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1991 WATER REPORT

IMPERIAL IRRIGATION DISTRICT
WATER DEPARTMENT

1991 WATER REPORT

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4. Drainage Design and Maintenance

5. Water Control

6. All-American

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b. Western Division

7. Irrigation and Drainage

I. WATER DEPARTMENT ORGANIZATION

A. Historical Overview of Imperial Irrigation District and Water Rights

The Imperial Irrigation District (IID) was organized in 1911 under the California Irrigation District Act. During its early years of existence, the IID acquired properties of the bankrupt California Development Company and its Mexican subsidiary.

In 1922, the Colorado River Compact was signed by the upper and lower basin states of the Colorado River System, which entitled, on an annual basis, 7.5 million acre-feet (MAF) of water from the Colorado River for exclusive beneficial consumptive use to the upper and lower basin states.

In 1928, Congress approved the Boulder Canyon Project Act which authorized the construction of the Hoover Dam and the All-American Canal.

In 1929, the California Limitation Act limited California to an annual consumptive usage of 4.4 MAF plus not more than one-half of any excess or surplus water unapportioned by the compact.

In 1931, the seven southern California water agencies signed the Seven-Party Agreement, which outlined the water apportionment priorities for 4.4 MAF.

In 1944 a signed treaty between the United States and Mexico entitled Mexico to 1.5 MAF of Colorado River water per year. In years of low flow, any shortfall required to meet the Mexican treaty will be made up in equal quantities by the upper and lower basin states.

In 1964, the U.S. Supreme Court decree in the Arizona vs. California water lawsuit recognized Arizona's right to 2.8 MAF of Colorado River water, 4.4 MAF to California, and .3 MAF to Nevada, subject to availability. It recognized that the Secretary of Interior had contracts with California. These contracts allocated 3.85 MAF to agriculture in accordance with the priorities established in the Seven-Party Agreement and the Boulder Canyon Project Act. The IID has a "present perfected right" of 2.6 MAF of water annually. In times of shortage, present perfected rights must be satisfied first.

B. Purpose of The Imperial Irrigation District

Headquartered in the city of Imperial, the purpose of the IID is to serve water to all users in Imperial Valley and electrical power in both Imperial and Coachella Valleys. The IID is governed by a board of five elected directors.

Since 1942 the IID has operated and maintained the All-American Canal which carries all the Colorado River water that has been diverted at the Imperial Dam. The IID also operates and maintains the main delivery canals and all the associated lateral canals and drains.

The IID serves approximately 5,600 water delivery points for irrigation and maintains 1,671 miles of canals and laterals. The IID also maintains a 1,457 mile drainage system which collects surface runoff and subsurface drainage from 32,539 miles of tile drains underlying 441,417 acres of land.

1. Board of Directors Statement of Fundamental Principles of the Imperial Irrigation District July 1991

" The reason for the existence of the Imperial Irrigation District is to provide water for the Imperial Valley and to provide electricity for those who live in Imperial and Coachella Valleys.

The Imperial Irrigation Directors, Management, and Staff are aware of our closeness to densely settled Southern California, whose cities need additional water to withstand future drought, and recognize that it is in the public interest for the urban area near the Imperial Valley to have sufficient guarantees of water. The State of California has created an opportunity to help assure these guarantees by the passage of California Water Code Section 1011 which encourages greater efficiency in the use of water, even as it protects and rewards those who achieve the efficiency. It is also in the public interest for the Imperial Valley to have the resources to improve and enhance its agricultural, industrial and commercial development capability which will be impacted without careful planing.

The Imperial Irrigation District is committed to helping the Imperial Valley strengthen itself in many areas, including general education on and close management of water-and-power-related issues, conservation, and communications. The Imperial Irrigation District must come to master an array of advanced techniques and information to allow it to improve what it does best: Provide water to Imperial Valley water users to provide electricity to Imperial and Coachella Valleys.

The Imperial Irrigation District has two landmarks to steer by: (1) The conviction that the Valley's future lies with agriculture and the economic stability associated therewith, which will assist industrial and commercial development, and (2) the determination that our actions will serve our interests and the interests of California.

There is nothing contradictory about the desire to serve both ourselves and others. We wish to be of service to those around us, but that service must be grounded in the protection and improvement of the Imperial Valley."

IMPERIAL IRRIGATION DISTRICT

MANAGEMENT GOALS AND OBJECTIVES

September 18, 1991

1. GOAL: Management Leadership

- Set the example in professionalism and integrity.
- Provide a management climate which fosters trust, initiative, integrity, responsiveness, and open communication which supports taking action when conditions are uncertain and risks are inherent.
- Strengthen vertical and lateral coordination and cooperation between departments, sections, and units.
- Maintain good customer relations.
- Be progressive and initiate changes enthusiastically.

2. GOAL: Provide Quality Service

- Provide a quality product at the least possible cost.
- Emphasize performance.
- Instill pride in employees that they work for the IID.
- Emphasize maintainability and aesthetics in planning, engineering, and construction.
- Encourage all employees to emphasize good public relations.

3. GOAL: Provide Water to Imperial Valley

- Deliver when and where needed and in quantity desired.
- Emphasize water measurement to ensure accurate water accounting.
- Prepare for rapid response during emergencies.
- Minimize flow of water to Salton Sea within State Water Resources Control Board order guidelines while recognizing natural resource values.
- Emphasize importance of water conservation to all.
- Improve long-range and annual workplans to allow coordinated planning which will contribute to continuity of operations, construction, repair, and maintenance activities.

- Accomplish the sixteen tasks embodied in the IID/MWD water transfer agreement on time and within the budget.

4. **GOAL: Provide Power to our Service Area at the Lowest Cost Consistent with Quality Service**

- Improve long-range and annual workplans.
- Ensure that planning is dynamic, considers load growth, evaluates current resource assets, and incorporates changes to the system which will maximize efficient utilization of energy resources.
- Continue planning for further development of hydroelectric and other alternative energy facilities.
- Ensure continuity of operations, construction, repair, and maintenance to provide a reliable transmission and distribution system.
- Improve energy consciousness program.
- Modernize system according to priorities.

5. **GOAL: Manage IID Resources**

- Ensure construction contract activities produce quality products on time and within cost.
- Consider impact on the environment of all IID actions.
- Continue to expand automation capability to improve efficiency throughout IID in an integrated manner.
- Compare equipment requirements to inventory and reduce it where operational conditions permit.
- Modernize equipment in accordance with a prioritized plan.
- Reduce maintenance backlog.
- Develop plans for a modern facility in Imperial to house the operating headquarters.
- Instill cost conscious attitude in employees.
- Refine the job-order system to ensure written approval of work before initiation, except for emergencies.
- Improve work control procedures to ensure continuity of operations and accomplishment of work in accordance with priorities.

- Improve safety conscientiousness.
- Improve control procedures for safeguarding IID assets.

6. **GOAL: Financial Solvency**

- Reduce operating costs.
- Maximize yield on investments in compliance with the statutes in the Water Code and Codes of the State of California.
- Process payments timely to prevent extra charges.
- Audit activities in accordance with plan to ensure full coverage.
- Develop job cost-standards through improvement in cost accounting system.
- Develop written procedures for accounting for emergency action expenditures.

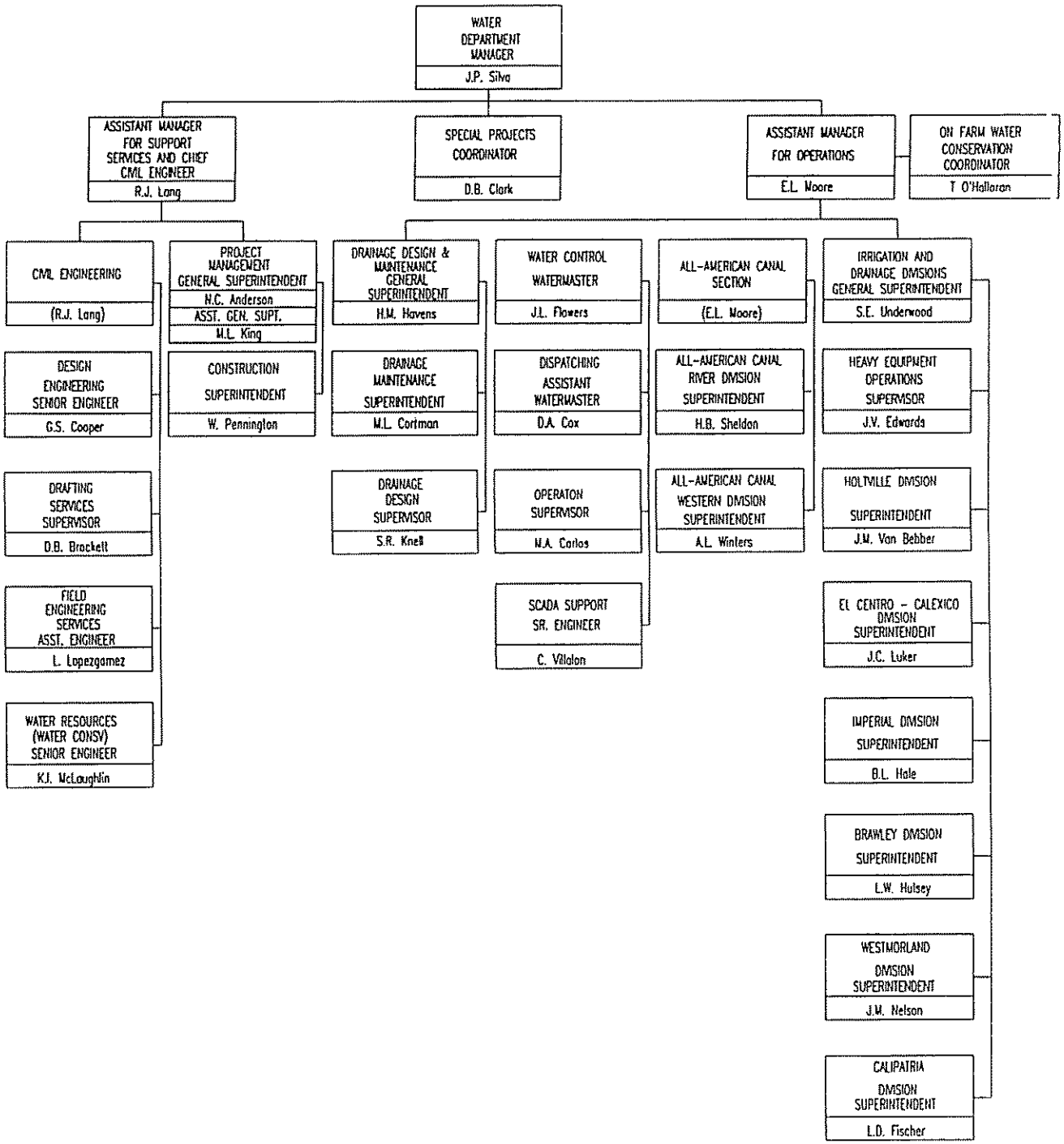
7. **GOAL: Develop the Work Force**

- Develop professionalism and ensure recognition for it.
- Continue to meet affirmative action goals.
- Emphasize "state-of-the-art" training programs for all employees.
- Improve communications up and down the chain-of-command ladder.
- Continue to improve employee development programs.

8. **GOAL: Improve Public Relations**

- Be proactive rather than reactive with the media.
- Continue to develop publications and videos on key IID subjects and projects for ready reference and distribution.
- Continue to expand contacts with schools to include safety and energy.
- Expand participation in legislative forums and professional associations where issues affecting IID are discussed and/or debated.
- Coordinate actions with impacted agencies.

WATER DEPARTMENT



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E. Water Department Sections

1. Water Administration

The Water Administration Section is comprised of the Water Manager, Assistant Manager, Special Projects Coordinator, and the Computer Services, Water Resources and Irrigation Management Units. The Water Manager and Assistant Manager are responsible for the administration of the entire department. The Special Projects Coordinater is responsible for contacting landowners and coordinating projects between the landowners and the IID; the Computer Services Unit is responsible for any computer work, (i.e., programming or installation) for the Water Department; the Water Resources Unit is primarily involved in the various aspects of the IID/MWD Water Conservation Agreement as related to the verification and planning of water conservation stemming from the many water conservation projects being built and/or implemented as well as other water resources planning issues and the Irrigation Management Unit is involved in various on-farm projects with the landowners.

2. Water Engineering

The Water Engineering Section is comprised of Field Engineering Services, Design and Drafting Services. This section is responsible for the planning of irrigation facility programs and the drawings and specifications to construct these projects. The Field Engineering Unit is responsible for all surveying work required for the planning and design of various water-related projects. The Design Unit is responsible for all design work on water-related projects such as the design of lateral and main canals, regulating reservoirs, and lateral interceptors. The Drafting Services Unit is responsible for all drawings and maps required for the planning, design and construction of various IID projects. Drafting Service also handles other miscellaneous general drafting needs of the IID Water Department Staff.

3. Project Management

The Project Management Section is responsible for coordinating all projects associated with the IID/MWD Water Conservation Program. Project Management is also responsible for all construction projects within the IID main canal, lateral canal and drainage network.

4. Drainage Design and Maintenance

The Drainage Design and Maintenance Section is responsible for the engineering of various maintenance and capital work projects as well as the day to day field maintenance of the approximately 500 miles of the IID drainage system. The Drainage Design Unit duties include developing plans for drain structure replacement and installation, pipelines, grade

control structures and managing the operation and maintenance of 650 drainage pumps throughout the Valley. The Drainage Maintenance Unit insures the proper flow of drain water through various field activities which include sediment removal, weed control through mechanical and/or chemical treatment, minor structure repairs and unplugging drain siphons.

5. Water Control

The Water Control Section operates the All-American Canal and main canal system. Water is ordered from the Imperial Dam by Water Control and distributed through the main canal system to the Division lateral canal system. Water Control hydrographers deliver the water to the laterals and farmland directly off the All-American and other main canals.

6. All-American Canal

a. River Division

The River Division of the All-American Canal Section is responsible for the operation and maintenance of the Imperial Dam and all related facilities including Senator Wash and Laguna Dam. This division operates and maintains the All-American Canal from Imperial Dam to the Pilot Knob Check.

b. Western Division

The Western Division of the All-American Canal Section maintains the All-American Canal from Pilot Knob to the Westside Main Canal turnout. This division is involved in maintenance duties which include the repair and maintenance of all the large checks and gates throughout the IID system.

7. Irrigation and Drainage

The Irrigation and Drainage Section is comprised of six operating divisions. These divisions are primarily involved with the delivery of water from the laterals to the farm fields in the geographic area of jurisdiction. Each of the divisions must also maintain and repair the lateral canals, drains and main canals within their boundaries to ensure unrestricted flow. The Heavy Equipment Operations Unit is also a part of this Section.

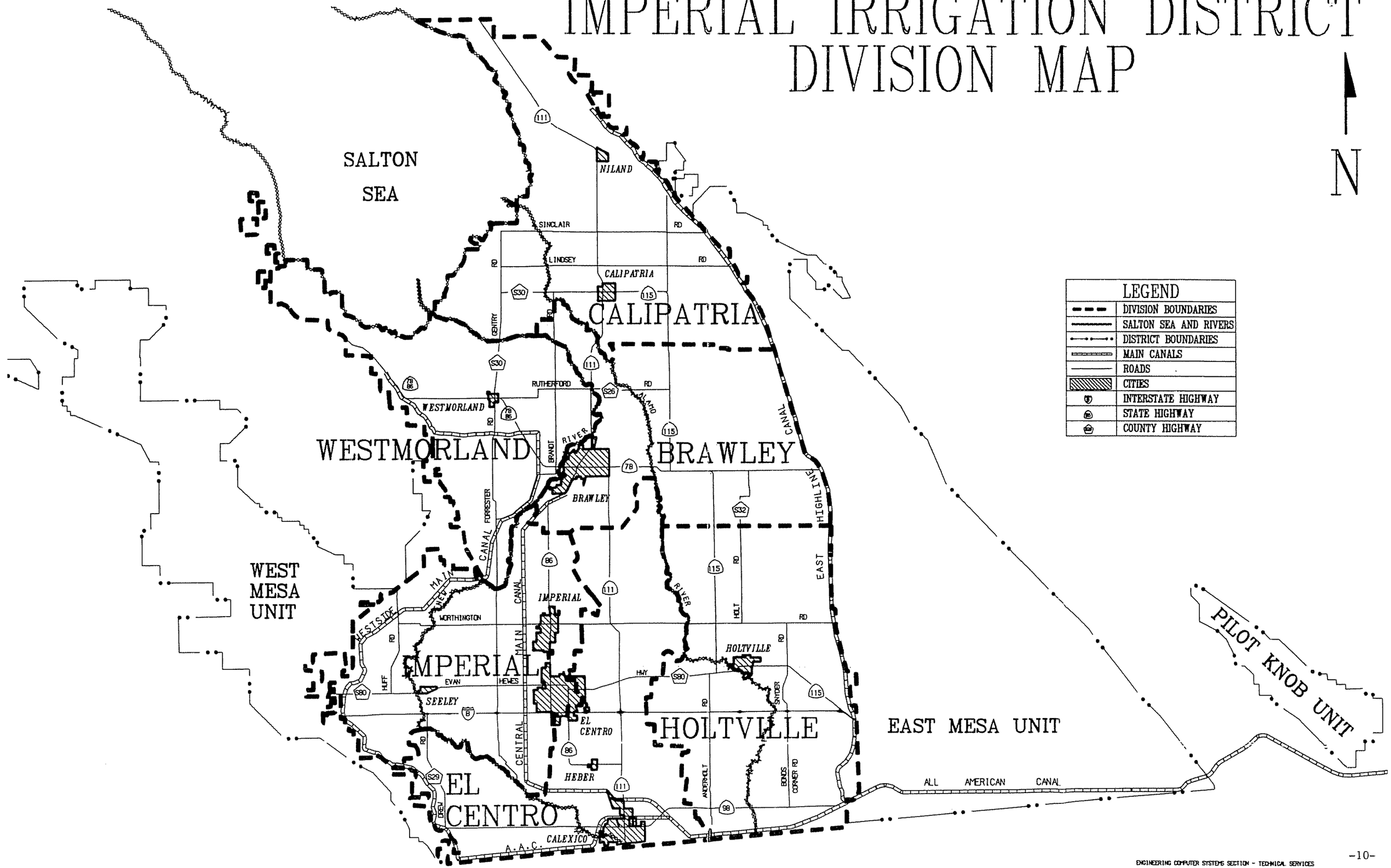
II. LOCATION MAPS

A. Division Location Map

B. Irrigation/Drainage Maps

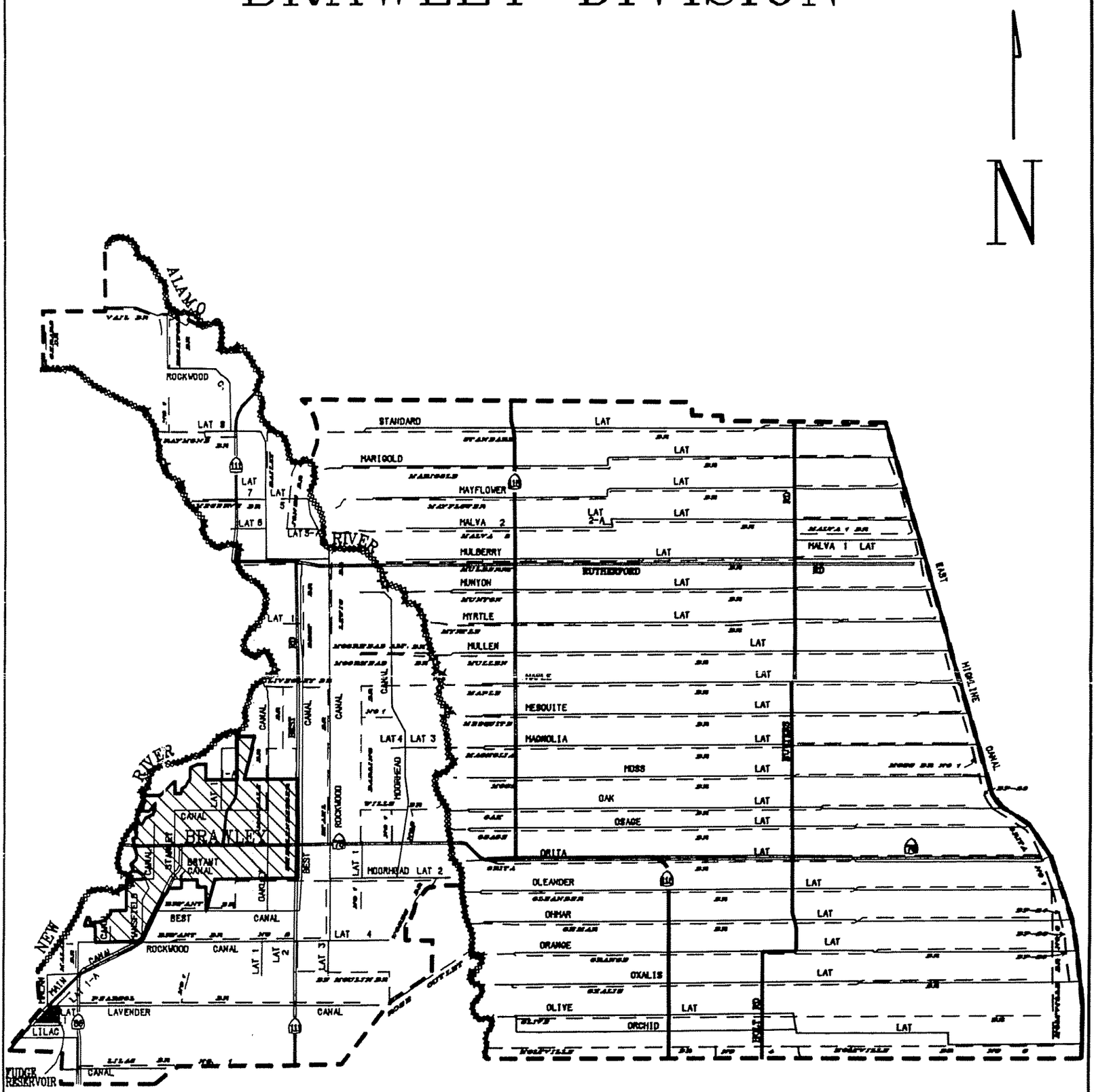
1. Brawley Division
2. Calipatria Division
3. El Centro Division
4. Holtville Division
5. Imperial Division
6. Westmorland Division

IMPERIAL IRRIGATION DISTRICT DIVISION MAP



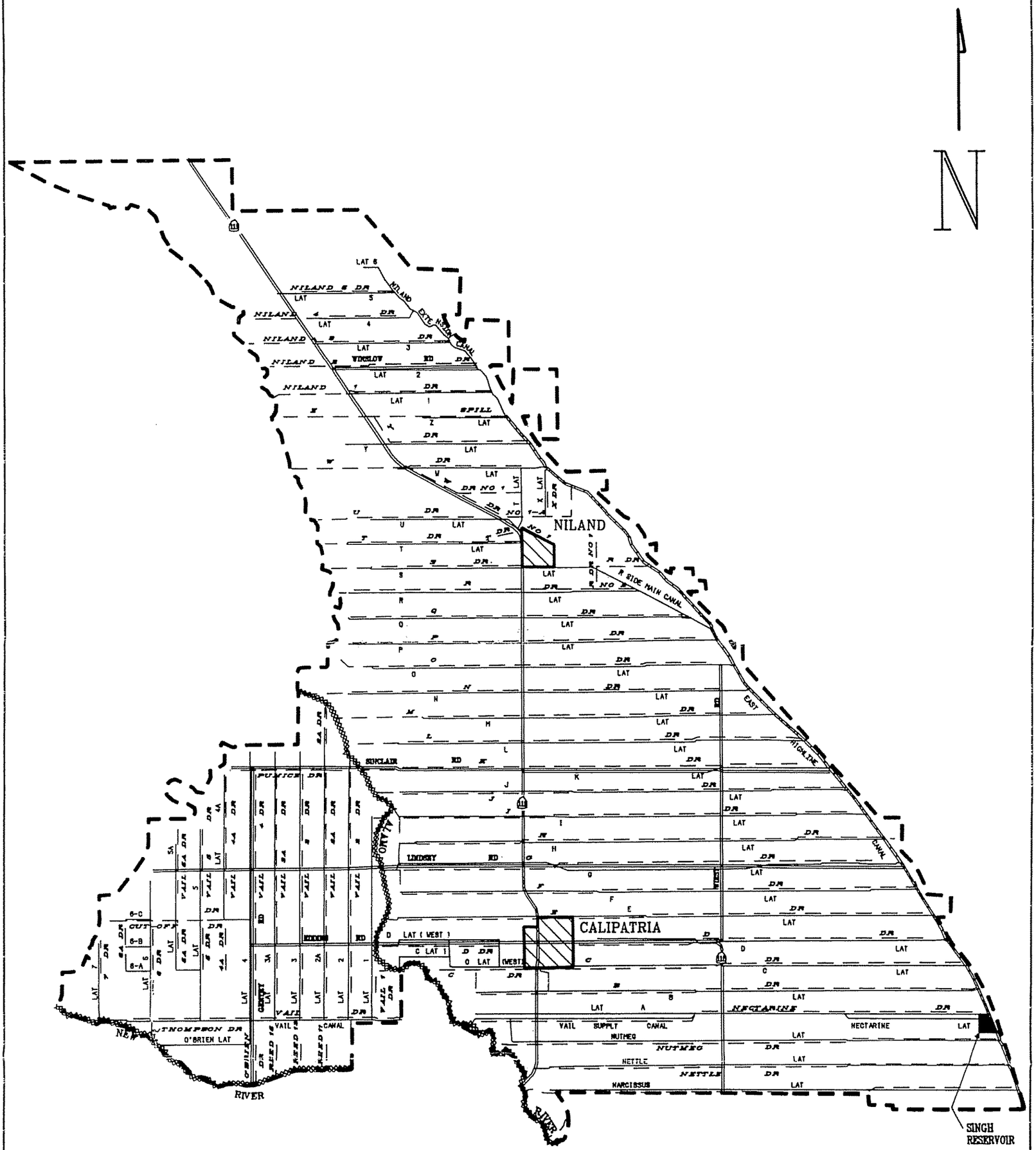
ENGINEERING COMPUTER SYSTEMS SECTION - TECHNICAL SERVICES

IMPERIAL IRRIGATION DISTRICT
BRAWLEY DIVISION



LEGEND	
	INTERSTATE HIGHWAY
	STATE HIGHWAY
	COUNTY HIGHWAY
	CANALS AND LATERALS
	DRAINS
	HIGHWAYS AND COUNTY ROADS
	RIVERS
	DIVISION BOUNDARIES
	ALL AMERICAN, WESTSIDE MAIN, & CENTRAL MAIN CANALS
	CITIES
ABCD	TYPE STYLE FOR DRAINS

IMPERIAL IRRIGATION DISTRICT
CALIPATRIA DIVISION



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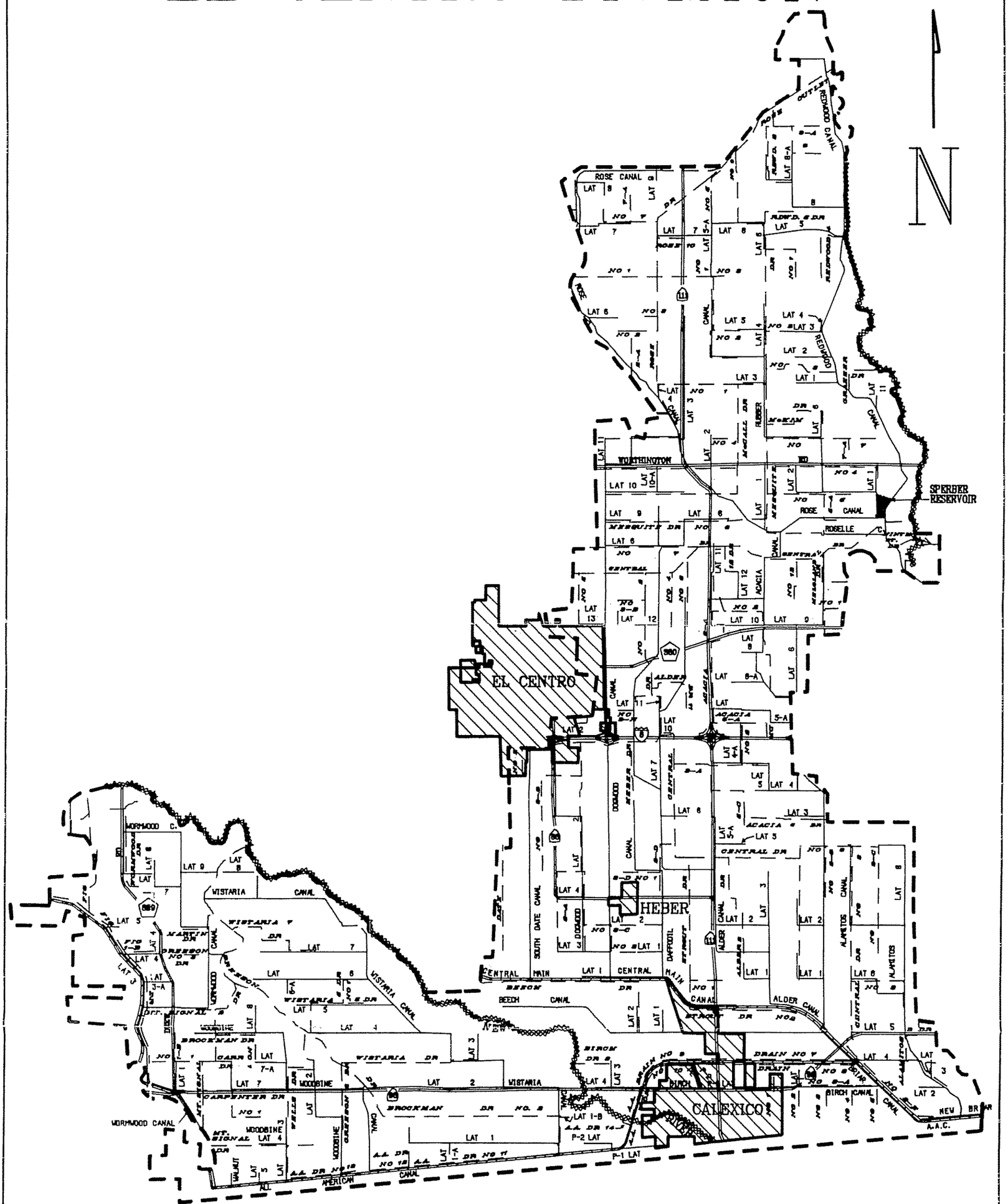
ENGINEERING COMPUTER SYSTEMS SECTION - TECHNICAL SERVICES

IMPERIAL IRRIGATION DISTRICT
EL CENTRO DIVISION



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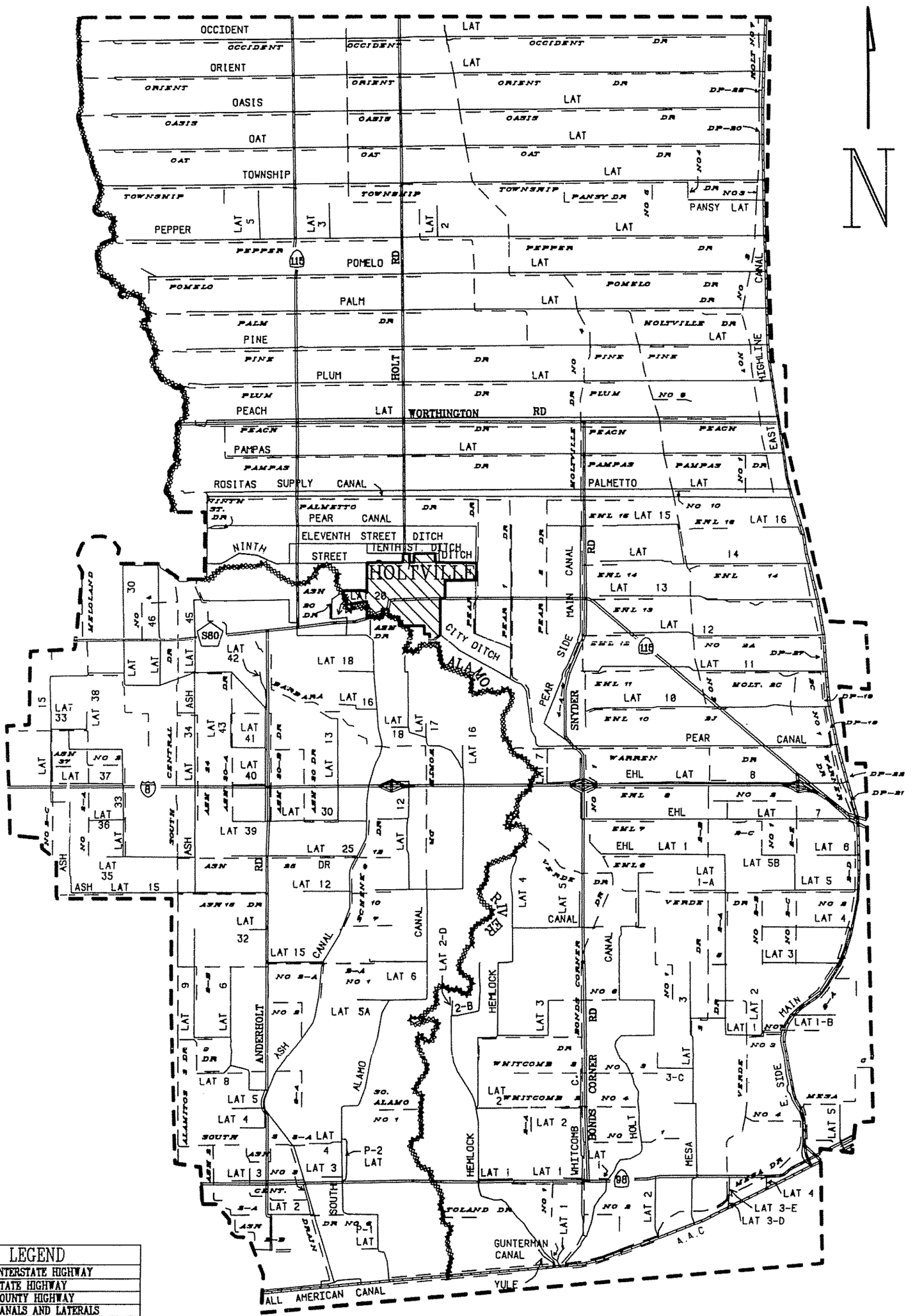
ENGINEERING COMPUTER SYSTEMS SECTION - TECHNICAL SERVICES

IMPERIAL IRRIGATION DISTRICT
HOLTVILLE DIVISION



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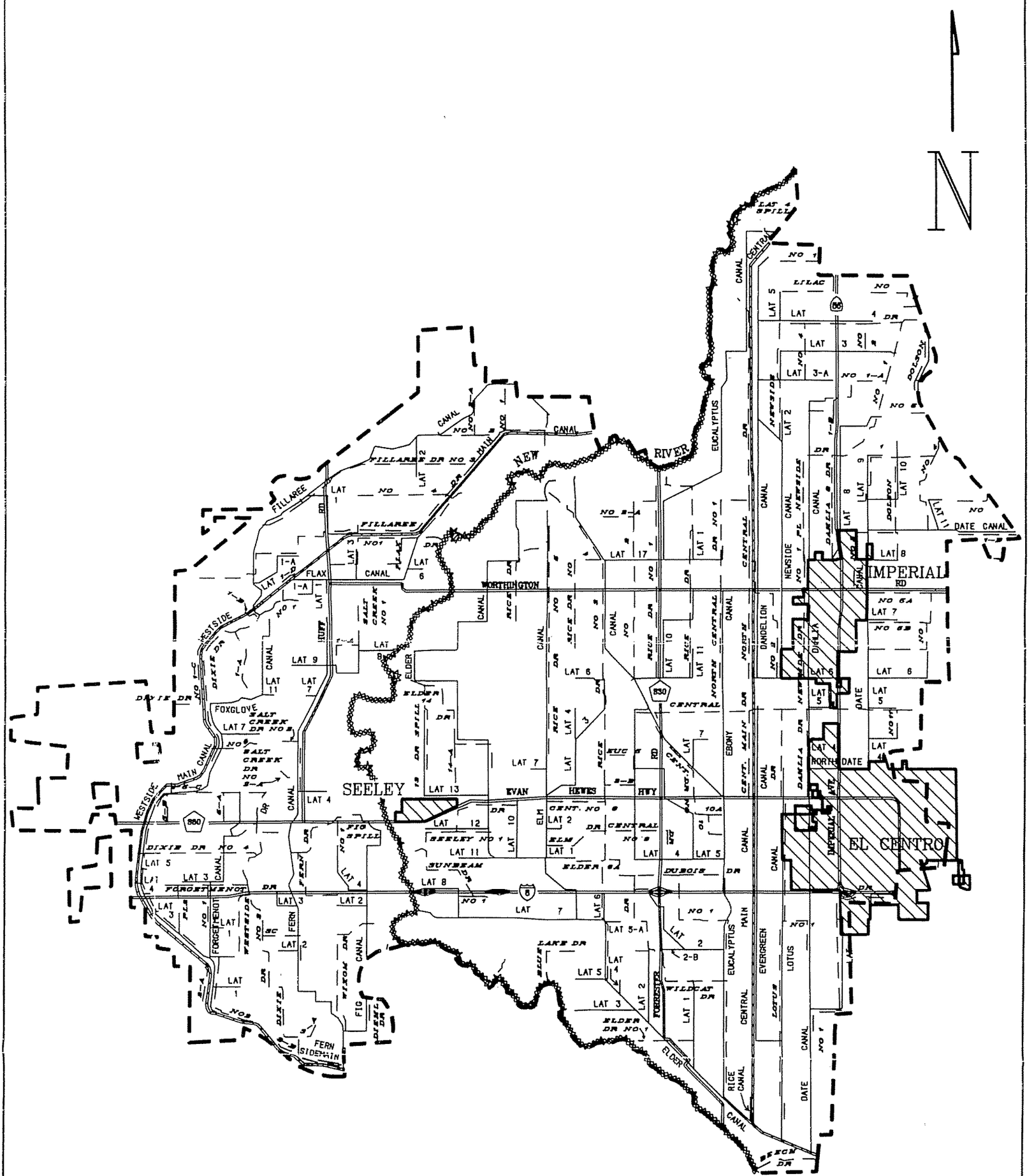
ENGINEERING COMPUTER SYSTEMS SECTION - TECHNICAL SERVICES

IMPERIAL IRRIGATION DISTRICT
IMPERIAL DIVISION



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ABCD	TYPE STYLE FOR DRAINS
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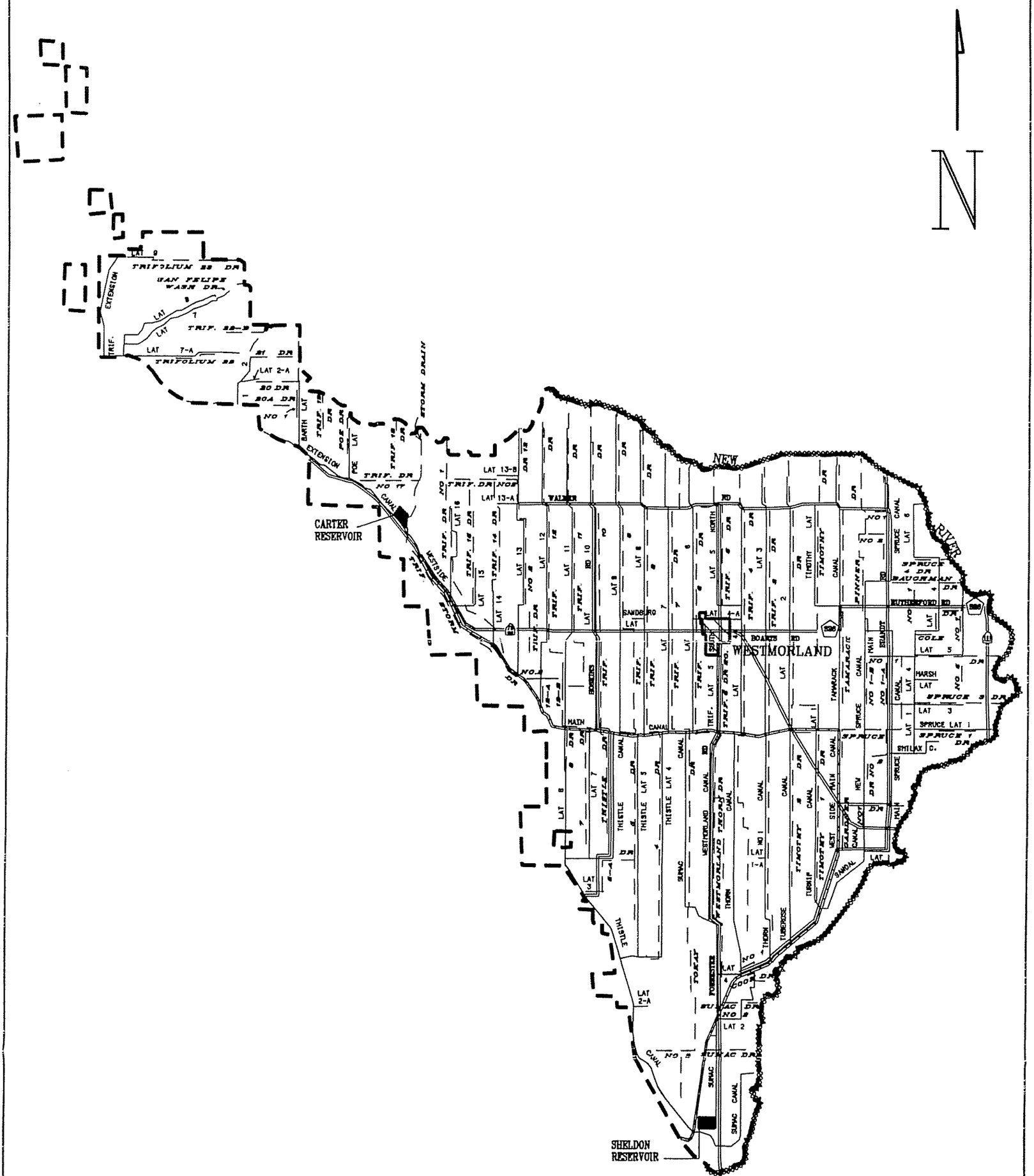
ENGINEERING COMPUTER SYSTEMS SECTION - TECHNICAL SERVICES

IMPERIAL IRRIGATION DISTRICT
WESTMORLAND DIVISION



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ENGINEERING COMPUTER SYSTEMS SECTION - TECHNICAL SERVICES

III. IRRIGATION SYSTEM INFRASTRUCTURE

A. Annual Summary

1. Total Miles of Canals and Drains
2. Total Miles of Main Canals By Division
3. Total Miles of Lateral Canals By Division
4. Total Miles of Drains By Division
5. Structural Inventory of Mains, Laterals and Drains
6. Structures Installed, Replaced and Removed

B. Historical Summary

1. Miles of Concrete Lined Laterals
2. Pipeline Drain Installation
3. Tile Installation

Annual Summary

1991

Total Miles of Canals and Drains

	Earthen Section (miles)	Concrete Section (miles)	Pipeline Section (miles)	Total (miles)
All-American Canals	79.68	2.60	0.00	82.28
All-American Drains	37.51	0.00	14.13	51.64
Main Canals	130.85	16.84	0.00	147.69
Laterals Canals	414.62	1,013.44	12.74	1,440.80
Drains	1,302.49	0.60	102.45	1,405.54
Total	1,965.15	1,033.48	129.32	3,127.95

Annual Summary

1991

Total Miles of Main Canals By Division

Division	Earth Lined (miles)	Percent Earth (%)	Concrete Lined (miles)	Percent Concrete (%)	Pipeline (miles)	Percent Pipeline (%)	TOTAL LENGTH (miles)
Holtville	16.60	100.00	0.00	0.00	0.00	0.00	16.60
El Centro/Calexico	31.20	84.53	5.71	15.47	0.00	0.00	36.91
Imperial	26.50	100.00	0.00	0.00	0.00	0.00	26.50
Brawley	12.94	100.00	0.00	0.00	0.00	0.00	12.94
Westmorland	15.09	78.59	4.11	21.41	0.00	0.00	19.20
Calipatria	28.52	80.25	7.02	19.75	0.00	0.00	35.54
Division Total	130.85	88.60	16.84	11.40	0.00	0.00	147.69
All-American Canal	79.68	96.84	2.60	3.16	0.00	0.00	82.28
TOTAL	210.53	91.55	19.44	8.45	0.00	0.00	229.97

Annual Summary

1991

Total Miles of Lateral Canals By Division

	Earth Lined (miles)	Percent Earth (%)	Concrete Lined (miles)	Percent Concrete (%)	Pipeline (miles)	Percent Pipeline (%)	TOTAL LENGTH (miles)
Holtville	43.57	15.02	245.86	84.73	0.74	0.25	290.17
El Centro/Calexico	73.83	32.44	151.67	66.64	2.10	0.92	227.60
Imperial	31.60	16.06	162.73	82.72	2.40	1.22	196.73
Brawley	82.44	34.12	153.12	63.36	6.09	2.52	241.65
Westmorland	28.69	14.62	167.03	85.14	0.46	0.24	196.18
Calipatria	154.49	53.55	133.03	46.12	0.95	0.33	288.47
Division Total	414.62	28.78	1,013.44	70.34	12.74	0.88	1,440.80

Annual Summary

1991

Total Miles of Drains by Division

Division	Earth Lined (miles)	Percent Earth (%)	Concrete Lined (miles)	Percent Concrete (%)	Pipeline (miles)	Percent Pipeline (%)	TOTAL LENGTH (miles)
Holtville	98.15	83.65	0.30	0.00	18.88	16.09	117.33
El Centro/Calexico	72.92	90.91	0.30	0.00	6.99	8.72	80.21
Imperial	65.45	91.96	0.00	0.00	5.72	8.04	71.17
Brawley	216.24	98.62	0.00	0.00	3.03	1.38	219.27
Westmorland	132.84	98.30	0.00	0.00	2.30	1.70	135.14
Calipatria	266.06	93.02	0.00	0.00	19.96	6.98	286.02
Division Total	851.66	93.68	0.60	0.00	56.88	6.25	909.14
Drainage	450.83	90.82	0.00	0.00	45.57	9.18	496.40
All-American Canal	37.51	72.64	0.00	0.00	14.13	27.36	51.64
Total	1,340.00	91.96	0.60	0.04	116.58	8.00	1,457.18

Annual Summary
1991
Structural Inventory
of
Mains, Laterals and Drains

Main Canals - All Divisions	Concrete	Rubble	Wood	Others	Total
Deliveries.....	195	13	2	0	210
Checks.....	57	2	0	0	59
Lateral Headings.....	134	8	0	0	142
Control Structures.....	94	4	1	0	99
Bridges.....	5	0	19	4	28
Siphons.....	24	1	0	0	25
Moss Pipes.....	5	0	0	2	7
Storm Spillways.....	4	4	0	0	8
Flumes.....	0	0	0	1	1
Sub-total Main Canals.....	518	32	22	7	579
All-American Canal.....	145	0	0	0	145
Total Main Canals.....	**663**	**32**	**22**	**7**	**724**

Lateral Canals - All Divisions					
Deliveries.....	5,228	126	25	1	5,380
Checks.....	3,185	163	19	0	3,367
Lateral Headings.....	326	24	1	0	351
Control Structures.....	670	48	17	2	737
Bridges.....	29	4	25	1	59
Siphons.....	128	2	0	4	134
Moss Pipes.....	116	0	4	1	121
Storm Spillways.....	32	4	0	0	36
Flumes.....	1	0	0	0	1
Total Lateral Canals	**9,715**	**371**	**91**	**9**	**10,186**

Drains - All Divisions					
Deliveries.....	4	0	0	0	4
Checks.....	1	0	0	0	1
Control Structures.....	458	9	12	2	481
Bridges.....	2	0	32	0	34
Siphons.....	1,306	11	5	39	1,361
Flumes.....	3	0	35	1	39
Spillways.....	21	0	0	0	21
Outlets.....	216	0	0	0	216
Maintenance Crossings.....	348	0	0	0	348
Delivery Pumps.....	2	0	0	0	2
Total Drains	**2,361**	**20**	**84**	**42**	**2,507**

Annual Summary

1991

Structures Installed, Replaced and Removed

Installed:	1991	1990
Bridges	-	-
Checks	8	6
Control Structures	12	4
County Road Crossings	6	11
Deliveries	6	11
Headings	-	-
Headwalls	2	-
Irr.& Drain. District Pumps (total = 23)	-	-
Maintenance Crossings	2	-
Moss Pipes	-	1
Outlets	2	-
Private Sumps	-	1
Railroad Crossings	-	-
Siphons	-	2
State Highway Crossings	4	-
Storm Spillways	-	-
Surface Drainage Sumps.(total = 29)	-	-
Tile Sumps (total = 525)	1	2
Replaced:		
Bridges	-	1
Checks	51	46
Control Structures	2	18
Deliveries	76	53
Flumes	-	-
Maintenance Crossings	-	-
Siphons	8	2
Removed:		
Irr.& Drain. O&M District Pumps	-	-
Private Sumps	-	-
Tile Sumps	-	-

	(miles)	(miles)
Open drains replaced with pipeline drains	0.17	0.42
Canals replaced with pipeline	1.67	0.62

HISTORICAL SUMMARY

Miles of Concrete Lined Laterals

	Privately Owned Laterals		Imperial Irrigation District Owned - Concrete Lined Laterals						Private/IID/MWD	
	Private Maintenance		Private Maintenance		IID Maintenance		MWD Maintenance		Total	Total
Year	Annual (miles)	Cumulative (miles)	Annual (miles)	Cumulative (miles)	Annual (miles)	Cumulative (miles)	Annual (miles)	Cumulative (miles)	Annual (miles)	Cumulative (miles)
1956	125.60	424.50	4.05	5.20	1.66	2.96	0.00	0.00	131.31	432.66
1957	128.90	553.40	4.53	9.73	3.15	6.11	0.00	0.00	136.58	569.24
1958	98.40	651.80	4.97	14.70	3.11	9.22	0.00	0.00	106.48	675.72
1959	115.70	767.50	7.56	22.26	4.07	13.29	0.00	0.00	127.33	803.05
1960	122.10	889.60	4.60	26.86	3.62	16.91	0.00	0.00	130.32	933.37
1961	89.50	979.10	4.41	31.27	10.10	27.01	0.00	0.00	104.01	1,037.38
1962	93.30	1,072.40	1.60	32.87	17.67	44.68	0.00	0.00	112.57	1,149.95
1963	118.30	1,190.70	5.74	38.61	27.54	72.22	0.00	0.00	151.58	1,301.53
1964	110.80	1,301.50	3.53	42.14	50.52	122.74	0.00	0.00	164.85	1,466.38
1965	80.70	1,382.20	0.76	42.90	54.35	177.09	0.00	0.00	135.81	1,602.19
1966	72.30	1,454.50	0.75	43.65	68.24	245.33	0.00	0.00	141.29	1,743.48
1967	62.90	1,517.40	0.40	44.05	60.24	305.57	0.00	0.00	123.54	1,867.02
1968	67.50	1,584.90	1.02	45.07	51.68	357.25	0.00	0.00	120.20	1,987.22
1969	73.00	1,657.90	0.27	45.34	56.11	413.36	0.00	0.00	129.38	2,116.60
1970	66.10	1,724.00	0.61	45.95	38.74	452.10	0.00	0.00	105.45	2,222.05
1971	63.10	1,787.10	0.93	46.88	35.85	487.95	0.00	0.00	99.88	2,321.93
1972	61.20	1,848.30	1.21	48.09	36.20	524.15	0.00	0.00	98.61	2,420.54
1973	71.50	1,919.80	1.11	49.20	29.94	554.09	0.00	0.00	102.55	2,523.09
1974	94.50	2,014.30	1.00	50.20	31.17	585.26	0.00	0.00	126.67	2,649.76
1975	56.80	2,071.10	2.44	52.64	38.39	623.65	0.00	0.00	97.63	2,747.39
1976	68.00	2,139.10	0.77	53.41	38.25	661.90	0.00	0.00	107.02	2,854.41
1977	60.30	2,199.40	0.30	53.71	34.63	696.53	0.00	0.00	95.23	2,949.64
1978	33.40	2,232.80	0.00	53.71	19.20	715.73	0.00	0.00	52.60	3,002.24
1979	25.50	2,258.30	0.00	53.71	21.79	737.52	0.00	0.00	47.29	3,049.53
1980	37.40	2,295.70	0.00	53.71	21.36	758.88	0.00	0.00	58.76	3,108.29
1981	43.60	2,339.30	0.00	53.71	27.30	786.18	0.00	0.00	70.90	3,179.19
1982	36.20	2,375.50	0.00	53.71	18.52	804.70	0.00	0.00	54.72	3,233.91
1983	24.10	2,399.60	0.00	53.71	23.08	827.78	0.00	0.00	47.18	3,281.09
1984	21.40	2,421.00	0.00	53.71	43.49	871.27	0.00	0.00	64.89	3,345.98
1985	24.80	2,445.80	0.00	53.71	30.52	901.79	0.00	0.00	55.32	3,401.30
1986	10.40	2,456.20	0.00	53.71	6.23	908.02	0.00	0.00	16.63	3,417.93
1987	9.50	2,465.70	0.00	53.71	0.22	908.24	0.00	0.00	9.72	3,427.65
1988	8.30	2,474.00	0.00	53.71	0.58	908.82	0.00	0.00	8.88	3,436.53
1989	12.40	2,486.40	0.00	53.71	2.56	911.38	0.00	0.00	14.96	3,451.49
1990	4.80	2,491.20	0.00	53.71	0.00	911.38	66.40	66.40	71.20	3,522.69
1991	8.30	2,499.50	0.00	53.71	0.00	911.38	56.56	122.96	64.86	3,587.55

Historical Summary

Pipeline Drain Installation

Year	Total Annual Installation (miles)	Cumulative Installation (miles) (a)
1962	1.38	22.51
1963	9.74	32.25
1964	5.38	37.63
1965	4.92	42.55
1966	13.64	56.19
1967	7.11	63.30
1968	6.24	69.54
1969	7.37	76.91
1970	3.69	80.60
1971	2.16	82.76
1972	5.54 (b)	88.30
1973	1.83	90.13
1974	5.31	95.44
1975	6.47 (c)	101.91
1976	1.11	103.02
1977	1.36	104.38
1978	0.90	105.28
1979	1.12	106.40
1980	2.13	108.53
1981	1.96	111.49
1982	0.49	110.98
1983	0.79	111.77
1984	0.79	112.56
1985	0.10	112.66
1986	0.96	113.62
1987	0.46	114.08
1988	0.00	114.08
1989	0.33	114.41
1990	0.42	114.83
1991	0.17	115.00

(a) These values reflect total pipeline drain installation miles, not to be confused with actual existing drain miles. Actual pipeline drain miles do not make any distinction between single or parallel drain miles and do not account for abandoned pipeline drains.
(b) 0.48 miles of parallel drain installed.
(c) 0.27 miles of parallel drain installed.

Historical Summary

Tile Installation

Year	Tile Installed (miles)	Cumulative (miles)	Acres Tiled	Cumulative Acres Tiled
1939		332.77		12,200
1940	66.84	399.61	4,040	16,240
1941	46.08	445.69	2,880	19,120
1942	37.15	482.84	2,040	21,160
1943	53.24	536.08	3,960	25,120
1944	60.00	596.08	1,880	27,000
1945	55.00	651.08	3,240	30,240
1946	133.25	784.33	5,480	35,720
1947	325.00	1,109.33	17,920	53,640
1948	393.80	1,503.13	17,220	70,860
1949	455.62	1,958.75	21,670	92,530
1950	458.00	2,416.75	22,610	115,140
1951	603.10	3,019.85	22,665	137,805
1952	709.54	3,729.39	23,345	161,150
1953	512.19	4,241.58	16,000	177,150
1954	491.12	4,732.70	14,960	192,110
1955	526.92	5,259.62	15,160	207,270
1956	519.36	5,778.98	13,290	220,560
1957	560.97	6,339.95	12,200	232,760
1958	490.88	6,830.83	10,690	243,450
1959	546.54	7,377.37	9,550	253,000
1960	794.05	8,171.42	15,713	268,713
1961	857.51	9,028.93	17,921	286,634
1962	611.01	9,639.94	11,485	298,119
1963	766.02	10,405.96	10,129	308,248
1964	993.97	11,399.93	12,707	320,955
1965	734.52	12,134.45	7,958	328,913
1966	527.38	12,661.83	6,634	335,547
1967	634.00	13,295.83	6,419	341,966
1968	754.33	14,050.16	6,046	348,012
1969	808.64	14,858.80	6,010	354,022
1970	1,036.61	15,895.41	8,230	362,252
1971	919.34	16,814.75	7,552	369,804
1972	1,019.40	17,834.15	7,311	377,115
1973	1,154.35	18,988.50	8,031	385,146
1974	1,191.96	20,180.46	3,734	388,880

Tile Installation (continued)

Year	Tile Installed (miles)	Cumulative (miles)	Acres Tiled	Cumulative Acres Tiled
1975	1,223.22	21,403.68	6,258	395,138
1976	1,530.67	22,934.35	7,941	403,079
1977	822.31	23,756.66	3,441	406,520
1978	958.32	24,714.98	5,719	412,239
1979	1,234.11	25,949.09	6,636	418,875
1980	1,061.32	27,010.41	3,873	422,748
1981	865.80	27,876.21	4,839	427,587
1982	631.54	28,507.75	1,950	429,537
1983	463.88	28,971.63	1,687	431,224
1984	565.88	29,537.51	1,633	432,857
1985	654.11	30,191.62	1,035	433,892
1986	455.14	30,646.76	1,496	435,388
1987	374.44	31,021.20	1,919	437,307
1988	530.31	31,551.51	1,586	438,893
1989	342.46	31,893.97	828	439,721
1990	332.76	32,226.73	952	440,673
1991	312.07	32,538.81	744	441,417

IV. STATUS OF IMPERIAL IRRIGATION DISTRICT LANDS WITHIN ALL-AMERICAN CANAL SERVICE AREA BOUNDARY

A. Imperial Irrigation District Gross Acreage Within the All-American Canal Service Area Boundary

B. Salton Sea Lands Within Imperial Irrigation District Boundary

C. Incorporated and Unincorporated Cities and Airports Within IID Imperial Unit Boundary

Annual Summary

A. Imperial Irrigation District Gross Acreage Within the All-American Canal Service Area Boundary

	Imperial Unit (acres)	East Mesa Unit (acres)	West Mesa Unit (acres)	Pilot Knob Unit (acres)	Total For All Units (acres)
Included Lands	627,827	201,938	67,545	15,478	912,788
Included Lands-No Water Rights	63,933(*)				63,933
Not Included Lands	2,586	17,491	58,817	6,022	84,916
Total Area per Unit	694,346	219,429	126,362	21,500	1,061,637

NOTE:
Included Lands are lands within the Unit that are within the AAC Service Area Boundary and the IID and are eligible to use Colorado River water.

Included Lands (No Water Rights) are lands within the Unit for which the IID Board of Directors has approved a petition for inclusion within the IID service area boundary but the lands have no water rights and thus are not eligible to use Colorado River water.

Not Included Lands are lands within the Unit and the AAC Service Area Boundary but are not within the IID and are therefore not eligible to use Colorado River water.

B. Salton Sea Lands Within Imperial Irrigation District Boundary

	(acres)
Salton Sea area within IID boundary For year ending 1991	102,939
Salton Sea area within IID boundary, above Dec. 1991 shoreline and below -230 foot Salton Sea Reserve Boundary	2,461
Total	105,400

(*) Resolution No. 107-67

C. **Incorporated and Unincorporated Cities and Airports Within IID Imperial Unit Boundary**

1991

Cities	Acres	
El Centro	4,063	
Brawley (*)	3,642	
Calexico (*)	2,687	
Holtville	717	
Imperial (**)	2,118	
Calipatria (*)	2,268	
Westmorland	253	
Seeley	213	
Niland	272	
Heber	220	
TOTAL Cities Acreage.....		16,453
Airports		
U.S. Naval Air Station	2,315	
Imperial County Airport Ext.	21	
TOTAL Airports Acreage.....		2,336
TOTAL Airports and Cities Acreage.....		**18,789**

(*) includes airport
(**) includes part of county airport

V. WATER CONSERVATION PROGRAMS

A. 1991 Status of IID/MWD Water Conservation Projects

1. Projects Completed/Implemented

A. South Alamo Canal Lining, Phase II

B. Bernard Galleano ("Z") Reservoir

C. Twelve-Hour Delivery

2. Projects in Progress

A. Vail Supply, Rositas Supply and Westside Main Canal Linings

B. Lateral Canal Lining

C. Irrigation Water Management

D. Non-Leak Gates

E. System Automation

3. Projects in Planning

A. Plum-Oasis Lateral Interceptor

B. IID Water Conservation Projects

1. 1991 Status of IID Water Conservation Programs

2. Historical Summary - Past IID Water Conservation Programs

A. Structural Programs

B. Operational Programs

C. Administrative Programs

D. Water Balance/Accounting Programs

E. Educational Programs

F. Cooperative Programs

3. Experimental Programs

A. Non-Crop Irrigation Reduction Plan

B. Modified Irrigation

Tables

A. Table V.B.1 All-American Seepage Recovery Drain No. 2

B. Table V.B.2 All-American Seepage Recovery Drains #1, #4, #5, #6, #11, #12, #34

C. Table V.B.3 East Highline Canal Water Recovery Sumps

V. WATER CONSERVATION PROGRAMS

A. 1991 Status of IID/MWD Water Conservation Projects

The IID and Metropolitan Water District of Southern California (MWD) entered into an agreement for the implementation of a water conservation/water transfer program during December 1989. In accordance with the agreement, MWD will pay for and IID will implement various water conservation measures in IID's irrigation distribution system. In exchange for financing the projects, IID will make available water conserved from the projects for MWD's diversion and use. By 1994, 100,000 acre-feet of water is to be conserved by IID and made available for diversion and use by MWD. As part of this Agreement a Water Conservation Measurement Committee (WCMC) and a Program Coordinating Committee (PCC) were established. The PCC consists of one registered engineer each, from IID, MWD and an unbiased, mutually agreed upon, third party, who shall be the acting chairperson. The WCMC consists of the same PCC representatives from IID, MWD, and the unbiased third party and one representative each from Palo Verde Irrigation District (PVID) and Coachella Valley Water District (CVWD). The PCC determined that 32,750 acre-feet of water was conserved during calendar year 1991 which will be made available for MWD's use in calendar year 1992.

The following is a brief summary of the status and progress made on each of the water conservation projects during 1991.

1. Projects Completed/Implemented

a. South Alamo Canal Lining, Phase II

This project involves the replacement of an earth lined canal with a concrete lined canal to reduce the present water losses due to seepage. Two miles of concrete lining on the South Alamo Canal (South Alamo Heading to Highway 98) were completed in August of 1990. Another 3.2 miles of canal (Highway 98 to delivery 31) were concrete lined during June of 1991.

b. Bernard Galleano ("Z") Reservoir

This reservoir was formally named the Bernard Galleano Reservoir by the IID Board of Directors. The construction of this 425 acre-foot capacity regulating reservoir was completed in October 1991. This reservoir is located just south of the "Z" Lateral Canal at the head of the Niland Extension Canal in the Calipatria Division and will essentially eliminate operational discharge at the end of the East Highline Canal.

c. Twelve-Hour Delivery

This project offers water users the opportunity to order deliveries with a 12-hour duration, as opposed to the 24-hour duration historically available. The project is expected to conserve water by

permitting irrigators to more closely match water orders to irrigation needs. This program also allows irrigators/farmers to order small delivery heads (up to seven cfs) on a fixed 12-hour basis and allows for cutoff of the delivery within the last four hours, if the canal capacity exists. Implementation of this program began during February 1990.

2. Projects in Progress

a. Vail Supply, Rositas Supply and Westside Main Canal Lining

These projects have been put on hold pending further seepage studies.

b. Lateral Canal Lining

During 1991, IID concrete lined approximately 57 miles of lateral canals. Seepage studies completed to date indicate that the canal lining projects are not as viable as once thought. Canal lining will continue on a limited basis until further seepage studies can be completed.

c. Irrigation Water Management

This program has taken water conservation onto the farm by providing funds for the construction of on-farm water conservation systems, and the training and support to educate farmers on the most advanced irrigation management techniques. Six tailwater return systems are functional and another six are under construction. Nine drip irrigation systems, funded by the program, are also under construction.

d. Non-Leak Gates

Design work for the installation of non-leaking aluminum gates, in place of wooden gates, was completed in 1991, as was the methodology to verify gate seepage losses. The installation of 50 gates is planned for 1992.

e. System Automation

This program has begun to improve the IID's control of water delivery. On-site computers now manage water control gates at nine locations. Seventy-five remote terminal units are currently being installed to provide additional water control data and allow for improved system control. A new Water Control Center is designed, with construction to begin in January 1992.

3. Projects in Planning

a. Plum-Oasis Interceptor

This project will utilize a header canal to intercept operational discharge from eight lateral canals between Orient Lateral Canal and Plum Lateral Canal in the Holtville Division. The intercepted water will then be stored in a reservoir and transferred across the Alamo River where it will be discharged into the Redwood Lateral Canal. Approximately 183 pond leveling gates will be used to create a virtual demand water system for these eight lateral canals. Construction on this project began in September 1991.

B. IID Water Conservation Programs

1. 1991 Status of IID Water Conservation Programs

As a result of the 1989 IID/MWD Water Conservation Agreement, much of the IID's present water conservation efforts have been diverted to the fulfillment of the goals associated with this agreement. The IID has the ongoing responsibility for Water Recovery Sumps on the East Highline Canal and the All-American Canal and the operation and maintenance of its five regulating reservoirs. Other ongoing water conservation programs include maintenance of concrete lined canals, tailwater assessment and spill monitoring.

2. Historical Summary - Past Water Conservation Programs

a. Structural Programs

In 1954, the IID began a program of concrete lining canals and laterals. Under this program a total of 911 miles of IID maintained canals and laterals and 53.7 miles of privately maintained laterals have been concrete lined by IID to date (1991). During 1991, an additional 56.56 miles of canals were concrete lined by IID but funded by MWD as part of the IID/MWD Water Conservation Agreement. This is a total of 122.96 miles concrete lined under the MWD/IID Water Conservation Agreement. In addition to concrete lining, 12.74 miles of laterals have been replaced with concrete pipe. About 80 percent of the farm head ditches have been lined.

In 1947, seepage recovery Drain No. 2 was installed along the All-American Canal. Historical records, beginning in 1964, show that more than 318,187 acre-feet of water has been recovered from this drain. In 1948, seepage recovery Drain No. 1 was constructed along the All-American Canal and between 1951 and 1965, All-American Drainage Pumps Nos. 4, 5, 6, 11 and 12 were installed. More recently, in 1989, All-American Drainage Pump No. 34 was installed. From 1988 to the present, approximately 39,987 acre-feet of water has been recovered from these seven drain pump systems. Table V.B.1 (pg.35) and V.B.2 (pg.36) are a historical summary of the annual water recovered from these seepage recovery systems.

Between 1967 and 1974, the IID constructed 12 seepage recovery pump systems involving approximately six miles of seepage recovery lines (twelve 0.5 mile sections) parallel to the East Highline Canal. Water entering these lines is pumped back into the canal for delivery to farms. Historical records on the amount of water recovered from these recovery lines began in 1967. To date, approximately 353,930 acre-feet of water has been recovered from from these seepage recovery lines over the past 25 years. Table V.B.3 (pg.37-38) is a historical summary of the annual water recovered from these seepage recovery lines.

By 1983 the IID had constructed four regulating reservoirs; Singh (1976), Sheldon (1977), Fudge (1982) and Sperber (1983). These reservoirs together have a total operational storage capacity of 1,570 AF. One reservoir is located on each of the three main canals and the fourth, Sperber Reservoir stores water from the Rositas Canal. A fifth reservoir, Galleano Reservoir, a 425-acre-foot capacity regulating reservoir was completed in October 1991. This reservoir will eliminate operational discharge at the end of the East Highline Canal.

The Water Control Section and the Watermaster operate remote electronic monitoring and control devices at 22 locations, including the All-American Canal.

b. Operational Programs

The IID has installed radio equipment in the division offices, zanjero vehicles and at operating headquarters to facilitate in the effective exchange of information.

As operational methods have changed and structures built or modernized, the IID has established training programs for all affected Water Department employees. As an ongoing program, specialized training in water measurement and management is given to zanjeros and hydrographers.

c. Administrative Programs

In July 1976, the IID supplemented its existing water conservation efforts with a stringent 13-Point Program. The overall goal of the 13-Point Program was to improve water use efficiency within the IID and reduce inflow to the Salton Sea. For more detailed information on the 13-Point Program, refer to IID's publication **Water Conservation Plan 1985, pg. IV.11**

In 1979 the IID Board of Directors appointed a Water Conservation Advisory Board to make recommendations to the IID Board regarding the implementation of additional water conservation measures. In 1980, the recommendations suggested by the Advisory Board were reviewed and adopted by the Board as the 21-Point Program which was intended to supplement the original 13-Point Water Conservation Program. For more detail on the 21-Point Program refer to IID's publication **Water Conservation Plan 1985, pgs. IV.12-14.**

d. Water Balance/Accounting Programs

In 1985, an accounting procedure was adopted to provide for the separate accounting of water delivered versus water ordered and billed. This allowed information to be gathered on the quantity of water used.

A Tailwater Monitoring Program involved a system of assessments for tailwater quantities in excess of 15 percent of deliveries. This program has been in operation since 1976. The IID also required tailwater structures to be in adequate repair. In 1985, a revised Tailwater Monitoring Program replaced and superseded the 13-Point and 21-Point Programs. A tailwater monitoring study program was also authorized to aid in revising the existing assessment program.

A Spill Monitoring Program was started in 1985 to provide an estimate of operational water losses in the IID's irrigation system. There are 241 locations where water can be spilled from IID canals. By 1980 there were 15 monitoring sites, and by 1984 there were a total of 31 sites.

A Tile Flow Monitoring Program was implemented to augment the IID's current sump program by installing recorders on about ten tile outlets in the areas of the IID not covered by sumps. This data will be used to estimate flows from tile for the whole IID as part of the total water budget.

e. Educational Programs

The IID has implemented a series of educational programs to encourage water conservation within the Valley. These programs range in complexity from public meetings to full-scale demonstration programs on tailwater recovery, field irrigation and irrigation training.

f. Cooperative Programs

The IID has been involved in various cooperative studies and programs, researching innovative water conservation methods. Some of these programs include a demonstration Irrigation Scheduling Program, a Drain Water Reuse Program, Irrigation Scheduling with Neutron Probe and supporting the Imperial Valley U.S. Department of Agriculture (USDA) Irrigated Desert Research Station, the USDA Soil Conservation Service, and the University of California Extension Service (Farm Advisors).

3. Experimental Programs

a. Non-Crop Irrigation Reduction Plan

A Non-Crop Irrigation Reduction Plan reduced the amount of leaching allowed prior to planting the crop. This program was started in May 1991 and will be in effect until May 1992.

b. Modfied Irrigation

Twelve fields of 35 acres each in various parts of the Valley did not receive water for alfalfa for 75 days during the summer. The IID was evaluating the impact on the crop and the amount of water saved. The study developed could be implemented in the future on a larger scale to create a source of transferable water should it be needed due to drought conditions.

Table V.B.1

Historical Summary
All-American Canal Seepage Recovery
Drain No. 2

Year	Acre-Feet Recovered
1964	13,012.8
1965	13,227.8
1966	12,929.9
1967	11,542.6
1968	11,204.6
1969	10,651.8
1970	10,605.8
1971	11,845.9
1972	11,687.8
1973	11,406.9
1974	12,258.6
1975	11,724.5
1976	11,510.3
1977	10,892.2
1978	10,906.9
1979	11,051.7
1980	11,484.3
1981	11,082.8
1982	9,481.4
1983	9,913.2
1984	10,248.6
1985	11,791.5
1986	12,909.2
1987	11,771.3
1988	11,627.7
1989	10,806.5
1990	11,453.6
1991	9,157.2
Total	**318,187.4**

AAC Seepage Recovery Drain No. 2 installed in 1947.

Table V.B.2

Historical Summary

All-American Canal Seepage Recovery

(acre-feet)

Year	Drain 1	DP #4 small	DP #4 large	DP #5 small	DP #5 large	DP #6	DP #11	DP #12	DP #34
1988	1,176.00	-	-	-	-	-	-	-	-
1989	1,497.51	14.61	3,205.98	1,531.67	4,138.25	97.54	62.63	51.55	204.18
1990	2,150.09	32.29	4,041.08	1,786.93	5,078.29	153.88	95.74	44.68	438.87
1991	2,143.17	76.98	3,830.80	1,955.61	5,492.77	151.57	93.42	70.43	370.25
Total	**6,966.76**	**123.88**	**11,077.87**	**5,274.21**	**14,709.31**	**402.99**	**251.79**	**166.67**	**1,013.30**

Notes: Drain No.1 installed June 1948.
DP #4, DP #5, DP #6, DP #11, DP #12 installed between 1951 and 1965.
DP #34 installed in 1989.

Table V.B.3

Historical Summary
East Highline Canal Water Recovery Sumps
Volume Water Recovered and Power Costs Per Sump

	DP-17		DP-18		DP-19		DP-20		DP-21		DP-22		DP-23	
	Plum to Pine		Pear to EHL Lat 10		EHL Lat 10 to Lat. 11		Oat to Oasis		Highway 80 to EHL Lat. 8		EHL Lat. 8 to Pear		Oak to Moss	
Year	Acre-Feet Recovered	Cost	Acre-Feet Recovered	Cost	Acre-Feet Recovered	Cost	Acre-Feet Recovered	Cost	Acre-Feet Recovered	Cost	Acre-Feet Recovered	Cost	Acre-Feet Recovered	Cost
1967	736	287	-	-	-	-	-	-	-	-	-	-	-	-
1968	1,288	510	467	182	262	116	140	98	96	54	121	58	-	-
1969	1,449	516	1,508	580	723	353	697	323	1,120	455	713	355	-	-
1970	1,321	479	1,416	533	658	332	653	314	1,088	447	621	328	925	361
1971	1,349	487	1,455	544	570	304	640	309	1,053	436	593	317	1,351	533
1972	1,207	451	1,388	526	568	306	599	295	1,123	456	652	332	1,297	519
1973	1,130	432	1,410	531	511	284	589	287	936	431	658	334	1,272	513
1974	1,109	590	1,363	680	599	384	587	304	889	532	588	385	1,340	700
1975	1,072	790	1,220	889	512	448	301	263	932	606	499	437	1,190	927
1976	984	755	1,084	839	470	422	371	314	865	717	507	461	1,269	948
1977	1,060	928	663	643	397	428	397	384	885	878	347	371	1,347	1,119
1978	977	977	559	679	390	462	441	439	911	915	242	438	1,298	1,272
1979	1,113	1,252	693	841	260	406	515	528	921	1,104	243	524	1,298	1,510
1980	922	1,245	676	992	194	339	475	630	778	1,102	281	580	1,313	1,796
1981	948	1,335	788	1,195	390	367	309	780	866	1,350	643	822	1,334	1,774
1982	1,089	1,913	811	1,648	377	435	258	1,125	860	1,796	482	997	1,240	2,198
1983	1,154	2,221	938	2,157	355	598	206	1,204	860	2,066	494	1,351	1,150	2,482
1984	1,066	2,206	842	2,087	288	591	249	1,224	902	2,036	456	1,268	1,215	2,535
1985	905	1,562	875	1,793	300	761	338	975	722	1,403	459	1,040	1,105	1,917
1986	889	1,829	833	1,878	512	827	339	1,111	701	1,536	476	1,266	1,095	2,153
1987	887	1,871	1,072	2,084	341	842	457	1,076	746	1,766	596	1,271	1,197	2,140
1988	912	2,024	1,035	2,172	568	900	329	1,100	891	2,075	585	1,419	1,025	1,937
1989	873	2,084	989	2,288	372	962	358	1,304	801	2,097	488	1,336	1,113	2,391
1990	910	2,147	1,005	2,335	351	933	290	1,094	798	2,083	531	1,488	1,200	2,415
1991	1,168	2,559	1,022	2,195	381	1,057	236	959	795	2,097	563	1,730	1,138	2,333
TOTALS	26,518	29,658	24,112	29,996	10,349	12,056	9,774	15,705	20,539	27,482	11,838	18,167	26,712	34,112

Table V.B.3

Historical Summary
East Highline Canal Water Recovery Sumps
Volume Water Recovered and Power Costs Per Sump
(continued)

Year	DP-24 Oleander Acre-Feet Recovered	DP-24 Oleander Cost	DP-25 Orange to Ohmar Acre-Feet Recovered	DP-25 Orange to Ohmar Cost	DP-26 Oxalis to Orange Acre-Feet Recovered	DP-26 Oxalis to Orange Cost	DP-27 To Lat. 12 Acre-Feet Recovered	DP-27 To Lat. 12 Cost	DP-28 Highway 80 to Oasis to Orient Acre-Feet Recovered	DP-28 Highway 80 to Oasis to Orient Cost	Totals For All Drains Acre-Feet Recovered	Totals For All Drains Cost	Average Power Cost Per Acre-Feet Recovered
1967	-	-	-	-	-	-	-	-	-	-	736	287	.39
1968	-	-	-	-	-	-	-	-	-	-	2,374	1,018	.43
1969	-	-	-	-	-	-	-	-	-	-	6,210	2,582	.42
1970	-	-	-	-	-	-	-	-	-	-	6,682	2,794	.42
1971	406	143	-	-	-	-	-	-	-	-	7,417	3,073	.41
1972	1,854	653	1,361	627	-	-	-	-	-	-	10,049	4,165	.41
1973	1,795	636	1,489	648	3,309	1,120	2,731	1,012	-	-	15,830	6,228	.39
1974	1,850	884	1,109	603	3,714	1,825	3,195	1,548	2,369	1,063	18,712	9,498	.51
1975	1,460	1,124	1,300	995	3,368	2,362	3,046	2,097	3,094	1,822	17,994	12,760	.71
1976	1,388	1,168	1,370	1,195	3,126	2,387	3,062	2,271	3,296	2,092	17,792	13,569	.76
1977	1,760	1,388	1,210	1,388	3,047	2,665	2,947	2,566	3,244	2,412	17,304	15,170	.88
1978	1,833	1,569	1,322	1,544	3,704	3,475	3,039	2,863	3,255	2,633	17,971	17,266	.96
1979	1,639	1,827	1,146	1,780	3,332	3,777	3,014	2,469	3,449	3,383	17,623	*19,401	*1.10
1980	1,625	2,138	1,113	2,061	3,357	4,469	2,883	3,836	3,499	3,983	17,116	23,171	1.35
1981	1,456	1,915	1,249	2,139	3,235	4,339	3,021	4,040	3,321	3,923	17,560	23,979	1.37
1982	1,523	2,346	1,188	2,741	3,460	5,966	2,947	5,213	3,148	4,956	17,383	31,334	1.80
1983	1,478	2,666	1,287	3,137	3,373	6,788	2,794	5,691	3,052	5,928	*17,141	36,289	2.12
1984	1,440	2,690	1,120	3,092	3,280	5,539	3,280	5,539	2,669	5,807	16,807	34,614	2.06
1985	1,604	2,237	1,008	2,480	1,870	3,219	2,544	4,087	2,991	4,565	14,721	26,039	1.77
1986	1,586	2,937	1,081	2,919	1,977	5,324	2,692	4,703	2,891	4,857	15,072	31,340	2.08
1987	1,576	2,831	1,295	2,707	2,720	5,656	1,866	2,848	3,314	4,521	16,067	29,613	1.84
1988	1,777	3,027	1,189	3,101	3,465	6,167	3,255	5,702	2,824	4,840	*17,855	*34,464	*1.93
1989	1,514	3,350	1,073	3,327	2,575	7,037	2,588	5,929	2,362	5,176	*15,106	*37,281	*2.47
1990	1,562	3,155	815	2,618	3,383	6,574	3,059	6,066	2,239	4,908	16,143	35,816	2.22
1991	1,496	3,248	731	2,510	3,238	7,134	3,010	3,547	2,487	4,895	16,265	35,264	2.17
TOTAL	32,622	41,932	23,456	41,612	59,533	85,823	54,973	72,027	53,504	71,764	353,930	480,334	1.42

* Correction made during 1990.

Note: Each DP Water Recovery Tile Drainage system is approximately 0.5 miles long for a total length of approximately 6.0 miles of tile drains paralleling the East Highline Canal. Power costs are prorated from actual billings for the year.

VI. WATER DISTRIBUTION SYSTEM

A. Annual Summary

1. Colorado River

A. Water Storage and Discharges

B. Daily Maximum, Minimum and Mean Discharges

2. All-American Canal Water Balance

A. Imperial Dam to Drop 1

B. Drop 1 to Westside Main

C. Losses and Diversions Imperial Dam to Westside Main

3. IID System Water Balance

A. Main and Lateral Canals

B. Water Diversions to Divisions

C. Water Deliveries to Cities

B. Historical Summary

1. Water Deliveries to Cities

A. Graph - Historical Population Trends, Cities and Unincorporated Communities

B. Graph - Historical Urban Water Use, Cities and Unincorporated Communities

2. Water Delivery

A. Delivery Efficiency, Comparing Discharges at Pilot Knob, Drop 1 and Delivered to User Headgates

B. Graph - Delivery Efficiency of Conveyance System

C. Graph - Annual Water Delivery

Annual Summary
1991
Water Storages and Discharges
Colorado River

	1991 (A.F.)	1990 (A.F.)
Grand Canyon:		
Discharge For Year	8,574,000	7,947,400
Hoover Dam:		
Maximum Reservoir Elevation	1,180.19(ft.)	1,191.84(ft.)
Reservoir Elevation - Dec.31	1,173.44(ft.)	1,177.89(ft.)
Maximum Available Storage	20,166,000	21,754,000
Storage - December 31	19,288,000	19,864,000
Change in Storage	- 576,000	-1,534,000
Discharge for Year	8,952,500	9,204,900
Davis Dam:		
Storage - December 31	1,782,100	1,598,300
Change in Storage	+183,800	-37,500
Discharge for Year	8,460,100	9,228,000
Parker Dam:		
Storage - December 31	549,900	539,500
Change in Storage	+10,400	-5,400
Discharge for Year	6,692,500	7,165,300
Imperial Dam:		
Diversions to:		
All-American Canal	4,649,186	4,929,456
Gila Main	813,070	852,240
Passing Imperial Dam	278,380	243,720
Discharge for Year	5,740,636	6,025,416
Yuma - Below Yuma Main Spill:		
Discharge for Year	801,740	769,240
Morelos Dam:		
Diversion to Alamo Canal:		
Discharge for Year	1,375,585	1,398,860

Annual Summary
1991
Daily Discharges
Colorado River

		1991 (cfs)		1990 (cfs)	
Hoover Dam:					
Daily Discharge	- Maximum	20,200	(05/29)	22,100	(07/12)
	- Minimum	4,830	(11/09)	4,310	(10/28)
	- Mean	12,366		12,715	
Davis Dam:					
Daily Discharge	- Maximum	19,000	(07/24)	21,300	(07/03)
	- Minimum	2,290	(1/11,12,13)	4,770	(12/23)
	- Mean	11,686		12,747	
Parker Dam:					
Daily Discharge	- Maximum	16,000	(07/16)	16,000	(06/27)
	- Minimum	1,060	(01/05)	1,480	(01/05)
	- Mean	9,244		9,897	
Imperial Dam:					
Daily Discharge	- Mean	7,929		8,323	
Diversions to A.A.C. (Sta.60):					
Daily Discharge	- Maximum	10,500	(04/12)	10,100	(04/12,19)
	- Minimum	1,480	(12/12)	2,390	(01/01)
	- Mean	6,422		6,809	
Drop No. 1:					
Daily Discharge	- Maximum	6,100	(04/09)	6,250	(05/05)
	- Minimum	500	(12/15)	950	(01/1,12/25)
	- Mean	3,886		4,109	
Yuma Diversion:					
Daily Discharge	- Maximum	2,780	(09/08)	2,550	(09/04)
	- Minimum	574	(07/29)	509	(05/05)
	- Mean	1,107		1,063	

Annual Summary
1991
Water Balance
All-American Canal
(Imperial Dam to Drop 1)

	1991 (A.F.)	1990 (A.F.)
All-American Canal Diversion @ Imperial Dam (Sta. 60):		
IID(p)	2,985,177	3,135,822
CVWD(p)	327,770	379,578
Yuma(p)	1,175,343	1,210,957
Pilot Knob (power)(p)	160,896	202,308
USBR recharge(p)	0	791
Total (m)	**4,649,186**	**4,929,456**
Diversion above Siphon Drop - Bard(-)	76,764	76,644
Diversion at Siphon Drop & Walapai(-)	722,856	741,887
Pilot Knob P.P. Diversions (see note 1)(m)(-)	503,144	565,268
Losses Imperial Dam to Pilot Knob (see note 2)(c)(-)	135,298	125,957
Discharge Below Pilot Knob(m)	**3,211,124**	**3,419,700**
Discharge Below P.K. (1117) Check To:		
U.S.B.R.(see note 3)(p)	0	791
Coachella(p)	317,013	368,901
I.I.D.(p)	2,894,111	3,050,008
Total (m)	**3,211,124**	**3,419,700**
Losses P.K. to Drop No.1 (c):		
USBR(p)(-)	0	52
Coachella Portion(p)(-)	9,187	9,499
I.I.D. Portion(p)(-)	81,092	75,361
Total(c)(-)	**90,279**	**84,912**
Diversions at Drop No.1:		
USBR Diversions to CVWD Canal(p)	0	739
Coachella(p)	307,826	359,402
I.I.D.(p)	2,813,019	2,974,647
Total(e)	**3,120,845**	**3,334,788**

(p) estimated proportion value, (m) measured value, (c) calculated value.
Note: In 1991, an Acoustical Velocity Meter was installed to measure discharge below Drop 1.

Annual Summary
1991
Water Balance
All-American Canal
(Imperial Dam to Drop 1)
(continued)

Note 1: Pilot Knob Power Plant Diversions (Return to River at Pilot Knob)	1991	1990
	(A.F.)	(A.F.)
Y.C.W.U.A. Transfer(p)	345,153	366,704
Imperial Irrigation District(p)	157,868	198,445
Diversions to Pilot Knob Spillway(p)	123	119
Total (m)(-)	**503,144**	**565,268**

Note 2: Losses Imperial Dam (Sta. 60) to Pilot Knob (1117)		
IID(p)	91,066	85,814
CVWD(p)	10,757	10,677
Yuma(p)	30,447	25,603
Pilot Knob (power)(p)	3,028	3,863
USBR recharge(p)	0	0
Total (c)(-)	**135,298**	**125,957**

Note 3: U.S.B.R. Diversions**		
Discharge to Sta.60 USBR(p)	0	791
Losses Sta. 60 to P.K.(1117) USBR(c)	0	0
Discharge Below P.K. for USBR (p)	0	791
Losses P.K. to Drop No. 1 USBR(c)	0	- 52
Diversion to Coachella Canal USBR(p)	**0**	**739**

(p) **estimated proportion value:** is a percentage of a measured or calculated value.

(m) **measured value:** is determined by using a standard measuring device i.e., weir, gate, measurements are made on a continuous basis.

(c) **calculated value:** is determined by subtracting measured and/or estimated values.

(e) **estimated value:** is determined by taking flow measurement readings several times a day.

****U.S.B.R. Diversions** were temporary and were not applicable in 1991.

Annual Summary
1991
Water Balance
All-American Canal
(Drop 1 to Westside Main)

	1991 (A.F.)	1990 (A.F.)
* I.I.D. Discharge Below Drop 1(m)	2,813,019	2,974,647
Diversions Drop 1 to EHL check(m)	**1,204,183**	**1,279,060**
Losses Drop No.1 to EHL Check(c)	42,341	31,049
Discharge Below EHL Check(m)	1,566,495	1,664,538
Diversion EHL Check to CM Check(m)	**850,707**	**915,860**
Losses EHL to CM Check(c)	25,903	18,703
Discharge Below CM Check(m)	689,885	729,975
Losses CM to WSM Check(c)	11,238	8,502
Diversion CM Check to WSM Check(m)	**678,647**	**721,473**

SUMMARY

Total Diversions from All-American Canal Below Drop 1	**2,733,537**	**2,916,393**
Total Losses from All-American Canal Below Drop 1	**79,482**	**58,254**

* An Acoutical Velocity Meter (AVM) was installed in 1991 to measure discharge below Drop 1 and the discharge below East Highline Check.

Annual Summary
1991
Losses and Diversions
(Imperial Dam to Westside Main)

Summary of Diversions From Imperial Dam to Westside Main Canal

	1991 (A.F.)	1990 (A.F.)
USBR	0	739
Pilot Knob Spill	123	119
IID Power	157,868	198,445
YCWUA	345,153	366,704
Siphon Drop & Walapai	722,856	741,887
Bard	76,764	76,644
Coachella	307,826	359,402
East Highline	1,204,183	1,279,060
Central Main	850,707	915,860
Westside Main	678,647	721,473
Total	**4,344,127**	**4,660,333**

Summary of Losses From Imperial Dam to Westside Main Canal

	1991 (A.F.)	1990 (A.F.)
Losses Imperial Dam to Pilot Knob(-)	135,298	125,957
Losses Pilot Knob to Drop No.1(-)	90,279	84,860
Losses Pilot Knob to Drop 1 - USBR(+)	0	52
Losses Drop No.1 to EHL Check(-)	42,341	31,049
Losses EHL Check to CM Check(-)	25,903	18,703
Losses CM Check to WSM Check(-)	11,238	8,502
Total(-)	**305,059**	**269,019**

Annual Summary
1991
Total System Water Balance
Main/Lateral Canals

		1991 (A.F.)	1990 (A.F.)
Discharge Below Pilot Knob (I.I.D.)	(p)	2,894,111	3,050,008
Total Main Canal Losses (incl. All-American, WSM, CM, EHL)	(c)	-307,775	-286,268
Total Diversions from Main Canals	(c)	2,586,336	2,763,740
Main Canal Operational Spill (see Note 1)	(m)	-7,483	-7,179
Deliveries From Main Canals	(c)	2,578,853	2,756,561
Operational Spill Recovered (see Note 2)	(m)	+24,833	+20,221
Net Received by Divisions, incl. recovered spill	(m)	2,603,686	2,776,782
Lateral Canal Losses	(c)	-83,526	- 95,870
Delivered to User Headgate	**(e)**	**2,520,160**	**2,680,912**
Total Charged to User (est.ordered)		**2,534,202**	**2,691,572**

Note 1. Main Canal Operational Spill:

All-American Canal Alamo Spill	0	0
All-American Canal New River Spill	205	18
Dahlia Spillway	0	0
No. 4 Spillway	0	0
Dixie Spillway	70	19
Vail Spillway to New River	714	492
Vail Supply to Alamo-Above North End Dam	2,148	2,024
Rositas Spillway at Rose Heading	0	0
East Highline at Z Spillway	4,286	4,397
W.S.M. Storm Drain Spillway	60	229
TOTAL	**7,483**	**7,179**

Note 2. Division Operational Spill Recovered:

Diversions to WSM	12,760	8,248
Diversions to Rositas	11,561	9,718
Diversions to Vail	512	2,255
TOTAL	**24,833**	**20,221**

(e) estimated value, (c) calculated value, (m) measured value,
(p) estimated proportioned value

Annual Summary
1991
Water Diversions to Division

Division	Net Received at Laterals (estimated)		Lateral Canal Losses (calculated)		Delivered to User Headgates (estimated)		Charged to Users (est. orderd)	
Division	1991 (A.F.)	1990 (A.F.)	1991 (A.F.)	1990 (A.F.)	1991 (A.F.)	1990 (A.F.)	1991 (A.F.)	1990 (A.F.)
East Mesa	6,041	4,052	0	0	6,041	4,052	6,041	4,052
Holtville	547,990	583,965	15,170	19,416	532,820	564,549	545,382	573,257
El Centro	449,925	481,093	7,952	6,267	441,973	474,826	449,102	479,454
Imperial	396,127	424,525	10,032	14,079	386,095	410,446	379,880	408,901
Brawley	430,970	462,475	28,631	30,181	402,339	432,294	403,833	434,270
Westmorland	378,754	405,048	9,006	10,876	369,748	394,172	371,775	394,904
Calipatria	393,879	415,624	12,735	15,051	381,144	400,573	378,189	396,734
TOTAL 1991	**2,603,686**		**83,526**		**2,520,160**		**2,534,202**	
TOTAL 1990		**2,776,782**		**95,870**		**2,680,912**		**2,691,572**

NET RECEIVED is based on a daily estimated flow measured at lateral headings by hydrographers. For affected divisions this value includes operational spill recovery. **LATERAL CANAL LOSSES** includes evaporation, seepage, carriage water and operational discharge. **DELIVERED TO USERS** is based on a daily estimated flow at water user headgates measured several times daily by the zanjeros. Information is gathered by divisions and given to Water Control. **CHARGED TO USERS** is water ordered by farmers/irrigators with possible adjustments reflecting quantity actually delivered.

NOTE: Typically the quantity of water charged to user is greater than delivered to user because irrigators usually will cut back their original orders during the end of the irrigation period resulting in less actual delivered water. However, they are still charged for the amount of water that was originally ordered.

Annual Summary
1991
Water Deliveries
Cities

City	Water Delivered (acre-feet)		Population *	
	1991	1990	1991	1990
Calexico	5,634.0	5,926.0	20,050	18,633
Holtville	1,952.8	2,134.6	5,050	4,820
El Centro	7,523.2	7,044.0	34,500	31,384
Imperial	2,077.6	2,165.2	4,480	4,133
Brawley	6,129.6	5,977.0	20,100	18,923
Westmorland	720.4	428.0	1,460	1,380
Calipatria	1,429.6	1,389.2	2,890	2,690
Niland	791.4	725.4	1,183	1,183
Seeley	356.0	345.0	1,228	1,228
Heber	346.0	89.2	2,566	2,566
	---	---	---	---
TOTAL	26,960.6	26,223.6	93,507	86,940

The Imperial Irrigation District delivers an estimated 11,604 acre-feet of water to 1,934 service pipes annually.

Cities includes unincorporated communities.

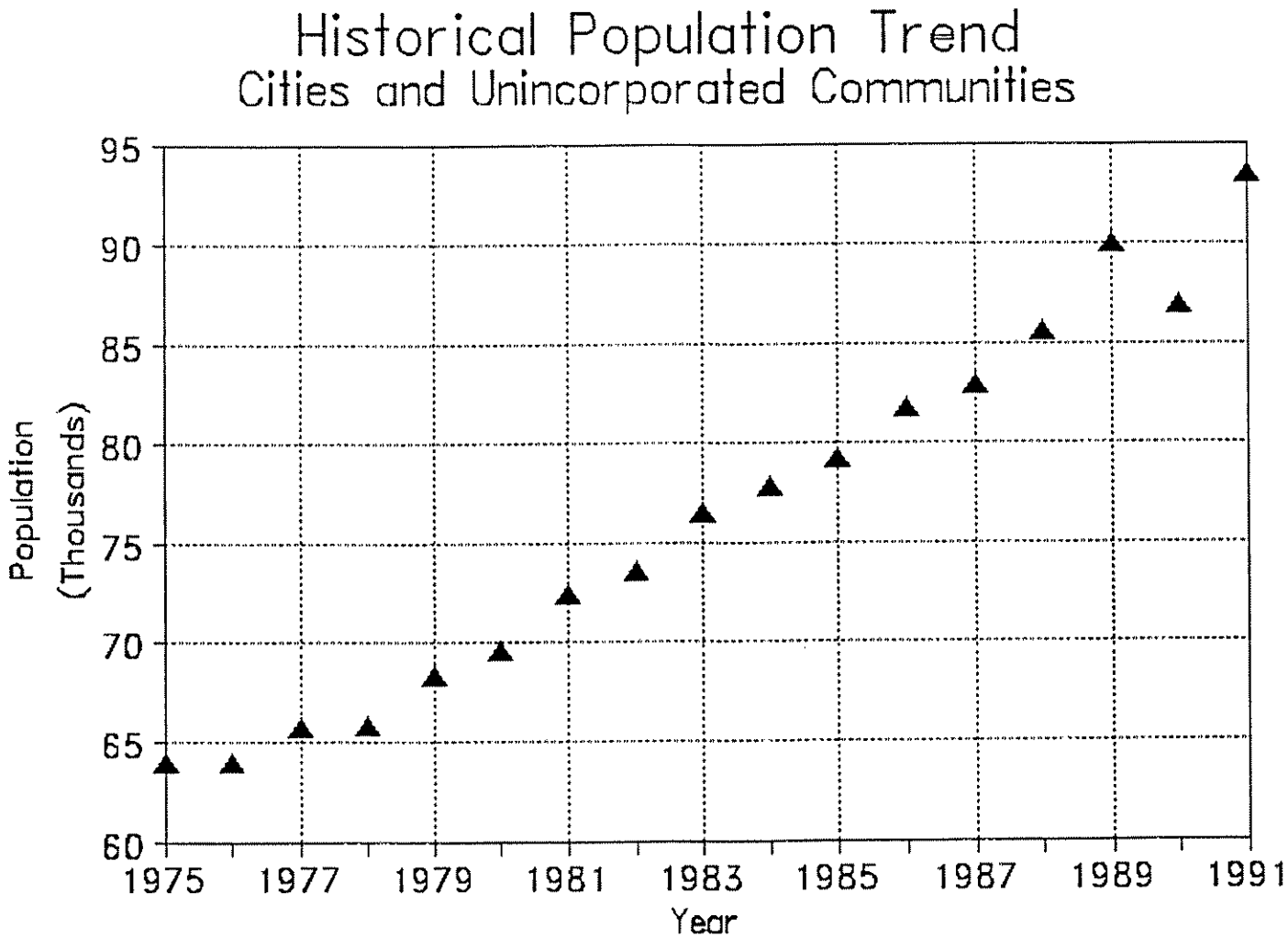
* Source: Imperial Irrigation District's Public Information and Community Service Section, Imperial County Planning Department.

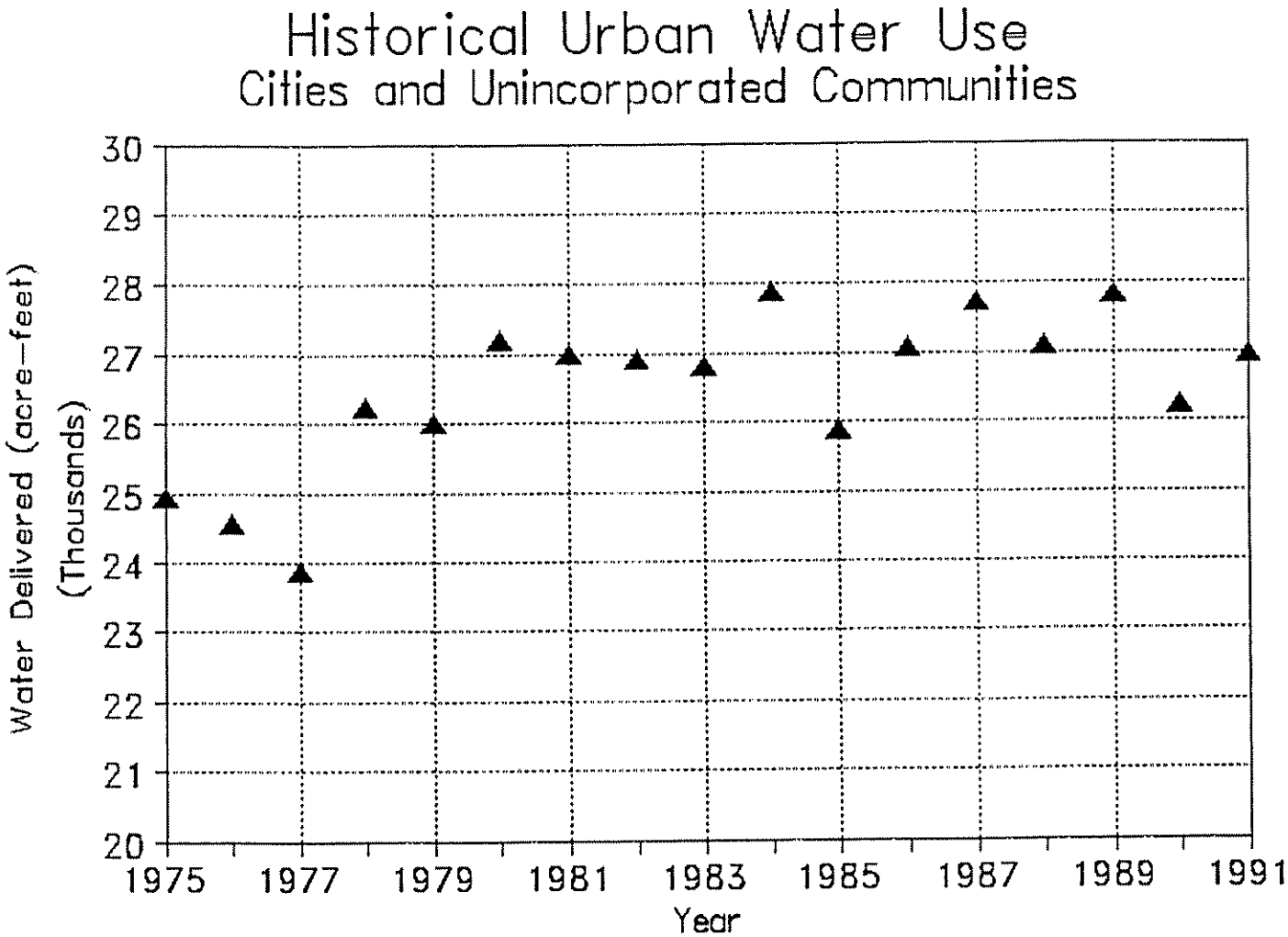
Historical Summary

Water Deliveries to Cities

Year	Water Delivered to Cities (acre-feet)	Population
1974	24,738	59,984
1975	24,922	63,974
1976	24,543	63,974
1977	23,886	65,752
1978	26,229	65,844
1979	26,003	68,345
1980	27,170	69,551
1981	26,977	72,347
1982	26,916	73,504
1983	26,812	76,490
1984	27,870	77,771
1985	25,874	79,266
1986	27,058	81,754
1987	27,731	82,934
1988	27,071	85,641
1989	27,827	90,011
1990	26,224	86,940
1991	26,961	93,507
MEAN	**26,378**	**75,422**

Water Delivered to Cities includes cities and unincorporated communities in Calexico, Holtville, El Centro, Imperial, Brawley, Westmorland, Calipatria, Niland, Seeley and Heber.

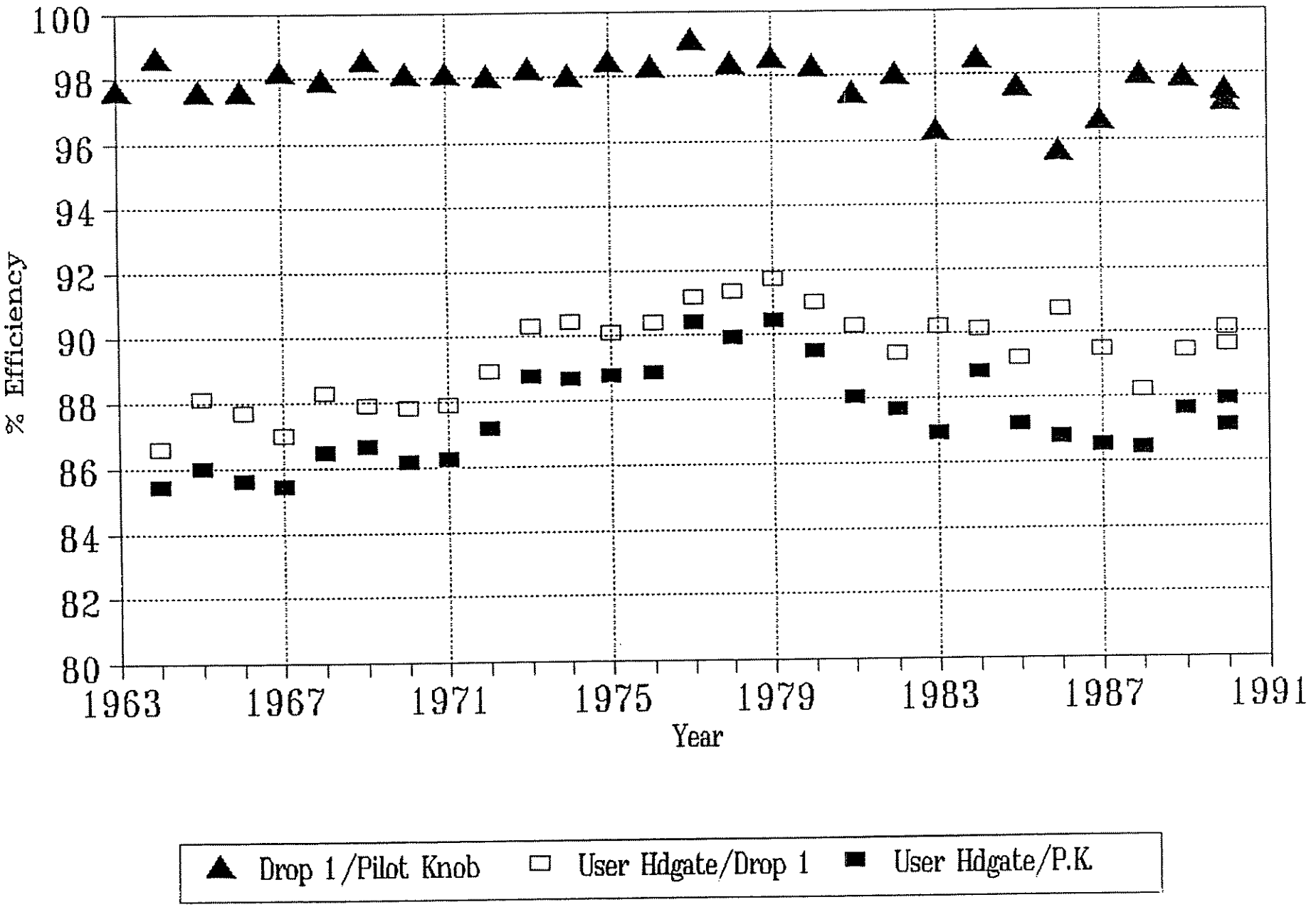

Historical Population Trend
Cities and Unincorporated Communities
Population (Thousands)
95
90
85
80
75
70
65
60
1975
1977
1979
1981
1983
1985
1987
1989
1991
Year


Historical Urban Water Use
Cities and Unincorporated Communities
Water Delivered (acre-feet)
(Thousands)
30
29
28
27
26
25
24
23
22
21
20
1975
1977
1979
1981
1983
1985
1987
1989
1991
Year

Historical Summary
Delivery Efficiency
Comparing Discharges at Pilot Knob, Drop 1 and Users Headgates

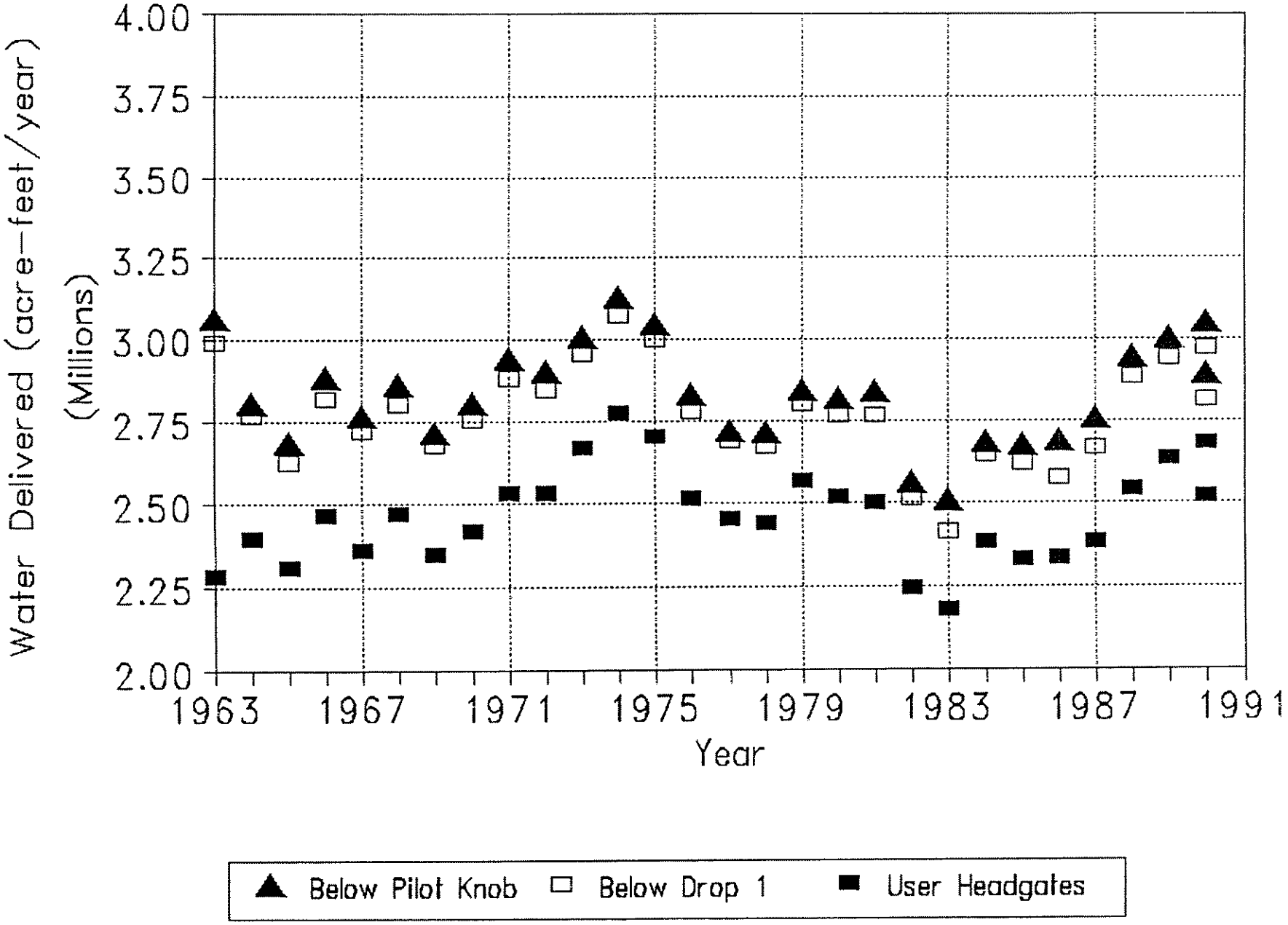
Year	Discharge IID Below Pilot Knob (ac-ft.)	A.A.C. IID Below Drop 1 (ac-ft.)	Effic. Drop 1/ PK %	Delivered to User Headgate (ac-ft.)	Effic. Deliv./ PK %	Effic. Deliv./ Drop 1 %
1963	3,062,485	2,991,429	97.68	2,284,666	74.60	76.37
1964	2,807,681	2,770,474	98.67	2,398,693	85.43	86.58
1965	2,688,158	2,624,363	97.63	2,311,966	86.01	88.10
1966	2,886,364	2,817,912	97.63	2,470,268	85.58	87.66
1967	2,769,592	2,719,861	98.20	2,365,379	85.41	86.97
1968	2,864,151	2,806,124	97.97	2,475,825	86.44	88.23
1969	2,714,487	2,675,833	98.58	2,351,578	86.63	87.88
1970	2,807,817	2,754,898	98.12	2,418,439	86.13	87.79
1971	2,938,783	2,883,960	98.13	2,534,599	86.25	87.89
1972	2,903,491	2,846,613	98.04	2,531,343	87.18	88.92
1973	3,008,661	2,956,013	98.25	2,670,313	88.75	90.33
1974	3,133,038	3,072,327	98.06	2,777,221	88.64	90.39
1975	3,046,890	3,001,207	98.50	2,703,706	88.74	90.09
1976	2,831,443	2,783,630	98.31	2,515,265	88.83	90.36
1977	2,717,201	2,693,030	99.11	2,454,750	90.34	91.15
1978	2,714,988	2,671,798	98.41	2,440,701	89.90	91.35
1979	2,843,730	2,803,166	98.57	2,570,856	90.40	91.71
1980	2,817,121	2,769,495	98.31	2,519,695	89.44	90.98
1981	2,839,495	2,769,112	97.52	2,499,761	88.04	90.27
1982	2,565,475	2,515,637	98.06	2,248,235	87.63	89.37
1983	2,509,289	2,416,885	96.32	2,180,243	86.89	90.21
1984	2,687,114	2,647,285	98.52	2,386,328	88.81	90.14
1985	2,678,381	2,616,876	97.70	2,335,297	87.19	89.24
1986	2,692,789	2,576,012	95.66	2,336,583	86.77	90.71
1987	2,758,681	2,666,891	96.67	2,386,120	86.49	89.47
1988	2,943,868	2,885,053	98.00	2,544,203	86.42	88.19
1989	3,004,888	2,942,429	97.92	2,631,047	87.56	89.42
1990	3,050,008	2,974,647	97.53	2,680,912	87.90	90.12
1991	2,894,111	2,813,019	97.20	2,520,160	87.08	89.59
Avg.	2,833,799	2,774,689	97.91	2,467,040	87.06	88.91

Delivery Efficiency
Conveyance System



Annual Water Delivery

To Pilot Knob, Drop 1 & User Headgates



Historical Summary
Salinity of Colorado River

Below Drop 1 on All-American Canal

Year	I.I.D. Diversions (acre-feet) (a)	Salt Content (tons) (b)	Weighted Average (tons/ac-ft)	p.p.m. (c)
1958	2,730,876	2,723,153	1.00	735
1959	2,840,173	2,852,019	1.00	735
1960	2,983,860	3,162,485	1.06	779
1961	2,957,200	3,330,087	1.13	831
1962	2,951,266	3,399,464	1.15	845
1963	2,991,429	3,378,583	1.13	831
1964	2,770,474	3,284,284	1.19	875
1965	2,624,363	3,406,457	1.30	955
1966	2,817,912	3,650,447	1.30	955
1967	2,719,861	3,306,261	1.22	897
1968	2,806,124	3,408,548	1.21	889
1969	2,675,833	3,396,105	1.27	933
1970	2,754,898	3,488,023	1.27	933
1971	2,883,969	3,666,277	1.27	933
1972	2,846,613	3,541,248	1.24	911
1973	2,956,013	3,492,199	1.18	867
1974	3,072,327	3,669,832	1.19	875
1975	3,001,207	3,581,043	1.19	875
1976	2,783,630	3,263,454	1.17	860
1977	2,693,030	3,039,155	1.13	831
1978	2,671,798	2,897,906	1.08	797
1979	2,803,166	3,216,228	1.15	843
1980	2,769,495	3,058,785	1.10	812
1981	2,769,112	3,192,402	1.15	847
1982	2,515,637	2,918,781	1.16	853
1983	2,416,885	2,538,349	1.05	772
1984	2,647,285	2,654,712	1.00	737
1985	2,616,876	2,468,408	0.94	691
1986	2,576,012	1,821,898	0.71	522
1987	2,666,891	2,144,276	0.80	588
1988	2,885,053	2,591,698	0.90	662
1989	2,942,429	2,743,768	0.93	684
1990	2,974,647	2943,702	0.99	728
1991	2,813,019	2,637,852	0.94	691

(a) I.I.D. Diversion below Drop 1.

(b) Prior to 1973, weekly samples were taken at the All-American Canal Station 2963 at the East Highline Check. Beginning in 1973, weekly samples were taken at the All-American Canal below Drop 1.

(c) p.p.m. = 735 x T.A.F. (tons of salt per acre-foot of water).

HISTORICAL SUMMARY
SALT BALANCE IN THE IMPERIAL VALLEY
(Influent to Imperial Valley/Effluent to Salton Sea)
(Excludes Mexico's Contribution)

	Influent (a)				Effluent (b)					
Year	Discharge Below Drop 1 (A.F.)	Salt Imported (tons)	T.A.F.	p.p.m.	Discharge Below Drop 1 (A.F.)	Salt Imported (tons)	T.A.F.	p.p.m.	Difference (Imp-Exp) (tons)	Percent Change %
1958	2,730,876	2,723,153	1.00	733	974,045	3,341,376	3.43	2,521	618,223	22.70
1959	2,840,173	2,852,019	1.00	738	1,200,963	3,401,652	2.83	2,082	549,633	19.27
1960	2,983,860	3,162,485	1.06	779	1,059,804	3,558,534	3.36	2,468	396,049	12.52
1961	2,957,200	3,330,087	1.13	828	1,050,700	3,572,808	3.40	2,499	242,721	7.29
1962	2,951,266	3,399,464	1.15	847	1,088,965	3,806,946	3.50	2,570	407,482	11.99
1963	2,991,429	3,378,583	1.13	830	1,153,827	4,050,087	3.51	2,580	671,504	19.88
1964	2,770,474	3,284,284	1.19	871	905,153	3,635,121	4.02	2,952	350,837	10.68
1965	2,624,363	3,406,457	1.30	954	882,962	3,819,255	4.33	3,179	412,798	12.12
1966	2,817,912	3,650,447	1.30	952	1,004,685	4,148,874	4.13	3,035	498,427	13.65
1967	2,719,861	3,306,261	1.22	893	1,027,970	4,139,477	4.03	2,960	833,216	25.20
1968	2,806,124	3,408,548	1.21	893	1,001,027	4,012,009	4.01	2,946	603,461	17.70
1969	2,675,833	3,396,105	1.27	933	962,639	3,754,477	3.90	2,867	358,372	10.55
1970	2,754,898	3,488,023	1.27	931	1,020,503	3,780,732	3.70	2,723	292,709	8.39
1971	2,883,969	3,666,277	1.27	934	1,092,571	3,900,990	3.57	2,624	234,713	6.40
1972	2,846,613	3,541,248	1.24	914	1,063,537	3,886,592	3.65	2,686	345,344	9.75
1973	2,956,013	3,492,199	1.18	868	1,065,414	3,980,338	3.74	2,746	488,139	13.98
1974	3,072,327	3,669,832	1.19	878	1,123,492	4,204,158	3.74	2,750	534,326	14.56
1975	3,001,207	3,581,043	1.19	877	1,128,268	4,196,407	3.72	2,734	615,364	17.18
1976	2,783,630	3,263,454	1.17	862	1,084,993	4,361,658	4.02	2,955	1,098,204	33.65
1977	2,693,030	3,039,155	1.13	829	1,020,797	4,187,227	4.10	3,015	1,148,072	37.78
1978	2,671,798	2,897,906	1.08	797	995,674	3,824,323	3.84	2,823	926,417	31.97
1979	2,803,166	3,216,228	1.15	843	1,056,652	3,998,131	3.78	2,781	781,903	24.31
1980	2,769,495	3,058,785	1.10	812	1,043,241	3,988,611	3.82	2,810	929,826	30.40
1981	2,769,112	3,192,402	1.15	847	962,925	3,825,050	3.97	2,920	632,648	19.82
1982	2,515,637	2,918,781	1.16	853	888,575	3,608,490	4.06	2,985	689,709	23.63
1983	2,416,885	2,538,349	1.05	772	867,835	3,333,260	3.84	2,823	794,911	31.32
1984	2,647,285	2,654,712	1.00	737	895,034	3,360,256	3.75	2,759	705,544	26.58
1985	2,616,876	2,468,408	0.94	691	830,841	3,296,232	3.97	2,918	827,824	33.54
1986	2,576,012	1,821,898	0.71	522	833,937	2,837,518	3.40	2,499	1,015,620	55.75
1987	2,666,891	2,144,276	0.80	588	839,567	2,749,625	3.28	2,411	605,349	28.23
1988	2,885,053	2,591,608	0.90	662	919,126	2,854,307	3.11	2,283	262,699	10.14
1989	2,942,429	2,743,768	0.93	684	948,876	3,119,682	3.29	2,418	375,914	13.70
1990	2,974,647	2,943,702	0.99	728	1,004,483	3,328,850	3.35	2,433	385,148	13.08
1991	2,813,019	2,637,852	0.94	691	960,370	3,033,473	3.16	2,323	395,621	15.00

(a) Influent is sampled weekly at A.A.C. Below Drop 1.
(b) Effluent is sampled weekly on Alamo and New River at Salton Sea boundary.
Direct to Sea salt concentration is a weighted average of the Alamo and New River concentration at Salton Sea boundary. Value is corrected to exclude Mexico's contribution.
Note: Prior to 1973 weekly samples from A.A.C. at Station 2963 (East Highline Canal).
Prior to Jan.1, 1970 all salt concentrations were obtained by drying to 105 C.
Subsequent to Jan.1, 1970, salt concentrations were obtained by drying to 180 C.

VII. DRAINAGE SYSTEM

A. Annual Summary

1. Drainage Inflow to Salton Sea (Mexico and IID)

2. Salton Sea Weather Station Evaporation

B. Historical Summary

1. Water Drainage

a. Approximate Total Inflow to Salton Sea

2. Elevation of the Salton Sea

a. Salton Sea Water Surface Elevation at Fig Tree John Gage - Monthly

1. Graph - Monthly Salton Sea Elevation (1987-1991)

b. Salton Sea Water Surface Elevation at Fig Tree John Gage - Annual

1. Graph - Annual Salton Sea Elevation (1906-1991)

3. Salinity of the Salton Sea

Annual Summary
1991
Drainage Inflow To Salton Sea
(Mexico and Imperial Valley)

		1991 (A.F.)	1990 (A.F.)
Alamo River:			
Border from Mexico	(m)	1,951	1,993
Main Canal Operational Loss	(m):		
Vail Supply to Alamo Above N. End Dam		2,148	2,024
All-American Canal Alamo Spillway		0	0
Rositas Spillway at Rose Heading		0	0
*Imperial Valley Drainage Contribution	(c)	590,027	613,849
Alamo River Discharge to Salton Sea	(m)	594,126	617,866
New River:			
Border of Mexico	(m)	130,775	133,088
Main Canal Operational Loss	(m):		
No.4 Spillway		0	0
Vail Spillway at New River		714	492
All-American Canal New River Spillway		205	18
Dahlia Spillway		0	0
Dixie Spillway		70	19
*Imperial Valley Drainage Contribution	(c)	278,865	296,893
New River Discharge to Salton Sea	(m)	410,629	430,510
Direct to Salton Sea:			
Main Canal Operational Loss (m):			
East Highline @ "Z" Spillway		4,286	4,397
Storm Drain		380	229
*Imperial Valley Drainage Contribution (see note A for specific sites)	(m)	83,675	86,462
Direct Discharge to Salton Sea	(m)	88,341	91,088
Total Discharge to Salton Sea from Imperial Valley and Mexico			
Border from Mexico	(m)	132,726	135,081
Main Canal Operational Loss	(m)	7,483	7,179
*Imperial Valley Drainage Contribution	(c)	952,887	997,204
Mexico & Imperial Valley to Salton Sea	(m)	1,093,096	1,139,464

* Imperial Valley Drainage Contribution includes division operational discharge, tile discharge, tailwater, subsurface seepage, stormwater, city and industrial effluent and other miscellaneous discharge.

Annual Summary
1991
Drainage Inflow To Salton Sea
(continued)

Note A: **Imperial Valley Direct Discharge to the Salton Sea-Farm Drainage Contribution**

Calipatria Division Direct to Salton Sea:

Lateral P	Drain P	Drain Z
Lateral Q	Drain Q	Niland Drain 1
Lateral R	Drain R	Niland Drain 2
Vail Lateral 5	Vail Drain 5	Niland Drain 3
Vail Lateral 5A	Drain S	Niland Drain 4
Vail Lateral 4A	Drain T	Niland Drain 5
Vail Lateral 6	Drain U	Vail Cutoff Drain
Drain O	Drain W & Y	Below Meas. Station
Pumice Drain		

Westmorland Division Direct to Salton Sea:

Trifolium 10 Drain	Trifolium 1 Drain
Trifolium 11 Drain	Trifolium Extension 20 Drain
Trifolium 12 Drain	Trifolium Extension 22 Drain
Trifolium 12 Lateral	Trifolium Extension 23 Drain
Trifolium 13 Drain	Below Meas. Station

Annual Summary
1991
Salton Sea Weather Station
Pan Evaporation
(feet)

Month	1991 T.F. Evap	1991 D.H. Evap	1991 S.F. Evap	1991 *Avg. Evap	25-yr. Avg. Evap	Deviation From 25-Yr.Avg.
January	.302	.335	.285	.307	.282	.025
February	.465	.278	.185	.309	.330	-.021
March	.574	.433	.502	.503	.542	-.039
April	1.037	.593	.729	.786	.743	.043
May	1.171	.768	.868	.936	.941	-.005
June	1.226	.778	.939	.981	1.023	-.042
July	1.192	.805	1.055	1.017	1.049	-.032
August	1.248	.801	1.056	1.035	1.009	.026
September	.792	.637	.848	.759	.849	-.090
October	.769	.508	.743	.673	.645	.028
November	.503	.309	.473	.428	.421	.007
December	.288	.175	.284	.249	.302	-.053
Total	9.567	6.420	7.967	7.983	8.136	-.153

S.B. = Sandy Beach Weather Station, southwest shore of Salton Sea.
T.F. = Three Flags Weather Station, southwest shore of Salton Sea.
D.H. = Devil's Hole Weather Station, north shore of Salton Sea.
S.F. = Salt Farm Weather Station, southeast shore of Salton Sea.

*Avg. = Average evaporation for three stations.

The Three Flags Station replaced the Sandy Beach Weather Station during June 1990. Three Flags is located two miles south of the abandoned Sandy Beach Station.

25-year average evaporation based on period 1966-1991.

Historical Summary

Approximate Total Inflow to Salton Sea

Year	Imperial Valley Contribution(a) (A.F.)	%	Mexico(b) Contribution (A.F.)	%	Coachella(c) Contribution (A.F.)	%	Approx. Total Inflow (A.F.)
1975	1,128,268	80.5	101,359	7.2	172,400	12.3	1,402,027
1976	1,084,993	78.7	103,959	7.5	189,820	13.8	1,378,772
1977	1,020,797	79.0	109,132	8.4	162,666	12.6	1,292,595
1978	995,674	80.0	99,704	8.0	149,788	12.0	1,245,166
1979	1,056,652	77.5	146,321	10.7	161,070	11.8	1,364,043
1980	1,043,241	74.9	157,975	11.3	192,400	13.8	1,393,616
1981	962,925	69.9	157,717	11.5	256,660	18.6	1,377,302
1982	888,575	68.5	159,099	12.3	250,190	19.3	1,297,864
1983	867,835	63.4	244,515	17.9	256,590	18.7	1,368,940
1984	895,034	64.6	269,735	19.5	219,850	15.9	1,384,619
1985	830,841	68.3	262,105	21.5	123,855	10.2	1,216,801
1986	833,937	68.2	266,757	21.8	122,959	10.0	1,223,653
1987	851,694	69.7	252,920	20.7	117,032	9.6	1,221,646
1988	918,726	72.6	228,954	18.1	117,118	9.3	1,264,798
1989	965,879	78.4	155,322	12.6	110,816	9.0	1,232,017
1990	1,004,383	80.4	135,081	10.8	109,613	8.8	1,249,077
1991	960,370	80.2	132,726	11.1	103,866	8.7	1,196,962
TOTAL	**16,309,824**	**73.8**	**2,983,381**	**13.5**	**2,816,693**	**12.7**	**22,109,898**
MEAN	**959,401**		**175,493**		**165,688**		**1,300,582**

(a) **Imperial Valley Contribution** is total inflow from the New River and Alamo River metered weekly at Salton Sea boundary **minus** inflow from the New River and Alamo River metered weekly at Mexican border **plus** Imperial Valley direct discharge to Salton Sea, which reflects contributions from agricultural operation and drainage, stormwater, city and industrial effluent.

(b) **Mexico Contribution** is the total inflow from the New River and Alamo River metered weekly at the Mexican border.

(c) **Coachella Contribution** is the total inflow from Coachella's Whitewater River drainage channel.

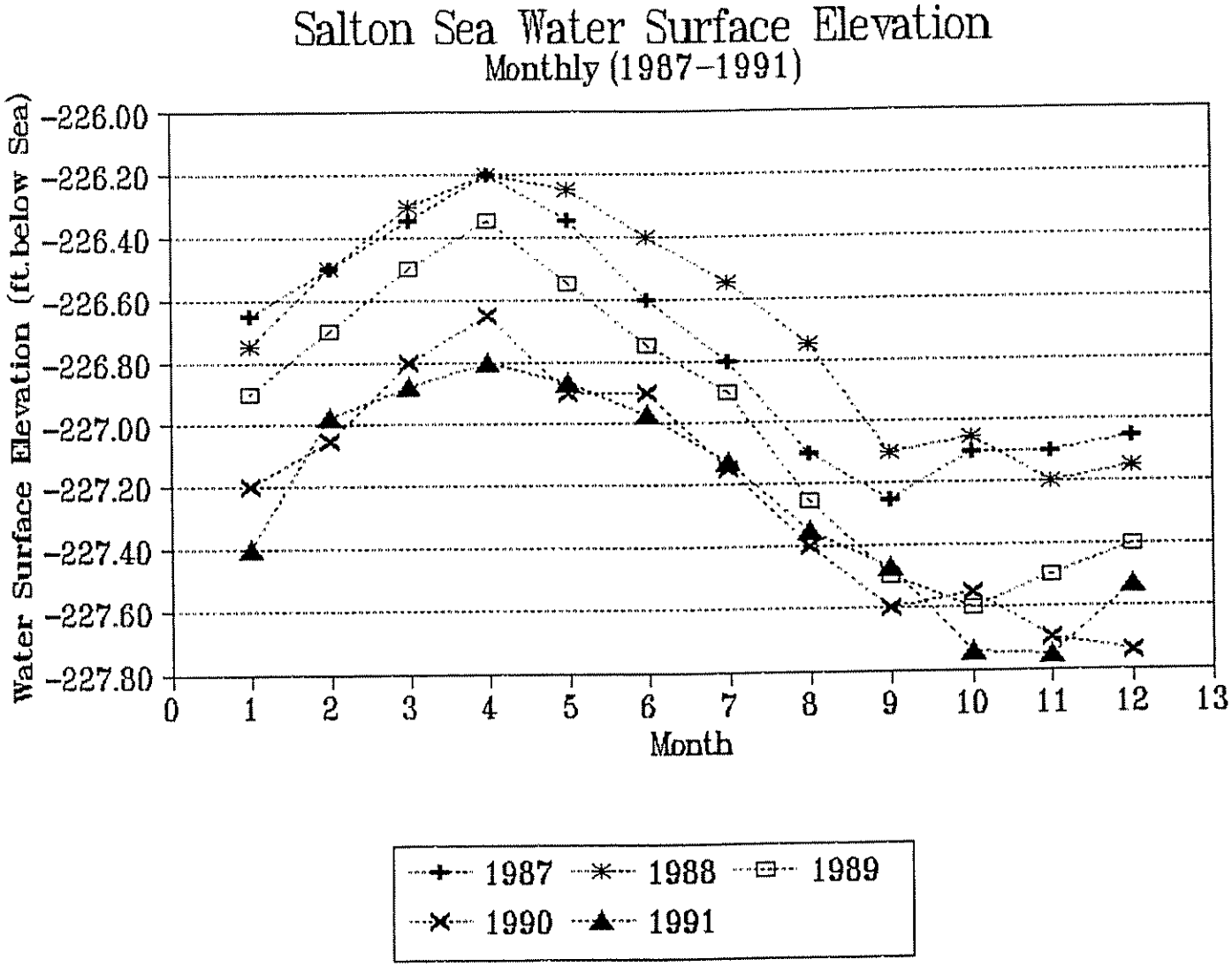
Historical Summary
Salton Sea Water Surface Elevation
Monthly

(elevation in feet below Sea level)

Month	1987 (ft)	1988 (ft)	1989 (ft)	1990 (ft)	1991 (ft)
January	226.65	226.75	226.90	227.20	227.40
February	226.50	226.50	226.70	227.05	226.98
March	226.35	226.30	226.50	226.80	226.88
April	226.20	226.20	226.35	226.65	226.80
May	226.35	226.25	226.55	226.90	226.87
June	226.60	226.40	226.75	226.90	226.97
July	226.80	226.55	226.90	227.15	227.13
August	227.10	226.75	227.25	227.40	227.35
September	227.25	227.10	227.50	227.60	227.47
October	227.10	227.05	227.60	227.55	227.74
November	227.10	227.20	227.50	227.70	227.75
December	227.05	227.15	227.40	227.74	227.53

Note: Elevation for each month is the closest 24 hour adjusted reading value to the end of the month. Beginning with December 1990, readings are from a Remote Terminal unit which replaced the Stevens Recorder.

Source: Fig Tree John Gage


Salton Sea Water Surface Elevation
Monthly (1987-1991)
Water Surface Elevation (ft. below Sea)
-226.00
-226.20
-226.40
-226.60
-226.80
-227.00
-227.20
-227.40
-227.60
-227.80
0
1
2
3
4
5
6
7
8
9
10
11
12
13
Month
1987
1988
1989
1990
1991

Historical Summary
Salton Sea Water Surface Elevation
Annual

(elevation in feet below Sea level)

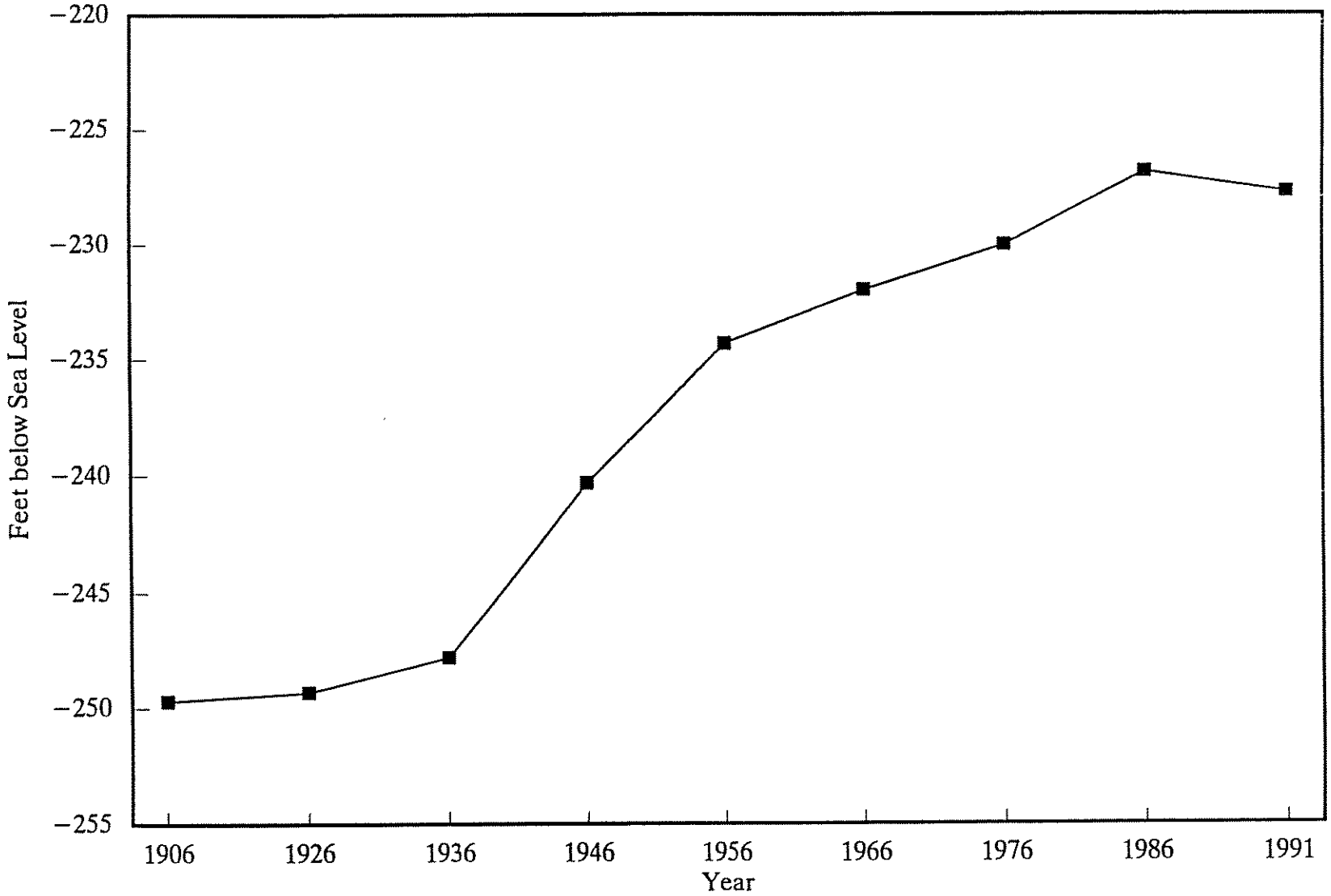
Year	Elevation End of Year	Year	Elevation End of Year
1938	244.70	1965	232.00
1939	242.20	1966	231.95
		1967	231.75
1940	242.50	1968	231.80
1941	241.00	1969	231.95
1942	241.30		
1943	241.05	1970	231.90
1944	240.80	1971	231.65
		1972	231.30
1945	240.35	1973	231.15
1946	240.45	1974	230.65
1947	240.45		
1948	240.75	1975	230.05
1949	240.20	1976	228.60
		1977	228.25
1950	239.60	1978	228.20
1951	238.30	1979	227.75
1952	236.60		
1953	235.75	1980	227.25
1954	234.75	1981	227.40
		1982	227.55
1955	234.35	1983	226.65
1956	234.50	1984	226.70
1957	234.45		
1958	234.60	1985	226.85
1959	234.30	1986	226.80
		1987	227.10
1960	233.75	1988	227.15
1961	233.35	1989	227.40
1962	232.65		
1963	231.20	1990	227.74
1964	231.85	1991	227.53

Note: During January 1991, the Steven's Recorder and Easy Logger were removed and replaced with a Remote Terminal Unit (RTU). End of year elevations beginning with 1990 are from RTU measurements.

Source: Fig Tree John Gage

Salton Sea Elevation (1906–1991)

Historical Annual Graph



– –January Readings

Historical Summary
Salinity of the Salton Sea

Year	Total Dissolved Solids (a) p.p.m.	T.A.F. (b)
1964	36,727	49.95
1965	36,835	50.10
1966	36,339	49.42
1967	38,120	51.84
1968	38,540	52.41
1969	40,009	54.41
1970	38,583	52.47
1971	39,150	53.24
1972	39,013	53.06
1973	39,186	53.29
1974	39,183	53.29
1975	38,973	53.00
1976	38,528	52.40
1977	38,461	52.31
1978	38,141	51.87
1979	38,423	52.26
1980	37,616	51.16
1981	38,451	52.29
1982	39,897	54.26
1983	39,479	53.69
1984	40,335	54.86
1985	40,021	54.43
1986	40,792	55.48
1987	40,516	55.10
1988	42,654	58.01
1989	42,327	57.56
1990	43,582	59.27
1991	42,151	57.33

(a) Annual T.D.S. value is an average of surface samples taken in May and November at Bertram Station, Desert Beach, Sandy Beach and Salton Sea Beach.

(b) T.A.F. (tons per acre-foot) = 0.00136 x p.p.m.

Note: Prior to January 1, 1970, samples were dried at 105 C. Subsequent to January 1, 1970 samples were dried at 180 C.

VIII. WEATHER STATION DATA

A. Location of Weather Stations within Imperial Irrigation District Area

B. Annual Summary - Valley Weather Stations

1. 1991 Monthly Rainfall

2. 1991 Monthly Evaporation

3. 1991 Monthly Mean Maximum Temperature

C. Historical Summary

1. Valley Weather Stations

a. Annual Rainfall (1975-1991)

b. Annual Evaporation (1975-1991)

c. Annual Mean Maximum Temperature (1975-1991)

2. Imperial Weather Station

a. Monthly Rainfall (1914-1991)

b. Monthly Maximum, Minimum and Mean Temperature (1914-1991)

IMPERIAL IRRIGATION DISTRICT

LOCATION OF WEATHER STATIONS

Imperial County

Calipatria (IID)
City of Calipatria in IID Yard
S.E. 1/4 of S.E. 1/4, Section 16, 12-14
(Elev. -175)
Latitude 33°07'15" North, Longitude 115°20'30" West

Brawley (U.S.D.A.)
Approximately two miles southwest of Brawley (Research Center)
N.E. 1/4 of N.E. 1/4, Section 7, 14-14 (Elev. -100)
Latitude 32°57'30" North, Longitude 115°33'30" West

Imperial (U.S.W.B.)
City of Imperial at IID Headquarters
S.E. 1/4 of N.W. 1/4, Section 18, 15-14 (Elev. -64)
Latitude 32°51' North, Longitude 115°34' West

El Centro (IID)
Approximately seven miles south-southwest of El Centro at junction of Kubler and Farrell Roads
Near northeast corner of Section 12, 17-13,
(Elev. -10)
Latitude 32°41'45" North, Longitude 115°35'35" West

Holtville (IID)
Approximately six miles southeast of Holtville
N.W. 1/4 of N.E. 1/4, Section 20, 16-16 (Elev. +17)
Latitude 32°45' North, Longitude 115°20'30" West

Three Flags (IID) *replaced Sandy Beach Station in 1990. Approximately two miles south of abandoned Sandy Beach Station
Southwest shores of the Salton Sea
S.E. 1/4 of S.W. 1/2, Section 33, 11-11

Salt Farm (IID)
Approximately 0.25 miles east of Niland Marina
Southeast shores of the Salton Sea
N.W. 1/4 of N.W. 1/4, Section 6, 10-13
Latitude 33°20'18" North, Longitude 115°39'36" West

Riverside County

Devils Hole (IID)
Approximately 0.50 miles south of Highway 111
North shores of the Salton Sea
N.E. 1/4 of N.E. 1/4, Section 31, 7-10
Latitude 33°31'29" North, Longitude 116°58'24" West

Annual Summary
1991
Monthly Rainfall
Imperial Valley Stations
(inches)

Month	Calipatria	Brawley	El Centro	Holtville	Three Flags	Devil's Hole	Salt Farm	Imperial
January	0.81	0.72	0.44	0.53	0.50	0.55	0.53	0.54
February	0.52	0.86	0.41	0.52	0.65	1.20	0.48	0.62
March	1.15	0.89	0.55	0.55	0.55	0.59	1.06	0.72
April	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
June	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
July	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47
August	0.03	0.56	0.32	0.03	0.00	0.00	0.00	Trace
September	0.20	0.70	0.19	0.27	0.57	0.57	0.30	0.59
October	0.02	0.01	0.02	Trace	0.00	0.00	0.00	0.02
November	0.00	0.02	0.11	0.13	0.00	0.00	0.00	0.35
December	0.94	1.42	1.34	1.66	0.79	0.17	0.58	1.26
Total	3.67	5.18	3.38	3.69	3.06	3.08	2.95	4.57
Annual Mean	3.66	3.81	3.54	3.34	3.76	3.43	3.14	3.37

Three Flags replaced Sandy Beach weather station in June 1990 and is located two miles south of the abandoned Sandy Beach site.

Annual Mean is based on period 1975-1991.

Annual Summary
1991
Monthly Evaporation
Imperial Valley Stations
(inches)

Month	Calipatria	Brawley	El Centro	Holtville	Three Flags	Devil's Hole	Salt Farm	Imperial	Valley Stations Monthly Average 1991	Valley Stations Monthly Average Long-term
January	2.87	3.62	2.76	2.25	3.62	4.02	3.42	3.01	3.20	3.32
February	4.29	5.68	4.26	3.41	5.58	3.33	2.22	4.63	4.18	4.18
March	5.80	7.67	5.75	4.81	6.89	5.20	6.02	6.26	6.05	6.86
April	8.89	11.86	8.69	7.81	12.44	7.12	8.75	10.38	9.49	9.13
May	11.10	14.65	11.21	8.85	14.05	9.22	10.42	13.21	11.59	11.66
June	12.58	14.10	11.45	9.94	14.71	9.34	11.27	13.30	12.09	13.16
July	12.46	13.59	9.86	9.85	14.30	9.66	12.66	12.12	11.81	13.19
August	11.84	14.22	9.86	9.73	14.98	9.61	12.67	11.72	11.83	12.32
September	9.92	11.41	8.62	8.28	9.50	7.64	10.18	9.11	9.33	10.10
October	8.25	9.76	6.89	6.25	9.23	6.09	8.92	8.06	7.93	7.48
November	4.54	5.59	4.28	3.73	6.03	3.71	5.68	4.65	4.78	4.76
December	2.15	2.95	2.22	2.26	3.45	2.10	3.41	2.37	2.61	3.19
Total (inches)	94.69	115.10	85.85	77.17	114.78	77.04	95.62	98.82	94.88	99.36
Annual Mean	99.15	114.84	93.10	80.58	113.98	90.63	98.22	104.13		

Annual Mean is based on period 1975-1991.

Three Flags replaced Sandy Beach weather station in June 1990 and is located two miles south of the abandoned Sandy Beach site.

Annual Summary
1991
Monthly Mean Maximum Temperature
Imperial Valley Station
(degrees Fahrenheit)

Month	Calipatria	Brawley	El Centro	Holtville	Three Flags	Devil's Hole	Salt Farm	Imperial	Valley Stations Monthly Average 1991	Valley Stations Monthly Average Long-term
January	68.0	68.2	67.7	67.7	62.6	64.1	65.5	68.4	66.5	68.0
February	79.5	79.9	79.5	80.3	74.4	73.9	74.5	79.7	77.7	72.8
March	72.3	72.2	71.7	72.3	67.3	69.9	68.4	72.3	70.8	76.8
April	84.9	85.1	85.1	83.9	79.8	77.9	81.1	85.1	82.9	84.1
May	91.7	91.1	90.8	89.9	88.1	86.6	86.8	90.8	89.5	91.2
June	98.5	98.2	98.4	97.1	94.5	90.9	95.1	97.3	96.3	101.9
July	105.3	104.9	103.5	103.0	96.5	97.7	100.3	103.5	101.8	105.2
August	105.3	104.2	104.6	103.8	96.9	97.1	102.0	104.7	102.3	103.3
September	102.8	101.0	101.3	99.8	97.1	96.9	97.5	100.9	99.7	99.2
October	96.6	95.2	95.5	93.7	92.9	92.5	90.9	95.4	94.1	90.0
November	80.6	78.6	79.1	75.6	77.5	74.7	74.7	78.8	77.5	77.4
December	67.9	66.0	67.8	64.3	62.4	63.2	65.2	67.5	65.5	68.2
Annual Mean	87.8	87.1	87.1	86.0	82.5	82.1	83.5	87.0	85.4	86.5

Three Flags replaced Sandy Beach weather station beginning June 1991 and is located two miles south of abandoned Sandy Beach site.

Note: Long term averge is based on years 1975-1991.

Historical Summary
Annual Rainfall
Imperial Valley Station
(inches)

Year	Calipatria	Brawley	El Centro	Holtville	Three Flags	Devil's Hole	Salt Farm	Imperial	Valley-wide Annual Mean
1975	1.16	1.41	1.14	1.85	1.04	0.80	0.41	1.19	1.13
1976	7.11	7.16	4.38	5.39	7.91	8.17	5.76	5.08	6.37
1977	4.33	6.12	5.74	4.49	4.98	2.59	7.66	5.21	5.14
1978	5.04	4.66	3.81	4.44	6.57	5.58	6.56	4.37	5.13
1979	3.14	3.50	3.32	5.68	3.08	4.71	3.23	2.35	3.63
1980	4.97	4.91	4.45	4.43	4.44	4.81	4.01	4.35	4.55
1981	2.84	2.70	2.28	2.29	3.42	2.35	1.33	2.52	2.47
1982	4.22	3.55	6.03	4.64	4.70	2.92	1.88	4.84	4.10
1983	6.48	7.51	6.50	4.26	6.42	8.60	9.29	5.72	6.85
1984	4.14	3.22	4.78	3.33	3.30	2.13	2.64	3.43	3.37
1985	3.17	3.07	3.35	2.73	2.57	2.59	1.88	3.74	2.89
1986	4.66	3.65	3.70	1.84	4.97	2.96	1.74	3.73	3.41
1987	2.77	2.38	2.39	3.06	2.88	3.33	-	2.58	2.77
1988	1.72	1.69	2.02	1.72	0.88	2.00	1.88	1.32	1.65
1989	1.17	0.88	1.13	1.26	0.80	1.04	1.15	0.75	1.02
1990	1.64	3.16	1.70	1.61	2.92	0.63	1.09	1.46	1.78
1991	3.67	5.18	3.38	3.69	3.06	3.08	2.95	4.57	3.70
Historical Mean	**3.66**	**3.81**	**3.54**	**3.34**	**3.76**	**3.43**	**3.14**	**3.37**	**3.51**

Rainfall records for Brawley began in 1958; records for Imperial began in 1914; records for Salt Farm and Devil's Hole began in 1947; and records for Three Flags began in 1990.

Three Flags replaced Sandy Beach weather station in June 1990 and is located two miles south of the abandoned Sandy Beach site.

Historical Summary
Annual Evaporation
Imperial Valley Station
(inches)

Year	Calipatria	Brawley	El Centro	Holtville	Three Flags	Devil's Hole	Salt Farm	Imperial	Valley-wide Annual Mean
1975	106.8	117.2	97.2	86.7	124.3	86.6	88.2	113.3	102.5
1976	103.6	107.4	93.1	80.4	112.8	88.1	92.7	107.0	98.1
1977	104.5	108.6	98.4	79.3	119.7	100.4	99.8	111.1	102.7
1978	102.0	119.3	96.3	86.9	129.7	111.8	112.2	106.1	108.0
1979	96.3	110.0	96.8	85.4	127.6	106.2	105.3	101.3	103.6
1980	98.2	110.7	96.5	83.6	118.2	96.3	98.2	103.8	100.7
1981	100.8	114.9	99.6	81.5	112.9	80.9	103.3	103.8	99.7
1982	95.7	111.3	87.2	76.8	110.9	92.3	99.4	100.6	96.8
1983	98.3	113.3	86.1	77.0	105.0	85.3	91.8	99.0	94.5
1984	98.8	113.4	84.8	77.2	104.1	89.7	93.4	99.9	95.1
1985	96.6	118.0	90.2	82.0	107.1	79.0	91.7	102.2	95.8
1986	93.7	114.5	99.8	80.8	94.4	81.9	87.7	103.5	94.5
1987	95.8	116.1	91.1	80.2	106.5	82.3	98.6	106.1	97.1
1988	98.4	119.5	96.6	81.9	119.3	81.6	95.7	105.0	99.8
1989	102.3	120.9	93.5	77.1	110.3	100.4	106.8	107.5	102.4
1990	99.0	122.2	90.2	76.0	120.1	101.2	109.2	101.1	102.4
1991	94.7	115.1	85.9	77.2	114.8	77.0	95.6	98.8	94.9
Historical Mean	99.2	114.8	93.1	80.6	114.0	90.6	98.2	104.3	99.3
	(ft) 8.3	9.6	7.8	6.7	9.5	7.6	8.2	8.7	8.3

Pan evaporation records for Brawley began in 1958.
Pan evaporation records for Sandy Beach, Salt Farm and Devil's Hole began in 1947.

Three Flags replaced Sandy Beach weather station in June 1990 and is located two miles south of the abandoned Sandy Beach site.

Historical Summary
Annual Mean Maximum Temperature
Imperial Valley Station
(degrees Fahrenheit)

Year	Calipatria	Brawley	El Centro	Holtville	Sandy Beach * Three Flags	Devil's Hole	Salt Farm	Imperial
1975	84.7	86.4	86.5	85.7	83.2	82.8	84.1	86.7
1976	88.4	86.6	87.1	86.6	84.4	83.4	83.8	87.3
1977	89.1	88.3	88.3	87.3	85.1	85.5	86.9	88.2
1978	88.2	87.8	88.5	87.4	85.4	84.4	86.1	87.7
1979	88.2	87.7	88.5	88.0	84.5	83.9	85.8	87.5
1980	89.4	89.1	89.5	89.4	86.5	85.2	87.3	88.6
1981	90.0	90.4	90.3	89.5	86.6	85.3	87.9	89.5
1982	86.8	87.2	85.8	86.6	84.3	83.2	85.4	86.3
1983	87.4	88.3	86.8	88.0	84.7	84.9	86.0	87.0
1984	88.2	89.6	87.7	88.1	86.2	85.6	86.9	87.7
1985	88.0	89.0	87.1	87.1	84.6	85.9	86.2	87.0
1986	89.3	89.7	89.2	89.2	86.7	85.8	87.4	89.3
1987	89.0	88.0	87.0	87.3	84.5	82.5	83.0	88.1
1988	89.9	89.2	88.1	88.7	84.8	84.8	81.3	88.6
1989	90.2	90.3	89.0	88.7	89.1	85.4	81.9	89.1
1990	88.5	88.5	87.8	87.4	* 88.5	82.9	84.1	87.3
1991	87.8	87.1	87.1	86.0	82.5	82.1	83.5	87.0
Historical Mean	**88.4**	**88.4**	**87.9**	**87.7**	**85.4**	**84.3**	**85.2**	**87.8**

* Three Flags Weather Station replaced Sandy Beach beginning in June 1990 and is located 2 miles south of the abandoned Sandy Beach site.

Temperature records for Brawley began in 1958.
Temperature records for Sandy Beach, Salt Farm and Devil's Hole began in 1947.

Historical Summary
Monthly Rainfall
Imperial Weather Station

(1914-1991)
(inches)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.		TOTAL	WET YRS
1914	0.06	0.62	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.25	0.90	0.93	*	2.83	
1915	2.30	0.02	0.10	0.28	0.00	0.00	0.00	0.60	0.02	0.00	0.00	0.00	*	3.32	+
1916	1.09	0.00	1.41	0.25	0.00	0.00	0.00	1.25	0.40	0.00	0.00	0.40	*	4.80	+
1917	1.32	0.00	0.00	0.10	0.00	0.00	0.20	0.00	0.02	0.00	0.00	0.00	*	1.64	
1918	0.63	0.06	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.35	*	1.85	
1919	0.08	0.40	0.26	0.00	0.02	0.00	0.08	0.00	0.89	0.28	0.84	0.00	*	2.85	
1920	0.88	1.52	0.06	0.00	0.00	0.00	0.00	1.05	1.30	0.10	0.00	0.00	*	4.91	+
1921	0.47	0.00	0.03	0.00	0.12	0.00	0.06	2.84	0.85	0.00	0.00	1.66	*	6.03	+
1922	0.68	0.75	0.00	0.00	0.00	0.00	0.78	0.00	0.11	0.00	0.22	0.03	*	2.57	
1923	0.09	0.10	0.40	0.20	0.00	0.00	0.02	0.02	0.59	0.02	1.29	0.78	*	3.51	+
1924	0.00	0.00	0.17	0.00	0.14	0.00	0.00	0.00	0.02	0.00	0.00	0.33	*	0.66	
1925	0.00	0.03	0.24	0.09	0.00	0.00	0.00	0.16	0.00	1.62	0.30	0.50	*	2.94	+
1926	0.17	0.00	0.02	1.11	0.00	0.00	0.00	0.05	1.30	0.00	0.00	3.87	*	6.52	+
1927	0.12	0.64	0.11	0.02	0.00	0.00	0.00	0.00	0.00	0.89	0.00	2.92	*	4.70	+
1928	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	*	0.28	
1929	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.26	1.23	0.00	0.00	0.00	*	1.64	
1930	0.35	0.00	0.38	0.03	0.41	0.00	0.00	0.00	0.73	0.00	0.00	0.00	*	1.90	
1931	0.06	1.90	0.00	0.93	0.00	0.00	0.05	0.51	0.57	0.10	0.33	0.30	*	4.75	+
1932	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.86	0.00	0.62	*	4.62	+
1933	0.47	0.00	0.00	0.79	0.02	0.00	0.10	0.63	0.01	0.30	0.06	0.00	*	2.38	
1934	0.01	0.18	0.08	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.01	0.25	*	0.62	
1935	0.62	2.12	0.12	0.00	0.00	0.00	0.12	1.14	0.50	0.00	0.00	0.70	*	5.32	+
1936	0.25	0.57	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.10	0.21	0.21	*	1.59	
1937	0.19	0.10	0.61	0.00	0.00	0.00	0.35	0.00	0.15	0.00	0.00	0.09	*	1.49	
1938	0.00	1.19	0.59	0.00	0.00	0.00	0.47	0.23	0.00	0.00	0.00	1.36	*	3.84	+
1939	0.73	0.45	0.00	0.00	0.00	0.00	0.00	0.00	7.06	0.00	0.28	0.00	*	8.52	+
1940	0.05	0.77	0.01	0.01	0.00	0.00	0.00	0.00	1.73	0.07	0.05	2.38	*	5.07	+
1941	0.85	0.30	1.10	0.46	0.01	0.00	0.06	1.08	0.28	1.04	0.10	1.34	*	6.62	+
1942	0.13	0.74	0.55	0.41	0.00	0.00	0.00	0.65	0.00	0.01	0.00	0.00	*	2.49	
1943	0.44	0.04	0.24	0.00	0.00	0.00	0.00	0.90	0.38	0.00	0.00	2.46	*	4.46	+
1944	0.01	1.31	0.13	0.05	0.00	0.00	0.00	0.00	0.00	0.04	0.90	1.15	*	3.59	+
1945	0.57	0.07	0.03	0.03	0.00	0.00	0.00	1.44	0.00	0.00	0.00	0.67	*	2.81	
1946	0.01	0.00	0.00	0.00	0.00	0.00	0.01	2.16	0.05	0.21	0.14	0.57	*	3.15	+
1947	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.06	0.08	0.03	0.10	0.14	*	0.49	
1948	0.00	0.15	0.04	0.00	0.00	0.04	0.00	0.00	0.00	0.81	0.00	0.29	*	1.33	
1949	1.77	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.04	0.20	0.03	0.19	*	2.29	
1950	0.00	0.19	0.00	0.00	0.00	0.00	0.17	0.00	0.06	0.00	0.00	0.03	*	0.45	
1951	0.38	0.01	0.01	0.13	0.00	0.00	0.18	1.79	0.00	0.00	0.26	0.36	*	3.12	+
1952	0.63	0.05	0.40	0.42	0.00	0.00	0.03	0.28	0.00	0.00	0.64	0.19	*	2.64	
1953	0.00	0.02	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	0.20	
1954	0.53	0.00	0.18	0.00	0.00	0.00	0.06	0.00	0.03	0.00	0.00	0.03	*	0.83	
1955	1.60	0.00	0.06	0.00	0.00	0.00	0.29	0.53	0.00	0.00	0.00	0.05	*	2.53	
1956	0.13	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	*	0.16	
1957	0.63	0.04	0.07	0.03	0.00	0.00	0.00	0.45	0.00	2.04	0.02	0.07	*	3.35	+
1958	0.08	1.24	0.64	0.61	0.13	0.00	0.00	0.00	0.00	0.00	0.01	0.00	*	2.71	
1959	0.15	0.23	0.00	0.00	0.00	0.00	0.02	0.02	0.11	0.40	0.01	1.03	*	1.97	
1960	0.50	0.15	0.30	0.00	0.01	0.00	0.03	0.01	0.53	0.00	0.14	0.07	*	1.74	
1961	0.20	0.00	0.00	0.00	0.00	0.00	0.04	0.75	0.00	0.00	0.05	0.83	*	1.87	
1962	0.77	0.23	0.05	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.78	*	1.85	
1963	0.06	0.14	0.18	0.00	0.00	0.00	0.00	0.30	1.06	0.23	0.46	0.00	*	2.43	
1964	0.01	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.29	0.01	*	0.93	

Historical Summary
Monthly Rainfall
Imperial Weather Station

(1914-1991)
(inches)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.		TOTAL	WET YRS
													*		
1965	0.04	0.22	0.10	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.24	1.89	*	3.21	+
1966	0.32	0.10	0.18	0.00	0.00	0.00	0.00	0.00	0.47	0.48	0.06	0.00	*	1.61	
1967	0.34	0.00	0.12	0.00	0.00	0.00	0.00	0.21	1.31	0.00	1.50	0.77	*	4.25	+
1968	0.00	0.06	0.58	0.00	0.00	0.00	1.31	0.00	0.00	0.00	0.00	0.04	*	1.99	
1969	0.92	0.08	0.02	0.00	0.00	0.00	0.00	0.01	0.82	0.02	1.51	0.12	*	3.50	+
													*		
1970	0.00	0.69	0.83	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.02	0.09	*	1.68	
1971	0.10	0.01	0.00	0.13	0.00	0.00	0.00	0.32	0.44	0.18	0.00	0.11	*	1.29	
1972	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.71	0.45	0.00	*	2.16	
1973	0.03	0.58	0.31	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.09	0.00	*	1.28	
1974	1.11	0.00	0.18	0.00	0.00	0.00	0.04	0.00	0.09	0.12	0.00	0.44	*	1.98	
													*		
1975	0.07	0.00	0.16	0.47	0.00	0.00	0.20	0.00	0.17	0.00	0.00	0.12	*	1.19	
1976	0.00	0.84	0.00	0.36	0.02	0.00	0.29	0.00	2.84	0.00	0.58	0.15	*	5.08	+
1977	0.05	0.02	0.04	0.00	0.00	0.00	0.01	3.87	0.00	0.29	0.00	0.93	*	5.21	+
1978	1.15	0.46	0.39	0.09	0.00	0.00	0.47	0.00	0.00	0.65	0.57	0.59	*	4.37	+
1979	1.09	0.09	0.60	0.00	0.09	0.00	0.07	0.40	0.01	0.00	0.00	0.00	*	2.35	
													*		
1980	1.59	1.41	1.06	0.23	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	*	4.35	+
1981	0.88	0.36	0.60	0.00	0.05	0.00	0.00	0.36	0.00	0.00	0.27	0.00	*	2.52	
1982	0.31	0.09	0.82	0.00	0.00	0.00	0.00	0.49	0.63	0.00	0.10	2.40	*	4.84	+
1983	0.23	1.25	1.64	0.00	0.00	0.00	0.00	1.21	0.79	0.00	0.00	0.60	*	5.72	+
1984	0.20	0.00	0.00	0.00	0.00	0.00	0.76	0.81	0.03	0.00	0.20	1.43	*	3.43	+
													*		
1985	0.03	0.12	0.00	0.00	0.00	0.00	0.02	0.15	1.40	0.36	0.90	0.76	*	3.74	+
1986	0.14	0.50	0.12	0.00	0.00	0.00	0.06	0.05	0.04	2.59	0.19	0.04	*	3.73	+
1987	0.05	0.22	0.00	0.00	0.00	0.00	0.00	0.14	0.01	1.12	0.72	0.32	*	2.58	
1988	0.11	0.90	0.00	0.07	0.00	0.01	0.04	0.12	0.00	0.00	0.07	0.00	*	1.32	
1989	0.65	0.00	0.01	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	*	0.75	
													*		
1990	0.14	0.02	0.06	0.05	0.00	0.00	0.00	0.89	0.09	0.21	0.00	0.00	*	1.46	
1991	0.54	0.62	0.72	0.00	0.00	0.00	0.47	0.00	0.59	0.02	0.35	1.26		4.57	+
													*		
													*		
78 YR. AVG.	0.38	0.33	0.23	0.10	0.01	0.00	0.09	0.36	0.37	0.25	0.19	0.50	*	2.82	
PERCENT ANNUAL AVG.	13.2	11.7	7.9	3.5	0.5	0.0	3.1	12.5	13.0	8.5	6.8	17.4			

(+) Wetter than 78-year annual average.

IMPERIAL IRRIGATION DISTRICT

MAXIMUM, MINIMUM AND MEAN TEMPERATURES BY MONTHS FOR YEARS 1914-1991, INCLUSIVE

Year	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE			JULY		
	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean
1914					No records for these months								100	51	75.4	112	58	84.4	110	70	89.8
1915	73	30	53.5	79	40	59.2	92	41	63.4	96	48	69.0	103	41	73.3	109	57	85.1	110	62	88.9
1916	75	25	52.3	88	29	61.8	100	42	67.8	100	44	71.8	105	50	75.9	116	55	85.4	111	62	89.9
1917	76	30	50.4	82	32	57.4	93	32	58.8	98	41	66.7	99	48	71.0	117	56	85.5	113	70	91.3
1918	85	26	53.7	88	28	57.1	95	40	64.7	96	44	69.5	98	50	73.0	113	59	88.7	110	59	89.6
1919	82	24	51.6	82	32	56.1	89	35	60.4	100	48	71.8	101	55	77.0	114	57	85.4	111	73	90.7
1920	81	33	55.6	82	41	60.5	85	38	61.1	96	44	68.0	106	41	76.2	108	58	82.8	115	63	91.3
1921	79	28	52.2	93	32	54.2	93	41	66.3	102	40	66.9	104	46	72.5	110	57	84.2	111	63	91.0
1922	75	23	49.5	90	28	55.7	89	32	58.8	96	40	65.1	106	46	77.1	114	62	86.5	111	69	90.3
1923	85	28	56.1	87	30	56.7	89	34	60.4	95	42	67.8	107	52	78.1	114	54	79.5	113	67	88.6
1924	81	27	53.6	91	37	64.2	92	38	66.0	95	39	70.4	107	53	79.8	113	60	88.9	111	65	89.8
1925	82	27	52.6	85	35	61.2	94	39	64.4	100	44	70.7	103	54	78.6	114	55	84.3	115	64	90.6
1926	85	29	53.9	88	33	61.5	91	42	66.9	105	50	73.0	104	55	78.6	113	62	86.9	112	62	90.3
1927	76	32	55.3	87	34	59.6	92	38	62.2	102	41	70.8	110	53	78.7	111	54	84.0	114	68	91.7
1928	86	29	56.2	84	33	57.6	91	42	66.0	96	39	69.6	105	53	77.9	112	57	85.2	114	62	90.3
1929	79	25	50.7	88	24	55.0	95	36	61.9	98	36	66.0	102	49	77.7	117	54	83.9	111	69	90.7
1930	77	28	52.7	89	34	61.0	92	34	62.4	99	45	71.9	104	43	71.7	112	57	83.4	112	68	90.2
1931	85	29	54.8	76	38	58.5	95	37	64.5	97	51	72.5	108	55	80.0	111	58	84.7	116	75	95.2
1932	75	25	49.7	87	28	57.2	94	40	64.1	98	47	69.2	102	52	76.9	110	58	84.2	111	63	89.9
1933	76	29	50.2	78	23	51.1	87	39	63.4	96	45	66.2	106	44	73.4	111	57	84.0	117	65	92.9
1934	81	30	56.5	82	40	62.9	101	42	72.6	102	42	75.5	112	54	82.2	106	52	80.5	118	66	93.7
1935	84	29	55.4	84	36	60.1	89	36	60.1	95	43	69.7	102	51	75.0	113	58	88.6	113	61	90.2
1936	78	31	54.9	83	35	59.3	93	41	67.2	101	43	73.3	106	51	80.6	117	54	88.0	119	63	92.4
1937	68	16	43.8	82	31	55.7	88	41	61.2	98	46	69.0	108	53	77.2	110	58	84.7	117	72	94.6
1938	80	33	56.8	82	34	57.1	88	38	61.4	105	40	69.7	111	50	77.9	112	58	85.7	115	62	91.7
1939	78	35	53.6	81	32	42.3	95	32	63.4	102	48	73.2	108	55	79.2	114	59	85.1	118	66	92.2
1940	83	32	57.8	83	35	58.5	91	39	66.8	103	52	72.3	108	61	82.7	117	62	88.4	116	61	90.8
1941	74	38	56.5	78	44	61.0	87	43	63.8	95	45	67.3	105	48	79.6	108	58	83.4	114	66	91.6
1942	80	27	56.4	78	33	56.3	93	38	62.5	94	45	69.1	110	46	76.7	113	58	85.6	118	71	94.5
1943	85	25	55.6	85	32	60.5	95	44	67.0	100	45	72.1	106	55	79.0	110	53	81.5	119	62	89.9
1944	80	31	53.9	78	32	54.5	88	39	61.3	99	47	69.3	100	50	76.3	110	57	79.9	112	64	87.9
1945	81	33	55.9	82	36	58.5	88	37	60.3	100	35	68.5	100	54	76.1	114	58	83.5	113	72	91.9
1946	78	31	54.9	86	31	56.3	87	40	62.3	101	44	73.1	103	56	77.0	111	60	87.6	111	67	91.5
1947	83	28	52.9	85	39	61.7	88	42	64.8	104	45	72.9	116	52	79.7	110	61	84.7	113	67	92.3
1948	84	25	54.8	85	26	56.9	85	35	59.0	100	41	70.5	104	50	77.3	114	54	83.7	113	65	89.8
1949	71	21	45.3	82	28	53.8	85	41	61.6	102	45	73.3	106	53	77.0	110	57	86.1	115	66	90.7
1950	82	21	51.7	85	34	61.0	95	36	64.9	101	45	73.6	103	49	75.5	118	57	83.6	117	65	89.8
1951	84	32	54.4	88	31	57.5	88	33	62.4	98	46	69.7	111	47	77.4	110	56	83.2	113	63	91.4
1952	75	26	51.4	81	35	58.0	87	37	59.4	95	50	69.5	105	56	81.6	110	55	82.7	111	67	90.5
1953	86	34	59.9	85	30	58.3	91	35	63.5	97	44	68.4	99	49	72.4	113	53	83.6	114	72	93.6
1954	84	31	56.0	92	41	64.4	90	37	61.9	103	45	74.5	102	50	78.0	112	53	83.5	116	71	92.9
1955	77	35	51.9	83	29	55.2	92	35	63.6	88	50	69.0	103	48	74.9	113	55	84.1	113	64	88.7
1956	80	35	58.1	80	29	54.3	93	33	64.9	98	41	68.9	104	52	76.8	113	59	87.1	110	64	90.2
1957	74	30	54.6	89	34	63.7	91	40	64.9	94	45	69.8	102	55	73.8	117	62	88.7	116	71	93.1
1958	80	35	57.5	81	40	61.6	80	38	60.7	102	42	70.4	109	54	82.6	112	61	86.1	117	67	91.2
1959	85	33	58.3	83	37	57.3	91	41	66.9	102	49	74.3	99	51	76.1	116	62	88.8	113	73	94.3
1960	79	27	52.1	81	31	56.9	92	43	67.8	97	47	73.1	109	52	77.8	113	65	89.6	115	69	93.1
1961	83	34	58.0	82	38	60.9	89	43	64.3	103	50	72.3	102	50	76.0	116	56	88.1	114	64	91.2

IMPERIAL IRRIGATION DISTRICT

MAXIMUM, MINIMUM AND MEAN TEMPERATURES BY MONTHS FOR YEARS 1914-1991, INCLUSIVE

Year	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE			JULY		
	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean
1962	87	25	55.4	81	28	59.1	89	32	59.7	101	50	74.5	101	48	73.5	111	57	84.4	110	68	90.4
1963	73	24	52.0	90	42	65.3	88	39	62.6	95	43	67.5	104	52	79.2	110	51	82.0	114	69	91.1
1964	77	30	52.0	80	32	56.2	91	36	61.5	99	47	68.4	102	45	76.2	112	60	84.0	116	72	92.1
1965	82	33	57.2	88	31	59.5	84	36	62.1	101	44	70.1	105	52	76.9	105	57	80.6	113	69	90.6
1966	77	30	52.8	77	32	55.9	97	34	65.7	98	49	73.6	103	58	80.4	110	62	86.3	115	71	92.3
1967	81	30	55.4	85	38	60.3	91	42	66.0	88	45	63.3	107	48	76.5	111	57	82.7	113	75	93.3
1968	79	33	55.7	90	44	65.4	92	44	66.0	98	46	69.5	108	55	78.7	115	60	86.6	114	68	91.4
1969	82	33	59.5	76	36	57.5	96	38	63.3	95	49	71.1	107	54	80.1	109	62	82.9	115	67	92.8
1970	79	29	55.3	83	39	61.6	90	43	63.9	94	43	66.9	109	53	78.8	119	58	86.8	113	71	93.1
1971	90	23	55.3	89	31	59.2	98	32	64.8	94	44	68.5	99	54	73.8	112	54	84.2	113	67	92.3
1972	75	24	52.9	86	30	61.8	94	46	70.8	96	42	71.7	102	54	78.3	114	66	86.0	116	73	94.0
1973	77	30	53.3	77	40	59.5	80	43	60.7	97	46	68.5	107	54	80.1	117	57	87.9	115	70	91.2
1974	81	28	56.0	81	38	58.3	90	40	65.6	96	47	70.5	111	51	78.7	116	59	89.4	112	69	91.2
1975	83	31	55.1	83	34	57.6	86	40	61.5	88	42	63.7	105	50	75.8	110	59	85.1	115	71	91.7
1976	86	29	57.2	84	40	60.9	89	42	63.0	99	45	67.7	106	55	79.3	115	50	86.8	115	66	90.6
1977	80	33	56.7	91	39	63.3	87	39	60.8	98	43	72.2	105	53	72.6	115	66	88.3	113	72	93.0
1978	76	37	57.4	82	39	60.6	95	47	67.6	93	48	69.3	107	54	78.7	115	62	90.9	116	68	93.6
1979	74	31	52.6	79	35	58.9	89	42	64.1	97	46	71.9	102	52	77.2	115	61	87.6	115	68	91.9
1980	77	38	60.1	85	39	63.2	86	46	63.3	101	46	70.7	101	52	73.9	114	59	87.4	116	73	94.9
1981	83	42	60.9	90	39	61.8	91	44	64.4	97	47	72.9	103	56	78.4	114	65	90.5	112	73	93.2
1982	76	33	55.8	86	37	61.7	83	41	63.5	94	44	76.7	101	52	70.9	108	59	82.8	113	61	90.5
1983	82	35	59.0	85	42	60.5	90	46	65.2	90	45	66.7	114	52	78.9	108	57	84.3	114	67	92.0
1984	82	35	58.7	83	38	60.3	95	40	66.7	101	48	70.2	111	58	83.0	111	61	85.7	112	75	91.9
1985	73	36	54.8	85	28	57.6	86	39	63.8	101	54	74.3	101	57	79.2	114	61	88.6	116	72	93.3
1986	85	38	61.4	96	34	63.4	99	44	69.5	102	51	72.6	106	53	79.7	114	64	89.2	115	70	91.2
1987	83	31	55.1	82	39	60.0	85	41	64.0	101	50	75.9	104	56	78.8	114	65	88.1	112	64	89.8
1988	79	32	55.5	84	37	61.9	99	40	66.4	101	45	70.7	108	50	77.4	108	54	85.1	111	69	91.6
1989	78	32	54.1	93	30	59.9	96	42	68.8	105	51	76.8	106	54	79.4	111	62	86.9	114	69	92.7
1990	78	31	54.9	86	29	57.9	93	41	66.4	99	53	73.6	102	54	76.9	117	59	87.3	114	69	92.2
1991	77	31	54.9	85	39	64.3	82	38	60.2	98	45	70.1	102	51	75.0	106	60	82.0	112	69	88.8
Average	79.8	30.0	54.7	84.3	34.3	59.0	90.6	39.2	63.8	98.2	45.3	70.4	104.9	51.7	77.3	112.5	58.2	85.4	113.8	67.5	91.5

IMPERIAL IRRIGATION DISTRICT

MAXIMUM, MINIMUM AND MEAN TEMPERATURES BY MONTHS FOR YEARS 1914-1991, INCLUSIVE

Year	AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER			FOR YEAR				MEAN FOR YEAR
	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Date	Min.	Date	
1914	113	64	88.7	108	60	84.1	100	52	73.4	91	41	65.6	No Record			113	8- 3	Incomplete		
1915	117	64	90.6	109	52	81.2	104	50	75.5	91	30	60.8	82	28	54.1	117	8-10	28	12-17	71.2
1916	111	56	87.7	110	57	83.1	95	43	68.2	90	30	58.5	79	25	51.2	116	6-15	25	1-12	71.1
1917	109	62	88.9	108	53	85.3	106	44	76.2	90	38	63.7	89	31	58.3	117	6-16	30	1- 5	71.0
1918	114	55	86.7	105	56	83.1	110	44	74.7	86	32	59.4	82	28	50.5	114	8- 2	26	1-11	70.9
1919	113	67	90.3	107	60	83.7	94	36	68.3	88	31	59.7	82	31	55.6	114	6-26	24	1- 1	70.9
1920	111	58	87.8	108	53	81.8	102	41	65.7	86	34	58.2	78	29	52.9	115	7- 8	29	12-14	70.1
1921	110	68	88.5	107	57	82.6	103	43	75.1	93	32	62.2	81	33	53.4	111	7-22	28	1-12	70.8
1922	110	67	88.8	113	59	87.2	100	42	73.3	85	34	58.2	79	34	56.6	114	6-29	23	1-23	70.6
1923	107	67	87.6	109	51	80.7	97	44	69.7	83	35	62.1	78	32	52.8	114	6-28	28	1- 3	70.2
1924	113	61	89.0	108	48	84.2	100	44	69.4	93	34	61.6	83	23	53.1	113	6-28	23	12-26	72.5
1925	109	67	88.0	104	52	80.7	101	46	70.4	90	33	60.4	80	31	56.0	115	7-16	27	1-11	71.1
1926	110	63	89.4	106	53	82.6	100	44	73.1	92	39	63.4	78	27	52.1	113	6-26	27	12-27	72.6
1927	115	72	90.9	106	56	82.8	101	43	73.8	98	37	63.9	85	31	53.4	115	8-10	31	12- 8	72.3
1928	113	60	88.5	113	54	85.5	102	45	72.2	88	31	61.2	79	29	53.0	114	7-24	29	1-18 & 12-17/21	71.9
1929	111	73	90.5	112	54	80.8	104	40	73.8	88	30	59.2	84	31	58.0	117	6-24	24	2- 8/9	70.8
1930	110	63	87.6	110	51	79.7	100	46	70.2	92	31	61.0	77	26	51.5	112	6- 7 & 7- 2, 11, 15	26	12-22	70.3
1931	112	70	89.9	111	58	83.0	98	51	73.1	93	27	58.0	75	28	51.1	116	7- 2	27	11-23/25	72.2
1932	114	62	89.9	112	60	85.6	102	45	71.8	87	40	63.2	80	30	50.8	114	8- 5	25	1-27	71.0
1933	118	67	91.5	109	59	84.9	105	50	77.9	91	37	63.5	82	29	55.8	118	8-11	23	2- 8	71.2
1934	117	71	94.0	114	53	86.5	109	49	77.5	94	38	65.6	81	31	57.2	118	7-26/27, 7-30/31	30	1- 9	75.5
1935	115	70	90.6	109	63	87.4	99	42	72.9	81	36	59.5	78	33	56.1	115	8-11	29	1-22	72.2
1936	112	67	91.8	108	52	83.7	103	47	74.2	90	36	62.3	76	32	54.8	119	7-14/16	31	1-19	73.6
1937	115	65	93.6	112	61	88.3	99	54	75.9	91	40	64.3	82	33	58.7	117	7- 2	16	1-22	72.4
1938	114	65	90.7	108	64	87.2	101	46	72.5	84	29	57.2	88	35	57.3	115	7-19	29	11-25/28	72.2
1939	111	75	92.7	112	58	82.1	95	44	72.4	91	44	64.7	85	32	59.7	118	7-13	32	2- 3/10 3-1; 12-28	72.7
1940	117	66	92.3	110	62	84.3	101	48	75.1	86	38	61.1	85	30	58.6	117	6-13	30	12-15	74.1
1941	109	65	87.2	104	53	79.1	100	47	69.5	91	30	64.2	82	37	56.6	114	7-10/20	30	11-20	71.7
1942	113	62	91.8	109	60	84.1	101	45	73.9	88	36	63.3	81	32	57.1	118	7-24/25	27	1- 7	72.6
1943	110	67	88.9	113	64	87.7	105	45	74.8	86	36	62.3	74	35	54.7	119	7-25	25	1-19	73.0
1944	115	65	91.5	111	57	85.7	101	55	76.1	85	35	60.9	77	33	55.9	115	8-11	31	1- 9/10	71.2
1945	110	68	90.2	114	56	86.7	101	49	76.2	91	39	61.7	80	31	54.1	114	6-19 & 9-5	31	12-14/16	72.1
1946	113	68	92.0	111	63	86.6	96	46	70.1	81	38	59.0	82	35	57.3	113	8- 2	31	1-11/31; 2- 3	72.4
1947	113	60	89.2	113	64	87.5	105	49	74.5	89	30	57.9	74	28	51.6	116	5- 3	28	1- 4 &12/14	72.4
1948	115	65	91.3	118	54	87.0	103	46	75.5	83	34	58.9	76	31	52.1	118	9- 3	25	1- 1	71.4
1949	114	61	89.8	112	64	89.7	102	41	71.5	93	43	67.8	87	26	52.8	115	7-14	21	1- 4	71.6
1950	116	66	90.5	118	58	82.8	106	54	78.7	98	34	67.2	84	35	60.6	118	6-30 & 9-1	21	1- 4	73.3
1951	111	66	89.6	109	62	86.8	105	50	75.6	85	38	60.7	78	30	54.6	113	7-31	30	12- 9	71.9
1952	112	72	92.2	112	51	87.6	108	57	81.6	88	34	58.9	84	32	55.1	112	8- 3 & 9-1/2	26	1- 4	72.4
1953	111	61	90.6	111	61	86.4	101	48	75.2	90	37	64.6	82	26	54.6	114	7- 2	26	12-25	72.7
1954	113	66	88.9	108	54	86.5	101	46	76.5	89	43	66.9	79	27	55.7	116	7-28	27	12-29	73.8
1955	110	72	90.9	113	60	86.5	104	52	77.7	89	40	63.4	84	37	57.8	113	6- 9/22,			

IMPERIAL IRRIGATION DISTRICT

MAXIMUM, MINIMUM AND MEAN TEMPERATURES BY MONTHS FOR YEARS 1914-1991, INCLUSIVE

Year	AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER			FOR YEAR				MEAN FOR YEAR
	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Date	Min.	Date	
1956	111	60	88.3	113	64	90.5	100	44	73.5	92	33	62.0	81	29	56.7	113	6-12, 9- 2	29	2- 3, 12- 9	72.7
1957	114	63	90.3	110	61	86.3	101	51	71.9	82	37	60.3	82	36	57.9	117	6-24	30	1-27	73.0
1958	111	77	92.9	109	60	87.7	103	50	78.3	90	32	63.3	90	36	59.6	117	7- 9	32	11-17	74.4
1959	112	66	90.6	111	60	83.7	101	45	76.5	88	36	64.6	83	36	56.1	116	6-22	33	1- 5	73.9
1960	115	69	91.5	111	64	88.5	103	50	75.2	90	39	62.7	78	28	54.9	115	7-16 & 8-13	27	1- 3	73.6
1961	111	64	90.7	105	59	82.6	103	43	73.5	83	37	60.5	77	33	55.2	116	6-25	33	12-12	72.8
1962	113	69	93.6	110	61	87.1	102	55	76.0	93	42	66.3	83	34	58.0	113	8-25	25	1-12	73.2
1963	110	72	90.3	111	66	87.3	102	58	78.1	89	42	64.5	80	33	56.0	114	7-14	24	1-13, 14	73.0
1964	111	68	90.5	107	61	83.7	105	55	79.3	86	33	60.7	85	32	56.8	116	7-12	30	1- 9, 10	71.9
1965	111	70	91.2	110	58	82.0	105	53	78.4	90	41	66.0	80	36	55.2	113	7- 4	31	2-12	72.6
1966	111	70	92.6	109	62	86.1	95	49	74.6	94	43	65.1	82	32	57.4	115	7- 6	30	1- 4, 22	73.7
1967	113	74	93.5	104	65	85.5	97	54	77.7	94	44	67.9	78	33	53.2	113	7- 1,2 &8-29	30	1-7	73.0
1968	108	65	88.6	113	58	85.5	98	53	76.0	88	42	65.9	75	27	52.4	115	6-22	27	12-22	73.5
1969	117	75	95.9	113	65	88.7	102	51	72.5	89	42	64.7	77	33	57.7	117	8- 4	33	1-30	74.0
1970	114	72	93.5	111	57	84.5	98	42	72.9	87	43	63.8	78	37	55.2	119	6-25	29	1- 3	73.1
1971	110	71	91.3	115	56	85.6	102	36	69.9	87	39	61.7	72	31	52.5	115	9-12	23	1- 5, 7	71.7
1972	116	68	89.5	107	61	84.2	104	52	72.0	84	41	60.5	78	28	54.2	116	7-31 & 8- 1	24	1- 5	73.0
1973	111	64	91.0	110	60	83.8	99	50	75.4	92	40	63.9	80	37	57.5	117	6-27	30	1- 6, 7	72.8
1974	112	68	90.7	110	67	88.6	102	49	75.8	88	40	64.2	79	30	53.7	116	6-27	28	1- 3	73.6
1975	115	69	91.8	109	66	87.7	103	43	73.3	92	37	63.3	85	32	57.2	115	7-11 & 8- 4	31	1- 2, 4	72.1
1976	111	64	89.1	105	66	82.6	98	47	75.0	92	33	65.9	79	33	56.5	115	6-27 & 7-6,7	29	1- 1,2,3	72.9
1977	112	72	91.6	111	60	85.6	99	51	78.3	89	41	66.3	83	41	59.6	115	6-28 & 6-29	33	1-10	74.1
1978	111	65	91.6	107	60	84.7	105	57	79.9	89	42	63.0	75	29	53.0	116	7-19, 20	29	12- 8, 9	74.3
1979	112	69	88.7	111	70	90.0	103	47	78.0	84	34	62.3	85	37	59.0	115	6-13,27&7-10,24	31	1- 2	73.6
1980	113	65	91.1	110	63	86.6	110	48	76.6	94	38	64.9	85	40	61.4	116	7-27	38	1- 5&11-18	74.5
1981	116	69	93.9	107	66	88.5	96	48	73.0	90	44	66.5	81	36	59.8	116	8-27	36	12-23	75.3
1982	113	73	92.4	116	56	84.5	95	50	73.8	84	43	61.9	75	35	55.4	116	9- 2	33	1- 4	72.6
1983	111	69	89.8	112	64	89.4	96	61	77.5	90	39	64.9	76	36	58.8	114	7-12 & 13	35	1- 1, 2 & 4	74.0
1984	116	76	91.8	112	67	89.9	102	49	72.8	89	38	63.3	71	34	54.6	116	8-30	34	12-15	74.1
1985	117	68	92.1	107	58	80.9	100	54	74.3	88	36	61.2	80	33	57.1	117	8-24	28	2-1	73.2
1986	112	74	93.7	112	58	82.0	97	54	73.5	87	42	65.0	77	33	57.0	115	7-31	33	12-12	74.9
1987	115	66	91.2	110	62	86.7	106	56	79.4	84	41	63.6	77	28	53.4	115	8-31	28	12-27	73.9
1988	109	67	90.7	109	58	85.1	105	59	80.1	96	40	64.7	83	30	55.9	111	7-25	30	12-27,30,31	73.8
1989	110	67	89.4	111	56	85.9	99	46	74.5	90	37	64.3	81	34	56.4	114	7-4	30	2-7	74.2
1990	109	67	89.0	112	65	86.5	99	50	75.4	87	36	63.5	77	21	51.5	117	6-26	21	12-23	73.0
1991	109	71	90.9	108	63	87.1	107	43	79.8	93	39	63.8	75	33	56.0	112	7-28	31	1-30	72.8
Average	112.4	67.0	90.6	110.0	59.2	85.2	101.4	48.2	74.6	89.0	37.1	62.7	79.2	31.3	54.8	115.2		28.4		72.6

IX. AGRICULTURAL CROP STATUS

A. Annual Summary

1. Inventory of Areas Receiving Water (1991, 1990, and 1989)

B. Historical Summary

1. Water, Weather and Crop Summary Table

IMPERIAL IRRIGATION DISTRICT
ANNUAL INVENTORY OF AREAS RECEIVING WATER
YEARS 1991, 1990, 1989

I CROP SURVEY

GARDEN CROPS	ACRES 1991	1990	1989
Beans	75	157	202
Blackeyed Peas	330	182	188
Broccoli	9.543	10.484	11.343
Broccoli (Seed)	168	168	183
Cabbage	1,365	1.192	846
Cabbage. Chinese	66	33	20
Carrots	14.635	12.682	11.874
Carrots (Seed)	283	20	20
Cauliflower	6.087	7.334	6.673
Cauliflower (Seed)	26	46	46
Celery	457	280	334
Cucumbers	39	59	161
Ear Corn	2.973	1.822	1,724
Eggplant	167	167	25
Flowers	42	0	19
Flowers (Seed)	195	0	0
Garlic	464	353	42
Herbs. Mixed	182	133	47
Herbs. Mixed (Seed)	24	0	0
Lettuce	30,042	38.042	32.061
Lettuce. Butter	105	50	94
Lettuce. Chinese	17	49	14
Lettuce, Romaine	1,024	737	360
Lettuce (Seed)	0	113	72
Lettuce (Red)	104	51	99
Melons			
Cantaloupes. Fall	3,264	10.498	8,174
Cantaloupes (Seed)	224	0	183
Cantaloupes, Spring	17,972	22,837	20.684
Casaba. Fall	73	65	0
Casaba. Spring	31	127	0
Crenshaw. Fall	2	0	229
Crenshaw. Spring	0	0	66
Honeydew. Fall	489	2.148	1.761
Honeydew. Spring	303	800	389
Honeydew (Seed)	105	0	0
Mixed. Fall	241	376	484
Mixed, Spring	158	912	72
Watermelons	2,326	3.234	3.830
Watermelons (Seed)	76	0	90
Kava	60	0	0
Mustard	0	12	117
Mustard (Seed)	0	13	123
Onions	11.862	10,125	8,903
Onions (Seed)	2,540	3,339	2,261
Parsnips	0	50	50
Peanuts	0	0	100
Peppers. Bell	235	157	241
Peppers. Hot	10	59	15
Peppers. Sweet	65	70	0
Potatoes	621	177	152
Radishes	49	87	0
Radishes (Seed)	0	49	25
Rapini	520	479	505
Rutabagas	0	25	30
Spinach	222	191	85
Squash	201	216	206
Swiss Chard	20	0	0
Tomatoes. Fall	53	581	568
Tomatoes. Spring	6,332	10.835	12.640
Turnips	188	178	243
Vegetables	1,635	1.382	1.350
Vegetables. Mixed (Seed)	86	138	83
Total	118,376	143.314	130.106

FIELD CROPS	ACRES 1991	1990	1989
Alfalfa	202.145	190.808	166.732
Alfalfa (Seed)	17.397	4.523	3.070
Alicia Grass	1	0	0
Barley	145	203	0
Bermuda Grass	5.776	4.498	4.249
Bermuda Grass (Seed)	15.890	13.410	3.778
Clover	0	0	0
Cotton	9.401	11.014	9.568
Dunaliella	25	20	20
Field Corn	35	210	142
Grass. Mixed	102	0	5
Kenaf	361	0	0
Oats	3,750	2.602	4.806
Rye Grass	9.091	8.876	8.205
Rye Grass (Seed)	0	56	395
Safflower	0	0	0
Sesbania	368	55	20
Sesbania (Seed)	6	0	0
Sorghum Grain	0	0	50
Sorghum Sileage	336	369	280
Soy Beans	0	0	144
Spirulina Algae	20	20	20
Sudan Grass	64,513	41.482	48.792
Sudan Grass (Seed)	167	1.055	342
Sugar Beets	41.591	41.508	29,163
Wheat	32.552	56.833	99,891
Total	403.672	377.542	379.672

PERMANENT CROPS	ACRES 1991	1990	1989
Artichoke	560	442	237
Asparagus	6.445	6.145	5,376
Citrus			
Grapefruit	864	688	688
Lemons	660	580	580
Mixed	33	33	33
Oranges	1,060	472	402
Tangerines	510	58	58
Limes	0	0	0
Dates	18	63	63
Duck Ponds (Feed)	8.099	7.863	7.819
Eucalyptus	13	12	8
Fish Farms	908	908	721
Fruit, Mixed	240	340	10
Jojoba	2.117	2.117	2,117
Nursery	13	13	13
Palms	55	24	24
Pasture. Permanent	607	599	501
Peaches	368	396	396
Pecans	27	27	27
Total	22.597	20.780	19.073
Total Acres of Crops	544,645	541,636	528,851

Note: Crops are listed for the year in which they are predominately harvested

SUMMARY

	1991		1990		1989	
Number of Farm Accounts		6.700		6.661		6.622
Number of Owner-Operated Farm Accounts	(31 5%)	2.110	(33 8%)	2.253	(35 2%)	2.334
Number of Tenant-Operated Farm Accounts	(68 5%)	4.590	(66 2%)	4.408	(64 8%)	4.288
Average Acreage of Farm Accounts		72 46		72.38		73 88

II SUMMARY OF AREA SERVED

	ACRES		
	1991	1990	1989
Field Crops	403.672	377.542	379.672
Garden Crops	118.376	143.314	130.106
Permanent Crops	22,597	20,780	19,073
Total Acres of Crops	544.645	541.636	528.851
Total Duplicate Crops	76,854	78,606	68,797
Total Net Acres in Crops	467.791	463.030	460.054
Area Being Reclaimed: Leached	660	5,798	3,869
Net Area Irrigated	468.451	468.828	463.923
Area Farmable but not Farmed during Year (Fallow Land)	17,018	19,671	25,278
Total Area Farmable	485.469	488.499	489.201
Area of Farms in Homes, Feed Lots. Corrals. Cotton Gins. Experimental Farms. and Industrial Areas	15.350	14.290	14,303
Areas in Cities. Towns. Airports. Cemeteries. Fairgrounds. Golf Courses. Recreational Parks. Lakes & Rural Schools. Less Area Being Farmed	20,330	18,292	17,570
Total Area Receiving Water	521.149	521.081	521.074
Area in Drains. Canals. Rivers. Railroads. and Roads	73.860	73.928	73.935
Area below -230 Salton Sea Reserve Boundary & Area Covered by Salton Sea. Less Area Receiving Water	40.150	40,150	40.150
Area in Imperial Unit not Entitled to Water	63.933	63.933	63.933
Undeveloped Area of Imperial. West Mesa. East Mesa. and Pilot Knob Units	277,629	277,629	277,629
Total Acreage Included - All Units	976.721	976.721	976.721
*Acreage Not Included - All Units	84,916	84,916	84,916
Total Gross Acreage within District Boundaries	1.061.637	1.061,637	1.061.637

IMPERIAL IRRIGATION DISTRICT

J.P. Silva

J P SILVA. Manager
Water Department

*Acreage within District Boundaries that is not included in District

Historical Summary - Water, Weather, and Crop Data - Imperial Irrigation District

Calendar Year	Net IID Acres Irrigated	IID Diversions at Drop 1	Total Operational Loss, Canal Loss, and Unaccounted (ac-ft)	Delivered to Users (ac-ft)	Delivered Water per Net IID Irrigated Acres (ac-ft/acre)	Imperial Station Rainfall (ft)	Delivered Water per IID Irrigated Acres plus Rainfall (ac-ft/acre)	Mean Annual Temperature (°F)	Dates of Freezing Temperature (32°F): Jan. 1 - July 15	Dates of Freezing Temperature (32°F): July 16 - Dec 31	Percentage of Area in Different Crops: Cereals and Seed	Percentage of Area in Different Crops: Hay and Forage	Percentage of Area in Different Crops: Cotton	Percentage of Area in Different Crops: Vegetables Miscellaneous and Permanent Crops
1965	432,491	2,624,363	312,397	2,311,966	5.35	0.27	5.62	72.6	Feb. 12, 13	None	24.25	40.18	15.33	20 24
1966	433,775	2,817,912	347,644	2,470,268	5.69	0.13	5.82	73.7	Jan 3, 4, 5, 22, 23; Feb. 14	Dec. 28	20.46	50.18	6.68	22.68
1967	445,428	2,719,861	354,482	2,365,379	5.31	0.35	5.66	73.0	Jan. 7	None	24.87	48.09	6.32	20.72
1968	441,155	2,806,124	330,299	2,475,825	5.61	0.17	5.78	73.5	None	Dec. 19, 21, 22, 23	33.33	31.04	8.77	26.86
1969	442,294	2,675,833	324,255	2,351,578	5.32	0.29	5.61	74.0	None	None	29.07	31.67	8.61	30.65
1970	437,336	2,754,898	336,459	2,418,439	5.53	0.14	5.67	73.1	Jan. 1, 2, 3, 5, 6, 7	None	35.15	33.49	6.01	25.35
1971	441,783	2,883,960	349,361	2,534,599	5.74	0.11	5.85	71.7	Jan. 4, 5, 6, 7, 8, 9, 10; Feb. 27; Mar. 3	Dec. 10, 12, 15	32.96	34.96	5.94	26.14
1972	444,393	2,846,613	315,270	2,531,343	5.70	0.18	5.88	73.0	Jan. 5, 6, 8; Feb. 3	Dec. 12, 15, 31	32.58	34.41	5.45	27.56
1973	444,309	2,956,013	285,700	2,670,313	6.01	0.11	6.12	72.8	Jan. 6, 7, 8	None	30.90	34.51	6.57	28.02
1974	450,038	3,072,327	295,106	2,777,221	6.17	0.17	6.34	73.6	Jan. 3	Dec. 24, 26, 27, 28	26.52	30.65	13.74	29.09
1975	456,174	3,001,207	297,501	2,703,706	5.93	0.10	6.03	72.1	Jan. 2, 4	None	33.23	30.34	7.34	29.09
1976	458,131	2,783,630	268,365	2,515,265	5.49	0.42	5.91	72.9	Jan. 1, 2, 3	None	28.82	32.63	10.90	27.65
1977	459,433	2,693,030	238,280	2,454,750	5.34	0.43	5.77	74.1	None	None	15.07	34.11	24.44	26.38
1978	451,304	2,671,798	231,097	2,440,701	5.41	0.36	5.77	74.3	None	Dec. 8, 9	30.00	35.77	10.89	23.34
1979	458,894	2,803,166	232,310	2,570,856	5.60	0.20	5.80	73.6	Jan. 2	None	24.09	41.37	15.66	18.88
1980	459,662	2,769,495	249,800	2,519,695	5.48	0.36	5.84	74.5	None	None	26.96	36.01	14.17	22.86
1981	463,275	2,769,112	269,351	2,499,761	5.40	0.21	5.61	75.3	None	None	29.93	33.51	13.33	23.23
1982	464,391	2,515,637	267,402	2,248,235	4.84	0.40	5.24	72.6	None	None	32.27	36.96	7.10	23.67
1983	445,055	2,416,885	236,642	2,180,243	4.90	0.48	5.38	74.0	None	None	25.14	44.19	3.60	27.07
1984	447,115	2,647,285	260,957	2,386,328	5.34	0.29	5.63	74.1	None	None	9.79	52.08	8.47	29.66
1985	456,794	2,616,876	281,579	2,335,297	5.11	0.31	5.42	73.2	Feb. 1, 5	None	20.61	45.04	4.07	30.28
1986	457,883	2,576,012	239,429	2,336,583	5.10	0.31	5.41	74.9	None	None	23.56	45.80	3.70	29.94
1987	454,751	2,666,891	280,771	2,386,120	5.25	0.21	5.46	73.9	Jan. 16, 17	Dec. 15, 26, 27, 28	15.63	45.56	4.57	34.24
1988	459,998	2,885,053	340,850	2,544,203	5.53	0.11	5.64	73.8	Jan. 21	Dec. 27, 28, 29, 30, 31	14.49	46.18	4.17	35.16
1989	462,958	2,942,429	311,382	2,631,047	5.68	0.06	5.74	74.2	Jan. 13, 14; Feb. 6, 7	None	21.88	43.16	1.81	33.15
1990	467,861	2,974,647	293,735	2,680,912	5.73	0.12	5.85	73.0	Jan. 4; Feb. 15, 16	Dec. 22, 23, 24, 25, 26 27, 30, 31	14.81	45.91	2.03	37.25
1991	467,244	2,813,019	292,859	2,520,160	5.39	0.38	5.77	72.8	Jan. 30	None	12.84	52.46	1.72	32.98
Total	12,203,923	74,704,076	7,843,283	66,860,793	147.95	6.67	154.62	1,984.3						
Average	451,997	2,766,818	290,492	2,476,326	5.48	0.25	5.73	73.5						

Note: Water Duty based on "Annual Inventory of Areas Receiving Water Service," Item "Net Area Irrigated."
*Discharge Below Drop No. 1

X. WATER DEPARTMENT REVENUES AND EXPENDITURES

A. Annual Summary

1. Water Department Revenue and Expense Statement
2. Water Department Balance Sheet
3. Water Department Capitalization and Liabilities

B. Historical Summary

1. Operation and Maintenance Costs
   - a. Standard Tile Drainage Sumps
   - b. Salton Sea Tile Drainage Sumps
   - c. East Highline Canal Water Recovery Sumps
   - d. Surface Drainage Sumps
2. Payment to USBR of Net Proceeds From Power Development on All-American Canal
3. Water Sales, Water Delivered to Users, Number of Orders

C. Miscellaneous

1. Index of Imperial Irrigation District Water Rate Schedule

ANNUAL SUMMARY
1991
WATER DEPARTMENT

REVENUE AND EXPENSE STATEMENT

	1991	1990
OPERATING REVENUES		
Sales of:		
Power	0	0
Water	30,306,685	29,192,420
Water Availability Charge	1,993,723	1,963,527
Rentals	529,675	458,307
Interdepartmental Charge for Use of All–American Canal	1,193,599	1,118,599
Other	4,758,282	4,923,043
Total Operating Revenues	38,781,964	37,655,896
OPERATING REVENUES		
Provision for loss on contingent litigation	0	0
Operation and Maintenace on All–American Canal	1,651,844	1,889,090
Operation and Maintenance of Irrigation System	16,521,708	14,810,806
General Administration	12,107,058	8,865,121
Provision for Loss on Experimental Farms	29,960	27,125
Depreciation	2,823,549	2,435,647
Total Operating Expenses	33,134,119	28,027,789
Net Operating Revenue	5,647,845	9,628,107
OTHER REVENUES (EXPENSE)		
Interest Income	2,062,448	975,823
Interest Expense	(133,978)	(81,458)
Net Other Revenues (Expense)	1,928,470	894,365
Net Revenues (loss) retained to finance operations & plant additions	7,576,314	10,522,472
Net Income	**7,576,314**	**10,522,472**

() Credit Balance

ANNUAL SUMMARY
1991
WATER DEPARTMENT

BALANCE SHEET

	1991	1990
UTILITY PLANT AT ORIGINAL COST		
Plant in Service	204,883,566	172,974,010
Less Accumulated Depreciation Reserves	(39,466,852)	(42,691,348)
Subtotal	165,416,714	130,282,662
Construction Work in Progress	780,885	391,803
Total Utility Plant	166,197,599	130,674,465
RESTRICTED FUNDS		
Debt Service Funds	336,916	322,385
Construction Funds	13,080,003	200,000
Self–Insurance Funds	5,270,000	4,020,000
Other Restricted Funds	16,696,371	7,930,250
Total Restricted Funds	35,383,290	12,472,635
CURRENT ACCOUNTS		
Operating Funds	1,454,550	1,394,169
Accounts Receivable, Less		
Reserve for Doubtful Accounts	4,543,425	4,950,037
Subtotal	5,997,975	6,344,206
Inventories at Cost:		
Materials and Supplies	634,062	524,304
Prepaids	47,050	43,471
Subtotal	681,112	567,775
Total Current Assets	6,679,087	6,911,981
OTHER ASSETS	26,629	32,553
TOTAL ASSETS	208,286,605	150,091,634

ANNUAL SUMMARY
1991
WATER DEPARTMENT

CAPITALIZATION AND LIABILITIES

	1991	1990
CAPITALIZATION		
Accumulated Net Revenues		
Balance at End of December 1991	126,366,253	109,623,774
Contributions Received in Aid of Construction	58,521,612	22,393,397
Net Unrealized Loss on Equity Securities	0	(106,244)
Total Capitalization	184,887,865	131,910,927
Long–Term Debt, Less Current Portion		
All–American Canal Obligation	1,282,072	1,991,872
Accrued Termination Sick Leave – Long–Term	1,373,309	1,373,309
Note Payable – Long–Term	765,816	323,043
Water Conservation – Long–Term	2,076,122	2,136,302
Total Long–Term Debt, Less Current Portion	5,497,319	5,824,526
Total Capital	190,385,184	137,735,453
Deferred Credits and Other Liabilities		
Customers' Advances for Construction	2,240	250
Deferred Revenues, Non–Current Portion	359,093	359,094
Other Accrued Expenses, Non–Current Portion	5,201,000	4,272,905
Total Deferred Credits and Liabilities	5,562,333	4,632,249
CURRENT LIABILITIES		
Current Portion of Long–Term Debt		
All–American Canal Obligation	709,799	709,799
Note Payable – Computer – Current	0	0
Note Payable – Trifolium Reservoir	490,174	83,616
Accrued Interest	21,432	22,012
Accounts Payable	2,352,088	2,573,006
Accrued Vacation Pay and Sick Leave	1,342,882	1,498,138
Accrued Salaries, Wages & Payroll Taxes	327,029	407,306
Advance from Other Agencies for Operation of All–American Canal & Imperial Dam Facilities	126,930	334,750
Customers' Service Deposits & Advances	500	0
Total Current Liabilities	5,370,834	5,628,627
Revenues Billed for Future Water Availability, etc.	2,111,342	2,095,305
Other Liabilities	4,856,912	0
Total Capitalization and Liabilities	208,286,605	150,091,634

Historical Summary
Operation and Maintenance Costs
For
Standard Tile Drainage Sumps

	No. of Sumps		Annual Cost for All Sumps						Average Annual Cost Per Sump					
Year	Total No.	Weighted Average	Labor $	Material $	Equip. $	Maint. $	Power $	Total Cost	Labor $	Material $	Equip. $	Maint. $	Power $	Total $
1957	85	82	3,805	1,586	1,499	6,890	6,448	13,338	47	19	18	84	79	163
1958	96	90	5,210	2,408	1,991	9,609	6,846	16,455	58	27	22	107	76	183
1959	100	98	4,973	2,242	2,489	9,704	8,691	18,395	51	23	25	99	89	188
1960	126	112	4,909	1,187	1,476	7,572	9,188	16,760	44	11	13	68	82	150
1961	148	138	6,095	1,812	2,346	10,253	12,854	23,107	44	13	17	74	93	167
1962	170	156	6,728	3,243	1,623	11,594	15,971	27,565	43	21	10	74	102	176
1963	191	179	8,102	6,184	2,131	16,417	21,272	37,689	45	35	12	92	119	211
1964	221	215	9,451	6,728	2,320	18,499	17,720	36,219	46	33	11	90	87	177
1965	241	231	13,223	11,290	2,958	27,471	16,349	43,820	57	49	13	119	71	190
1966	263	249	14,852	13,449	3,153	31,454	15,569	47,023	59	54	13	126	63	189
1967	275	267	16,708	12,588	4,279	33,575	15,391	48,966	63	47	16	126	58	183
1968	306	287	15,222	10,531	3,554	29,307	18,188	47,495	53	37	12	102	63	165
1969	328	316	22,051	12,893	4,976	39,920	19,178	59,098	70	41	15	126	61	187
1970	356	342	25 868	17,147	6,323	49,338	20,976	70,314	76	50	18	144	61	205
1971	369	360	24,462	30,767	5,667	60,896	22,123	83,019	68	85	16	169	62	231
1972	390	378	29,958	28,352	7,072	65,382	23,485	88,867	79	75	19	173	62	235
1973	405	394	25,016	6,374	5,477	36,867	25,820	62,687	63	16	14	93	66	159
1974	419	412	32,387	15,457	6,273	54,117	34,692	88,809	79	37	15	131	84	215
1975	432	424	36,129	15,895	7,173	59,197	43,936	103,133	85	37	17	139	104	243
1976	435	433	39,895	18,890	8,187	66,972	48,485	115,457	92	44	19	155	112	267
1977	439	437	47,634	30,443	8,694	86,771	43,741	130,512	109	70	20	199	100	299
1978	442	439	55,963	24,382	8,720	89,065	55,304	144,369	127	56	20	203	126	329
1979	452	447	74,408	27,249	9,786	111,443	73,905	185,348	166	61	22	249	165	414
1980	464	457	78,078	43,794	10,413	132,285	88,721	221,006	170	96	23	289	194	483
1981	473	467	105,054	56,371	13,887	175,312	89,202	264,514	225	121	30	375	191	566
1982	473	473	127,865	41,154	15,499	184,518	115,789	300,307	270	87	33	390	245	635
1983	473	473	119,562	25,824	15,872	161,258	130,748	292,006	253	55	34	341	276	617
1984	476	474	110,630	2,605	15,100	151,335	120,528	271,863	233	54	32	319	254	572
1985	483	480	83,253	38,051	7,240	128,544	113,266	241,810	173	79	15	268	236	504
1986	487	485	71,961	35,147	8,786	115,894	118,637	234,531	148	73	18	239	245	484
1987	489	488	80,206	38,757	21,661	140,624	115,252	255,876	164	80	44	288	236	524
1988	489	488	89,307	46,111	21,393	156,811	132,617	289,428	183	94	44	321	272	593
1989	490	490	42,292	14,115	8,775	65,162	148,152	213,314	86	29	18	133	302	435
1990	494	493	105,883	43,346	32,789	182,018	150,000	332,018	215	88	67	370	304	673
1991	495	495	130,342	84,378	37,132	21,852	150,731	402,583	264	171	75	510	305	815

Historical Summary
Operation and Maintenance Costs
For
Salton Sea Tile Drainage Sumps

	No. of Sumps		Annual Cost for All Sumps						Average Annual Cost Per Sump					
Year	Total No.	Weighted Average	Labor $	Material $	Equip. $	Maint. $	Power $	Total Cost	Labor $	Material $	Equip. $	Maint. $	Power $	Total $
1957	15	14	201	119	23	343	1,796	2,139	14	9	2	25	128	153
1958	19	18	514	162	71	747	2,232	2,979	29	9	4	42	124	166
1959	22	20	897	211	518	1,626	2,629	4,255	45	10	26	81	132	213
1960	22	22	706	220	429	1,355	2,332	3,687	32	10	20	62	106	168
1961	25	24	829	327	598	1,754	3,049	4,803	34	14	25	73	127	200
1962	25	25	752	3,063	530	4,345	3,386	7,731	30	123	21	174	135	309
1963	27	26	1,381	3,509	917	5,807	4,487	10,294	53	135	35	223	173	396
1964	29	29	1,026	1,101	941	3,068	3,908	6,976	35	38	33	106	135	241
1965	29	29	1,102	951	887	2,940	3,179	6,119	38	33	30	101	110	211
1966	30	30	1,361	2,880	995	5,236	2,883	8,119	45	96	33	174	96	270
1967	30	30	991	3,034	823	4,848	2,644	7,492	33	102	27	162	88	250
1968	30	30	1,407	5,740	1,079	8,226	2,958	11,184	47	191	36	274	99	373
1969	30	30	1,815	4,759	1,529	8,103	3,325	11,428	60	159	51	270	111	381
1970	30	30	2,008	2,030	873	4,911	3,243	8,154	67	68	29	164	108	272
1971	30	30	3,488	10,660	1,529	15,677	3,551	19,228	116	356	51	523	118	641
1972	30	30	2,787	7,611	1,209	11,607	3,702	15,309	93	254	40	387	123	510
1973	30	30	1,945	739	943	3,627	3,941	7,568	65	25	31	121	131	252
1974	30	30	1,822	195	1,541	3,558	5,087	8,645	61	6	51	118	170	288
1975	30	30	2,264	576	2,069	4,909	6,462	11,371	76	19	69	164	215	379
1976	30	30	2,728	860	2,664	6,252	6,829	13,081	91	28	89	208	228	436
1977	30	30	2,556	1,141	2,944	6,641	8,476	15,117	85	38	98	221	283	504
1978	30	30	3,298	3,341	2,748	9,387	10,542	19,929	110	111	92	313	351	664
1979	30	30	3,409	3,141	1,026	7,576	13,008	20,584	114	105	34	253	433	68
1980	30	30	7,863	7,797	2,444	18,104	21,267	39,371	262	260	81	603	709	1,312
1981	30	30	8,180	6,122	1,524	15,826	15,063	30,889	273	204	51	528	502	1,030
1982	30	30	9,978	8,879	2,076	20,933	19,315	40,248	333	296	69	698	644	1,342
1983	30	30	21,319	9,186	3,699	34,204	27,034	61,238	711	306	123	1,140	901	2,041
1984	30	30	20,685	7,420	1,939	30,044	20,722	50,766	690	247	65	1,002	691	1,692
1985	30	30	20,583	8,360	1,437	30,380	18,099	48,479	686	279	48	1,013	603	1,616
1986	30	30	9,991	9,816	1,246	21,053	18,202	39,255	333	327	42	702	607	1,309
1987	30	30	8,839	9,819	2,125	20,783	19,138	39,921	295	327	71	693	638	1,331
1988	30	30	11,506	15,447	2,464	29,417	20,836	50,253	383	515	82	980	695	1,675
1989	30	30	9,756	7,271	2,169	19,195	25,404	44,599	325	242	72	640	847	1,487
1990	30	30	10,616	4,838	3,348	18,802	25,596	44,398	354	161	112	627	853	1,480
1991	30	30	11,950	5,995	3,920	21,865	23,260	45,125	398	200	131	729	775	1,504

Historical Summary
Operation and Maintenance Costs
For
East Highline Canal Water Recovery Sumps

	No. of Sumps		Annual Cost for All Sumps						Average Annual Cost Per Sump					
Year	Total No.	Weighted Average	Labor $	Material $	Equip. $	Maint. $	Power $	Total Cost	Labor $	Material $	Equip. $	Maint. $	Power $	Total $
1968	6	2	582	152	148	882	872	1,754	291	76	74	441	436	877
1969	6	6	2,406	675	702	3,783	2,591	6,374	401	112	117	630	432	1,062
1970	7	7	1,576	500	243	2,319	2,828	5,147	225	71	35	331	404	735
1971	8	7	1,876	72	123	2,071	3,037	5,108	268	10	18	296	434	730
1972	11	9	2,332	199	123	2,654	4,130	6,784	259	22	14	295	459	754
1973	11	11	3,847	(46)	392	4,193	5,791	9,984	350	(4)	35	381	527	908
1974	12	12	3,426	287	274	3,987	9,674	13,661	285	24	23	332	806	1,138
1975	12	12	3,756	379	302	4,437	12,450	16,887	313	32	25	370	1,037	1,407
1976	12	12	2,053	103	78	2,234	13,283	15,517	171	9	6	186	1,107	1,293
1977	12	12	3,683	527	620	4,830	15,217	20,047	307	44	52	403	1,268	1,671
1978	12	12	2,324	1,154	170	3,648	17,232	20,880	194	96	14	304	1,436	1,740
1979	12	12	3,760	1,251	1,160	6,171	20,299	26,470	313	104	97	514	1,692	2,206
1980	12	12	3,593	278	531	4,402	23,180	27,582	300	23	44	367	1,932	2,299
1981	12	12	9,388	9,332	1,471	20,191	23,060	43,251	782	778	123	1,683	1,921	3,604
1982	12	12	9,430	4,598	1,400	15,428	31,501	46,929	786	383	117	1,286	2,625	3,911
1983	12	12	7,391	944	1,646	9,981	34,999	44,980	616	79	137	832	2,916	3,748
1984	12	12	5,204	854	689	6,747	29,170	35,917	434	71	57	562	2,431	2,993
1985	12	12	13,342	3,872	3,484	20,698	25,987	46,685	1,112	322	290	1,724	2,166	3,890
1986	12	12	12,365	7,651	2,636	22,652	31,276	53,928	1,030	638	220	1,888	2,606	4,494
1987	12	12	5,857	1,050	1,848	8,755	29,393	38,148	488	88	154	730	2,449	3,179
1988	12	12	13,476	14,907	3,121	31,504	34,380	65,884	1,123	1,242	260	2,625	2,865	5,490
1989	12	12	16,233	12,739	2,735	31,707	38,069	69,776	1,353	1,061	228	2,642	3,173	5,815
1990	12	12	11,986	5,165	3,446	20,597	35,842	56,438	999	430	287	1,716	2,987	4,703
1991	12	12	12,590	3,272	3,003	18,865	34,369	53,234	1,049	273	250	1,572	2,864	4,436

( ) Credit

Historical Summary
Operation and Maintenance Costs
For
Surface Drainage Sumps

	No. of Sumps		Annual Cost for All Sumps						Average Annual Cost Per Sump					
Year	Total No.	Weighted Average	Labor $	Material $	Equip. $	Maint. $	Power $	Total Cost	Labor $	Material $	Equip. $	Maint. $	Power $	Total $
1979	3	2	161	767	56	984	424	1,408	80	384	28	492	212	704
1980	21	15	7,455	5,390	1,431	14,276	4,392	18,668	497	359	96	952	293	1,245
1981	21	21	5,870	3,501	1,879	11,250	4,895	16,145	280	167	90	536	233	769
1982	21	21	4,909	2,223	1,037	8,169	5,824	13,993	234	106	49	389	277	666
1983	21	21	6,039	2,655	2,254	10,948	8,200	19,148	288	126	107	521	391	912
1984	22	22	7,813	3,451	2,107	13,371	7,205	20,576	355	157	96	608	327	935
1985	24	23	9,654	49,561	1,124	60,339	8,580	68,919	419	2,155	49	2,623	373	2,996
1986	27	25	8,023	1,773	1,455	11,251	8,765	20,016	321	71	58	450	351	801
1987	28	28	19,626	4,076	4,834	28,536	9,063	37,599	701	145	173	1,019	324	1,343
1988	28	28	13,246	6,114	3,224	22,584	11,669	34,253	473	218	115	806	417	1,223
1989	28	28	8,782	6,518	1,637	16,937	11,903	28,840	314	233	59	605	425	1,031
1990	28	28	14,053	4,449	3,986	22,488	11,063	33,551	502	159	142	803	395	1,198
1991	28	28	15,712	3,073	5,192	23,977	12,247	36,224	561	110	185	856	437	1,294

PAYMENT TO U.S. BUREAU OF RECLAMATION
OF NET PROCEEDS FROM POWER DEVELOPMENT ON ALL-AMERICAN CANAL
ACCOUNT 172 – (4224.2)

For Year	Date Paid	Yearly Payments	
1936 to 1946, Incl.	Nov. 1, 1948 (1 payment)	250,986.00	
1947 to 1965. Incl.	Paid through 04-04-66	2,236,920.49	
1966 to 1985, Incl.	Paid through 02-28-85	2.167,864.43	
1986	February 28, 1986	141,410.00	
1987	February 28. 1987	155,068.00	
1988	February 29, 1988	364,684.00	
1989	February 28, 1989	310,867.00	
1990	February 28, 1990	224,631.00	
1991	March 1. 1991	296,450.00	
Total Net Proceeds Paid to March 1. 1991			6,148,880.92

PAYMENT ON CONTRACT TO U.S. BUREAU OF RECLAMATION
FROM U.S. CONTRACT FUND – ALL-AMERICAN CANAL.
Account 250 – (1850)

1969 to 1971, Incl.	Paid through 08-31-71	1,309,094.11	
1972 to 1988, Incl.	Paid through 03-31-88	10,688,890.66	
1989	Paid through 08-25-89	439,733.03	
1990	Paid through 08-31-90	525.969.03	
1991	Paid through 08-31-91	454,150.03	
Total Paid from U.S. Contract Fund to August 31. 1991			13,417,836.86
Total Paid to August 31, 1991		19,566,717.78	

	Date Allowed		
Credit allowed for Coachella Branch AAC –	December 17, 1981	137,525.70	
Credit allowed for Flood Protective Works by PL 750-81st Congress	April 12, 1957	3,000,000.00	
Credit allowed for Allocated Share of Gila Project Participation on Laguna Dam Cost	January 23, 1957	201,483.13	
Total Paid & Credits Allowed	December 31. 1991	22,905,726.61	
Applied by United States on All-American Canal Contract Liability:			
January 1955 to August 1965		4,253,400.17	
Janury 1966 to August 1985		14,148,726.26	
January & August 1986		750,600.03	
January & August 1987		750,600.03	
January & August 1988		750,600.03	
January & August 1989		750,600.03	
January & August 1990		750,600.03	
January & August 1991		750,600.03	22,905,726.61
Final costs – All-American Canal (07-14-54) $25,020,000.90:			

Installments Payable

First five years – 1% 1955-59, Inc. – $ 250,200.01 per year	1,251,000.05
Next ten years – 2% 1960-69, Incl. – $ 500,400.02 per year	5,004,000.20
Next 26 years – 3% 1970-94, Incl. – $ 750,600.03 per year	18,765,000.65
	25,020,000.90
Less Total Applied (see above)	22,905,726.61
Net Liability – All-American Canal Contract – December 31, 1991	2,114,274.29

Historical Summary

Water Sales, Water Delivered to Users and Number of Water Orders

Year	Water Sales $	Water Delivered To Users (A.F.)	Water Orders (#)
1966	4,945,585	2,470,268	252,920
1967	5,061,640	2,365,379	227,223
1968	5,678,158	2,475,825	239,036
1969	5,401,789	2,351,578	229,034
1970	5,539,925	2,418,439	231,235
1971	5,798,557	2,534,599	241,376
1972	5,782,168	2,531,343	171,375
1973	6,071,659	2,670,313	249,218
1974	7,393,908	2,777,221	250,882
1975	8,494,593	2,703,706	238,821
1976	9,506,431	2,515,265	219,724
1977	11,228,752	2,454,750	217,709
1978	11,633,741	2,440,701	200,013
1979	13,176,853	2,570,856	208,620
1980	15,256,800	2,519,695	202,175
1981	17,750,415	2,499,761	201,334
1982	17,075,806	2,248,235	184,574
1983	19,735,596	2,180,243	177,843
1984	21,995,877	2,386,328	193,696
1985	21,471,400	2,335,297	193,250
1986	21,433,197	2,336,583	188,068
1987	23,963,398	2,386,120	197,856
1988	26,730,103	2,544,203	211,008
1989	30,085,615	2,631,047	211,765
1990	29,192,420	2,680,912	217,880
1991	30,179,154	2,520,160	201,372

INDEX OF

IMPERIAL IRRIGATION DISTRICT

WATER RATE SCHEDULE

Schedule Number	Class of Service	Date Effective	Supersedes Resolution Dated
1	General Agricultural and Municipal Service	01-01-91	01-09-90
1-A	Mesa Agricultural Service	01-01-91	01-09-90
2	Pump Service	08-01-88	07-21-87
3	Pipe Service	01-01-91	01-09-90
4	Whole Service	01-01-91	01-09-90
5	Reuse of Drainage Water	08-01-88	09-08-87
6	Stand-by Service	01-01-89	09-08-87
7	General Industrial Service	01-01-91	01-09-90
8	Penalty for Adjusting Gates	10-01-87	-
9	Charge for Drainage Service	10-01-87	-
10	Accounts for Exempt Charges	10-01-87	-
11	Drainage Construction	10-01-87	-
12	12-Hour Run	09-01-89	-