IMPERIAL VALLEY, CALIFORNIA

FROM DESERT WASTELAND TO AGRICULTURAL WONDERLAND: THE STORY OF WATER AND POWER

IMPERIAL IRRIGATION DISTRICT

The wilderness and the solitary place shall be glad for them; and the desert shall rejoice, and blossom as the rose.

Isaiah 35:1

Hoover Dam, 303 miles upstream from Imperial Dam.

IMPERIAL VALLEY AND IMPERIAL IRRIGATION DISTRICT

A Brief History

By Jamie K. Hartshorn

Viewing today's Imperial Valley, one would never guess that an early explorer many years before had christened his trip through the area "The Journey of the Dead." Life is vividly apparent in the Valley, with its lush farmlands and thriving cities. True, the Valley is bounded by desert, but this provides a playground which attracts thousands of recreationists each year.

Survival in Imperial Valley since its beginning days has depended on its water supply. The Colorado River, flowing 60 miles away, ultimately changed this desert waste to fertile farmland, yet it proved to early settlers that it was capable of treachery.

The original developers of Imperial Valley were plagued with misfortune; they became deeply in debt and were unable to provide reliable water service. So, in 1911, the Imperial Irrigation District, a publicly-owned subdivision of the State of California, was formed to acquire the rights and properties of the developers. Today, it is the District's function to bring water to the Valley, delivering it to the farmers and wholesaling it to the cities for distribution. The history of water--and of the District--is essentially the history of Imperial Valley.

Early Explorers Faced Scorching Desert

Juan Bautista de Anza, a captain in the Spanish army, found only desert when he led an expedition across the area in the 18th century. De Anza encountered a wasteland so forbidding that upon reaching San Gabriel Mission he declared that he had made "La Jornada de los Muertos"--"The Journey of the Dead." De Anza was preceded by Father Hermengildo Francisco Garces who, too, searched for water in the desert and later aided de Anza in his journeys.

Travelers who were to follow encountered the same scorching barrier, yet as early as 1850 a few farsighted men realized that the area could be made productive with an assured water supply.

William P. Blake was one of the first to recognize the potential of the Imperial Valley. A geologist with a railroad survey party, Blake had passed through the desert in 1853 and had noticed the ancient shoreline at the foot of the mountains, showing that at one time there had been an inland sea where now there was desert. Barometric readings taken by Blake proved that the desert lay below sea level and could be irrigated by a gravity-flow canal diverting from the Colorado River.

Another individual interested in the development of the desert was Dr. Oliver M. Wozencraft, who crossed through the area during the gold rush of 1849. Hiring an engineer to make a survey and recommend a location for a canal, Wozencraft, in 1861, succeeded in having legislation introduced in the United States Congress to authorize development of Imperial Valley. But the Civil War delayed further progress on the plan for many years, and Wozencraft died without seeing his dream become a reality.

C. D. Company Formed to Reclaim the Valley

Finally, in 1896, the California Development Company (C. D. Company) was formed by Charles Rockwood, Anthony Heber and others to reclaim Imperial Valley with Colorado River water, based on water filings made by certain individuals in the 1890s and assigned to the C. D. Company. George Chaffey, a famous irrigationist, was persuaded to join forces with the C. D. Company, and in 1900 he contracted to build a canal to deliver water by gravity from the river to the upper end of the Valley. C. N. Perry laid out much of the complicated irrigation system which was to serve the land.

Excavation of the canal commenced in August, 1900. The point of diversion from the Colorado River was near Pilot Knob, a short distance above the Mexican border. The canal paralleled the river to the border and on into Mexico for a distance of four or five miles. It then swung west for three miles to connect with an old river channel (Alamo River), which, with a minimum amount of work, was converted into a serviceable canal. For the next 40 miles, the canal passed through Mexico, reentering the United States at Sharp's Heading where the Alamo turned northward to Salton Sea.

Early in 1901, a wooden head gate, known as Chaffey Gate, was built in the intake canal about five hundred feet north of the international boundary to control inflow of water into the canal.

Water was first delivered to the Valley through the Imperial (Alamo) Canal in June, 1901, and some 1,500 acres of land were put into crops in the fall of that year.

Because settlement of the Imperial Valley was more rapid than anticipated, and also because of silt build-up in the intake canal, serious water shortages occurred during the winters of 1902-03 and 1903-04. Difficulties with the federal government arising over water rights compounded the problem. To relieve the water shortage, the C. D. Company decided to open another intake from the Colorado River to the Imperial Canal further downstream in Mexico, below the silt-clogged intake.

A channel 60 feet wide and 3,300 feet long was constructed between the river and the canal. No control gate was built, since this was

considered a temporary diversion, to be closed before the 1905 spring flood season. The engineers, however, had not reckoned with the capriciousness of the Colorado.

1905-07: The Flood Years

The unstable river in past ages had left its channel to the Gulf of California and had turned northward into what is now Imperial Valley. Raising its new bed with deposited silt, the river would then be forced southward again by gravity, to pour its water once more into the Gulf. The inland lake that had been formed would eventually evaporate, awaiting the time, perhaps centuries in the future, when the river would again change its course. Man's first attempts to harness the Colorado helped hasten this inevitable geological phenomenon.

In 1905, unanticipated winter floods poured out of the Gila River in Arizona and into the Colorado; the river changed its course and poured its full flow down the Imperial Canal into the Salton Sink, where the Salton Sea stands today. Repeated attempts to close the cut failed.

A monumental effort by the C. D. Company and the Southern Pacific Company was required to turn the river back into its former channel. This finally was accomplished in 1907, and the Colorado once again flowed down its ancient course into the Gulf of California, leaving the Salton Sea behind.

Settlers Take Control

After more flooding in 1910, Imperial Valley settlers moved to take the situation into their own hands. Up to this time, the fate of the Valley had been in the control of outside forces. In 1911, the Imperial Irrigation District was formed, comprising 513,368 acres, for the purpose of acquiring the rights and properties of the C. D. Company.

The C. D. Company had been forced into bankruptcy by the flooding, and the Southern Pacific Company, which had controlled the C. D. Company since the great flood, bought it at receiver's auction in 1916. The properties, including the main canal, levees and equipment, were sold to the Imperial Irrigation District the same year and Charles Rockwood, formerly of the C. D. Company, became the District's first chief engineer. By 1922, the District had absorbed the 13 mutual water companies then distributing water in the Valley.

Need for All-American Canal Realized

Because its main canal and levees were located in Mexico, giving Imperial Valley little security in its water supply and flood defense, the District realized the need for an "All-American Canal" north of the border. The sand dunes between the River and the Valley would have to

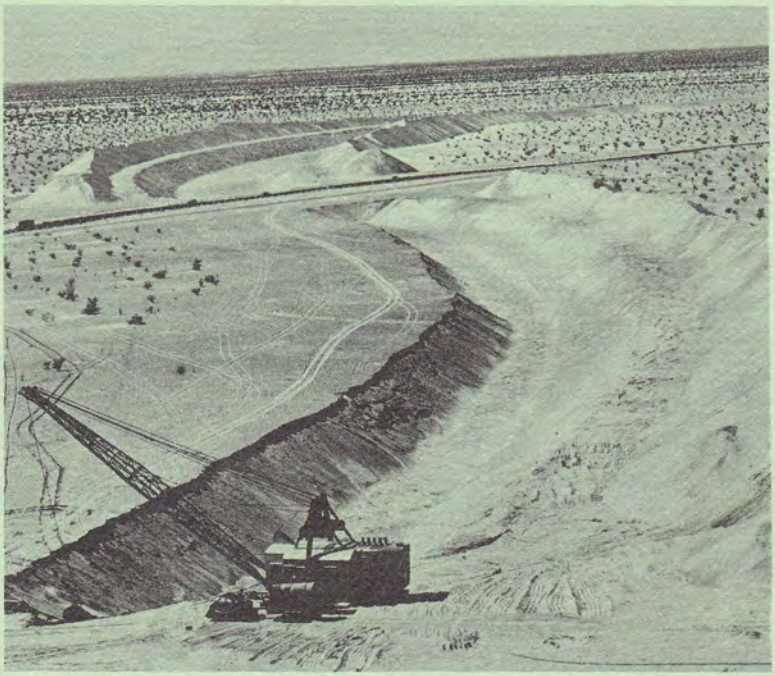
be crossed, but engineers believed such a canal could be constructed and maintained in spite of the shifting sands.

This concept of an All-American Canal was not a new one. Mark Rose, a pioneer farmer, had been trying to get water to his land on Imperial Valley's East Mesa since 1912. He found that he could do so by means of a ditch built from the Colorado through the sand dunes, since his land lay too high to be irrigated by gravity flow from the canal in Mexico.

Rose went to Washington to seek an appropriation for the building of a canal. Fearing that Rose's private interests might prove an obstacle to its plans, the District stepped in.

Phil Swing, who later became a U. S. Congressman and was known throughout the Southwest as "Mr. Water," was the District's chief counsel at this time. In 1917, he hurried to Washington to block Rose and was successful in negotiating an agreement between the Bureau of Reclamation and the District under which the Valley's need for an All-American Canal would be investigated.

Following that old adage, "If you can't beat 'em, join 'em," Rose ran for and was elected to a directorship of the District in its next election. He and Swing worked together as a team in the struggle to have an All-American Canal built.



Men and giant machines conquered the sand dunes to build the All-American Canal, Imperial Valley's lifeline from the Colorado River.

The Bureau of Reclamation reported that such a canal would be impractical without a dam to control flooding. In 1919, the Bureau issued another report recommending an All-American Canal and government construction of a storage reservoir on the Colorado.

Boulder Canyon Project Act Passed

The final result was passage of the Boulder Canyon Project Act in 1928, which authorized construction of Boulder (Hoover) Dam, Imperial Dam and the All-American Canal. Before the act could become effective, however, the Colorado River Compact of 1922, allocating water between the Upper and Lower Basin States, had to be ratified by all seven Colorado River Basin States; failing that, the California Limitation Act, limiting California's use of Colorado River water, had to be adopted. As Arizona did not ratify the Compact, California adopted the legislation limiting its use of Colorado River water. Boulder Dam and the reservoir behind it, Lake Mead, were dedicated in 1935.

Excavation of the All-American Canal got underway in 1934, with Mark Rose sitting at the levers of the power shovel which raised the first scoopful of earth. By 1935 the sand dunes were reached--and conquered--by a 650-ton dragline crane.

The first scheduled delivery of water by the new canal was in October, 1940, and by 1942 the Valley was drawing its entire supply through the All-American Canal. Control of the Canal west of Pilot Knob was turned over to the District in 1947 and the remainder in 1952.

The District's share of the construction costs of the All-American Canal was determined to be $25,020,000, including the balance remaining under the 1918 contract for the right to connect with the Laguna Dam, which right was not exercised. Under the terms of the All-American Canal contract with the federal government, the entire net proceeds from power generation at hydroelectric plants to be located on the Canal were to be applied to this indebtedness. In 1957, the District received a $3,000,000 credit from the federal government as partial reimbursement for flood control expenditures made in Mexico during the period the main canal passed through that country, as well as $201,000, which was the amount of the Gila Project's share of the cost of Laguna Dam, both of which were applied to the All-American Canal debt.

Work on Imperial Dam was begun in 1936. This was a "first" for the world of irrigation--here, river water would be held, then turned into a giant desilting plant before being released into the All-American Canal. No longer would silt fill irrigation ditches and clog furrows in the Imperial Valley.

The mighty Colorado at last had been tamed, but the District was not free of other natural disasters which occurred during the years 1930-1940.

A drought in 1934 proved to be the worst in Imperial Valley's history and in 1939 a severe flood, resulting from the Valley's heaviest rainfall of record, damaged the system extensively. In 1940, there was a strong earthquake which destroyed structures and shifted canals. The Valley's main water supply still traveled through Mexico, where the quake hit hardest. The All-American Canal was not yet in service, but the completed portion was put into temporary emergency use and saved the Valley from a desperate situation. District crews worked around the clock and before long water was again flowing into the Valley.

Colorado River Water Allocated

Waged to determine the allocation of Colorado River water among the Lower Basin states, the Arizona vs. California lawsuit stretched on from 1952 to 1964, when the Supreme Court of the United States issued its decree. Out of the six-million-word transcript came the allotment of 2,800,000 acre-feet per annum to Arizona, 4,400,000 to California, and 300,000 to Nevada, all subject to availability of water in the Colorado River.

Recent Developments in the Water Department

Turning to the Water Department's more recent history, every wooden structure in the system has been replaced by concrete within the past 25 years. Since 1929, nearly 23,000 miles of tile drains have been installed on Imperial Valley farms by the landowners. The District, in cooperation with the U. S. Department of Agriculture's Soil Conservation Service, pioneered in the design of tile drainage systems suited to Imperial Valley conditions and in the design and construction of the gigantic machines which install tile.

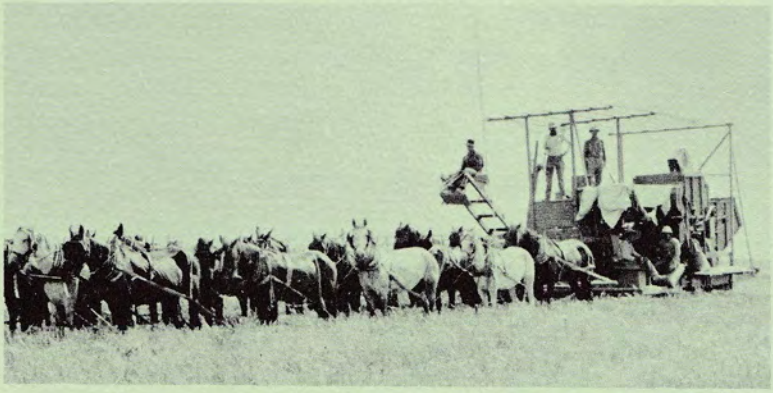
For nearly 30 years, a favorable salt balance has been maintained in Imperial Valley; that is, more salt is removed by the drainage system than is brought in by irrigation water.

In the 1960s, concrete lining of canals was initiated. Thus far, about 650 miles of canal have been lined, saving an estimated 122,200 acre-feet of water annually from seepage. Main canals which are not scheduled to be lined are being equipped with parallel water recovery lines and pumping stations for salvaging water lost by seepage.

Recognizing the seriousness of the water shortage the northern part of the state was experiencing in the mid-1970s, the District, in July, 1976, supplemented its existing water conservation efforts with a stringent 13-point program. A year before the program was initiated, the District had constructed the first of several planned water-regulating reservoirs, a major conservation effort. The 1976 program provided for construction of a second, larger reservoir, scheduled for completion in 1977. The two reservoirs are expected to save 40,000 acre-feet of water a year.

Water has indeed meant life to Imperial Valley, this land of little rain. With the District's help, what once was barren desert now blooms under acres and acres of a myriad of different crops, earning Imperial Valley the nickname "Salad Bowl of the Nation."

"La Jornada de los Muertos" no longer rings true.



Some early-day harvesting operations ran on mule power.

IMPERIAL IRRIGATION DISTRICT WATER DEPARTMENT

The Water Department's responsibility starts at Imperial Dam about 20 miles northeast of Yuma, Arizona, where water is diverted from the Colorado River, then passes through the All-American Canal headworks and desilting basins and into the All-American Canal. Water for the Yuma Project diverts from the Canal at Siphon Drop 15 miles downstream from Imperial Dam and that for Coachella Valley and Riverside County at Drop 1 about 20 miles west of Yuma. The entire flow below Drop 1 is for use by Imperial Irrigation District.

The District's gravity-flow irrigation and drainage systems serve 476,593 acres of farmland. The total gross area within District boundaries is 1,062,290 acres, which includes undeveloped areas, cities, airports, land covered by Salton Sea, etc.

AREA

Gross Acreage within IID Boundaries ..... **1,062,290 *acres***

Net Area Irrigated, 1976 ..... **458,386 *acres***

WATER

CANAL SYSTEM

	Miles
All-American Canal & New Briar	82
Coachella Branch (IID-Maintained Portion)	49
Drains - All-American	52
Canals	1,629
Drains	1,401
TOTAL	3,213

FLOW INTO IID SYSTEM

	Acre-Feet
1976	2,783,630
1975	3,001,207
1974	3,072,327
1973	2,956,013
1972	2,846,613

CONCRETE LINING

	Miles
District Laterals-IID Operated & Maintained(1954-1976)	661.90
Laterals Lined on Participating Basis Landowner-Operated & Maintained (1954-1976)	53.41
Farm Head Ditches--Paid For, Operated and Maintained by Landowner (1949-1976)	2,139.10

IRRIGATION STRUCTURES

Delivery Gates to Ranches	5,581
Canal Headings	497
TOTAL	6,078

TILE DRAINAGE

Drains Installed (1929-1976) (Miles)	22,934.35
Acres Tiled (1929-1976)	403,079

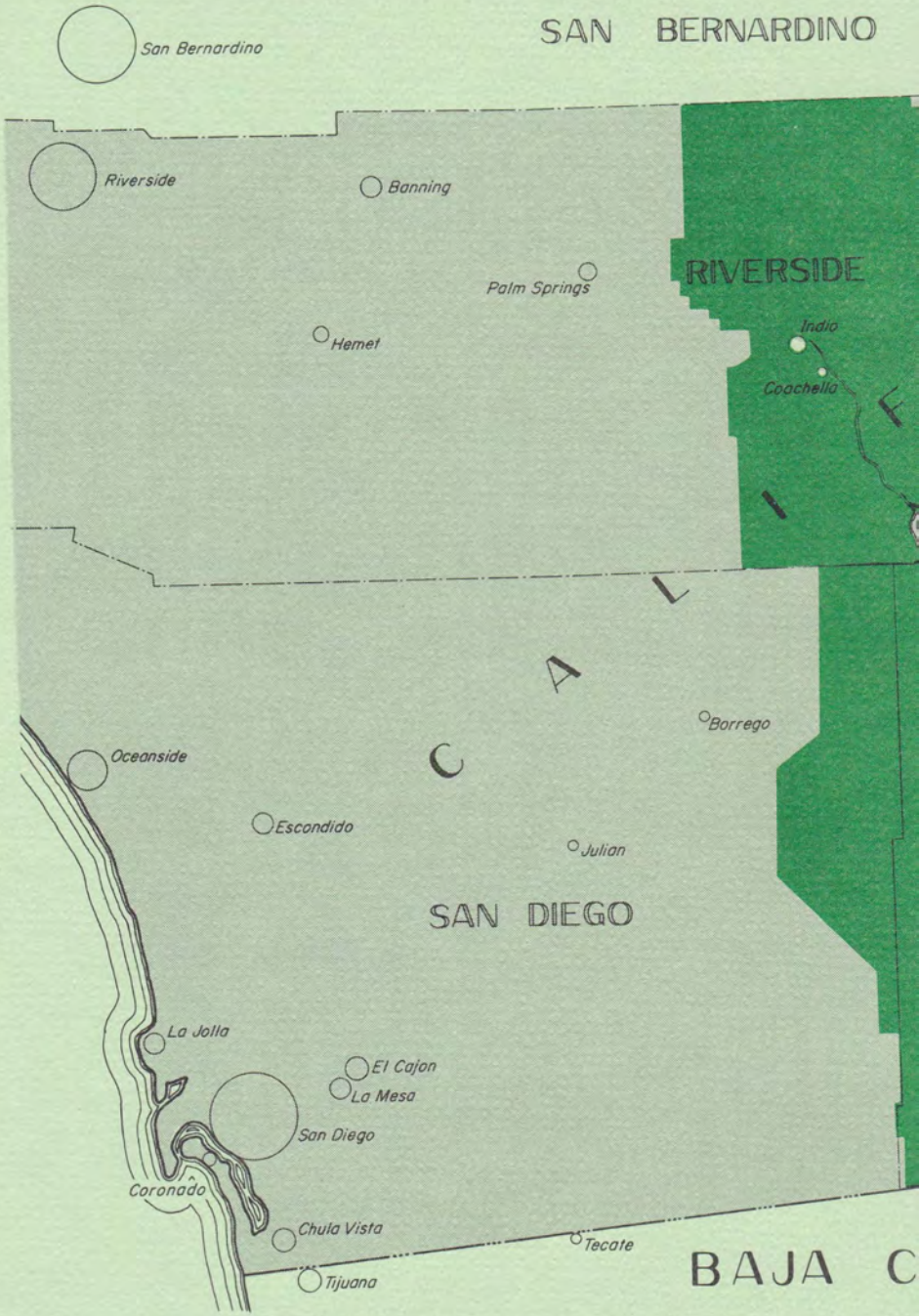
SUMMARY OF AREA SERVED

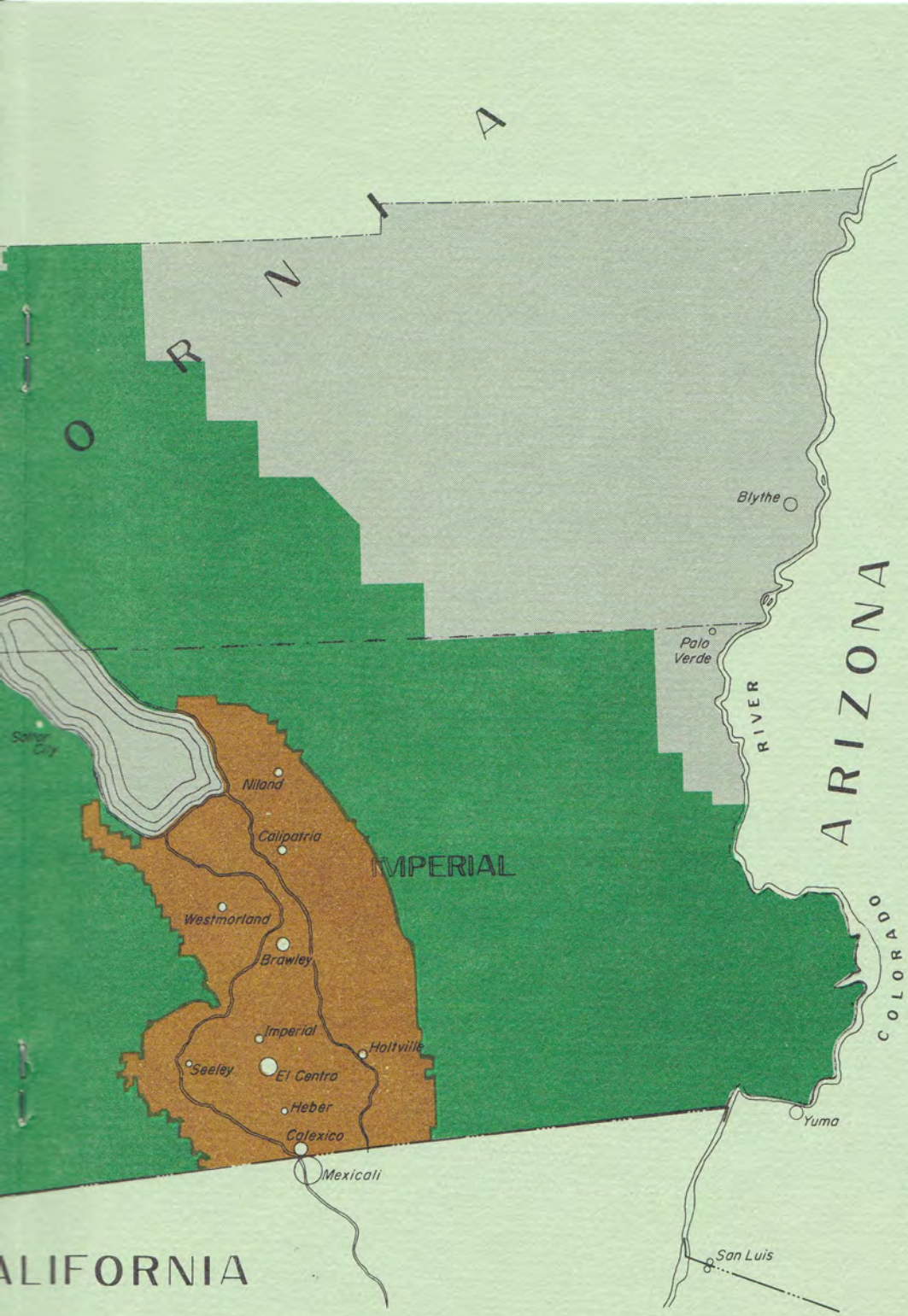
	Acres		
	1976	*1975*	*1974*
Field crops	517,145	486,654	475,662
Garden crops	79,480	83,476	81,666
Permanent crops	16,126	15,470	15,989
Total acres of crops	612,751	585,600	573,317
Total duplicate crops	154,830	129,466	123,555
Total net acres in crops	457,921	456,134	449,762
Area being reclaimed: leached	465	581	676
Net area irrigated	458,386	456,715	450,438
Area farmable but not farmed during year (fallow land)	18,207	20,146	25,522
Total area farmable	476,593	476,861	475,960
Area of farms in homes, feed lots, cotton gins, experimental farms, and industrial areas	13,231	13,300	13,279
Area in cities, towns, airports, cemeteries, fairgrounds, golf courses, recreational parks and lakes, and rural schools, less area being farmed	12,424	12,239	12,025
Total area receiving water	502,248	502,400	501,264
Area in drains, canals, rivers, railroads, and roads	71,428	71,515	71,577
Area below -230 Salton Sea Reserve boundary and area covered by Salton Sea, less area receiving water	36,873	36,628	36,628
Area in the Imperial Unit not entitled to water	63,933	63,933	63,933
Undeveloped area of Imperial Unit, West Mesa, East Mesa, and Pilot Knob Mesa Units	300,605	300,611	301,671
Total acreage included--all units	975,087	975,087	975,073
*Acreage not included--all units	87,203	87,203	87,217
Total gross acreage within District boundaries	1,062,290	1,062,290	1,062,290

**Acreage Within District Boundaries not included in District.*

BROWN -- Water and Power Service Area

DARK GREEN -- Power Service Area Only

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Holtville
Seeley
El Centro
Heber
Calexico
Mexicali
Yuma
San Luis
ALIFORNIA

HISTORY OF DISTRICT POWER

By Helen French

In 1936, the District entered the power business in competition with the private utility then serving the area. The private company supplied energy to the Imperial Valley by what it termed "the longest transmission line in the world--with double the line losses of any other power company." It followed that its rates were extremely high and its service undependable. The District set its power rates at 20 per cent less than those of its competitor and could assure better service to its customers.

Years before, W. F. Holt, a financier who owned many businesses in Imperial Valley, had recognized the need for electricity and, in 1903, formed the Holton Power Company. Holt's company retained its identity until 1929, when it was absorbed by the Southern Sierras Company, later known as Nevada-California Electric Corporation and, after that, as California Electric Company. This was the utility serving Imperial Valley when the District went into the power business.

Power a "Natural" for IID

To include power generation and distribution in its operations was a "natural" for the District. The five drops on the All-American Canal offered sites for hydroelectric plants, and revenue from the sale of electricity generated at plants to be constructed on the Canal would help repay the federal government the District's share of the construction costs of the Canal.

To build a market for All-American Canal power, the District, in 1934, contracted to purchase three diesel-electric generating units for installation in a plant in Brawley and began construction of a distribution system for that city. Litigation brought by the private power company delayed plant construction until January, 1936. The District's first power customer received service on May 18 of that year.

The bond market in the mid-1930s was such that the possibility of securing private financing of power development was out of the question; for that reason, the District applied for and, in 1937-1938, received loans and a grant from the Public Works Administration to construct two hydroelectric plants and a distribution system throughout Imperial Valley and to expand the Brawley Diesel Plant. It also received a loan from the Rural Electrification Administration to extend power lines into rural areas which had not before been served.

A period of stiff competition between the Cal-Electric and the District followed, which was culminated in 1943 by the District's purchase of Cal-Electric's properties in Imperial Valley and in a large part of Coachella Valley.

The District's power system has been continuously expanding to keep ahead of a rapidly increasing load. During 1938 and 1939, five larger units were added to the original three at the Brawley Diesel Plant, and in 1962, two gas turbine units were installed in the plant.

Hydroelectric Generation Begun

Hydroelectric generation began in 1941 when Drop 3 and Drop 4 plants on the All-American Canal went into service. The Drop 3 plant was enlarged in 1960 and the Drop 4 plant in 1950. The hydroelectric plant at Drop 2 was installed and power generation was begun in 1953. The Pilot Knob plant, built on a bypass channel between the All-American Canal and the Colorado River, went into service in 1957, but its operation is dependent upon the quantity of water being delivered to Mexico in satisfaction of the Mexican Water Treaty, excluding water required for river regulation.

Low-head hydroelectric plants were installed on the irrigation distribution system at Double Weir in 1961 and on the Turnip Canal in 1964.

The El Centro Steam Plant, now the District's major source of power generation, went into operation in 1949, and units were added in 1952, 1957 and 1968.

During the period from June, 1973, through May, 1976, four gas-turbine units were installed in Coachella to increase system capacity and to be used for peaking purposes.

The District also purchases power from the U. S. Bureau of Reclamation Parker-Davis Project and the Southern California Edison Company's Yucca Plant, located in Yuma, Arizona, which is operated by Arizona Public Service.

Until January 1, 1954, expansion of the power system was financed by power revenue bond issues. Since that time, additions and betterments have been paid for from current revenue.

Meeting the Growing Demand for Power

To meet the ever-increasing demands for electrical energy the District is planning to install new facilities to handle peak loads and is also supporting research and development of geothermal and nuclear power by the federal government and by private interests.

The District has been able to build and maintain an efficient power system and provide reliable service to its customers at rates less than those of any other utility in the area.

For about three decades after entering the power business, the District exerted great effort toward promoting "all-electric living," and the success of the power system has surpassed even the most optimistic dreams of the early planners. Then, in the early 1970s, when a worldwide energy shortage became evident, emphasis switched from promotion of power use to promotion of power conservation. But with the wise planning that has been done by the Power Department, and with prudent use of energy by its customers, inhabitants of this desert empire may hope to continue to live the comfortable life electricity has provided them.

IMPERIAL IRRIGATION DISTRICT
POWER DEPARTMENT

The average power consumption by customers in the District's service area is one of the highest in the nation. Virtually all homes and businesses are equipped with temperature-control air-conditioning. The average District residential customer uses 12,341 kilowatt-hours annually, while the nationwide average is 8,360 kwh.

Because of the extremely hot summers and mild winters in this desert region, the District's power system must accommodate a wide variance between the summer and winter coincident peak demands. In 1976, the coincident peak demand for the year occurred in July and reached 321,200 kilowatts; the month of February recorded a peak of only 148,000 kw.

1976 STATISTICS

Average Number of Customers:	
Residential	**36,954**
Commercial and Industrial	**7,075**
Agricultural (pumping)	**763**
Miscellaneous	**762**
Total	**45,554**
Total Power Sales (Kilowatt-hours):	
Imperial Valley	**729,343,000**
Coachella Area	**370,964,200**
Colorado River Area	**18,834,500**
San Diego Gas and Electric	**17,200**
Total	**1,118,758,900**

Total Power Sales (Gross Revenue):	
Imperial Valley	$ 19,500,233
Coachella Area	10,283,730
Colorado River Area	544,031
San Diego Gas and Electric	700
Total	$ 30,328,694

Maximum Demand on System-
321,200 kilowatts on July 7, 1976 at 4 p.m.

POWER LINES

	Miles
Transmission Lines	637.6
Subtransmission Lines	308.5
Distribution Lines (overhead and underground)	2,951.6
Total	3,897.7

SOURCES OF POWER

District Owned		*Nameplate Rating in Kilowatts*
El Centro Steam Plant		189,100
Brawley Diesel Plant		
Diesel	13,270	
Gas Turbine	22,500	
Total Diesel Plant		35,770
Coachella Gas Turbines		92,600
Hydroelectric Plants		
Pilot Knob	33,000	
Drop No. 2	10,000	
Drop No. 3	9,800	
Drop No. 4	19,600	
Double Weir	560	
Turnip	420	
Total Hydroelectric		73,380
Total District Owned		390,850
Other Power Sources		
U.S. Bureau of Reclamation		32,550
APS (Axis) Yucca Plant		25,000
Total Other Sources		57,550
TOTAL ALL SOURCES		448,400

HIGHLIGHTS

1901 FIRST WATER DELIVERY to Imperial Valley from Colorado River through Alamo Canal which had practically its entire length in Mexico . . .

1905 FLOODS of the Colorado River enlarged emergency diversion cut in the Colorado, releasing entire flow of river into Imperial Valley and forming Salton Sea . . .

1907 CONTROL of the flooding Colorado River accomplished by Southern Pacific Company, which had assumed ownership of the bankrupt California Development Company . . .

1911 IMPERIAL IRRIGATION DISTRICT organized . . .

1916 CALIFORNIA DEVELOPMENT COMPANY PROPERTIES acquired from Southern Pacific Company by IMPERIAL IRRIGATION DISTRICT . . .

1922 COLORADO RIVER COMPACT signed in City of Santa Fe, New Mexico. The first attempt by a group of states to apportion the waters of an interstate stream among themselves for irrigation and other consumptive use . . .

1922 IMPERIAL IRRIGATION DISTRICT acquired properties of thirteen MUTUAL WATER COMPANIES which had been responsible for retail distribution of water in Imperial Valley . . .

1928 CONGRESS APPROVED BOULDER CANYON PROJECT ACT authorizing construction of Hoover Dam and the All-American Canal . . .

1935 FIRST STORAGE behind Hoover Dam . . .

1936 BRAWLEY DIESEL PLANT completed. District entered power business. Prevailing rates reduced 20 per cent . . .

1938 IMPERIAL DAM, on Colorado River 20 miles north of Yuma, Arizona, completed . . .

1942 ALL-AMERICAN CANAL became sole source of water for Imperial Valley . . .

1943 COMPETING POWER COMPANY PROPERTIES in Imperial County and greater part of Coachella Valley acquired by District . . .

1947 CONTROL OF ALL-AMERICAN CANAL west of Pilot Knob turned over to District . . .

1947 U.S. BUREAU OF RECLAMATION of the Department of Interior and Imperial Irrigation District entered into an agreement whereby the District would undertake to determine the practicability of East Mesa lands for agricultural use. For this purpose, the Bureau leased to the District 560 acres located on the north side of Interstate 8 at Drop 2 on the All-American Canal . . .

1949 EL CENTRO STEAM PLANT, first unit, activated. Name plate rating was 25,000 kilowatts . . .

1952 DISTRICT ASSUMED CONTROL of remainder of ALL-AMERICAN CANAL, from Imperial Dam to Pilot Knob, and first 50 miles of Coachella Branch . . .

1954 DISTRICT NOTIFIED of final determination of costs under All-American Canal contract. IID share to be $25,020,000...

1956 DISTRICT SIGNS POWER POOL AGREEMENT with California Electric Power Company and Arizona Public Service . . .

1961 DISTRICT ENDS 50-YEAR OPERATION in Mexico by selling its holdings to Mexican government . . .

1964 U.S. SUPREME COURT decree in the Arizona-California water suit apportions 2,800,000 acre-feet of Colorado River water to Arizona, 4,400,000 to California, and 300,000 to Nevada, subject to availability . . .

1965 FIRST GENERATION OF ELECTRIC POWER in Imperial Valley from geothermal sources began in the Red Hill area on July 1. No generation since December, 1965 . . .

1967 DISTRICT TAXES ON LAND DISCONTINUED. Also, Board voted to pay off property bonded indebtedness (irrigation bonds) of $2,932,000 . . .

1968 EL CENTRO STEAM PLANT, fourth unit, put into operation. Addition paid for entirely from power revenue . . .

1970 AUTHORIZED CONSTRUCTION of a 60,000-kilowatt power plant for Coachella Valley. Projected cost $5.5 million . . .

1971 FAVORABLE JUDGMENT rendered in 160-acre land limitation suit in U. S. District Court . . .

1973 FIRST TWO UNITS OF NEW $6.5 million power plant put in operation in Coachella . . .

1974 THIRD UNIT of 20,000-kilowatt generator went into operation in Coachella, bringing total plant capacity to 60,000 kilowatts . . .

1976 FIRST WATER REGULATING RESERVOIR, located on East Highline Canal at Nectarine Heading, placed in service .

SALTON SEA

Located in Imperial and Riverside counties, Salton Sea is 35 miles long, 15 miles wide, and 40 feet deep. It contains 115 miles of shoreline and 375 miles of area.

The sea was created when the Colorado River rampaged in 1905-07. It is not a natural body of water and depends solely upon agricultural drainage and storm runoff from Imperial, Coachella, and Mexicali Valleys.

In 1924, President Calvin Coolidge signed an Order of Withdrawal creating a Public Water Reserve around the Salton Sea, and in 1928, a second such order increasing the size of the first was signed. Together, the orders cover about 124,000 acres and were put into force for the express purpose that the lands included were to be used as a reservoir for the storage of drainage from irrigated lands in Imperial and Coachella Valleys and natural runoff.

While the primary use of the sea is, and always will be, that of a storage basin for drainage waters--an absolute necessity for any irrigated area--recreational use of the sea has developed in the last 20 years. The sea's weather and location attract thousands of people annually who enjoy water sports, fishing, and camping. Too, the southern shores of the sea have been the site of geothermal test drilling.

The elevation of Salton Sea reached a low of 250.72 feet below sea level in September, 1925; since then it has gradually risen to its present (December, 1976) elevation of 228.60 feet below sea level.

The salinity of Salton Sea has shown a gradual increase due to the continuous flow of drainage water into the sea and evaporation at the rate of about six feet per year.

At present, the salinity is slightly greater than that of ocean water although it is considerably below that of the Great Salt Lake and the Dead Sea. At the end of 1976, the salinity of Salton Sea was 52.40 tons of salt per acre-foot of water, compared to 266 tons for the Great Salt Lake and 303 tons for the Dead Sea. Ocean water contains 47.80 tons per acre-foot.

SALTON SEA

Area	**375 square miles**
Length	**35 miles**
Width	**9 to 15 miles**
Shoreline	**115 miles**
Elevation (December 30, 1976)	**-228.60**
Depth (at deepest point)	**approx. 40 feet**

COMMUNITIES IN IMPERIAL IRRIGATION DISTRICT SERVICE AREA

	Estimated Population
Brawley	14,138
Bermuda Dunes	666
Bombay Beach	673
Calexico	13,200
Calipatria	2,170
Coachella	8,800
El Centro	22,660
Heber	2,206
Holtville	4,480
Imperial	3,210
Indio	19,100
La Quinta	2,700
Mecca	1,500
North Shore	600
Ocotillo	410
Salton City	887
Seeley	948
Thermal	6,000
Thousand Palms	3,450
Westmorland	1,440
Winterhaven	547

ELEVATIONS - IMPERIAL COUNTY

	Sea Level Elevation
Imperial Dam	+181
Calexico	Sea Level
Holtville	- 11
El Centro	- 52
Imperial	- 59
Brawley	-119
Westmorland	-165
Calipatria	-184

CLIMATE

Imperial County is located in the southeast corner of California. It is bordered on the south by Mexico, on the east by the Colorado River, on the north by Riverside County, and on the west by San Diego County. In area, Imperial County is the tenth largest county in California, encompassing over 4,200 square miles.

Imperial Valley, located in the central portion of Imperial County, has a typical desert climate--hot summers, which may last from mid-April through mid-October, and winters with cold nights, occasional frost, and mostly sunny, mild days.

In the "rainy season" (November through March), there are, on the average, 16 hours with rain, or slightly more than three hours a month. There are places in the world where more rain has fallen in a single year than has fallen in Imperial Valley during the past 75 years.

The following extreme weather conditions were recorded at Imperial Irrigation District's weather station at Imperial:

Highest temperature, 119 degrees, was registered four times since 1914 -- July 14 and 16, 1936; July 25, 1943; and June 25, 1970.

Lowest temperature ever recorded was 16 degrees. This occurred on January 22, 1937. The only snowfall of record was December 12-13, 1932, when the entire Imperial Valley was blanketed in snow, with as much as 4 inches measured in the southeastern portion.

Lowest maximum temperature was 42 degrees, recorded on January 24, 1949. The highest minimum temperature was 90 degrees, recorded on August 10, 1946, and in 1953, on July 15 and July 30.

Highest monthly mean temperature was 95.9 degrees, recorded in August, 1969. Month of lowest mean temperature was February, 1939, with 42.3 degrees.

AGRICULTURE

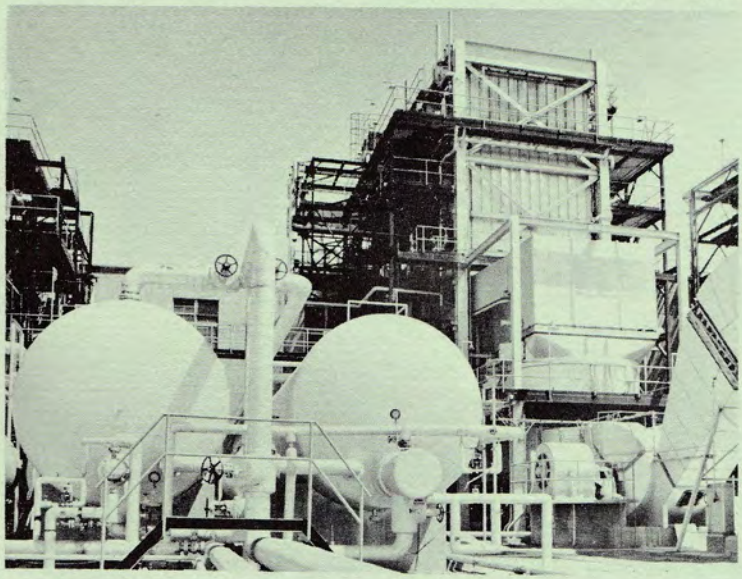
	1976	1975
APIARY	$ 960,000	$ 1,047,000
SEED AND NURSERY CROPS	15,355,000	10,780,000
LIVESTOCK AND DAIRY	113,432,000	127,224,000 *
FIELD CROPS	265,783,000	215,967,000
VEGETABLE CROPS	121,806,000	142,288,000
FRUIT AND NUT CROPS	3,380,000	2,896,000
TOTAL	$520,716,000	$500,202,000 *

*Revised

MILLION DOLLAR CROPS

	1976	1975
CATTLE	$107,038,000	$122,027,000
ALFALFA	100,327,000	57,474,000
LETTUCE	69,365,000	75,180,000
COTTON	50,988,000	25,641,000
WHEAT	50,801,000	43,560,000
SUGAR BEETS	37,800,000	57,296,000
CANTALOUPES	14,071,000	11,069,000
PASTURE	10,876,000	6,908,000
TOMATOES	9,836,000	13,892,000
ASPARAGUS	8,685,000	8,822,000
SORGHUM	5,214,000	5,674,000
SUDAN GRASS	5,169,000	3,075,000
CARROTS	5,062,000	13,630,000
SHEEP	4,459,000	3,938,000
SQUASH	3,518,000	1,157,000
ONIONS	2,553,000	4,521,000
WATERMELONS	1,861,000	2,911,000
LEMONS	1,662,000	733,000
ALFALFA SEED	1,606,000	1,346,000
BARLEY	1,094,000	1,100,000

Supplied by Imperial County Agricultural Commissioner's Office



View looking eastward at El Centro steam plant's No. 2 boiler (at right). White tanks beside it are fuel oil day tanks. (Marvin L. Wieben photo)

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