organization.

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1/ California, Water Code, Div. 18, secs. 60001-60449.

The organization also specified the terms or the relationships between water users and between the water users and the plan. Conflicts centered around those terms which affected project control and the incidence of costs.

The public district places control over its activities in the hands of local people rather than in a state or federal agency. Local people express their views through voting, and through discussion with the organization staff. Because of the high degree of organizational flexibility, the district's policies can be adapted to the particular problems of the locality. Further, this method of organization permits the ground water users to organize for ground water management within the present framework of the correlative rights doctrine. This ability to retain project control locally, however, poses familiar problems of obtaining effective local political action.

With respect to project control, approval was not forthcoming if particular groups feared a loss in control over the resources they considered to be theirs. This issue was of primary importance both in relation to organizing the districts and in efforts to work out agreements for construction and operation of specific projects. In one instance, there was an absolute refusal of joint efforts; while in the instance of Coyote Valley, a district was organized for defensive reasons--to protect vested interests and to gain greater strength in bargaining over terms of organization. This resulted in obtaining one seat on the board of directors of the Santa Clara Valley Water Conservation District. Thus, the district has the ability to give resource control to the local interests but agreement does not have to be unanimous. The terms of organization will specify these political-economic relationships by determining who can vote. The diffusion of benefits in Santa Clara County contributed to giving registered voters the franchise privileges. Caution needs to be exercised in selecting or writing the enabling act. Some district acts are so drawn as to place the control of the district within the hands of a very narrow group. In such cases, the possibility exists for domination by special interests rather than public interests.

The effect of having the broad base for voting has led to a responsiveness to the changing character of the population from farm to nonfarm. Because the board of directors is elected by a simple majority within electoral districts, but bond approval requires a two-thirds favorable vote on a district-wide basis, the relationship between farm and nonfarm has maintained a balance. Elections for board seats in the northern Valley generally have had little or no contest--for over two decades the electoral boundaries favored farmers; consequently, farm interests have been represented most heavily. But on financial matters of bond issues, a wider representation has been obtained as the nonfarm property owners contributedapproximately 63 per cent of the district revenues between 1957-1959. Yet, the district organization has had elements of flexibility. Electoral districts were changed, and nonfarm interests are appearing on the board as the district serves a higher proportion of municipalities and as the electoral districts become more urban.

In the formation process, conflicts arose over the incidence of costs. Again, the district is a flexible form of organization to the extent that it permits the process of bargaining to take place until a workable solution

is found. Assessment of benefits, an excise tax on pumping, and an ad valorum assessment of land and buildings were all considered; they were rejected because the relationships established by these terms were not in accord with the local evaluation of equity. The solution agreed upon was assessment on the value of the land exclusive of improvements. Both urban residents and farmers would pay on the value of their land. The justification was that by reducing the physical uncertainty in the supply of water to county residents the values of all property would be enhanced. A practical working of this concept can be seen in the fact that before the water conservation districts came into existence, local farm credit institutions would often warn about the dangers of assuming a mortgage debt in areas with an uncertain water supply.

The necessity for a two-thirds favorable vote on bond issues has been conducive to the establishment of a Valley-wide water management program. By focusing attention upon ground water and integrating surface water management with it, rather than the reverse, the extreme localism of managing each small surface stream as a unit was avoided. With this orientation the physical relationships of surface seepage and underground percolation were given consideration.

The district has been successful in sorting out functions and combinations of interests until one main overriding interest could be determined. Organization was then accomplished around this purpose. But the dynamics associated with time often means that new purposes arise to compete with existing purposes or to be complementarily integrated with them. Flood control, recreation, water importation, and municipal water supply fall into this category. In this case, recreation, importation, and municipal water supply have a large degree of complementarity, some competitiveness, and, for recreation, considerable areas of independence. On the other hand, flood control has been competitive to a significant degree in upstream matters but independent in many downstream situations.

The Santa Clara Valley Water Conservation District has found it difficult to integrate, within the district structure, the representation of recreational interests. When the recreational interests began to develop, the Santa Clara Valley Water Conservation District attempted to handle these affairs; that is, the board investigated police responsibility and contracted for concessions. But this interest was not formally recognized as a purpose of organization, and no expert staff was hired to represent it in district management. On the contrary, the Santa Clara Valley Water Conservation District assisted in the organization of a special group to develop the recreational resources of the county, including the reservoirs. The development of a sound area-wide recreational program contains many objectives not related to water management, and so separation of the two was deemed advisable. The recreational interest is basically external to the districts. Its new organization can hire competently trained specialists to represent its interests to the district boards of directors on matters of water development.

Flood control is another interest which has become important during the last 15 years. This interest also was organized separately. Its functions

were in part distinct; yet, in part, they also were complementary, as the floods of 1955 and 1958 illustrated. The use of two organizations has resulted in conflict so that an integrated plan has not been presented. Integration must take place in the design and planning stages. Since this has not been done, the voters have not had the opportunity to consider the full range of alternatives. Integration efforts have been attempted through third-party pressure, but this has not been successful to date. Thus, an apparent danger in using districts is the fact that they may be organized on such a narrow range of interest that fragmentation of decision making results, with consequent inability to cope with problems.

The integration of imported water is currently unresolved. The functional relationship between importation and ground water management would suggest that integration in planning and operation would be desirable. Such integration is feasible through the district structure thus avoiding fragmentation of functionally related water management decisions. On the other hand, it is not insured if separate interests each have their own district.