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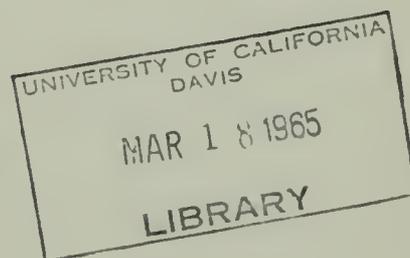


State of California
THE RESOURCES AGENCY
Department of Water Resources

BULLETIN No. 119-9

FEASIBILITY OF SERVING
THE NAPA COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
FROM THE STATE WATER PROJECT

FEBRUARY 1965



HUGO FISHER
Administrator
The Resources Agency

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

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ERRATA SHEET

Bulletin No. 119-9, "Feasibility of Serving the
Napa County Flood Control and Water Conservation
District From the State Water Project"

- Page 37- In ninth line the transposed word should be corrected to read "accomplished".
- Page 55- In fifth line after Table 24, substitute "located" for "location".
- Page A3- In last line of Paragraph 4, substitute "20 miles east" for "20 miles west".
- Page A4- Under Paragraph 3, add the following information opposite letter designations:
- a. Not Applicable
 - b. Not Applicable
 - c. No Limit
 - d. No Limit
 - e. Not Applicable
 - f. No Limit
 - g. No Limit
 - h. Not Applicable
 - i. Varies from year to year and district to district
 - j. No Limit
 - k. \$.15

March 5, 1965

FOREWORD

In November 1960, the California Water Resources Development Bond Act was approved by the State's electorate, paving the way for the construction of the State Water Project as the first phase of the California Water Plan. Since that time, many local water service agencies throughout the State have contracted with the State for water service from the proposed facilities. Several water agencies have been organized since November 1960 expressly for the purpose of obtaining water supplies from the state facilities for the areas they represent.

Prior to executing water supply contracts with water agencies, the Department of Water Resources makes studies of the agencies and the areas encompassed by them to determine the propriety of entering into such contracts. These studies are made with the goal of evaluating (1) each area's future demand for supplemental water supplies, (2) the legal ability of each agency in question to enter into a water supply contract with the State, (3) the engineering feasibility of providing the proposed water service, and (4) the financial ability of the agency to contract for a water supply from the State Water Project.

The results of studies made for each agency, as described above, along with significant supporting material, are embodied in reports published by the Department of Water Resources. This bulletin is one of a series of such publications and describes studies which led to the signing of a contract with the Napa County

Flood Control and Water Conservation District on December 19, 1963. The contract provides for delivery of a maximum annual entitlement of 25,000 acre-feet of water from the North Bay Aqueduct.

TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	iii
ORGANIZATION, DEPARTMENT OF WATER RESOURCES	xi
CHAPTER I. INTRODUCTION	1
Purpose of the Report	1
North Bay Aqueduct	2
Description of the Service Area	5
Development of the Area	6
Description of the Contracting Agency	7
Power of District to Finance its Contract with the State	8
Ability to Contract with the State	10
Local Water Agencies	11
CHAPTER II. PRESENT AND FUTURE DEVELOPMENT OF THE ECONOMY OF NAPA COUNTY	13
Population	13
Economic Support of Napa's Urban Economy	15
Agriculture	17
Historical and Present Agriculture Land Use	17
Irrigated Agricultural Land Use	18
Agricultural Incomes	18
Land Classification	20
Future Agricultural Development	21
Crop Projection	21
Agricultural Payment Capacity	22
Future Land Use	24
Urban Land Requirements	24

TABLE OF CONTENTS

	<u>Page</u>
Agricultural Land Requirements	26
CHAPTER III. WATER REQUIREMENTS AND WATER SUPPLIES	27
Urban Water Use	27
Unit Values of Municipal and Industrial Water Use . .	27
Present and Future Urban Water Requirements	28
Agricultural Water Use	29
Unit Values of Agricultural Water Use	29
Present and Future Agricultural Water Requirements	30
Present and Future Water Supplies	30
Local Surface Supplies	31
Ground Water Supplies	31
Imported and Exported Water Supplies	34
New Supplies	34
Summary of Water Supplies	36
Supplemental Water Requirements	36
Supplemental Urban Water Requirements	37
North Bay Aqueduct Contract	37
CHAPTER IV. COST OF WATER SERVICE TO NAPA COUNTY FROM THE NORTH BAY AQUEDUCT	41
Aqueduct Facilities	42
Cost of Facilities	42
Local Conveyance and Water Treatment Costs	45
City of Napa	46
Carneros Area	46

TABLE OF CONTENTS

	<u>Page</u>
American Canyon County Water District	46
Costs	47
CHAPTER V. ECONOMIC JUSTIFICATION AND FINANCIAL FEASIBILITY	
Economic Justification	49
Financial Feasibility	50
Present and Projected Assessed Valuation	51
Present and Projected Total Indebtedness	53
Ad Valorem Taxes	55
Capability to Meet Contract Obligations	56
Effect Upon Indebtedness	57
Effect Upon Ad Valorem Tax Rate	58
CHAPTER VI. SUMMARY AND CONCLUSIONS	
Summary	61
Conclusions	62

TABLES

<u>Table No.</u>		
1	Historic and Projected Populations of Napa County	14
2	Present and Future Population of the North Bay Area Within Napa County	15
3	Historical and Present Agricultural Land Use in Napa County	18
4	Historical and Present Agricultural Income in Napa County	19

TABLE OF CONTENTS

<u>Table No.</u>		<u>Page</u>
5	Classification of Potential Agricultural Lands in the North Bay Area of Napa County	20
6	Estimated Future Irrigated Crop Pattern in the North Bay Area of Napa County	23
7	Estimated Annual Payment Capacity for Selected Irrigated Crops in the North Bay Area	25
8	1990 Urban Land Requirements in the North Bay Area of Napa County	26
9	Estimated per Capita Water Use in the North Bay Area of Napa County	28
10	Present and Projected Urban Water Requirements of the North Bay Area within Napa County	29
11	Unit Values of Annual Water Use by Crops in the North Bay Area of Napa County	30
12	Future Agricultural Water Requirements in the North Bay Area of Napa County	31
13	Surface Water Supplies in the North Bay Area of Napa County	32
14	Ground Water Utilization in Napa County	33
15	Developed Water Supplies in the North Bay Area of Napa County	36
16	Supplemental Water Requirements in the North Bay Area of Napa County	38
17	Summary of Water Charges for Napa County Flood Control and Water Conservation District	44
18	Estimated Conveyance and Treatment Costs for North Bay Aqueduct Water	47
19	Historic Assessed Valuations in Napa County	51
20	Historic Per Capita Assessed Valuation in Napa County	52

TABLE OF CONTENTS

<u>Table No.</u>		<u>Page</u>
21	Projected Assessed Valuations of the North Bay Area Within Napa County	53
22	Present Indebtedness in Napa County	54
23	Historic Indebtedness of Napa County	54
24	Estimated Future Indebtedness in Napa County . .	55
25	Historic and Present Average Ad Valorem Tax Rates in Napa County	56
26	Summary of Capital Repayment Obligations Resulting from North Bay Aqueduct Contract . .	57
27	Estimated Levels of Indebtedness in Napa County Resulting from All Sources in 1968	58
28	Tax Rate Required for Repayment of Principal, Interest and Minimum Annual Charges of the North Bay Aqueduct	59

PLATES

(Plates follow page 64)

<u>Plate No.</u>	
1	North Bay Area, Napa County
2	Agricultural Service Areas in Napa County
3	Existing Water Development Facilities in Napa County
4	North Bay Aqueduct and Local Facilities for Service of Project Water

APPENDIX A

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

EDMUND G. BROWN, Governor
HUGO FISHER, Administrator, The Resources Agency
of California
WILLIAM E. WARNE, Director, Department of Water Resources
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BAY AREA BRANCH

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CHAPTER I. INTRODUCTION

On December 19, 1963, the Napa County Flood Control and Water Conservation District contracted for a supplemental water supply of 25,000 acre-feet annually from the State Water Project. The need for an additional water supply for Napa County has been substantiated in previous published reports of the Department of Water Resources, the most recent of which is Bulletin No. 110, "North Bay Aqueduct," December 1961. Water from the State Water Project will be imported through the North Bay Aqueduct. The contract provides that the aqueduct be constructed from Cordelia in Solano County to a terminus in Napa County with initial delivery to be made in 1967. Water will be provided at Cordelia until 1980 from either the Putah South Canal of the Solano Project of the Bureau of Reclamation or from the Cache Slough Pipeline of the City of Vallejo. Reaches of the North Bay Aqueduct will be constructed across Solano County to Cordelia by 1980 to meet all terms of the contract after that date.

Purpose of the Report

The purpose of this report is to support the need for supplemental water within Napa County, and the terms and conditions of the water service contract between the district and the State. Information within the report includes the present and future economic development of the county, population and crop projections, future water use and demand for supplemental supplies of imported water, and the costs and economic justification for serving the

area with imported water. Also presented are the district's legal ability to contract with the State, its power to act as a wholesaler of water, its taxing powers, and its ability to successfully meet the financial obligations under the water service contract.

North Bay Aqueduct

Investigation of the North Bay Aqueduct was originally authorized by the Abshire-Kelly Salinity Control Barrier Acts of 1953 and 1955. The aqueduct was proposed in Bulletin No. 60, "Interim Report to the California State Legislature on the Salinity Control Barrier Investigation," Department of Water Resources, March 1957, with plans for delivery of fresh water to the counties of Solano, Napa, Sonoma, and Marin.

Bulletin No. 60 recommended authorization of the North Bay Aqueduct for construction as a feature of the California Water Plan, and the appropriation of funds for the acquisition of lands, easements, and right-of-way and the preparation of construction plans and specifications. The Legislature in 1957 added Section 11270 to the Water Code authorizing the department to construct and operate the North Bay Aqueduct as a feature of the California Water Plan and a unit of the Central Valley Project, and appropriated \$1,340,000 for the preparation of construction plans and specifications. In 1959 the Legislature appropriated an additional \$1,000,000 for acquisition of lands, easements, and rights-of-way.

Following a public meeting of the north bay counties on April 28, 1960, a re-evaluation study of the North Bay Aqueduct was undertaken. The results of this study were reported in Bulletin No. 110, "North Bay Aqueduct," Department of Water Resources,

December 1961, and concluded that the North Bay Aqueduct was the most feasible means of providing near-future requirements for supplemental water in the "North Bay area." The "North Bay area" is defined as that study area which encompasses those portions of the four North Bay counties, including Napa, which lie within the drainage area tributary to San Francisco Bay. Based on the estimates of future water requirements an aqueduct capable of serving approximately 115,000 acre-feet per year of water to the North Bay area was evaluated and determined to be feasible for construction. Of this amount 44,500 acre-feet of water per year was included for Napa County for urban and agricultural uses.

During 1962 and 1963 extensive negotiations were carried out with Napa County for the sale of water from the aqueduct. These negotiations were brought near conclusion on December 10, 1963, when the Board of Supervisors of the district adopted the following resolution.

"BE IT RESOLVED by the Board of Supervisors of the Napa County Flood Control and Water Conservation District that this Board hereby finds and declares as follows;

1. This Board has the responsibility to act in the interests of all of Napa County to provide such supplemental water supplies as are necessary to meet its increasing water demands and to assure its economic growth.
2. The supplemental water requirements for domestic, municipal and industrial uses within the southern portion of Napa County will be 25,000 acre feet per annum by 1990.
3. The most economical method of meeting this supplemental water requirement is by contracting with the State of California for a supply from the North Bay Aqueduct, provided such aqueduct is constructed at a time to meet the joint needs of Napa and Solano Counties.

4. Such joint use of the North Bay Aqueduct will require deferring the completion of the reach thereof from the Delta to Cordelia until 1980. However, the reach from Cordelia to Napa will be constructed at an earlier date to transport Napa County's interim requirements from 1968 to 1980.

5. This Board has received assurance that the supplemental water requirements of the County, and particularly those of the City of Napa, for the period from 1968 to 1980 can be met from sources within Solano County.

6. This Board intends to execute prior to December 31, 1963, a water supply contract with the State of California to accomplish the foregoing.

7. This Board will forthwith enter into the negotiation of a contract with the City of Napa whereby, on terms mutually satisfactory, the City may purchase a portion of said supply for treatment, distribution and sale."

Solano County in the course of final negotiations also decided to participate in the aqueduct by contracting for a maximum annual entitlement of 42,000 acre-feet.

Since the original studies of the North Bay Aqueduct were made, Napa County has supported its construction. During 1961 a report entitled "Napa County Water Needs Study and Plan," was prepared by Farnum-Kerr Associates and Frederick L. Hotes for the district. This report concluded that supplemental water would be required in the southern part of Napa County by 1965. This requirement was estimated to increase to 28,000 acre-feet annually by 1981. In assessing the North Bay Aqueduct the report states:

"The North Bay Aqueduct, essentially as proposed by the California Department of Water Resources, is the most economical and practical source of imported water to supplement local water development for fulfillment of the water needs of Napa County in 1981 and 2020."

Initial delivery of water probably will not be made to Solano County until 1980, thereby maintaining the joint use concept specified in the Napa County resolution and allowing deferral of construction of the reaches of the aqueduct between Calhoun Cut and Cordelia until after 1975. Sonoma and Marin Counties concluded that their needs could best be met by diversions from the Russian River and therefore did not contract for water from the North Bay Aqueduct.

Description of the Service Area

The boundaries of the Napa County Flood Control and Water Conservation District are identical to those of Napa County and encompass a total area of approximately 500,480 acres. Of this, 275,000 acres are contained within the San Francisco Bay drainage area. For purposes of this report, this area, which represents the potential service area of the North Bay Aqueduct, is designated the "north bay area." This area is indicated on Plate I, "North Bay Area, Napa County."

Major topographic units within the district's boundaries include the fertile Napa Valley, the Howell Mountains to the east of the valley, and the Mayacmas Mountains to the west of the valley. The highest peak in the region is Mount St. Helena at 4,344 feet located about 4-1/2 miles north of the northern end of Napa Valley. The mountain areas to the east and west of the valley have steep brush covered slopes unsuited for agriculture. The Napa Valley, consisting of some 54,000 acres, is by far the most important land area within the county since it encompasses almost the entire population of the county and is the county's economic backbone.

Napa Valley is drained by the Napa River and several tributaries, largest of which are Conn and Milliken Creeks. The Napa River heads on the south flank of Mount St. Helena and flows intermittently throughout its southerly course through the Napa Valley. In the southerly few miles, however, it is continuous, probably owing to ground water accretions. Downstream from a point about half a mile above the City of Napa the river is tidal. The valley ranges in width from about one mile in the northern end to nearly four miles just north of Napa. About one mile south of Napa the plain narrows to about 2,000 feet due to encroaching foothills, which separate the valley from the marshlands of San Pablo Bay. The tidal marshlands along San Pablo Bay are flat lands at or near sea level and are traversed by numerous channels containing tidal waters with high salinity.

The climate of the Napa Valley is of the Mediterranean type, which is characterized by moderate temperatures and markedly seasonal precipitation. The mean annual temperature in the valley is about 60^oF. Recorded minimum and maximum temperatures range from 17^o to 110^oF at Napa and 10^o to 115^oF at St. Helena. The average annual precipitation ranges from about 23 inches at Napa in the southern portion of the valley to 32 inches at St. Helena in the northern portion and 60 inches at Mount St. Helena.

Development of the Area

In 1836 the first land grant in Napa County, the Rancho Caymus, consisting of 11,814 acres in the heart of the Napa Valley, was made to George C. Yount. In 1843 the Rancho Carne Humano in the

Napa Valley was given to Dr. Edward Turner Bale. Both men built sawmills and gristmills on their ranches and began Napa Valley's economic development. Since these original land grants, agriculture has been the predominant economy of the Napa Valley. Vineyards and orchards dominate the valley floor and wineries have become commonplace. Other agricultural lands produce hay and grain and support a moderate cattle industry on both irrigated and nonirrigated pasture lands.

Several industries other than agriculture and wineries have developed recently in Napa County. These include manufacturing and recreation. The greatest part of the county's manufacturing activity is centered in the City of Napa. This activity is represented by fabricated metals, apparel, and stone, clay and glass products. Minor industrial groups include food products, leather goods, chemicals and printing and publishing. Growth of the manufacturing segment of the economy has appeared slow since the industrial potential of Napa County is overshadowed by the expanse and importance of agriculture as the primary economic base.

The construction of Monticello Dam and the subsequent creation of Lake Berryessa in 1957 has given impetus to the recreational portion of Napa County's economy. Other recreational areas include R. L. Stevenson State Park on Mount St. Helena and Napa Valley State Park.

Description of the Contracting Agency

The district was created by enactment of the Napa County Flood Control and Water Conservation District Act (Calif. Stats.

1951, Ch. 1449, p. 3411, as amended, Deering Act 5275). The territory of the district includes all of Napa County. The Board of Supervisors of Napa County,

" . . . shall be and is hereby designated as, and empowered to act as, ex officio the Board of Supervisors of the Napa County Flood Control and Water Conservation District." (Section (5)) 1/

Power of District to Finance its Contract with the State

The district is authorized to incur indebtedness and to issue bonds; to cause taxes or assessments to be levied and collected for the purpose of paying any obligation of the district, and to carry out any of the purposes of the district act, all as provided in such act. (Sections 5(10) and 5(11).)

The district board may "levy ad valorem taxes or assessments upon all property in the district to pay the general administrative costs and expenses of the district, and to carry out any of the objects or purposes 'of the district act' of common benefit to the district". The act provides that such tax or assessment may not exceed 15 cents on each \$100 of assessed valuation. (Section 13(1).)

Zones, which may overlap, may be created by the district and zone projects may be instituted for the specific benefit of such zones. (Section 3.) To pay the cost of carrying out, constructing, maintaining, and operating any or all works or improvements established on behalf of zones, the district may levy taxes or assessments upon all property, or upon all real

Unless otherwise specified, all Section references are to Sections of the Napa County Flood Control and Water Conservation District Act.

property only, in each zone or participating zone, on the basis that the property so taxed or assessed within a given zone is equally benefited. (Section 13(2).)

The district also is empowered to levy taxes or assessments on all property, or on all real property, within zones according to the special benefits derived by the specific properties in the zones, to pay the cost of carrying out any of the objects or purposes of the district act of special benefit to such zone or zones. And in the event of project cooperation with a governmental body, as authorized in Section 5(7), and the making of a contract with such governmental body for the purposes set forth in such section,

" . . . by the terms of which work is agreed to be performed by any such governmental body in any specified zone or participating zones, for the particular benefit thereof, and by said contract it is agreed that the district is to pay to such governmental body, a sum of money in consideration or subvention for the performance of said work",

the district may levy

"a special tax or assessment upon the property in such zone or participating zones, whereby to raise funds to enable the district to make such payment, in addition to other taxes or assessments . . . otherwise provided for"

in the district act. (Section 13)3).)

As a state agency, under the Central Valley Project Act, the district may comply with the terms, provisions, and conditions of its water supply contract with the State. (Water Code Section 11662.) The district board, as the governing body of such a state agency, is required to provide for the punctual payment to the department of all amounts which become due under the contract, and shall, whenever necessary, levy upon all property in the district not exempt from taxation a tax or

assessment sufficient to provide for all payments under the contract then due or to become due within the then current fiscal year. (Water Code Sections 11651 and 11652.)

Ability to Contract with the State

The objects and purposes of the Napa County Flood Control and Water Conservation District Act are, among other things,

" . . . to increase and prevent the waste or diminution of the water supply in the district, and to obtain, retain and reclaim . . . waters from any sources, within or without the watershed in which the district is located for beneficial use within the district". (Section 4.)

The district is empowered to

" . . . import water into the district . . . and to do any and every lawful act necessary to be done that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the district, including but not limited to, the acquisition, storage and distribution of water for irrigation, domestic, fire protection, municipal, commercial, industrial, and all other beneficial uses". (Section 5(5).)

The district is authorized to

" . . . co-operate and to act in conjunction with the State of California, or any of its engineers, officers, . . . departments or agencies . . . in any . . . works, acts, or purposes", provided for in the district act, "and to adopt and carry out any definite plan or system of work for any such purpose". (Section 5(7).)

The district is a "state agency" within the meaning of that term as defined in Water Code Section 11102. As such

an agency, the district "may enter into and execute appropriate contracts with the department for any and all the purposes and projects" of provisions of the Water Code governing the State Central Valley Project. 2/ (Water Code Section 11661.) Any such state agency may enter into contracts with the department for the purchase or for the use of water, water flow, water storage, or other resources and facilities made available by the project. (Water Code Section 11625.) Conservation, diversion, and transportation facilities which will make water available for delivery to the district under its water supply contract with the State are acquired, constructed, operated, and maintained pursuant to the Central Valley Project Act, and are units of the State Water Project authorized for construction under both that act and the California Water Resources Development Bond Act. 3/ (Water Code Sections 11260, 11270, 11290, 11295, 12931, and 12934.)

Local Water Agencies

The Napa County Flood Control and Water Conservation District encompasses numerous public and private water service agencies within its boundaries. These include the City of Napa Water Works which serves nearly seventy percent of the population of the Napa Valley, the systems of the cities of Calistoga, St. Helena, Angwin, and the Yountville County Water District which serves the Yountville area, and several smaller entities.

2/ Part 3 (commencing with Section 11100) of Division 6 of the Water Code; the Central Valley Project Act.

3/ Also known as the Burns-Porter Act, Chapter 8 (commencing with Section 12930) of Part 6 of Division 6 of the Water Code.

Private water systems include that of the California Pacific Utilities Company which serves the southeast corner of the county and which soon will be acquired by either the City of Napa or the American Canyon County Water District. The American Canyon County Water District will provide service for the area between the City of Napa and the City of Vallejo.

CHAPTER II. PRESENT AND FUTURE DEVELOPMENT OF THE ECONOMY OF NAPA COUNTY

Napa County is presently in a transition period from a predominantly agricultural economy to an urban economy which is supported by major industries including manufacturing. In the course of this transition the southern portion of the county is becoming more closely aligned with the economy of the San Francisco-Oakland metropolitan area. Agriculture, although declining in relative importance, will continue to play an important part of the county's economy, particularly if supplies of agricultural water are imported into the county. Continued development of the Lake Berryessa recreation area may also have a positive influence on the county's economy.

Population

The population of Napa County has increased substantially during the past 20 years. During the years 1940 to 1960 the population of the county increased by 131 percent in comparison with an increase of 128 percent for the State of California. Since 1960, population has grown at a rate of three percent per year to an estimated level of over 70,000.

The county's population is presently growing at a rate nearly that of the entire State. This growth is related to the growth of the San Francisco Bay Area as well as to the development of local resources. Napa County's growth is similar to, although somewhat less than that in the other north bay counties of Solano, Sonoma, and Marin.

The forecast of population of Napa County and that portion within the north bay area made in this report is based upon previous projections made by the Department of Water Resources in Bulletin No. 110. These projections were based upon growth rates generally applicable to the entire San Francisco Bay area and assumptions that present trends of growth will continue in the future. The historical and projected population of Napa County is indicated in Table 1.

Table 1

HISTORIC AND PROJECTED POPULATIONS
OF NAPA COUNTY

Historic		:	Projected	
Year	Total county population	:	Year	Total county population
1890	16,400		1970	100,000
1900	16,500		1980	145,000
1910	19,800		1990	215,000
1920	20,700			
1930	22,900			
1940	28,500			
1950	46,600			
1960	65,900			
1963	72,200 <u>1/</u>			

1/ Estimated for June 30, by the State of California Department of Finance

The distribution of the present and future population in the north bay area of Napa County is indicated in Table 2. The population for each township includes the urban and rural population of major municipalities and surrounding areas within the township. The area of Napa County outside of the north bay area is presently very lightly populated and is not expected to experience significant growth until after 1990.

Table 2

PRESENT AND FUTURE POPULATION OF THE
NORTH BAY AREA WITHIN NAPA COUNTY
(in 1000's)

Township and subarea	1960		1970		1980		1990	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Calistoga Township	3	1	5	1	8	1	14	1
St. Helena Township								
St. Helena	7	1	8	3	15	4	23	6
Angwin	1	0	1	3	3	4	5	4
Napa Township								
Yountville	1	0	2	0	5	0	10	2
Napa	39	10	54	13	68	12	95	9
Middletown	<u>2</u>	<u>0</u>	<u>7</u>	<u>0</u>	<u>21</u>	<u>0</u>	<u>40</u>	<u>0</u>
Total	53	12	77	20	120	21	187	22

Urban areas in Napa County include the cities of Napa, St. Helena and Calistoga, and the areas of Carneros, Yountville, Angwin, Oakville, and Rutherford. The area which included the City of Napa and immediate surroundings accounted for over 70 per cent of the 1960 population of the county.

Economic Support of Napa's Urban Economy

Until recent years agriculture has been the primary support of the economy of Napa County. Although a portion of the urban economy of the county is presently supported by agriculture, the major support is derived from other contributions such as manufacturing industries outside of Napa County and institutions of the State of California.

Industrial growth in Napa County has become increasingly important to the county's economy. During the period 1950-60, manufacturing employment has increased from less than 2,000 employees to over 2,600. This rate of growth is comparable to that experienced by the entire State.

The availability of excellent railroad, highway and possibly future waterway transportation facilities will place Napa County in an excellent position to continue its economic growth. The area of the Napa Valley immediately south of the City of Napa is already being developed by major manufacturing industries. With a potential for the development of manufacturing throughout the north bay area, it is concluded that the trend of development of new industry in the Napa Valley can be sustained.

Major centers of employment outside of Napa County will also serve to support the urban economy. In 1960 over 5,000 residents were employed outside of the county. The majority of these people were employed at the Mare Island Naval Shipyard or in related activities in the City of Vallejo. With the potential industrial development in Solano County and improving transportation media between Napa County and the Oakland-San Francisco metropolitan area, commuters should continue to play an important part of the growth of the urban economy of the county.

There are two major institutions of the State of California in Napa County, the Napa State Hospital in Napa and the Veterans' Home of California in Yountville. These institutions employ several thousand people and present a stabilizing influence on the local economy.

Agriculture

Agriculture in Napa County can continue to play an important role in the county's economy. Minor reductions have occurred in the total area of land utilized for agricultural purposes. These reductions have been primarily due to urban development around the City of Napa and have involved areas utilized for pasture and the growing of grain and hay. Total agricultural incomes, however, have been steadily increasing as a result of increased yields in the grape industries and greater livestock production.

Historical and Present Agricultural Land Use

The Napa Valley, northerly of the City of Napa, contains the largest area of high quality agricultural lands within the entire north bay area. The predominant categories of land use in the valley include orchard and vines and pastured cropland. Principal orchard and vine crops include grapes, prunes, cherries, apples, walnuts, apricots, peaches, pears, olives, and plums. Grapes account for the largest acreages under agricultural production and are considered the most important agricultural crop in the Napa Valley. The fine wines for which the Napa Valley is famous are derived from approximately 10,000 acres of land planted to wine grapes. The production of prunes is also important and accounts for the utilization of approximately 7,000 acres. Other crops and products of agricultural importance include grains, hay, livestock, wool, dairy products, and poultry.

Historical and present agricultural land use is indicated in Table 3.

For the purpose of analyzing the potential agricultural development and related water requirements of the North Bay area of Napa County this area has been divided into nine agricultural service areas. These service areas are indicated on Plate II, "Agricultural Service Areas in Napa County."

Table 3

HISTORICAL AND PRESENT
AGRICULTURAL LAND USE IN NAPA COUNTY
(in acres)

Crop group or land use	Year				
	1940	1945	1950	1955	1960
Orchard and vines	29,900	26,200	25,200	23,300	22,600
Truck	700	2,300	700	600	300
Field	1,500	800	1,900	1,500	500
Grain	16,000	11,500	14,700	15,700	4,600
Hay	12,300	12,200	13,000	11,700	10,300
Pastured cropland	58,600	46,700	42,200	27,000	46,500
Idle cropland	6,700	13,500	11,500	11,400	6,700
Total cropland	125,700	113,200	109,200	91,200	91,500
Portion irrigated	2,600	1,900	4,400	8,400	10,200

1/ Data taken from Department of Commerce, Bureau of the Census publications.

Irrigated Agricultural Land Use. Irrigation of agricultural crops is not widespread in the Napa Valley, though undoubtedly the yields of many crops could be increased by the application of water. At the present time irrigation is practiced primarily on land utilized for orchards, vineyards, and pasture. Irrigated land use is increasing and should become the predominant method of farming if adequate water supplies become available.

Agricultural Incomes

Total agricultural incomes have been rising steadily in Napa County. Meat production accounts for nearly half of the

Table 4

HISTORICAL AND PRESENT AGRICULTURAL INCOME
IN NAPA COUNTY

(Thousands of dollars)

Year:	Grapes:	Prunes:	Walnuts:	Others:	Total:	Field and truck crops:	Livestock and dairy products:	Total income:			
1950	\$2,081	\$2,489	\$342	\$303	\$5,216	\$1,146	\$2,766	\$1,594	\$2,450	\$6,809	\$13,170
1955	1,993	1,342	484	332	4,152	678	4,816	1,467	2,726	9,009	13,838
1960	2,207	2,263	299	318	5,087	1,347	6,920	1,758	3,591	12,269	18,702
1961	2,362	1,545	127	291	4,325	1,454	9,087	1,690	1,617	12,393	18,171
1962	3,968	1,661	324	280	6,233	1,316	10,352	1,596	2,070	14,019	21,567

county's income. Grapes are the second most important product and account for nearly 20 percent of the county's total agricultural income.

Historical and present agricultural incomes are indicated by category in Table 4.

Land Classification

Classification of potential agricultural lands in the North Bay area of Napa County was undertaken in connection with the preparation of Bulletin No. 110. Table 5 indicates the results of these land classification studies.

Table 5

CLASSIFICATION OF POTENTIAL AGRICULTURAL LANDS
IN THE NORTH BAY AREA OF NAPA COUNTY
(In acres)

Agricultural Service Area :	Land classification 1/					Total irrigable
:	V	Vs	H	Hp	:	
Carneros	--	4,200	2,400	1,600		8,200
Middleton	1,800	800	--	1,300		3,900
Napa	5,000	--	2,100	300		7,400
Wooden Valley	200	--	1,100	--		1,300
Yountville	1,400	--	--	--		1,400
Oakville-						
Rutherford	9,300	--	400	400		10,100
St. Helena	4,200	--	100	--		4,300
Calistoga	6,000	--	--	--		6,000
Angwin	400	--	1,300	--		1,700
Total	28,300	5,000	7,400	3,600		44,300

1/ Classification legend (refers to climatically adapted crops):

V - suited to all crops

Vs - suited to crops tolerant to excess concentrations of soluble salts.

H - suited to crops which can be grown on slightly or moderately rolling topography.

Hp - suited to shallow, or moderately deep-rooted crops which can be grown on slightly or moderately rolling topography.

Future Agricultural Development

The potential for the future development of an irrigated agricultural economy in Napa County is limited to a maximum of 44,300 acres as indicated in Table 5. Additional lands are presently available for irrigation, but future urbanization will preclude their development. Total agricultural land use will gradually reduce as lands presently devoted to dry farms and which are not susceptible to irrigation are urbanized.

Crop Projection. The pattern and acreage of the various irrigated crops projected in Bulletin No. 110 have been utilized in this report and are based upon the following considerations: (1) climatic conditions and crop adaptability; (2) present cropping patterns; (3) cost of water at the farm head gate; (4) agricultural payment capacity; (5) comparative advantage of producing particular crops in the area; (6) availability of markets; and (7) requirement for capital investment. The first two of the foregoing are physical factors. The latter five considerations are intimately associated with economic factors.

Various crop projections have been made for the North Bay area of Napa County. These include projections by the following: (1) "Future Development of the San Francisco Bay Area, 1960-2020," U. S. Department of Commerce, 1958; (2) Bulletin No. 2, Department of Water Resources, 1949; (3) Bulletin No. 110, Department of Water Resources, 1961; (4) "Napa County Water Needs Study and Plan," Farnum-Kerr Associates, 1961.

Projected crop patterns and acreages in all of the above mentioned reports indicate that irrigation will be the predominant method of crop production in Napa County before the turn of the century. Existing trends in changes of crop patterns are expected to continue. Total irrigated acreage will increase to a maximum around 1985, but an overall decrease in agricultural acreage is anticipated due to increases in urban development.

Estimated future irrigated crop patterns for the North Bay area of Napa County are indicated by agricultural service areas in Table 6.

Agricultural Payment Capacity. Agricultural payment capacities for various crops were developed in Bulletin No. 110 and have been utilized in this report. The demand for agricultural water from any water supply facility is, to a large degree, a function of the ability of the potential water users to pay for this water at the indicated costs. In view of the importance of the relationship between agricultural payment capacity and demand for agricultural water, Bulletin No. 110 studies evaluated, in some detail, the payment capacities for the principal crops that could be grown in the North Bay area. The estimates of payment capacity were made by analysis of costs and return for crops representing approximately 98 percent of all those grown in the area.

In making this analysis, consideration was given specifically to historic yield and price data for climatically adaptable

Table 6

ESTIMATED FUTURE IRRIGATED CROP PATTERN
IN THE NORTH BAY AREA OF NAPA COUNTY
(acres)

Agricultural Service Area	Year	Total			Pasture	Total
		Fruit and Nut Crops	Truck Crops	Field Crops		
Carneros Area	1975	1,900	100	200	100	2,300
	1980	2,300	200	300	200	3,000
	1990	3,500	300	800	500	5,100
Middleton Area	1975	900	800		100	1,800
	1980	900	1,500		300	2,700
	1990	1,200	1,600		400	3,200
Napa and Vicinity	1975	4,700	300			5,000
	1980	4,600	700		100	5,400
	1990	5,100	1,000		100	6,200
Wooden and Foss Valley	1975	200				200
	1980	200				200
	1990	200				200
Yountville	1975	1,000				1,000
	1980	1,000	100			1,100
	1990	1,000	200			1,200
Oakville-Rutherford Area	1975	6,900	400			7,300
	1980	6,900	700		100	7,700
	1990	7,500	1,200		100	8,800
St. Helena	1975	3,100	200			3,300
	1980	3,000	400			3,400
	1990	3,200	600			3,800
Calistoga	1975	4,400	300			4,700
	1980	4,200	700			4,900
	1990	4,400	1,100			5,500
Angwin, Chiles Valley and Conn Valley	1975	100				100
	1980	200				200
	1990	400				400
Total	1975	23,200	2,100	200	200	25,700
	1980	23,300	4,300	300	700	28,600
	1990	26,500	6,000	800	1,100	34,400

crops. The difference between gross income and crop production costs, including an allowance for management and return on investment, represents the amount per acre which would be available for payment of costs for irrigation water. The estimated payment capacities for the various crops that could be grown in the North Bay area of Napa County are indicated in Table 7.

Future Land Use

Estimates of future urban and agricultural land use in the North Bay area of Napa County were made to determine the extent to which the area would develop during the next 30 years. This information was developed in order to insure that future development, as projected in this report, would be within the limits of the available land resources.

Urban Land Requirements

Estimates of future urban land use in the Napa Valley area were computed from projections of population and population densities after consideration and study of present land use and land use trends. The experience in most urban areas has been that, as population increases, urban densities also increase up to certain levels. It was assumed that this pattern would also occur in the Napa Valley area.

Table 8 indicates estimates of probable urban land requirements in the year 1990 for the North Bay area of Napa County.

Table 7

ESTIMATED ANNUAL PAYMENT CAPACITY
FOR SELECTED IRRIGATED CROPS IN THE NORTH BAY AREA
(In dollars per acre)

Crops	: Gross : income	Costs			: Payment : Total	: capacity
		: Variable	: Fixed	: Management : charge		
Pears	770.00	423.65	168.60	115.50	707.75	62.25
Walnuts	405.00	148.70	133.30	40.50	322.50	82.50
Prunes	550.00	262.80	161.35	55.00	479.15	70.85
Wine grapes	270.00	116.70	91.90	27.00	235.60	34.40
Sweet Corn	385.00	199.30	77.20	38.50	315.00	70.00
Cauliflower	480.00	258.30	93.20	72.00	432.50	56.50
Tomatoes	405.00	249.55	83.30	40.50	373.35	31.65
Asparagus	276.00	114.00	89.30	27.60	230.90	45.10
Milo	120.00	37.30	44.70	12.00	94.00	26.00
Corn silage	100.00	26.20	40.80	10.00	77.00	23.00
Sugar beets	241.50	117.95	62.90	24.15	205.00	36.50
Safflower	100.00	52.45	30.80	10.00	93.25	6.75
Corn grain	150.00	56.30	42.90	15.00	114.20	35.80
Barley	67.50	22.70	36.55	6.75	66.00	1.50
Oats	70.00	21.50	28.60	7.00	57.10	12.90
Alfalfa	150.00	44.70	57.30	15.00	117.00	33.00
Grain hay	72.00	24.20	34.50	7.20	65.90	6.10
Pasture (beef)	120.00	33.70	52.25	12.00	97.95	22.05
Pasture (dairy)	849.40	480.50	189.70	85.00	755.20	69.30
<u>Double crops</u>						
Barley-milo	187.50	60.00	74.00	18.75	152.75	34.75
Oats-corn silage	170.00	50.40	54.40	17.00	121.80	48.20
Sugar beets-corn	391.50	174.25	77.40	39.15	290.80	100.70
Grain hay-sweet corn	456.00	223.50	90.20	45.60	359.30	96.70
Cauliflower-tomatoes	885.00	507.85	137.40	132.40	778.00	107.00
Cauliflower-Sweet corn	864.00	457.60	165.60	129.60	752.80	111.20
Safflower-milo	220.00	89.75	62.75	22.00	174.50	45.50

Table 8

1990 URBAN LAND REQUIREMENTS IN THE
NORTH BAY AREA OF NAPA COUNTY
(acres)

Area <u>1/</u>	:	1990 urban land use
Carneros		1,400
Middleton		11,000
Napa		20,100
Wooden Valley		600
Yountville		900
Oakville-Rutherford		1,400
St. Helena		3,300
Calistoga		600
Angwin		<u>700</u>
Total urban area		40,000

1/ Same as agricultural service areas shown on Plate 2.

Agricultural Land Requirements

Land requirements for agricultural purposes will be made up of actual crop land requirements for both irrigated and nonirrigated farming, fallow land requirements, pasture land, and an allowance for necessary but nonproductive farmland to account for farm lots, roads, etc. Irrigated land use has been defined in Table 6. Specific estimates of dry farming land use were not developed since large acreages of crop land are presently and will continue to be available to satisfy these needs.

CHAPTER III. WATER REQUIREMENTS AND WATER SUPPLIES

Water requirements, as developed in this report, represent the quantities of water, other than precipitation, which must be supplied to provide for beneficial consumptive use of water on potential irrigated lands and urban (and suburban) areas.

Estimates of the water requirements of Napa County were developed in Bulletin No. 110. An evaluation of the data presented in Bulletin No. 110 has resulted in minor revisions to per capita water use estimates and the resulting estimates of urban water requirements.

Estimates of agricultural water requirements as developed in Bulletin No. 110 were found to be adequate.

Urban Water Use

Future supplemental urban water requirements of the Napa County Flood Control and Water Conservation District within the North Bay area were estimated by applying projected per capita use factors to the population projections presented in Chapter II.

Unit Values of Municipal and Industrial Water Use

Estimates of per capita water use were developed for Bulletin No. 110. These estimates have been revised to reflect more recent data and anticipated higher per capita water use

increases. A method commonly used to forecast future per capita water use is to increase the present unit use factor by 10 to 15 gallons per capita per day for each 10-year period. For the purposes of the report per capita water use has been increased at a rate of 15 gallons per capita per day per decade. Table 9 presents a summary of the estimated per capita water use for urban areas within the North Bay area of Napa County. In Table 9 the term "urban" refers to intensely developed areas containing both municipal and industrial development, whereas the designation "rural" represents low density residential areas.

Table 9

ESTIMATED PER CAPITA WATER USE IN
THE NORTH BAY AREA OF NAPA COUNTY
(Acre-feet per capita per year)

Population center:	1960		1970		1980		1990	
	urban	rural	urban	rural	urban	rural	urban	rural
Calistoga Township	.185	.170	.202	.179	.219	.185	.236	.191
St. Helena Township								
St. Helena	.163	.170	.179	.179	.196	.185	.213	.191
Angwin	.170		.187	.179	.204	.185	.221	.191
Napa Township								
Yountville	.151		.168		.185		.202	.191
Napa	.213	.170	.230	.179	.247	.185	.264	.191
Middleton	.135		.152		.169		.186	

Present and Future Urban Water Requirements

The present and future use of water for municipal and industrial purposes was determined by applying the estimates of per capita water use in Table 9 to the projections of population for each urban area. Table 10 indicates the total municipal and industrial water requirements of the County of Napa.

Table 10

PRESENT AND PROJECTED URBAN WATER REQUIREMENTS
OF THE NORTH BAY AREA WITHIN NAPA COUNTY
(Acre-feet per year)

:	1960	:	1970	:	1980	:	1990
Calistoga	730		1,200		1,950		3,500
St. Helena	1,480		2,650		5,100		7,900
Napa	<u>10,430</u>		<u>16,150</u>		<u>23,450</u>		<u>36,600</u>
Totals	12,640		20,000		30,500		48,000

Agricultural Water Use

The potential for irrigation of new agricultural lands, which at present are either not developed or are nonirrigated, has been discussed in Chapter II of this report. Agricultural water requirements were estimated as the product of the projected crop patterns and the unit water requirements of the specific crop.

Unit Values of Agricultural Water Use

Unit values of water use for individual crops were developed in Bulletin No. 110 and were adopted for the purposes of this report. Table 11 presents estimated unit values of water use for the various crops that could be grown in the north bay area of Napa County. These values represent the unit application of water, and are generally equivalent to the farm head-gate delivery.

Table 11

UNIT VALUES OF ANNUAL WATER USE BY CROPS
IN THE NORTH BAY AREA OF NAPA COUNTY
(Feet of depth)

Crop	: Unit : water use:	Crop	: Unit : water use
<u>Fruit & Nut Crops</u>		<u>Field Crops</u>	
Pears	1.9	Milo	1.5
Walnuts	2.0	Corn silage	1.5
Prunes	1.4	Field corn	1.5
Wine grapes	1.2	Barley	1.3
		Oats	1.3
		Grain	1.3
		Barley-milo	2.1
		Oats-corn silage	2.1
<u>Truck Crops</u>		<u>Forage</u>	
Sweet corn	1.5	Beef pasture	2.6
Cauliflower	1.5	Dairy pasture	2.6
Tomatoes	1.5		
Asparagus	1.5		
Grain-sweet corn	2.1		
Cauliflower- tomatoes	2.2		
Cauliflower- sweet corn	2.2		

Present and Future Agricultural Water Requirements

Table 12 presents estimated future agricultural water requirements under the assumption that all projected acreages indicated in Table 6 will be irrigated. These requirements were estimated on the basis of the unit applications of water indicated in Table 11.

Present and Future Water Supplies

Bulletin No. 60 reported a locally developed water supply of 22,000 acre-feet per year in the north bay area of Napa County. This supply included 16,000 acre-feet per year of surface water and

Table 12

FUTURE AGRICULTURAL WATER REQUIREMENTS
IN THE NORTH BAY AREA OF NAPA COUNTY
(Acre-feet per year)

Agricultural Service Area	:	:	:	:		
	:	:	:	:		
	:	1970	:	1980	:	1990
Carneros		2,800		5,300		9,800
Middleton		1,100		4,200		5,400
Napa		6,400		8,000		9,600
Wooden Valley		200		200		200
Yountville		1,200		1,500		1,800
Oakville- Rutherford		9,200		11,300		14,200
St. Helena		4,200		4,800		6,100
Calistoga		6,300		7,000		9,300
Angwin		300		300		600
Total		31,700		42,600		57,000

6,000 acre-feet per year of ground water. A re-evaluation of the surface water supplies reported in Bulletin No. 60 was conducted by the department for the purposes of Bulletin No. 110 and resulted in a total estimated supply of 19,000 acre-feet per year.

Local Surface Supplies

Local surface water developments in Napa County meet approximately 75 percent of the present urban water requirements. Table 13 presents a summary of presently developed local surface water supplies and the areas which they presently serve.

Potential additional sources of surface water supply in the Napa Valley though numerous, are of relatively small size, and would involve high development costs. Since the better reservoir sites in the area have already been developed, it is doubtful that major new surface water development can be justified.

Ground Water Supplies

Ground water pumpage in the Napa Valley during 1950 was reported in U. S. Geological Survey Water Supply Paper No. 1495

Table 13

SURFACE WATER SUPPLIES IN
THE NORTH BAY AREA OF NAPA COUNTY

Service Area	Reservoir or Supply Source	Existing Available Supplies (acre-feet per yr.)	Location Number on Plate III
<u>Urban Supplies</u>			
Calistoga Township:	Kimball Creek Dam ^{1/}	360	1
St. Helena Township:	Bell Canyon Reservoir		2
St. Helena	St. Helena Upper and Lower Reservoirs	1,640	3
	Lake Hennessey	980	4
Angwin	Conn Creek Tributaries	200	5
Napa Township:			
Yountville	Lake Hennessey	370	4
	Veteran's Home	40	6
Napa	Lake Hennessey	9,840	4
	Rector Reservoir	3,100	7
	Milliken	1,580	8
	Marie, Eastside and Scotts Canyon	<u>200</u>	9
Middleton			
Total Urban Supplies		18,310	
<u>Agricultural Supplies</u>			
Carneros	Potter Reservoir	120	
Middleton			
Napa	Cynthia, Robinson and Timberhill Reservoirs	240	
Wooden and Foss Valley			
Yountville			
Oakville-Rutherford	Naz	70	
St. Helena			
Calistoga			
Angwin	Conn Creek Tributaries	20	
	Matheson Reservoir	90	
	Crystal and La Herradra Reservoirs	<u>100</u>	
Total Agricultural Supplies		640	
Total Surface Water Supplies		<u>18,950</u>	

^{1/} City of Calistoga reports yield of 368 acre-feet per year and plans to enlarge reservoir to produce a yield of 800 acre-feet per year. However, recent efforts to finance the expansion have failed.

to be approximately 5,500 acre-feet per year, of which approximately 2,900 acre-feet were used for irrigation purposes. The source of all ground water in the Napa Valley is from precipitation on the alluvial plains and the adjacent hills and mountains within the drainage area of the valley.

The area south of the City of Napa is subject to tidal influence. Therefore, ground water in the area must be maintained at a relatively high level to prevent degradation by brackish waters from the Napa River. Ground water supplies in the area between the City of Napa and Yountville can also be subject to degradation by brackish waters if water levels are lowered any appreciable amount. The usable ground water storage basin in the Napa Valley is therefore largely confined to the area north of the City of Napa.

In the future, urban needs will be handled by local surface and supplemental water supplies and the available ground water supplies will probably be utilized almost entirely for agricultural purposes. Table 14 presents estimates of quantities of ground water pumpage and areas of use.

Table 14

GROUND WATER UTILIZATION IN NAPA COUNTY^{1/}
(Acre-feet per year)

Service Area	Supply	
	Urban	Agriculture
Napa and vicinity	1,500	2,600
Middleton	1,100	
Yountville		300
Total	2,600	2,900

^{1/} U. S. Geological Survey Water Supply Paper No. 1495, 1950 data.

Present ground water usage in Napa County was estimated to be 6,500 acre-feet by Farnum-Kerr Associates and Frederick L. Hotes in their report entitled, "Napa County Water Needs Study and Plan." Their estimate of the safe yield of the Napa Valley ground water basin is 25,000 acre-feet annually. Since the yields of individual wells is relatively small (100 gpm or less), it is doubtful that ground water can ever be economically developed to support a major municipal water system or irrigated agricultural economy.

Imported and Exported Water Supplies

At present there are no imported water supplies in the north bay area of Napa County. However, a total of 1,290 acre-feet per year from Lake Hennessey is exported to the City of Benicia. The contract between the Cities of Napa and Benicia for Lake Hennessey water terminates in 1970 and renewal is not anticipated.

New Supplies

Recently, the San Francisco District of the U. S. Army Corps of Engineers released "Review Report for Flood Control and Allied Purposes, Russian River Basin, California." This report recommends early authorization of the Knights Valley Project, a multiple-purpose development which would include service of water to the Napa Valley. The Department of Water Resources has reviewed the report and submitted comments to the Corps of Engineers including the following:

"The Corps of Engineers' plan for use of water from the initial phase of Knights Valley Reservoir is primarily directed toward provision of municipal and industrial supply in Napa Valley. However, since this draft report was prepared, a contract has been executed between

the County of Napa and the State of California for a supply of 25,000 acre-feet of water to be provided to the county annually through the North Bay Aqueduct of the State Water Project. Information in Bulletin No. 110, "North Bay Aqueduct," 1961, shows that this still leaves a supplemental requirement in 1990 for about 52,000 acre-feet of water in the portion of Napa County draining to San Francisco Bay. This 52,000 acre-feet would, for the most part, be used for agriculture. Bulletin No. 2, "Water Utilization and Requirements of California," 1955, presents an estimate of ultimate water requirements for the Napa River Basin of 287,000 acre-feet of water annually on presently reclaimed lands. This is about 261,000 acre-feet more than the available local supply.

The importance of providing an agricultural supply during the early years of the project appears to warrant the Corps of Engineers developing as much information as possible on federal financing of an irrigation supply. Consideration should be given to a contribution of interest-free money for those elements of the conservation facility that can be allocated to irrigation and for those portions of the distribution system that will be used to make the irrigation water available to the users. Development of the irrigation potential of the project should help to improve the justification for early authorization and construction.

The Knights Valley Project is also under study by the U. S. Bureau of Reclamation. The conclusions of the bureau's studies have not yet been reported, although it is known that the service of agricultural water supply to Napa Valley is being considered.

Since the Knights Valley Project is not yet authorized, and several years will be required between authorization and construction, the project could not meet the immediate needs of Napa County for urban water supplies. The cost to Napa County for urban water from the project at best would approximate the cost of water from the North Bay Aqueduct, particularly in the area

south of Yountville. The project could, however, economically meet most of the county's future demands for agricultural water. On this basis the county is actively encouraging the project's authorization.

Summary of Water Supplies

Presently available water supplies in the north bay area of Napa County total 24,450 acre-feet annually, 3,540 acre-feet of which are used for agricultural purposes, and 20,910 acre-feet of which are used for urban and domestic purposes. Table 15 summarizes the presently available water supplies in the north bay area of Napa County.

Table 15

DEVELOPED WATER SUPPLIES IN THE
NORTH BAY AREA OF NAPA COUNTY
(Acre-feet per year)

Source of supply	Type of Use	
	Urban	Agricultural
Surface reservoirs	18,310	640
Ground water pumpage <u>1/</u>	2,600	2,900
Imports	<u>0</u>	<u>0</u>
Total	20,910	3,540

1/ Ground water pumpage as reported in U. S. Geological Survey Water Supply Paper 1495 is 5,500 acre-feet. This value is considered to be the annual safe ground water yield.

Supplemental Water Requirements

The local water supplies of Napa County, for all practical purposes, are considered to be fully developed. There are no surface streams in the area that can be developed, at low costs, to meet any appreciable amount of the county's future water requirements. Some development of the ground water resources can be undertaken but in view of the small yields from individual

wells this development will only be suited for rural domestic and rural agricultural uses.

Supplemental Urban Water Requirements

Supplemental urban water requirements have been determined on the basis that imports from the North Bay Aqueduct would be exchanged for water from the City of Napa's system for redistribution to areas of need north of Yountville. The integration of present local supplies with imported water from the North Bay Aqueduct would be accomplished by mutual agreement between the city and other local water agencies. The Napa County Flood Control and Water Conservation District will receive water directly from the State as a prime contractor, and will deliver water to the city and other agencies as a wholesaler only.

Since this transfer of local water to areas north of Yountville would be made possible by the importation of water from the North Bay Aqueduct, it has been assumed that the area benefited by the importation of water from the North Bay Aqueduct would extend throughout the entire Napa Valley and immediate adjacent areas.

Supplemental water requirements in the north bay area of Napa County were determined from comparisons of total water requirements with estimates of available local water supplies. Supplemental water requirements are summarized in Table 16.

North Bay Aqueduct Contract

The contract between the district and State provides for delivery of a maximum annual entitlement of 25,000 acre-feet from the North Bay Aqueduct. In accordance with the contract between

Table 16

SUPPLEMENTAL WATER REQUIREMENTS IN THE
NORTH BAY AREA OF NAPA COUNTY
(Acre-feet per year)

Area	Year		
	1970	1980	1990
<u>Urban Requirements</u>			
Calistoga Township	-	-	-
St. Helena Township			
St. Helena	-	-	-
Angwin	-	-	-
Napa Township			
Yountville	-	-	- ^{1/}
Napa	-	7,150	20,800
Middleton	-	<u>2,450</u>	<u>6,300</u>
Subtotal		9,600	27,100
<u>Agricultural Requirements</u>			
Carneros	2,680	5,180	9,680
Middleton	1,100	4,200	5,400
Napa	3,560	5,160	6,760
Wooden Valley	200	200	200
Yountville	900	1,200	1,500
Oakville-Rutherford	9,130	11,230	14,130
St. Helena	4,200	4,800	6,100
Calistoga	6,300	7,000	9,300
Angwin	<u>90</u>	<u>90</u>	<u>390</u>
Subtotal	28,160	39,060	53,460
Total	28,160	48,660	80,560

^{1/} Part of this supplemental water will be used for the urban needs of the Carneros area and replaces the City of Napa's supply which will be used by areas north of Yountville.

the State and the district, initial delivery was to be made in 1966. The initial delivery date, however, was extended to December 31, 1967 because the district had not designated locations of delivery structures on the aqueduct prior to March 2, 1964, as requested. With the initial delivery rescheduled to 1968, there will be a buildup providing the delivery of 12,500 acre-feet in 1980 and delivery of the maximum annual entitlement in 1990. It has been indicated by the Napa County Flood Control and Water Conservation District that the water which has been contracted will be used for municipal and industrial purposes. The contracted deliveries closely approximate the estimated needs for supplemental urban water supplies defined in Table 16.

Although it has been firmly established in this report that a definite need for agricultural water supplies exists in Napa County, the district elected not to contract for this water from the North Bay Aqueduct. This decision was largely premised on the conclusion that agricultural water from the Knights Valley Project presented the best solution to the county's agricultural water supply problems. While the project is not yet authorized, the district is hopeful that it will be authorized and placed into operation during the early 1970's. In view of the large interest within the other North Bay counties for early authorization of the Knights Valley Project, there is considerable merit to the district's course of action.

CHAPTER IV. COST OF WATER SERVICE TO NAPA COUNTY
FROM THE NORTH BAY AQUEDUCT

The cost of water service from the North Bay Aqueduct to the Napa County Flood Control and Water Conservation District will include the district's allocated portion of construction, operation, and maintenance costs of the aqueduct, the costs accruing from the Delta Water Charge, and the cost of local conveyance and treatment facilities. Local conveyance and treatment systems will be constructed by the district or member units of the district. Construction of the North Bay Aqueduct, on the other hand, will be accomplished by the State and will be financed by monies from the California Water Fund and from the sale by the State of general obligation bonds authorized under the California Water Resources Development Bond Act of 1960.

Capital and annual costs of the North Bay Aqueduct will be allocated on the basis of the proportional use method in accordance with standard state water contract principles. The measure of proportionate use is based upon the average of the following two ratios: (1) the ratio of the contractor's maximum annual entitlement to be delivered from or through the reach to the total of the maximum annual entitlements of all contractors, and (2) the ratio of the capacity provided in the reach for the transport and delivery of project water to the contractor to the total capacity provided in the reach.

Aqueduct Facilities

The cost of North Bay Aqueduct water to the district cannot be accurately estimated at the present time since design studies have not yet been initiated, and the source of interim water supply at Cordelia is not yet defined. Preliminary designs and cost estimates have been prepared for the purposes of this report. These estimates were based on an unlined canal across Solano County to Cordelia and capable of delivering the maximum annual entitlements of Napa and Solano Counties, and a pipeline from Cordelia to the Napa terminus which was assumed to be located near the intersection of Highway 29 and Suscol Creek. Schedules of construction were developed on the basis of initial delivery to Napa County in 1968, but with deferral of all construction of the reaches of the aqueduct between the Delta and Cordelia until after 1975. The alignment of the aqueduct through Solano and Napa Counties is indicated on Plate 4, "North Bay Aqueduct and Local Facilities for Service of Project Water".

Cost of Facilities

The total allocated capital cost of the North Bay Aqueduct to the district is estimated to be approximately \$5,400,000 for the maximum annual entitlement of 25,000 acre-feet. This will require a maximum annual repayment of principal and interest by the district of about \$230,000. The annual capital repayment would be less than this amount in the years prior to 1990 and after 2015.

Operation and maintenance charges will be assessed in two ways. A minimum charge will be assessed each year for operation and maintenance of the facilities regardless of the amount of water delivered and a variable charge will be levied, based on the actual water delivered to the district. The maximum amount of these charges for the district is estimated to be approximately \$126,000 and \$91,500 per year, respectively.

The final component of annual cost to the district for water deliveries from the North Bay Aqueduct will be the Delta Water Charge. This is the charge to the water users of the State Water facilities for repayment of all those costs associated with project conservation facilities. The Delta water rate is fixed by the water supply contract at \$3.50 per acre-foot through 1969. It is estimated that during the period 1970 through 1977 the rate will be \$5.46 per acre-foot and that it will increase in 1978 to \$7.34 per acre-foot.

Over the entire repayment period, 1966 through 2039, the equivalent unit rate or average charge for water from the North Bay Aqueduct to the district will be approximately \$29.00 per acre-foot. This charge is based on the capitalization of all costs at four percent interest. This cost includes the Delta Water Charge, the allocated capital costs and all annual costs of the North Bay Aqueduct.

Table 17 indicates the estimated annual component costs of water service from the North Bay Aqueduct to the District for the entire repayment period. All costs are exclusive of the charges for an interim supply from 1968 through 1979 by either the City of Vallejo or the Solano Project.

TABLE 17
SUMMARY OF WATER CHARGES
FOR
NAPA COUNTY FC&WCD

(In dollars unless otherwise noted)

Calendar Year	ANNUAL ENTITLEMENTS In acre-feet (Table A)	ALLOCATED TRANS- PORTATION CAPITAL COSTS (Table c)	TRANSPORTATION CHARGE					DELTA WATER CHARGE	TOTAL WATER CHARGES	
			Capital Cost Component (Table D)			Minimum OMP & R Component (Tables E&G)	Variable OMP & R Component (Tables F&G)			Total Transportation Charge (Table G)
			Annual Principal payment	Annual Interest Payment	Total Annual Payment (Table G)					
1962	0	0	0	0	0	0	0	0	0	
1963	0	0	0	0	0	0	0	0	0	
1964	0	0	0	0	0	0	0	0	0	
1965	0	654760	0	0	0	0	0	0	0	
1966	0	1037641	4986	22967	27955	0	0	27955	27955	
1967	0	1746678	13064	59193	72257	0	0	72257	72257	
1968	900	232807	26841	120076	146917	84113	17600	246630	3150	
1969	1900	15000	29558	127299	156857	84597	18600	266054	6650	
1970	2800	15000	30709	126788	157497	84597	19600	261694	15288	
1971	3800	14692	31901	126236	158137	84194	20600	262931	20748	
1972	4800	14692	33132	125632	158764	84194	22600	265558	26208	
1973	5800	21144	34408	124983	159391	84194	23600	267185	31668	
1974	6700	99369	35775	124519	160294	84194	24600	269088	36582	
1975	7700	14692	37787	126750	164537	84194	26600	275331	42042	
1976	8600	22226	39223	125941	165164	84194	40700	290058	46956	
1977	9600	56131	40772	125341	166113	84194	44700	295007	52416	
1978	10500	486269	42625	125885	166510	84194	46700	299404	77070	
1979	11500	618064	47830	141441	189271	84194	47700	321165	84410	
1980	12500	84677	54210	161449	215659	127121	52472	395252	91750	
1981	13700	0	56759	162515	219274	126342	52788	398404	100558	
1982	15000	0	58746	160528	219274	126308	68914	414496	110100	
1983	16250	9192	60807	158467	219274	126273	69274	414821	119275	
1984	17500	123033	63011	156655	219666	126044	69790	415500	128450	
1985	18750	0	66157	158762	224919	126078	72872	423869	137625	
1986	20000	2740	68475	156444	224919	126078	86792	437789	146800	
1987	21250	38356	70903	154133	225036	126044	87605	438885	155975	
1988	22500	6452	73680	152994	226674	126044	89126	441844	165150	
1989	23750	84677	76319	150630	226949	126044	90406	443399	174325	
1990	25000	0	79637	150927	230564	126009	90724	447297	183500	
1991	25000	0	82423	148141	230564	126009	91530	448103	183500	
1992	25000	0	85319	145245	230564	126009	91530	448103	183500	
1993	25000	0	88314	142250	230564	126009	91530	448103	183500	
1994	25000	0	91408	139156	230564	126009	91530	448103	183500	
1995	25000	0	94614	135950	230564	126009	91530	448103	183500	
1996	25000	0	97930	132634	230564	126009	91530	448103	183500	
1997	25000	0	101364	129200	230564	126009	91530	448103	183500	
1998	25000	0	104920	125644	230564	126009	91530	448103	183500	
1999	25000	0	108600	121964	230564	126009	91530	448103	183500	
2000	25000	0	112407	118157	230564	126009	91530	448103	183500	
2001	25000	0	116250	114214	230564	126009	91530	448103	183500	
2002	25000	0	120427	110137	230564	126009	91530	448103	183500	
2003	25000	0	124653	105911	230564	126009	91530	448103	183500	
2004	25000	0	129025	101539	230564	126009	91530	448103	183500	
2005	25000	0	133554	97010	230564	126009	91530	448103	183500	
2006	25000	0	138235	92329	230564	126009	91530	448103	183500	
2007	25000	0	143083	87481	230564	126009	91530	448103	183500	
2008	25000	0	148104	82460	230564	126009	91530	448103	183500	
2009	25000	0	153293	77271	230564	126009	91530	448103	183500	
2010	25000	0	158669	71895	230564	126009	91530	448103	183500	
2011	25000	0	164238	66326	230564	126009	91530	448103	183500	
2012	25000	0	169994	60570	230564	126009	91530	448103	183500	
2013	25000	0	175960	54604	230564	126009	91530	448103	183500	
2014	25000	0	182127	48437	230564	126009	91530	448103	183500	
2015	25000	0	188519	42045	230564	126009	91530	448103	183500	
2016	25000	0	195141	35428	230564	126009	91530	448103	183500	
2017	25000	0	202000	28564	230564	126009	91530	448103	183500	
2018	25000	0	209113	21500	230564	126009	91530	448103	183500	
2019	25000	0	216480	14300	230564	126009	91530	448103	183500	
2020	25000	0	224100	7000	230564	126009	91530	448103	183500	
2021	25000	0	231970	0	230564	126009	91530	448103	183500	
2022	25000	0	240090	0	230564	126009	91530	448103	183500	
2023	25000	0	248460	0	230564	126009	91530	448103	183500	
2024	25000	0	257080	0	230564	126009	91530	448103	183500	
2025	25000	0	265960	0	230564	126009	91530	448103	183500	
2026	25000	0	275100	0	230564	126009	91530	448103	183500	
2027	25000	0	284500	0	230564	126009	91530	448103	183500	
2028	25000	0	294160	0	230564	126009	91530	448103	183500	
2029	25000	0	304080	0	230564	126009	91530	448103	183500	
2030	25000	0	314260	0	230564	126009	91530	448103	183500	
2031	25000	0	324600	0	230564	126009	91530	448103	183500	
2032	25000	0	335100	0	230564	126009	91530	448103	183500	
2033	25000	0	345760	0	230564	126009	91530	448103	183500	
2034	25000	0	356580	0	230564	126009	91530	448103	183500	
2035	25000	0	367560	0	230564	126009	91530	448103	183500	
2036	25000	0	378700	0	230564	126009	91530	448103	183500	
2037	25000	0	390000	0	230564	126009	91530	448103	183500	
2038	25000	0	401460	0	230564	126009	91530	448103	183500	
2039	25000	0	413080	0	230564	126009	91530	448103	183500	
TOTAL	1505800	5400292	5400292	6127908	11528200	8573879	5669533	25771612	10946196	

NOTES: a. Based on estimated costs of the project as of March, 1964.

b. The Delta Water Charge represents the product of the annual entitlement times \$3.50 per acre-foot through the year 1969, \$5.46 for the years 1970-1977, inclusive, and \$7.34 thereafter.

Local Conveyance and Water Treatment Costs

An additional component of the cost of North Bay Aqueduct water to the eventual consumer will consist of the cost of facilities for conveyance and water treatment. These facilities will be constructed by the district or member units of the district. Accordingly, the costs associated with their construction, financing, and operation will not be directly associated with the district's repayment of its allocated cost of the North Bay Aqueduct. However, these conveyance and treatment costs have been estimated in order that an approximate water rate to the ultimate consumer might be determined.

Estimates of water treatment and conveyance costs depend upon several factors: (1) location of the ultimate water user in relation to the water supply, (2) the quantity of water to be delivered, (3) the purpose for which the water will be used, and (4) the quality of the raw water. At the present time definite plans for the treatment and conveyance of North Bay Aqueduct water have not been formulated. However, in order to arrive at some estimate of the costs involved in constructing typical facilities and to determine the additional debt which could be imposed upon the area served, systems were assumed and evaluated on the basis of the distribution of aqueduct water to member units indicated in Table 18.

Typical treatment plant costs were reported in Bulletin No. 110. For the purposes of this report the municipal and industrial water from the North Bay Aqueduct was assumed to be

distributed in the southern half of Napa County with the prime contracting agencies to the district being the City of Napa, the Carneros Area, where a district will probably be formed in the near future, and the American Canyon County Water District.

City of Napa. Water for the City of Napa was assumed to be delivered to a treatment plant southeast of the terminus of the aqueduct at an elevation of approximately 325 feet above sea level. Transportation facilities from the aqueduct to the treatment plant would be minimal. The treated water would be delivered to the city service area by pipeline. The capacity of the treatment plant was assumed to be 15,000 acre-feet per year and the conveyance system 10,000 acre-feet per year.

Carneros Area. A treatment plant for the Carneros area was assumed to be placed west of the Napa River near Carneros Creek. The water would be conveyed from the terminus of the aqueduct to the treatment plant by a siphon under the Napa River. The capacity of the treatment plant would be approximately 10,000 acre-feet per year.

American Canyon County Water District. Water for this district was assumed to be conveyed from the Napa City treatment plant, discussed previously, to the district's service area by a now existing pipeline which is owned by the California Pacific Utility Company. The American Canyon County Water District was assumed to take 5,000 acre-feet per year. Capacity was assumed to be included in the City of Napa's treatment plant for this water.

Costs

The estimated costs of the above facilities are indicated in Table 18.

Table 18

ESTIMATED CONVEYANCE AND TREATMENT COSTS FOR
NORTH BAY AQUEDUCT WATER

Facilities	Area		
	City of Napa	Carneros Area	American Canyon County Water District
Capital Cost (\$)			
Conveyance	400,000	280,000	-
Treatment	<u>1,416,667</u> 1/	<u>1,675,000</u>	<u>708,330</u> 1/
Total	2,525,000	1,955,000	708,330
Unit Costs (\$/AF) 2/			
Conveyance	3.04	2.22	-
Treatment	<u>21.50</u>	<u>25.00</u>	<u>21.50</u>
Total	24.54	27.22	21.50

1/ Treatment plant assumed to be a joint facility of the City of Napa and American Canyon County Water District. Capital cost distributed according to a relative use factor.

2/ Includes principal, interest, operation, maintenance, and replacement.

CHAPTER V. ECONOMIC JUSTIFICATION AND FINANCIAL FEASIBILITY

The two important and basic elements relative to the execution of a water service contract between the State and the Napa County Flood Control and Water Conservation District are the economic justification for entering into a contract and the financial capability of the district to perform the contract. Economic justification proves the worth of the proposed water service, while financial capability indicates the ability on the part of the district to repay the costs associated with the importation of water.

Economic Justification

The economic justification of water development projects may be concluded if the economic benefits of the project resulting from the uses to which imported water supplies would be put exceed the cost of water service. Definite criteria have not been developed for the analyzing of the economic justification of a water importation project for urban utilization. Often, economic justification is shown by demonstrating that a need for additional water supplies exists, that alternative sources of water would be more costly, and that the costs of the project are not significantly greater than existing water costs. Where no alternatives are available, economic justification for urban areas has been shown if the cost of water importation is not unreasonably high as

compared to the cost of present water sources, the area's economic development would be restricted without additional water supplies, and the repayment of the necessary expenditures for the water supply is financially feasible.

Economic studies conducted by the department in conjunction with Bulletin No. 110 studies concluded that the North Bay Aqueduct is the most feasible initial development to meet near-future requirements for supplemental urban water supplies in the north bay area of Napa County. This conclusion was reached after an evaluation and comparison of the probable costs of water from other potential sources of supply with the cost of water from the North Bay Aqueduct. On the basis of present knowledge, water importation via the North Bay Aqueduct into Napa County is concluded to be economically justified.

Financial Feasibility

The financial feasibility of the Napa County Flood Control and Water Conservation District entering into a water supply contract with the State can best be demonstrated by showing that the public credit of the district will be strong enough to repay the costs which will be incurred as a result of the contract. It must be shown that the area represented by the agency will not be unduly burdened by debt during the project repayment period and that there is a reasonable method of obtaining funds for repayment of costs in the event that water sales are not as anticipated.

In appraising the financial capability of the Napa County Flood Control and Water Conservation District, the entire

area of Napa County has been considered even though the area that would directly benefit from the importation of North Bay Aqueduct water is primarily limited to the Napa Valley and surrounding areas. The entire county has been considered for purposes of financial analysis because approximately 97 percent of the population and nearly all major industries are located in the North Bay Area of the Napa County Flood Control and Water Conservation District.

Present and Projected Assessed Valuation

The assessed valuation of Napa County as of June 30, 1962, has been reported to be nearly \$100,000,000. A market value of over \$435,000,000 is represented by this valuation. Assessed valuation in Napa County has been increasing at a rate of nearly eight percent per year during the last eight years. Table 19 shows the growth of assessed valuation in Napa County from 1955 to the present.

Table 19

HISTORIC ASSESSED VALUATIONS IN NAPA COUNTY

Year <u>1/</u>	Assessed valuation	Percent increase over previous year
1955	\$ 58,064,660	---
1956	63,321,500	9.1
1957	68,389,850	8.0
1958	75,526,860	10.4
1959	83,689,120	10.8
1960	89,380,570	6.8
1961	94,222,230	5.4
1962	99,784,430	5.9
1963	106,528,500	6.8

1/ As of June 30.

Per capita assessed valuation in Napa County has historically increased at rates comparable to the state average. In spite of these increases, the present valuation per capita is considerably below the state average. This low valuation is explained by the effect of the large areas of undeveloped land in the county, the predominance of an agricultural economy, and the lack of a large industrial complex. Estimated historic per capita assessed valuation for the county is contained in Table 20.

Table 20

HISTORIC PER CAPITA ASSESSED VALUATION IN NAPA COUNTY

Year ^{1/}	Estimated population	Assessed valuation	Per capita assessed valuation	Per capita percent increase over previous year
1955	56,000	\$ 58,064,660	\$1,040	---
1956	58,500	63,321,500	1,080	3.8
1957	60,700	68,389,850	1,125	4.2
1958	63,500	75,526,860	1,190	5.8
1959	65,200	83,689,120	1,285	8.0
1960	65,900	89,380,570	1,360	5.8
1961	68,300	94,222,230	1,380	1.5
1962	70,000	99,784,430	1,430	3.6
1963	72,200	106,528,500	1,475	3.1

^{1/} As of June 30.

For purposes of analyzing the financial capability of the district to pay for future service from the North Bay Aqueduct, projections of future assessed valuations were made of property within the county. These projections were conservatively made,

based on the assumption that assessed valuation per capita would continue to increase but at a slower rate than in the past. Table 21 presents the projected assessed valuations based upon the total population estimated in Chapter II and estimated future per capita assessed valuation.

Table 21

PROJECTED ASSESSED VALUATIONS OF THE
NORTH BAY AREA WITHIN NAPA COUNTY

Year	Population	Assessed value per capita	Assessed valuation
1970	97,000	\$1,630	\$158,100,000
1980	141,000	1,750	246,800,000
1990	209,000	1,820	380,400,000

The use of per capita assessed valuations which increase at rates less than presently being experienced is considered conservative for the purpose of analyzing financial capability.

Present and Projected Total Indebtedness

The Napa County Flood Control and Water Conservation District has no bonded indebtedness at the present time, nor is any contemplated in the near future. Present bonded indebtedness and other types of indebtedness are indicated by category in Table 22 for Napa County.

Table 22

PRESENT INDEBTEDNESS IN NAPA COUNTY^{1/}

Category	:	Indebtedness
County	:	--
City	:	\$ 4,963,000 ^{2/}
School Districts	:	
Bonds	:	8,924,000 ^{2/}
Public School Building Fund	:	38,644
State School Building Fund	:	1,806,447
Special Districts	:	682,000 ^{2/}
Napa County Flood Control and Water Conservation District	:	--
Total	:	\$16,414,091

^{1/} As of June 30, 1962^{2/} Bonded indebtedness

Historically, indebtedness has increased in Napa County, much the same as it has in other portions of the State. However, indebtedness, expressed as a percent of assessed valuation, has decreased as shown in Table 23.

Table 23

HISTORICAL INDEBTEDNESS OF
NAPA COUNTY^{1/}

Year ^{2/}	:	Indebtedness:	Percent of Assessed Valuation
1956	:	\$11,951,200	18.9
1958	:	13,536,100	17.9
1959	:	14,441,100	17.3
1960	:	14,726,100	16.5
1961	:	15,798,600	16.8
1962	:	16,414,100	16.5

^{1/} Includes all categories listed in Table 22.^{2/} As of June 30.

While total indebtedness expressed as percentage of the assessed valuation in the county has decreased during the last several years, large investments will be required to support population growth. Maintenance of total indebtedness at a level of 16.5 percent of future assessed valuation should allow for this growth. Future indebtedness, based upon this assumption, is presented in Table 24.

Table 24

ESTIMATED FUTURE INDEBTEDNESS
IN NAPA COUNTY

Year	Percent of assessed valuation	Total indebtedness
1970	16.5	\$26,100,000
1980	16.5	40,700,000
1990	16.5	62,800,000

^{1/} Does not include the costs of the North Bay Aqueduct or water treatment facilities.

Ad Valorem Taxes

Property taxes upon lands within the Napa County Flood Control and Water Conservation District vary widely from place to place. For example, the 1962 tax rate ranged from a low of \$4.33 per \$100 of assessed valuation in the Howell Mountain area to a high of \$9.82 per \$100 of assessed valuation on lands location in the American Canyon County Water District. The average tax rate in 1962, based upon the weighted average of total property taxes and assessed valuation with Napa County, was estimated to be \$7.34 per \$100 assessed valuation. The distribution of this average tax rate among specific components is contained in Table 25.

Table 25

HISTORIC AND PRESENT AVERAGE AD VALOREM TAX RATES^{1/}
IN NAPA COUNTY

Tax rate components	Weighted average ad valorem tax rate						
	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63
General county	2.82	2.78	2.74	2.61	2.60	2.82	2.81
School districts	3.26	3.42	3.45	3.52	3.61	3.66	3.78
City tax	0.68	0.69	0.67	0.65	0.71	0.70	0.70
Special districts	0.29	0.29	0.08	0.07	0.07	0.07	0.23
Napa County Flood Control and Water Conservation District	<u>0.13</u>	<u>0.13</u>	<u>0.15</u>	<u>0.15</u>	<u>0.13</u>	<u>0.09</u>	<u>1/</u>
Total	7.18	7.31	7.07	7.00	7.12	7.34	7.52

1/ Included in Special Districts

Capability to Meet Contract Obligations

The capability of the Napa County Flood Control and Water Conservation District to finance the obligations resulting from the contract for water service from the North Bay Aqueduct can be determined by the resolution of two questions. These questions are (1) will the obligations incurred with the contract place the lands within the district in the position of being unable to finance capital improvements for other public services, and (2) can the district legally and financially meet the minimum obligations of the contract with ad valorem taxation if water revenues are insufficient.

Effect Upon Indebtedness. The maximum aggregate unpaid costs under the contract for North Bay Aqueduct water will be approximately \$4,600,000 in 1980. The assessed valuation of taxable lands within the district is estimated to be approximately \$250,000,000 in 1980. The aggregate unpaid balance under the water supply contract with the State resulting from the North Bay Aqueduct would then represent less than three percent of the assessed valuation of the district. Comparisons of North Bay Aqueduct contract aggregate unpaid balances with assessed valuation for various years during the repayment period are contained in Table 26.

Table 26

SUMMARY OF CAPITAL REPAYMENT OBLIGATIONS
RESULTING FROM NORTH BAY AQUEDUCT CONTRACT

Year	Assessed valuation	Unpaid Aggregate of costs under contract	Percent of assessed valuation
1968	\$140,000,000	\$3,629,000	2.6
1970	158,100,000	3,599,000	2.3
1980	246,800,000	4,633,000	1.9
1990	380,400,000	4,308,000	1.1

In addition to the repayment obligations resulting from the North Bay Aqueduct contract, expenditures associated with the construction of local conveyance and treatment facilities will also be incurred. Based upon the assumptions made in Chapter IV, it was estimated that a capital expenditure of approximately

\$4,480,000 would be required for these facilities during the years 1966-1968. The total indebtedness in 1968 would then represent approximately 5.8 percent of the assessed valuation of the county.

It was assumed previously in this report that the total indebtedness of the county would in the future be maintained at the 1962 level of 16.5 percent of the assessed valuation. This total indebtedness does not include costs of the North Bay Aqueduct nor of the water treatment facilities. Furthermore, it has been assumed that future miscellaneous indebtedness would be 1.9 percent of the assessed valuation and bonded indebtedness would be 14.6 percent of the assessed valuation of the district. Table 27 summarizes the projected levels of indebtedness from all sources in the county and indicates that financing of other capital improvements for public service will not be impaired by the repayment obligations of the North Bay Aqueduct.

Table 27

ESTIMATED LEVELS OF INDEBTEDNESS IN NAPA COUNTY
RESULTING FROM ALL SOURCES IN 1968

Source	:	:	Percent of
	:	:	assessed valuation
North Bay Aqueduct contract (aggregate unpaid costs)	\$ 3,629,000		2.6
Local distribution and treatment facilities	4,480,000		3.2
Bonded indebtedness	20,440,000		14.6
Miscellaneous indebtedness	2,660,000		1.9
Total	\$33,589,000		22.3

Effect Upon Ad Valorem Tax Rate. Under conditions of a reduced rate of economic development, it is possible that water revenues to the district would be insufficient to fully meet the repayment obligations of the North Bay Aqueduct. These obligations would then have to be met through the levy of ad valorem taxes.

The tax rates required to be levied by the district to meet the allocated capital and minimum overhead, maintenance, and replacement cost obligations of the North Bay Aqueduct contract are indicated in Table 28.

Table 28

TAX RATE REQUIRED FOR REPAYMENT OF PRINCIPAL, INTEREST
AND MINIMUM ANNUAL CHARGES OF THE NORTH BAY AQUEDUCT

Year	Assessed valuation of Napa County	Amount of payment	Tax rate per \$100 assessed valuation Alt. No. 1
1968	\$140,000,000	\$231,000	.17
1970	158,100,000	242,000	.15
1980	246,800,000	343,000	.14
1990	380,400,000	357,000	.09

In addition to the annual repayment obligations resulting from the North Bay Aqueduct contract, expenditures will be required for local distribution and treatment facilities. The average annual capital repayment obligations resulting from these local facilities is estimated to be approximately \$227,000 for a capital expenditure of \$4,480,000. This annual cost, if paid for through an ad valorem tax on all taxable property within the district, would result in a tax rate of \$0.16 per \$100 assessed valuation in 1968, \$0.14 per \$100 assessed valuation in 1970, and \$0.09 per \$100 assessed valuation in 1980. Therefore, in 1968 the total ad valorem tax rate required to meet the repayment obligations of a North Bay Aqueduct contract and the annual cost for local treatment and distribution facilities, assuming no revenues accrue from water sales, is estimated to be \$0.33 per \$100 assessed valuation. This tax rate is reasonable and can be levied if necessary, however it is not anticipated that water sales will be less than estimated.

CHAPTER VI. SUMMARY AND CONCLUSIONS

The pertinent information presented in this report is summarized and conclusions are presented in the following sections.

Summary

1. The Napa County Flood Control and Water Conservation District was formed in 1951 for the purposes of controlling and conserving surface water supplies and contracting with other entities for the storage, delivery, and sale of water supplies. It is empowered to levy taxes to pay for any obligations of the district and to accomplish the purposes of the district.

2. Based on current contracts, a maximum entitlement of 67,000 acre-feet of water has been reserved for the North Bay Aqueduct. Also, an additional 3,800 acre-feet was reserved as option water under Article 8 of the Standard Provisions for Water Supply Contracts, but was ultimately declined.

3. The rapid growth of population in Napa County, from 65,900 in 1960 to an estimated 215,000 by 1990, and the expected industrialization and urbanization of the county are sound factors for the development of a supplemental municipal and industrial water supply.

4. Although agriculture shows a slight decrease in Napa County, it will continue to play an important role in the county's economy. The reduction in agriculture is primarily due to urban development. The decrease in income due to decrease in area has been somewhat retarded by the increased yields in the grape industries and greater livestock production within the county.

5. There are two major institutions of the State of California in Napa County. These institutions employ several thousand people, which help to stabilize the local economy. Also the continuing development of industry and an influx of residents who are employed outside of the county were, for estimating purposes, assumed to continue and used as a basis for the study of future water needs of Napa County.

6. The total supplemental water requirement of Napa County is estimated to be 80,560 acre-feet annually in 1990 of which 25,000 acre-feet will be supplied by the North Bay Aqueduct. It is expected that the remainder of this requirement, which is for agriculture, could be taken care of by the proposed Knights Valley Project.

7. The State Water Project can provide water to the district at an estimated equivalent unit rate of \$29.00 per acre-foot.

8. The 1962 assessed valuation of the Napa County Flood Control and Water Conservation District's service area was \$99,780,000 and it is estimated it will increase to about \$380,400,000 by 1990.

9. The Napa County Flood Control and Water Conservation District has no bonded indebtedness. The 1961-62 total indebtedness of the county was approximately \$16,414,000. The ratio of debt to assessed valuation was 16.5 percent.

Conclusions

1. The State of California has the necessary water supply and the authority to have entered into a contract with the

Napa County Flood Control and Water Conservation District for a maximum annual entitlement of 25,000 acre-feet of water per year.

2. The contractual cost to the district can be met with a sound financial program based on the ability of users to pay for water and ad valorem assessments for benefits accruing from importation of water from the State Water Project.

3. The Napa County Flood Control and Water Conservation District has the authority, the necessity, and the financial capability to have entered into a contract with the State of California for a maximum annual entitlement of 25,000 acre-feet of water per year.



STATE OF CALIFORNIA
 THE RESOURCES AGENCY
 DEPARTMENT OF WATER RESOURCES
 BAY AREA BRANCH

REPORT ON FEASIBILITY OF SERVING
 THE NAPA COUNTY FLOOD CONTROL
 AND WATER CONSERVATION DISTRICT
 FROM THE STATE WATER PROJECT

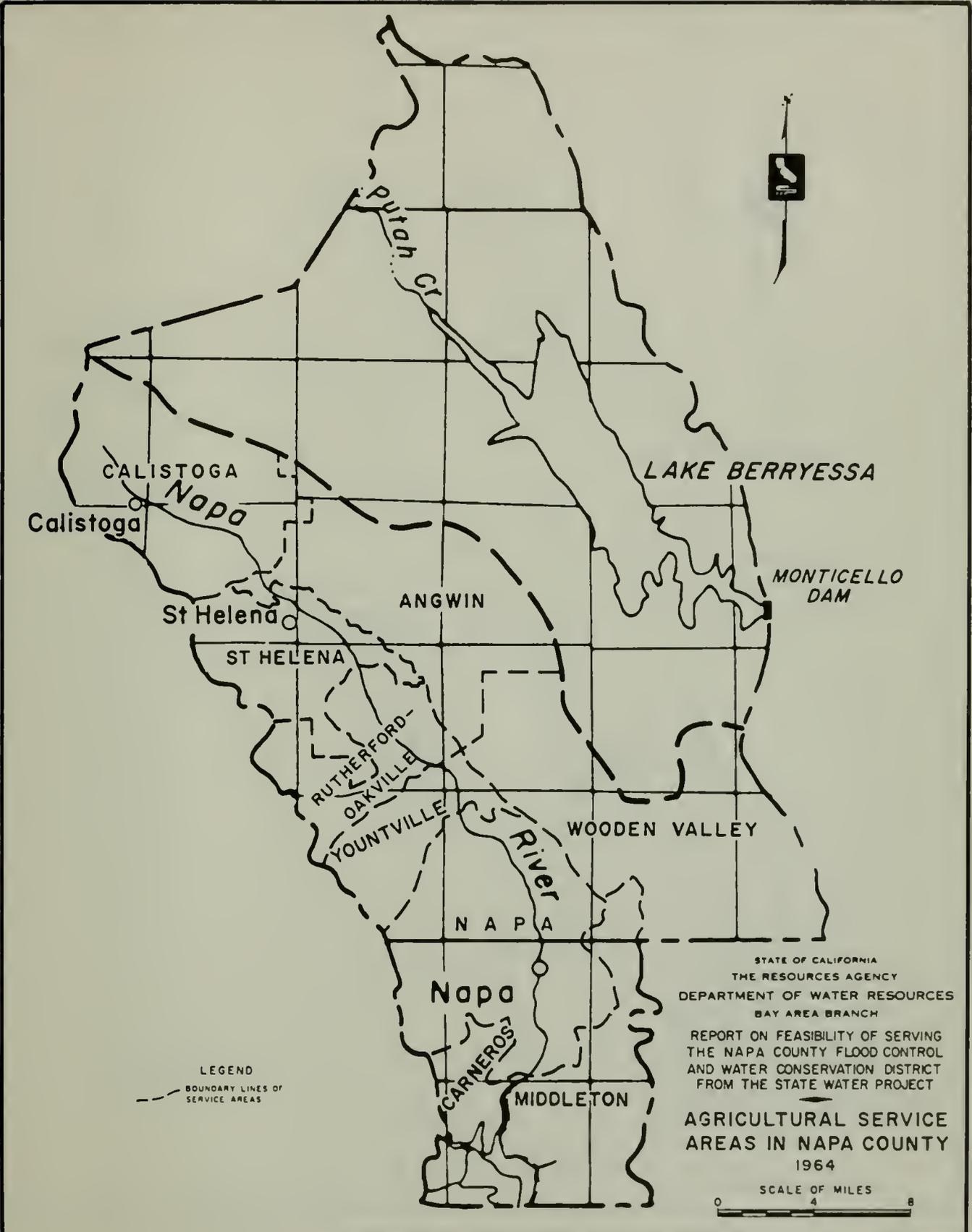
**NORTH BAY AREA
 NAPA COUNTY**

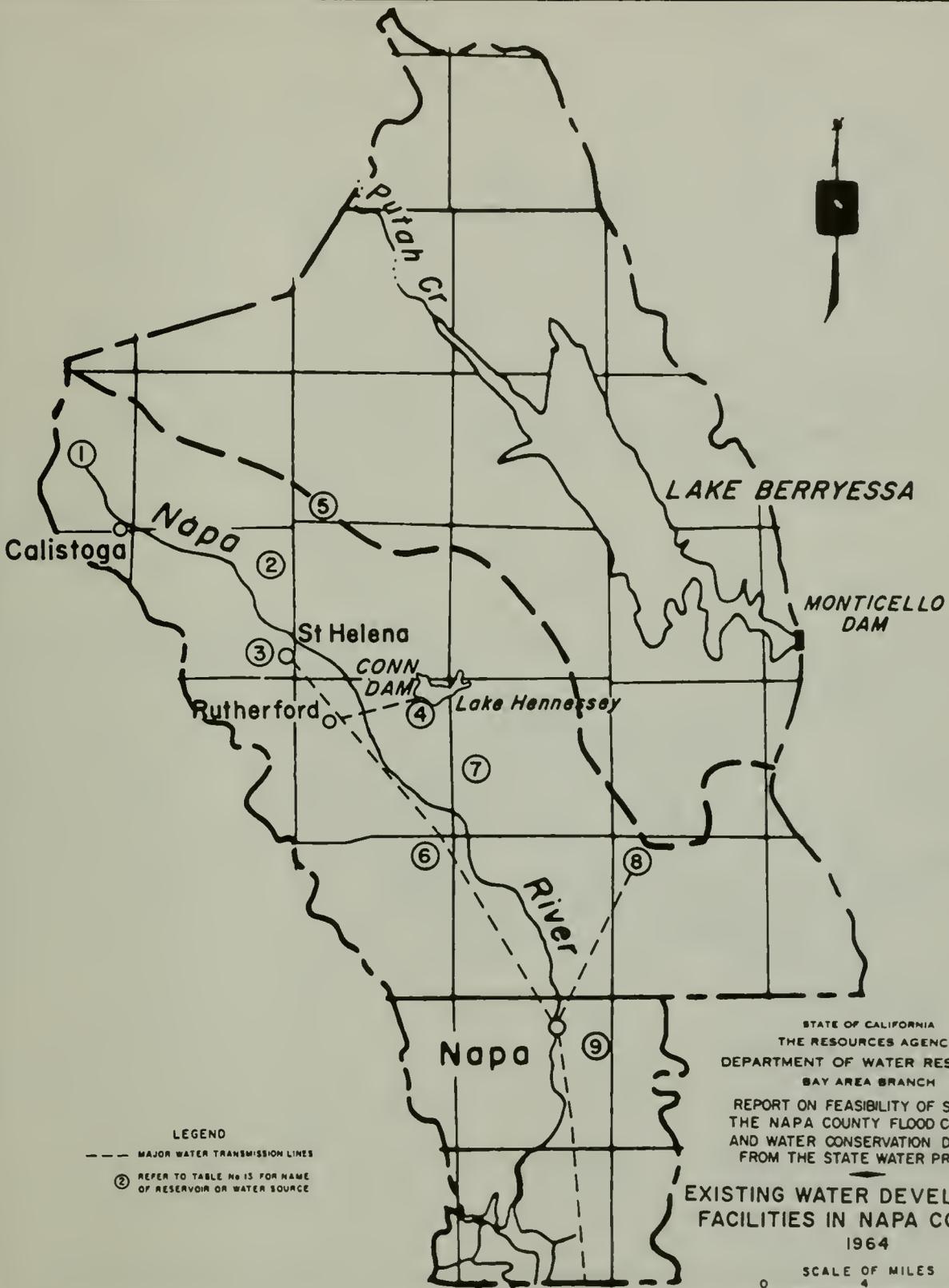
1964

SCALE OF MILES



- LEGEND**
- NORTH BAY AREA BOUNDARY
 - - - JUDICIAL TOWNSHIPS
 - ▨ NORTH BAY AREA OF NAPA COUNTY



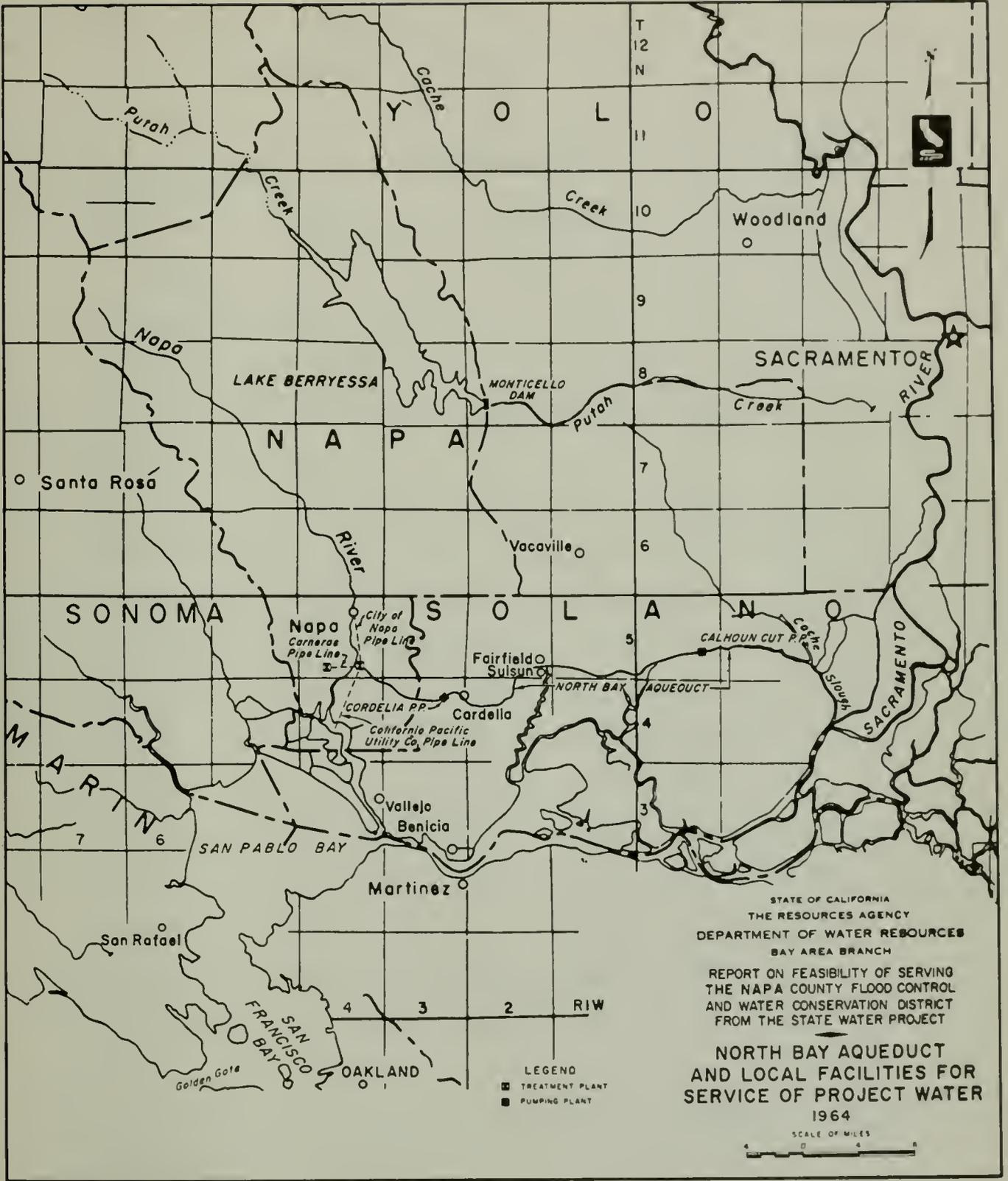


LEGEND
 - - - MAJOR WATER TRANSMISSION LINES
 ② REFER TO TABLE No 13 FOR NAME OF RESERVOIR OR WATER SOURCE

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 BAY AREA BRANCH
 REPORT ON FEASIBILITY OF SERVING
 THE NAPA COUNTY FLOOD CONTROL
 AND WATER CONSERVATION DISTRICT
 FROM THE STATE WATER PROJECT

**EXISTING WATER DEVELOPMENT
 FACILITIES IN NAPA COUNTY
 1964**

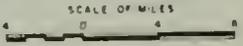
SCALE OF MILES
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REPORT ON FEASIBILITY OF SERVING
 THE NAPA COUNTY FLOOD CONTROL
 AND WATER CONSERVATION DISTRICT
 FROM THE STATE WATER PROJECT

**NORTH BAY AQUEDUCT
 AND LOCAL FACILITIES FOR
 SERVICE OF PROJECT WATER
 1964**



LEGEND
 □ TREATMENT PLANT
 ○ PUMPING PLANT

APPENDIX A^{1/}

CREDIT ANALYSIS OF THE NAPA COUNTY
FLOOD CONTROL AND WATER CONSERVATION DISTRICT

A. Statement of debt of the Napa County Flood Control and Water
Conservation District

1. Net direct debt (full faith and credit), June 30, 1962
 - a. Bonds: None
 - b. Floating debt: None
 - c. Total debt: None
2. Special obligations (not full faith and credit): None
3. Limitation on debt
 - a. Bonds: Bonds may be issued by the district to finance capital improvements at an interest rate of not more than five percent and a maturity date not in excess of 40 years. The maximum amount of bonds which can be issued shall not exceed that which can be repaid from revenues from an ad valorem tax rate of \$0.15 per hundred dollars of assessed valuation as of the date of sale of the bonds.
 - b. Applicable statutes: Napa County Flood Control and Water Conservation District Act, Statutes of 1951, Ch. 1449, p. 3411, as amended, Deering Act 5275b.
4. Amount of bonds authorized but unissued: None
5. Utilities operated by the district: None

^{1/} Since the boundaries of the Napa County Flood Control and Water Conservation District coincide with those of Napa County, some of the data contained herein refer to Napa County, and are so stated.

B. Debt of overlapping, coterminus, and underlying political units

<u>Type of Unit</u>	<u>Debt</u>	<u>Date of Statement</u>
County	\$	
Cities	4,963,000	June 30, 1962
County Water District	48,000	June 30, 1962
County Sanitation District	634,000	June 30, 1962
School Districts <u>1/</u>	<u>10,769,091</u>	June 30, 1962
Total debt		\$16,414,091

1/ Includes debt to State School Building Fund and Public School Building Fund

C. Summary of debt of Napa County and other political entities

<u>Type of Debt</u>	<u>As of June 30 (in thousands of dollars)</u>				
	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
1. <u>Net bonded debt</u>	0	0	0	0	0
2. <u>Net floating debt</u>	0	0	0	0	0
3. <u>Overlapping, etc., debt</u>	<u>\$13,536</u>	<u>\$14,441</u>	<u>\$14,726</u>	<u>\$15,799</u>	<u>\$16,414</u>
4. <u>Total debt</u>	<u>\$13,536</u>	<u>\$14,441</u>	<u>\$14,726</u>	<u>\$15,799</u>	<u>\$16,414</u>

D. Default Record: There has been no default either in the payment of principal or interest, by either the county or by any overlapping, coterminus or underlying taxing district in recent years.

E. Assessed valuations of property in Napa County

<u>Type of property</u>	<u>Valuation (\$1,000) as of June 30</u>				
	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>
a. Real property	67,925	73,677	76,673	82,202	88,637
b. Personal property	4,758	4,813	4,861	5,619	5,190
c. Utilities	<u>11,006</u>	<u>10,887</u>	<u>12,688</u>	<u>11,963</u>	<u>12,702</u>
d. Total assessed value	83,689	89,377	94,222	99,784	106,529
e. Estimated market value	360,072	385,153	399,385	430,505	440,568

2. Assessment ratio (proportion of market value):

- a. Real property: 22.6 percent
- b. Personal property: 22.6 percent
- c. Source: State Board of Equalization, Annual Report
1962-63, p. 13.

3. Important tax exempt property within the district:

The principal tax exempt properties are the Napa State Hospital, the Veterans Home in Yountville, and the Pacific Union College in Angwin. These properties have a total assessed valuation of approximately \$7,500,000. In 1961 tax exempt lands were assessed at \$7,794,000 and represented approximately 8.2 percent of the assessed valuation of taxable property.

4. Concentrations of valuable property just outside the area:

The county is bounded by Solano, Sonoma, and Lake Counties. The City of Vallejo, located in Solano County immediately south of Napa, is a substantial urban center and is the location of the Mare Island Naval Reservation. Travis Air Force Base is located in Solano County approximately 20 miles west of the City of Napa.

5. Largest taxpayers in the area:

- a. Basalt Rock Company
- b. Blaufuss and Son
- c. Calnap Tanning Company
- d. Kaiser Steel Corporation
- e. Napa Glove
- f. Napa Box Company
- g. Rough Rider, Inc.
- h. Stohsner Machine Works
- i. Wilkens Instrument
- j. Westberg Manufacturing Company

F. Property tax rates in Napa County

		Weighted average tax rates in dollars					
1. Tax rate components:		per \$100 assessed valuation					
		1957-58	1958-59	1959-60	1960-61	1961-62	1962-63
a.	County rate	2.78	2.74	2.61	2.60	2.82	2.81
b.	School Districts	3.42	3.45	3.52	3.61	3.66	3.78
c.	cities	0.69	0.67	0.65	0.71	0.70	0.70
d.	Special Districts	0.29	0.08	0.07	0.07	0.07	0.23
e.	NCFCWCD <u>1/</u>	<u>0.13</u>	<u>0.15</u>	<u>0.15</u>	<u>0.13</u>	<u>0.09</u>	<u>Not Available</u>
f.	Total rate	7.31	7.07	7.00	7.12	7.34	7.52

1/ Napa County Flood Control and Water Conservation District

2. Assessment roll: Taxes for all districts are levied from same assessment roll.

3. Legal limits on tax rates (in dollars per \$100 assessed valuation)

- a. County library
- b. Supervisorial road districts
- c. Cemetery districts
- d. Sanitary districts
- e. Hospital districts
- f. Lighting districts
- g. Fire protection districts
- h. Mosquito abatement districts
- i. School districts
- j. Water districts
- k. Flood control and water conservation districts

4. Taxes by classification of property

With few exceptions, tax rates apply to all classes of taxable property, whether real or personal, secured or unsecured.

5. Division of Tax rates into separate levies

Most tax rates are consolidated rates for all purposes. However, many rates are broken down into maintenance rates and bond repayment rates, where applicable. Examples of tax rates which are classified into various components are shown below.

- a. County tax rate: General county, social welfare, promotion, fire protection, special road, and library.
- b. School tax rate: General funds, bonds, Junior College tuition tax, countywide education tax.
- c. Water District rate: General fund, bonds.
- d. Sanitation districts: General fund, bonds.

G. Record of tax collections on property in the Napa County Flood Control and Water Conservation District

1. Tax collections

Fiscal Year	Amount levied	Cash collections in year of levy		Uncollected at end of fiscal year	
		Amount	Percent	Amount	Percent
1961-62	\$ 6,971,400	\$ 6,894,300	98.9	\$ 77,100	1.1
1960-61	6,519,400	6,241,500	95.7	277,900	4.3
1959-60	6,010,200	5,925,300	98.6	84,900	1.4
1958-59	5,489,300	5,375,100	97.9	114,200	2.1
Total	\$24,990,300	\$24,436,200	97.8	\$554,100	2.2

2. When taxes are due

- a. Due date: One-half of tax levy due and payable each on November 1 and February 1.
- b. When delinquent: December 11 and April 10 following due date.
- c. Penalties: Penalties attached as of the delinquent date, to the extent of 6 percent of each delinquent installment.

3. Tax sales: Tax sales of delinquent property are regularly held by the county.

4. Estimated tax delinquency: Each year the county auditor estimates a tax payment delinquency, usually five percent, which is used for budget purposes and for computing necessary tax levies and rates for the ensuing year.

5. Collection of taxes: The district does not collect its own taxes or the taxes of other taxing districts. The county collector collects all taxes.

H. Receipts and disbursements of the Napa County Flood Control and Water Conservation District

	Fiscal Year			
	1957-58	1958-59	1959-60	1960-61
Receipt and disbursement items :	1957-58	1958-59	1959-60	1960-61
1. <u>Cash balance, beginning of yr.</u>	\$ 68,094.55	\$ 99,584.00	\$ 44,649.21	\$ 85,253.43
2. <u>Receipts</u>				
a. Gen. property tax-current levy	85,651.27	109,548.19	122,342.99	113,621.86
b. Gen. property tax prior levies	<u>1,616.27</u>	<u>2,008.07</u>	<u>3,045.37</u>	<u>2,778.12</u>
c. Total from continuing sources of revenue	87,267.54	111,556.26	125,388.36	116,399.98
3. <u>Nonincome receipts</u>				
a. Aid from other agencies	<u>14,754.85</u>	<u>128.00</u>	<u>0.00</u>	<u>4,065.83</u>
4. <u>Total receipts</u>	102,022.39	111,684.26	125,388.36	120,465.81
5. <u>Disbursements</u>				
a. Salaries and wages	12,392.24	11,976.63	11,581.12	6,997.53
b. Other operating expense	1,912.56	4,290.44	2,286.77	4,959.44
c. Capital and emergency expenditure	<u>56,228.14</u>	<u>150,351.98</u>	<u>70,916.25</u>	<u>87,126.22</u>
6. <u>Total disbursements</u>	<u>70,532.94</u>	<u>166,619.05</u>	<u>84,784.14</u>	<u>99,083.19</u>
7. <u>Cash balance, end of year</u>	99,584.00	44,649.21	82,253.43	106,636.05
				113,318.13

- I. Sinking fund operations: There are no sinking funds being operated by the district at the present time.
- J. Future debt service requirements: None exist for the district as an entity at the present time.

K. Management and Services

- 1. Fiscal policies: Fiscal policies include the adopting of an annual budget. The county Board of Supervisors are ex officio Board of Directors and control the fiscal matters with the same responsibility as their duties to general county government.
- 2. General character and efficiency of the management
Management is accomplished by county officials. This provides qualified personnel well versed in management and budgetary control.
- 3. Services performed by the agency
The district's primary function is to conserve and make available sufficient water for present and future beneficial uses by lands and consumers within the boundaries of the district.

L. Economic background

- 1. Land area: The district includes all lands within Napa County which, according to the 1959 census of farming, amounted to 758 square miles or 485,120 acres classified as follows:
 - a. Agricultural, residential, and recreational - 80 percent ^{1/}
 - b. Industrial, commercial, incorporated, rights-of-way, and waste land - 20 percent ^{2/}

^{1/} Of the 80 percent devoted to agricultural, residential, and recreational, over 60 percent is in farming, including livestock farming. The average size farm comprises 251 acres.

^{2/} Of the 20 percent devoted to industrial, etc., over 8,900 acres are zoned for industrial use.

- 2. Population: Estimates based on U. S. Census data indicate that the population of the district has increased as follows:

	<u>1960</u>	<u>1950</u>	<u>1940</u>
a. Total for Napa County	65,890	46,603	28,503
b. Percent urban	37.8	32.1	27.6

c. Population projections by the Department of Commerce indicate population increases as follows:

1970 -	80,000	2000 -	280,000
1980 -	120,000	2010 -	430,000
1990 -	180,000	2020 -	660,000

3. Employment: Employment in Napa County as reported by the Department of Employment, State of California, is as follows:

	<u>1960</u>	<u>1950</u>	<u>1940</u>
a. Employed in agriculture	1,316	1,833	1,975
b. Employed in manufacturing	5,057	2,949	1,815
c. Total employed in county	21,495	14,626	9,375

4. Agriculture: Listed in order of importance, the following crops have, for the past five years, produced approximately that which is indicated and accordingly, ranked in the same order of importance economically.

a. Beef production	- 24,900 head,	total value	\$6,225,000
b. Grapes	- 39,516 tons,	total value	3,951,600
c. Prunes	- 7,510 tons,	total value	1,652,200
d. Walnuts	- 700 tons,	total value	322,000
e. Pears	- 2,025 tons,	total value	151,875

5. Industry: Industry is led by Kaiser Steel Corporation's fabrication plant which employs over 800 people with an annual payroll in excess of \$5.4 million. Excluding wine production and other agriculturally related industries, Napa County's industrial payroll is now well over \$20 million annually. This amount added to the area's farm income of \$16.4 million totals approximately \$37 million in purchasing power.

a. The principal products in order of importance are the following:

1. Fabricated metal products
2. Prestressed concrete beams
3. Sports clothing
4. Leather products
5. Precision instruments
6. Paper box products
7. Processed fruit juices

b. Large industrial plants in the area:

Basalt Rock Company	Napa State Hospital
Blaufuss and Sons	Rough Rider, Inc.
Calnap Tanning Company	Stohsner Machine Works
Kaiser Steel Corporation	Wilkens Instrument
Napa Glove	Veterans Home
Napa Paper Box	Westberg Manufacturing Company

6. Trade: The City of Napa is the leading trading center of the county, accounting for a major share of its wholesale and retail trade, as shown below:

<u>Year</u>	<u>Total taxable retail sales in Napa County</u>	<u>Total taxable retail sales in Napa, California</u>
1957	\$62,729,000	\$36,625,000
1958	57,708,000	34,054,000
1959	65,271,000	40,012,000
1960	67,166,000	40,036,000
1961	81,398,000	42,795,000
1962	96,220,000 (estimated)	46,450,000

Other communities of commercial importance are St. Helena and Calistoga to the north. The county has attracted a growing number of visitors as a result of the recreation facilities available at Lake Berryessa. The expenditures of these visitors have bolstered the retail trade of many lines of business.

7. Transportation: The Southern Pacific Railroad serves the Napa Valley. Transportation facilities are principally concerned with (1) serving Napa's large commute population, and (2) the marketing needs of local industry. Presently, transportation needs are served primarily through commercial passenger and freight carriers and through private auto. Water transportation at the present time is not significant. The major highway network in Napa County consists of State Highways 12, 29, and 37, and relatively rapid access to U. S. Highway 40.
8. Natural Resources: While lumbering activity is not of significant importance at the present time, the aggregate minerals industry plays a notable part in the county's economy, Basalt Rock Company being the chief developer to the extent of 495 employees and an annual payroll of \$3,547,000. There are minor developments in the quick-silver and asbestos fields.

M. Financial data for Napa County

1. General data

a. Population

1950	46,603
1960	65,890
1963	72,200 (estimated)

b.	<u>Assessed valuation</u>		
	1. Amount (June 30, 1962)	\$	99,784,430
	2. Basis of assessment		21.6 percent
	3. Estimated full valuation	\$	430,505,000
c.	<u>Bonded debt</u> (June 30, 1962)	\$	14,569,000
d.	<u>Tax levied</u> (June 30, 1962)	\$	6,971,400
2.	<u>Per capita data (1962)</u>		
a.	<u>Assessed valuation</u>	\$	1,415
b.	<u>Estimated full valuation</u>	\$	6,120
c.	<u>Bonded debt</u>	\$	207
d.	<u>Tax levied</u>	\$	99
3.	<u>Ratios</u>		
a.	<u>Tax supported bonded debt as percent of:</u>		
	1. Assessed valuation	-	14.6
	2. Estimated full valuation	-	3.4
	3. Tax levied	-	209
b.	<u>Percentage increase</u>		
	1. Population, 1950 to 1960	-	41.4
	2. Assessed valuation, 1950 to 1960	-	109.0
	3. Bonded debt, 1956 to 1962	-	27.2
	4. Tax levied 1958 to 1962	-	27.0

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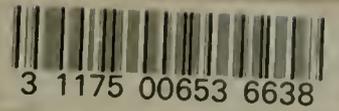
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