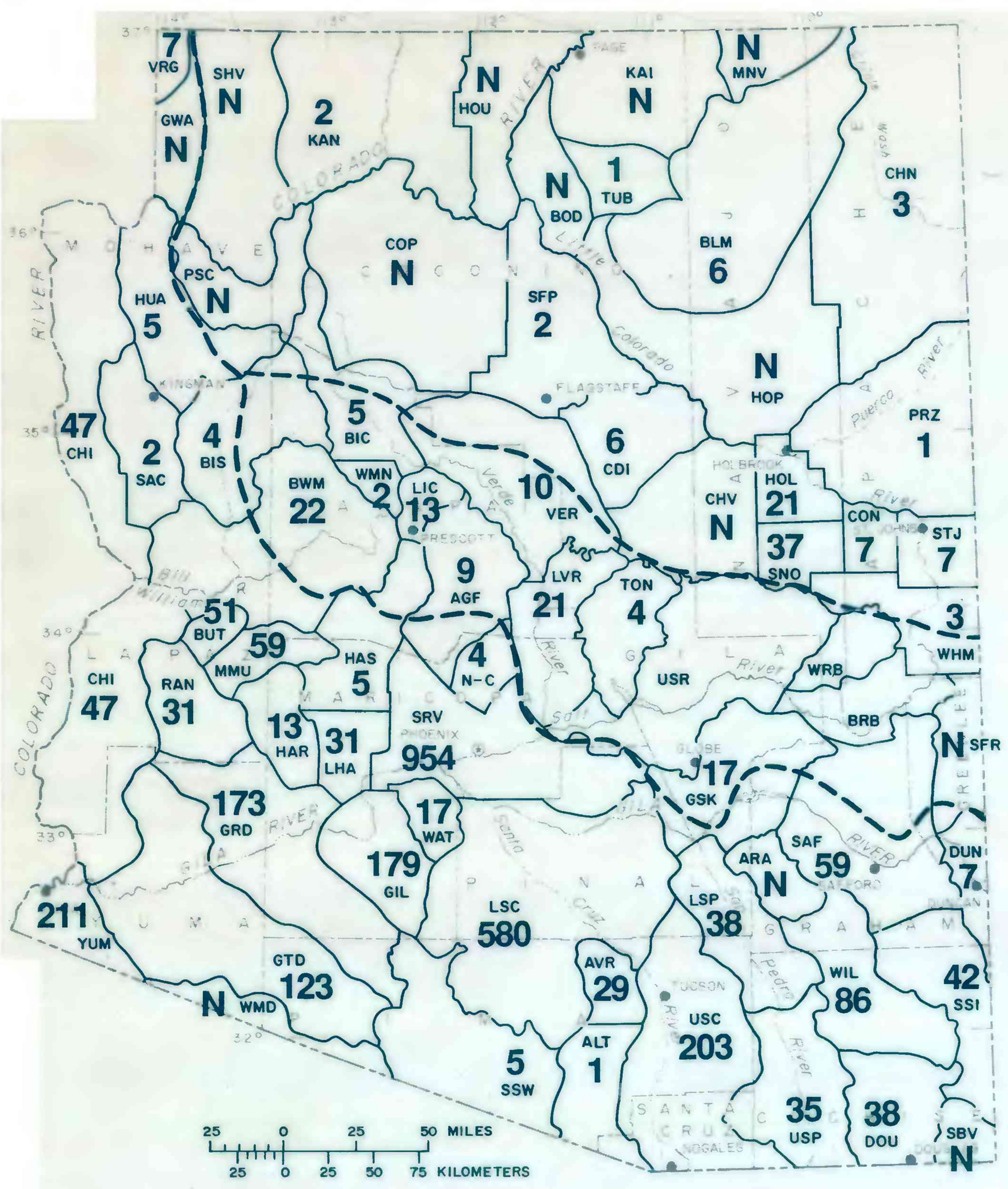
PREPARED IN COOPERATION WITH THE
ARIZONA DEPARTMENT OF WATER RESOURCES

OPEN-FILE REPORT 92-54
SHEET 1 OF 2



EXPLANATION

954 ESTIMATED GROUND-WATER PUMPAGE, IN THOUSANDS OF ACRE-FEET

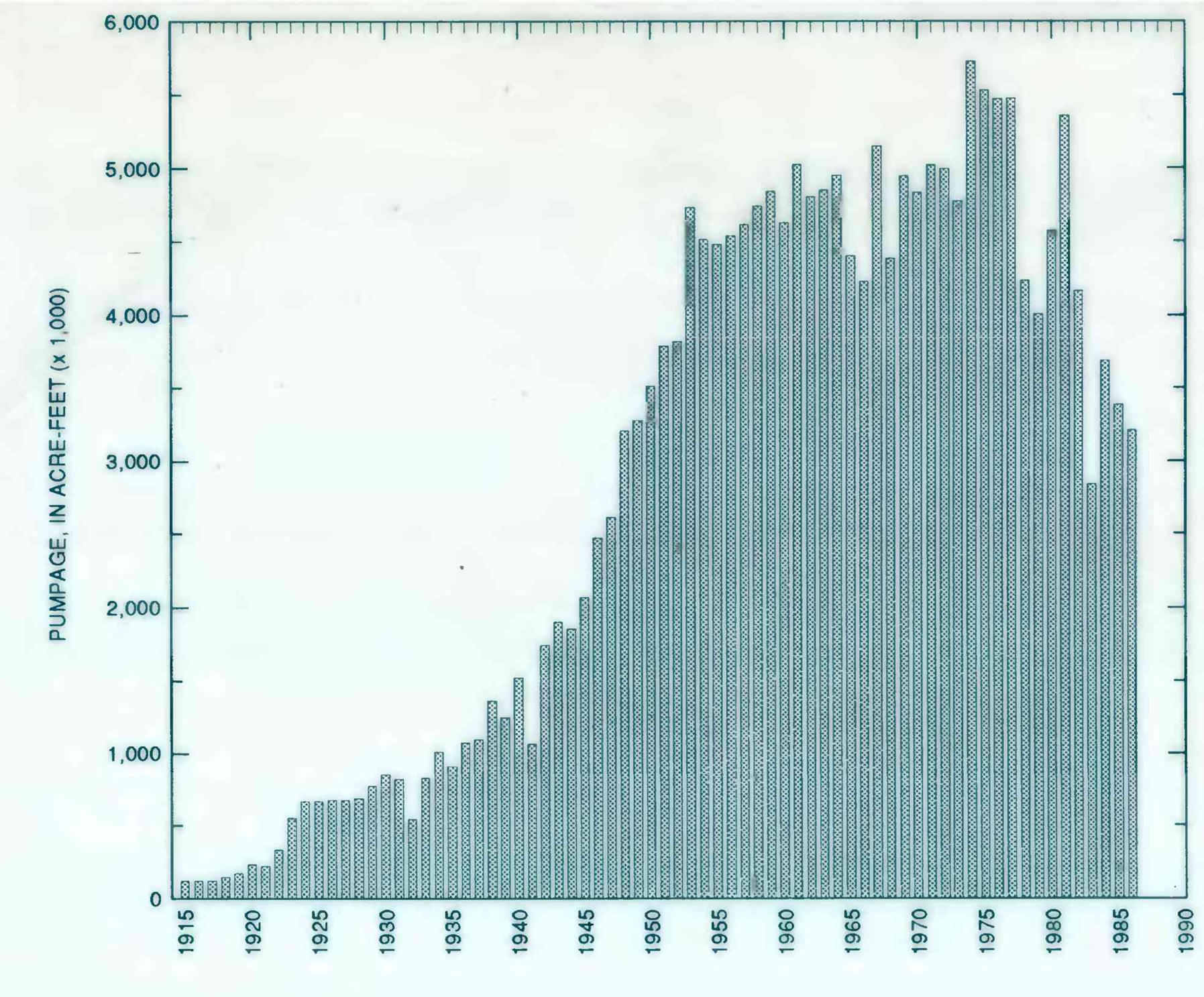
N PUMPAGE OF 500 ACRE-FEET OR LESS

BOUNDARY OF GROUND-WATER AREA

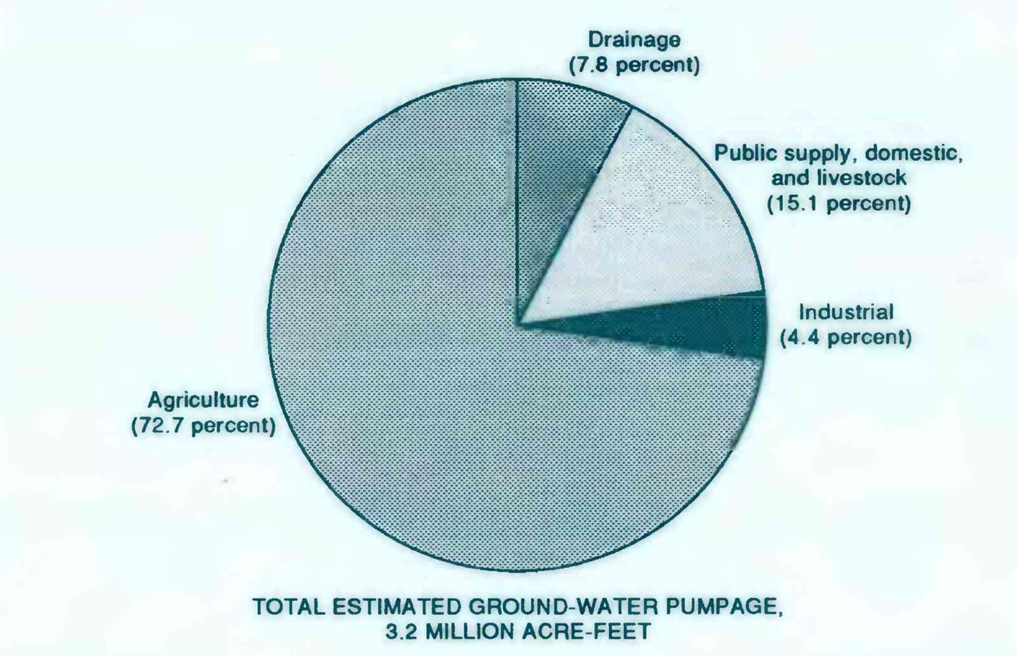
WATER-PROVINCE BOUNDARY

NOTE: In areas where no data are shown, the pumpage is mostly from domestic and stock wells, and the amount is unknown. The pumpage in these areas is estimated to be about 25,000 acre-feet for 1986 (see table).

ESTIMATED GROUND-WATER PUMPAGE IN ARIZONA IN 1986

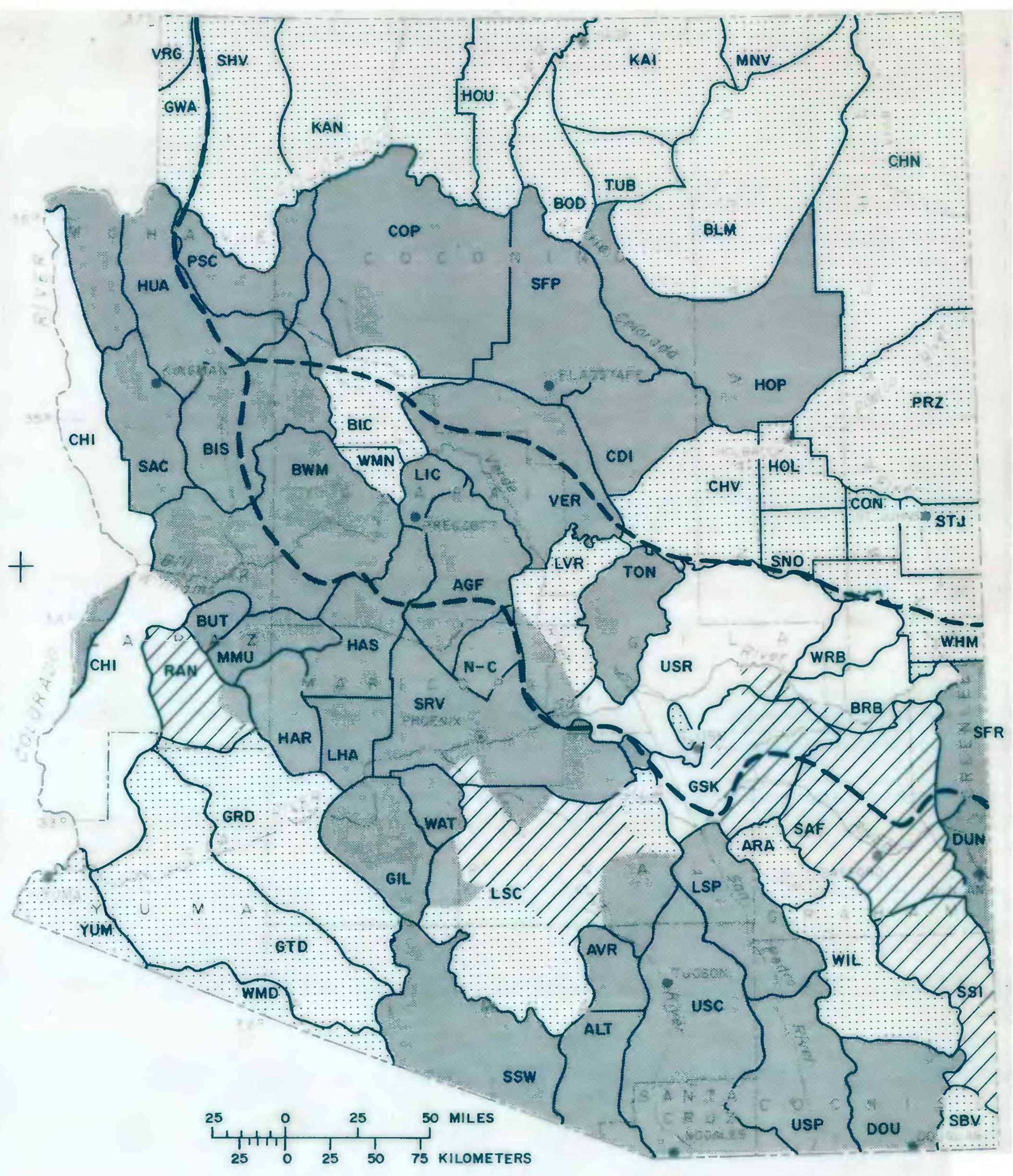


ESTIMATED GROUND-WATER PUMPAGE IN ARIZONA



TOTAL ESTIMATED GROUND-WATER PUMPAGE, 3.2 MILLION ACRE-FEET

ESTIMATED GROUND-WATER PUMPAGE BY TYPE OF USE IN 1986



EXPLANATION

AREA FOR WHICH A REPORT WAS PUBLISHED BEFORE 1980

AREA FOR WHICH A REPORT WAS PUBLISHED SINCE 1980

AREA FOR WHICH A REPORT IS IN PROGRESS

AREA FOR WHICH A REPORT IS NOT AVAILABLE

BOUNDARY OF GROUND-WATER AREA

WATER-PROVINCE BOUNDARY

STATUS OF GROUND-WATER INVENTORY

ESTIMATED ANNUAL GROUND-WATER PUMPAGE, IN THOUSANDS OF ACRE-FEET, BY AREA

[Numbers rounded to the nearest thousand acre-feet. Area: AGF, see sheet 2 for abbreviation and location]

YEAR	AGF	ALT	ARA	AVR	BIC	BIS	BLM	BOD	BUT	BWM	CDI	CHV	CHN	COP	CHI	CON	DOU	DUN
PRE-1915	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1915	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--
1916	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--
1917	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1918	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1919	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1920	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1921	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1922	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1923	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1924	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1925	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1926	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1927	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1928	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1929	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	--
1930	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--
1931	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--
1932	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--
1933	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--
1934	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--
1935	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	2	N
1936	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	2	N
1937	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	2	N
1938	--	--	--	8	--	--	--	--	--	--	--	--	--	--	--	--	2	1
1939	--	--	--	9	--	--	--	--	--	--	--	--	--	--	--	--	2	1
1940	--	--	--	12	--	--	--	--	--	--	--	--	--	--	--	--	5	2
1941	--	--	--	10	--	--	--	--	--	--	--	--	--	--	--	--	5	1
1942	--	--	--	6	--	--	--	--	--	--	--	--	--	--	--	--	5	2
1943	--	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	5	7
1944	--	--	--	19	--	--	--	--	--	--	--	--	--	--	--	--	5	8
1945	--	--	--	23	--	--	--	--	--	--	--	--	--	--	--	--	8	6
1946	--	--	--	23	--	--	--	--	--	--	--	--	--	--	--	--	12	17
1947	--	--	--	34	--	--	--	--	--	--	--	--	--	--	--	--	17	21
1948	--	--	--	38	--	--	--	--	--	--	--	--	--	--	--	--	22	21
1949	--	--	--	48	--	--	--	--	--	--	--	--	--	--	--	--	30	11
1950	--	--	--	41	20	--	--	--	--	--	--	--	--	--	--	--	35	23
1951	--	--	--	75	20	--	--	--	--	--	--	--	--	--	--	--	38	33
1952	--	--	--	80	20	--	--	--	--	--	--	--	--	--	--	--	42	17
1953	--	--	--	85	20	--	--	--	--	--	--	--	--	--	--	--	45	30
1954	--	--	--	90	20	--	--	--	--	--	--	--	--	--	--	--	42	27
1955	--	--	--	95	20	--	--	--	--	--	--	--	--	--	--	--	50	25
1956	--	--	--	100	20	--	--	--	--	--	--	--	--	--	--	--	60	20
1957	--	--	--	110	20	--	--	--	--	--	--	--	--	--	--	--	55	20
1958	--	--	--	120	20	--	--	--	--	--	--	--	--	--	5	--	55	25
1959	--	--	--	130	20	--	--	--	--	--	--	--	--	--	10	--	55	25
1960	--	--	--	140	20	--	--	--	--	--	--	--	--	--	10	--	60	9K
1961	--	--	--	145	20	--	--	--	--	--	--	--	--	--	10	--	65	21K
1962	--	--	--	140	20	--	--	--	--	--	--	--	--	--	10	--	65	19K
1963	--	--	--	115	20	--	--	--	--	--	--	--	--	--	10	--	65	17K
1964	--	--	--	115	20	--	--	--	--	--	--	--	--	--	15	--	60	22K
1965	--	--	--	125	20	--	--	--	--	--	--	--	--	--	13	--	90	17K
1966	--	--	--	95	20	--	--	--	--	--	--	--	--	--	12	--	105	13K
1967	--	--	--	121	9	--	--	--	--	--	--	--	--	--	20	--	120	16K
1968	--	--	--	134	9	--	--	--	--	--	--	--	--	--	17	--	120	12K
1969	--	--	--	155	9	--	--	--	--	--	--	--	--	--	12	--	104	20K
1970	--	--	--	157	9	--	--	--	--	--	--	--	--	--	12	--	103	18K
1971	--	--	--	140	9	--	--	--	--	--	--	--	--	--	16	--	95	14K
1972	--	--	--	146	8	--	--	--	--	--	--	--	--	--	19	--	89	23K
1973	--	--	--	152	8	--	--	--	--	--	--	--	--	--	25	--	110	17K
1974	--	--	--	129	11	--	5	N	4	--	2	N	1	N	28	3	138	29K
1975	--	--	--	145K	12	--	5	N	5	--	3	N	2	N	32	5	118	23K
1976	--	--	--	115	10	--	6	N	5	--	3	N	3	N	43	7	112	28K
1977	--	--	--	110	9	--	6	N	4	--	4	N	2	N	53	7	87	30K
1978	--	--	--	66	6	2K	5	N	4	--	4	N	2	N	53	7	80	30K
1979	3	--	3	71	5	2K	5	N	4	18	2	N	2	N	66	9	81	16K
1980	4	--	3	83	5	2K	5	N	4	18	2	N	3	N	61	14	91	18K
1981	4	--	3	67	6	3K	5	N	4	18	3	N	3	N	63	9	85	20K
1982	4	--	3	55	N	3K	6	N	3	18	2	N	3	N	82	11	76	16K
1983	6	2	1	31	N	3K	6	N	2	18	3	N	3	N	53	10	50	6K
1984	6	3	N	35	1	1K	6	N	4	18	2	N	3	N	80	10	46	11
1985	6	2	N	34	3	3	5	N	4	22	4	N	3	N	56	9	49	6
1986	9	1	N	29	5	4	6	N	4	22	6	N	3	N	47	7	38	7
TOTAL	42G	8I	13G	4032	474	23F	71B	-B	51B	152G	40B	-B	33B	-B	933	108B	2913	821

YEAR	GIL	GRD	GSK	GTD	GWA	HAR	HAS	HOL	HOP	HOU	HUA	KAI	KAN	LIC	LHA	LSP	LSC
PRE-1915	--	--	--	5	--	--	--	--	--	--	--	--	--	--	--	--	200
1915	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	82
1916	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	83
1917	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	84
1918	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	85
1919	--	--	--	6	--	--	--	--	--	--	--	--	--	--	--	--	86
1920	--	--	--	6	--	--	--	--	--	--	--	--	--	--	--	--	88
1921	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	90
1922	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	93
1923	--	--	--	10	--	--	--	--	--	--	--	--	--	--	--	--	96
1924	--	--	--	15	--	--	--	--	--	--	--	--	--	--	--	--	99
1925	--	--	--	15	--	--	--	--	--	--	--	--	--	--	--	--	101
1926	--	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	104
1927	--	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	106
1928	--	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	109
1929	--	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	111
1930	--	--	--	10	--	--	--	--	--	--	--	--	--	--	--	--	135
1931	--	--	--	15	--	--	--	--	--	--	--	--	--	--	--	--	160
1932	--	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	185
1933	--	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	210
1934	--	--	--	15	--	--	--	--	--	--	--	--	--	--	--	--	235
1935	2	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	260
1936	2	--	--	20	--	--	--	--	--	--	--	--	--	--	--	--	285
1937	2	--	--	25	--	--	--	--	--	--	--	--	--	2	--	--	305
1938	2	--	--	25	--	--	--	--	--	--	--	--	--	3	--	--	325
1939	2	--	--	25	--	--	--	--	--	--	--	--	--	4	--	--	352
1940	19	1	--	25	--	1	--	--	--	--	--	--	--	4	--	--	372
1941	19	1	--	25	--	1	--	--	--	--	--	--	--	4	--	--	421
1942	19	2	--	30	--	1	--	--	--	--	--	--	--	5	--	--	500
1943	20	2	--	35	--	1	--	--	--	--	--	--	--	6	--	--	515
1944	20	6	--	37	--	1	--	--	--	--	--	--	--	7	--	--	530
1945	20	9	--	35	--	1	--	--	--	--	--	--	--	7	--	--	610
1946	33	11	--	38	--	1	--	--	--	--	--	--	--	8	--	--	660
1947	40	11	--	43	--	1	--	--	--	--	--	--	--	9	--	--	700
1948	61	7	--	50	--	1	--	--	--	--	--	--	--	12	--	--	950
1949	67	13	--	45	--	1	--	--	--	--	--	--	--	12	--	--	1100
1950	59	15	--	46	--	5	--	--	--	--	--	--	--	13	--	--	1000
1951	104	21	--	50	--	7	--	--	--	--	--	--	--	13	--	--	1030
1952	120	32	--	40	--	10	--	--	--	--	--	--	--	12	--	--	950
1953	145	42	--	16	--	20	--	--	--	--	--	--	--	13	--	--	1400
1954	139	37	--	9	--	33	--	--	--	--	--	--	--	12	--	--	1200
1955	140	31	--	8	--	30	--	--	--	--	--	--	--	13	--	--	1200
1956	180	30	--	5	--	40	--	--	--	--	--	--	--	14	--	--	1100
1957	180	30	--	5	--	50	--	--	--	--	--	--	--	14	--	--	1100
1958	200	30	--	2	--	60	--	--	--	--	--	--	--	14	--	--	1200
1959	250	40	--	2	--	95	--	--	--	--	--	--	--	14	--	--	1200
1960	250	50	--	2	--	125	--	--	--	--	N	--	--	14	--	--	1100
1961	200	50	--	140A	--	100	--	--	--	--	1	--	--	15	--	--	1150
1962	170	50	--	215A	--	200	--	--	--	--	1	--	--	15	--	--	1050
1963	130	60	--	201A	--	200	--	--	--	--	1	--	--	13	--	--	1000
1964	130	65	--	181A	--	200	--	--	--	--	2	--	--	13	--	--	1150
1965	115	65	--	186A	--	200	--	--	--	--	2	--	--	14	--	--	910
1966	145	80	--	217A	--	160	--	--	--	--	3	--	--	14	--	30	915
1967	198	100	--	213A	--	170	--	--	--	--	4	--	--	12	--	29	1120
1968	153	126	--	220A	--	165	--	--	--	--	4	--	--	12	--	42	910
1969	166	120	--	218A	--	145	--	--	--	--	4	--	--	12	--	51	1043
1970	162	108	--	218A	--	111	--	--	--	--	4	--	--	12	--	58	890
1971	212	122	--	215A	--	99	--	--	--	--	4	--	--	12	--	51	819
1972	238	125	--	201A	--	108	--	--	--	--	4	--	--	12	--	53	798
1973	198	143	--	208A	--	109	--	--	--	--	4	--	--	12	91	57	990
1974	249	191	--	206A	N	137	--	16	N	N	5	N	N	13	89	61	1171
1975	288	164	--	210A	N	130	--	16	N	N	4	N	N	15	94	59	1016
1976	287	182	--	204A	N	129	--	18	N	N	4	N	2	14	98	67	1007
1977	300	210	--	208A	N	123	--	19	N	N	4	N	2	18	84	62	1037
1978	292	193	--	191A	N	100	3	24	N	N	6	N	2	15	63	55	748
1979	218	193	--	175A	N	93K	3	19	N	N	6	N	2	15	64	46	737
1980	275	234	--	197A	N	108	3	18	N	N	4	N	2	15	74	52	898
1981	308	315	--	157A	N	129K	3	24	1	N	6	N	2	15	87	60	998
1982	253	221	--	152A	N	79K	3	24	N	N	5	N	2	14	70	52	858
1983	123	123	14	141A	N	56K	3	22	N	N	5	N	2	14	48	40	495
1984	316	176	21	70A	N	72	3	20	N	N	5	N	2	15	72	46	629
1985	209	214	17	129A	N	59	3	19	1	N	5	N	2	14	60	35	614
1986	179	173	17	123A	N	13	3	21	N	N	5	N	2	13	31	38	580
TOTAL	7627	4224	691	5693	-B	3680	29F	260B	3B	-B	102	-B	22B	587	1025C	1044D	46440

YEAR	LVR	MMU	MNV	N-C	PSC	PRZ	RAN	SAC	SAF	SRV	SBV	SFP	SFR
PRE-1915	--	--	--	--	--	--	--	--	--	57	--	--	--
1915	--	--	--	--	--	--	--	--	--	15	--	--	--
1916	--	--	--	--	--	--	--	--	--	15	--	--	--
1917	--	--	--	--	--	--	--	--	--	15	--	--	--
1918	--	--	--	--	--	--	--	--	--	40	--	--	--
1919	--	--	--	--	--	--	--	--	--	60	--	--	--
1920	--	--	--	--	--	--	--	--	--	95	--	--	--
1921	--	--	--	--	--	--	--	--	--	100	--	--	--
1922	--	--	--	--	--	--	--	--	--	200	--	--	--
1923	--	--	--	--	--	--	--	--	--	400	--	--	--
1924	--	--	--	--	--	--	--	--	--	500	--	--	--
1925	--	--	--	--	--	--	--	--	--	500	--	--	--
1926	--	--	--	--	--	--	--	--	--	500	--	--	--
1927	--	--	--	--	--	--	--	--	--	500	--	--	--
1928	--	--	--	--	--	--	--	--	--	500	--	--	--
1929	--	--	--	--	--	--	--	--	--	600	--	--	--
1930	--	--	--	--	--	--	--	--	--	650	--	--	--
1931	--	--	--	--	--	--	--	--	--	600	--	--	--
1932	--	--	--	--	--	--	--	--	--	300	--	--	--
1933	--	--	--	--	--	--	--	--	--	572	--	--	--
1934	--	--	--	--	--	--	--	--	--	711	--	--	--
1935	--	--	--	--	--	--	--	--	20	554	--	--	--
1936	--	--	--	--	--	--	--	--	20	684	--	--	--
1937	--	--	--	--	--	--	--	--	20	665	--	--	--
1938	--	--	--	--	--	--	--	--	20	905	--	--	--
1939	--	--	--	--	--	--	--	--	20	738	--	--	--
1940	--	N	--	--	--	--	--	N	25	943	--	--	--
1941	--	N	--	--	--	--	--	N	9	444	--	--	--
1942	--	N	--	--	--	--	--	N	19	1004	--	--	--
1943	--	N	--	--	--	--	--	N	35	1104	--	--	--
1944	--	N	--	--	--	--	--	N	52	1017	--	--	--
1945	--	2	--	--	--	--	--	N	35	1143	--	--	--
1946	--	2	--	--	--	--	--	N	115	1360	--	--	--
1947	--	2	--	--	--	--	--	N	100	1406	--	--	--
1948	--	2	--	--	--	--	--	N	110	1670	--	--	--
1949	--	2	--	--	--	--	--	N	40	1644	--	--	--
1950	--	2	--	--	--	--	2	N	90	1852	--	--	--
1951	--	2	--	--	--	--	5	N	125	1910	--	--	--
1952	--	5	--	--	--	--	15	N	70	2020	--	--	--
1953	--	6	--	--	--	--	22	N	120	2300	--	--	--
1954	--	7	--	--	--	--	19	N	90	2300	--	--	--
1955	--	9	--	--	--	--	16	N	90	2240	--	--	--
1956	--	15	--	--	--	--	16	N	90	2300	--	--	--
1957	--	21	--	--	--	--	9	N	100	2300	--	--	--
1958	--	38	--	--	--	--	10	N	50	2300	--	--	--
1959	--	50	--	--	--	--	10	N	100	2206	--	--	--
1960	--	60	--	--	--	--	11	N	90	2005	--	--	--
1961	--	70	--	--	--	--	12	N	140	2178	--	--	--
1962	--	65	--	--	--	--	15	N	60	1976	--	--	--
1963	--	75	--	--	--	--	17	N	80	2134	--	--	--
1964	--	90	--	--	--	--	7	N	110	1972	--	--	--
1965	--	90	--	--	--	--	6	4	150	1500	--	--	--
1966	--	105	--	--	--	--	7	4	90	1350	--	--	--
1967	--	98	--	--	--	--	12	4	145	1763	--	--	--
1968	--	95	--	--	--	--	15	6	78	1264	--	--	--
1969	--	98	--	--	--	--	16	5	140	1600	--	--	--
1970	--	86	--	--	--	--	15	4	120	1700	--	--	--
1971	--	101	--	--	--	--	15	5	190	1800	--	--	--
1972	--	112	--	--	--	--	19	6	130	1800	--	--	--
1973	--	113	--	--	--	--	19	5	140	1200	--	--	--
1974	--	134	N	--	N	1	22	7	110	1800	--	2	--
1975	--	139	N	--	N	2	13	8	145	1750	--	4	--
1976	--	129	N	--	N	2	6	8	170	1680	--	2	--
1977	--	132	N	--	N	2	13	7	213	1709	--	2	--
1978	--	115	N	--	N	2	12	8	132	1098	--	2	1
1979	--	115	N	2	N	1	14	6	83	1043	--	2	1
1980	--	123	N	2	N	2	10	4	107	1109	--	3	1
1981	2	144	N	3	N	2	50	5	140	1620	--	3	1
1982	2	90	N	3	N	2	40	2	94	1115	--	3	1
1983	2	65	N	3	N	2	26	2	72	707	N	4	N
1984	2	93	N	3	N	1	38	2	70	1122	N	4	N
1985	18	80	N	4	N	1	21	2	67	891	N	3	N
1986	21	59	N	4	N	1	31	2	59	954	N	2	N
TOTAL	47H	2841	-B	24G	-B	21B	606	106	4690	84779	-I	36	5F

YEAR	SSI	SSW	SHV	SNO	STJ	TON	TUB	USP	USC	VER	VRG	WAT	WHM	WIL	WMD	WMN	YUM	OTHERS	TOTAL
PRE-1915	5	--	--	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	347
1915	10	--	--	--	--	--	--	--	7	--	--	--	--	2	--	--	2	--	123
1916	8	--	--	--	--	--	--	--	7	--	--	--	--	2	--	--	2	--	122
1917	8	--	--	--	--	--	--	--	8	--	--	--	--	1	--	--	2	--	122
1918	6	--	--	--	--	--	--	--	8	--	--	--	--	N	--	--	3	--	146
1919	6	--	--	--	--	--	--	--	10	--	--	--	--	N	--	--	4	--	172
1920	5	--	--	--	--	--	--	--	35	--	--	--	--	N	--	--	4	--	233
1921	5	--	--	--	--	--	--	--	20	--	--	--	--	N	--	--	4	--	222
1922	5	--	--	--	--	--	--	--	30	--	--	--	--	N	--	--	4	--	335
1923	5	--	--	--	--	--	--	--	37	--	--	--	--	N	--	--	4	--	552
1924	5	--	--	--	--	--	--	--	45	--	--	--	--	N	--	--	4	--	668
1925	5	--	--	--	--	--	--	--	42	--	--	--	--	N	--	--	5	--	668
1926	4	--	--	--	--	--	--	--	40	--	--	--	--	1	--	--	6	--	675
1927	4	--	--	--	--	--	--	--	40	--	--	--	--	1	--	--	7	--	678
1928	4	--	--	--	--	--	--	--	45	--	--	--	--	2	--	--	8	--	688
1929	4	--	--	--	--	--	--	--	40	--	--	--	--	2	--	--	9	--	776
1930	4	--	--	--	--	--	--	--	38	--	--	--	--	1	--	--	10	--	854
1931	4	--	--	--	--	--	--	--	25	--	--	--	--	1	--	--	11	--	822
1932	3	--	--	--	--	--	--	--	20	--	--	--	--	1	--	--	12	--	543
1933	3	--	--	--	--	--	--	--	16	--	--	--	--	1	--	--	13	--	832
1934	3	--	--	--	--	--	--	--	30	--	--	--	--	1	--	--	14	--	1011
1935	3	--	--	--	--	--	--	--	28	--	--	--	--	1	--	--	15	5	911
1936	3	--	--	--	--	--	--	--	32	--	--	--	--	1	--	--	16	5	1071
1937	3	--	--	--	--	--	--	--	35	--	--	--	--	1	--	--	17	10	1091
1938	3	--	--	--	--	--	--	--	40	--	--	--	--	2	--	--	18	10	1364
1939	3	--	--	--	--	--	--	--	50	--	--	--	--	2	--	--	19	20	1247
1940	3	--	--	--	--	--	--	--	62	--	--	N	--	2	--	--	19	25	1520
1941	3	--	--	--	--	--	--	--	70	--	--	N	--	5	--	--	20	25	1063
1942	4	--	--	--	--	--	--	--	94	--	--	N	--	5	--	--	21	25	1742
1943	4	--	--	--	--	--	--	--	95	--	--	N	--	5	--	--	22	25	1901
1944	4	--	--	--	--	--	--	--	100	--	--	N	--	5	--	--	20	25	1856
1945	5	--	--	--	--	--	--	--	106	--	--	N	--	9	--	--	22	25	2066
1946	6	--	--	--	--	--	--	--	109	--	--	N	--	15	--	--	32	30	2472
1947	6	--	--	--	--	--	--	--	136	--	--	N	--	20	--	--	39	30	2615
1948	6	--	--	--	--	--	--	--	135	--	--	1	--	23	--	--	62	35	3206
1949	6	--	--	--	--	--	--	--	132	--	--	1	--	28	--	--	65	35	3280
1950	6	--	--	--	--	--	--	--	160	--	--	5	--	35	--	2	64	40	3515
1951	6	--	--	--	--	--	--	--	180	--	--	10	--	38	--	2	70	50	3789
1952	15	--	--	--	--	--	--	--	195	--	--	17	--	39	--	2	68	50	3819
1953	25	--	--	--	--	--	--	--	200	--	--	28	--	94	--	2	69	50	4732
1954	32	--	--	--	--	--	--	--	200	--	--	30	--	105	--	2	69	50	4513
1955	40	--	--	--	--	--	--	--	200	--	--	40	--	110	--	2	72	50	4481
1956	40	--	--	--	--	--	--	--	200	--	--	40	--	120	--	2	87	60	4539
1957	48	--	--	--	--	--	--	--	200	--	--	40	--	135	--	2	114	60	4613
1958	50	--	--	--	--	--	--	--	175	--	--	45	--	155	--	2	121	60	4737
1959	50	--	--	--	--	--	--	--	165	--	--	50	--	183	--	2	122	60	4839
1960	60	--	--	--	--	--	--	--	165	--	--	60	--	195	--	2	122	75	4625K
1961	65	--	--	--	--	--	--	--	175	--	--	65	--	184	--	2	124	90	5022K
1962	65	--	--	--	--	--	--	--	200	--	--	50	--	180	--	2	121	110	4799K
1963	65	--	--	--	--	--	--	--	180	--	--	50	--	180	--	2	121	110	4846K
1964	75	--	--	--	--	--	--	--	175	--	--	50	--	220	--	2	154	120	4948K
1965	70	--	--	--	--	--	--	--	200	--	--	45	--	250	--	2	179	150	4403K
1966	72	--	--	--	--	--	--	35	190	--	--	45	--	240	--	2	178	100	4227K
1967	76	--	--	--	--	--	--	34	200	--	--	52	--	300	--	2	229	100	5147K
1968	81	--	--	--	--	--	--	29	210	--	--	54	--	290	--	2	234	100	4382K
1969	78	--	--	--	--	--	--	28	236	--	--	60	--	291	--	2	231	100	4944K
1970	105	--	--	--	--	--	--	33	240	--	--	55	--	289	--	2	220	100	4831K
1971	107	--	--	--	--	--	--	36	258	--	--	55	--	309	--	2	233	100	5019K
1972	104	--	--	--	--	--	--	38	253	--	--	57	--	292	--	2	257	100	4994K
1973	115	--	--	--	--	--	--	41	280	--	--	55	--	305	--	2	272	100	4771K
1974	135	--	N	29	1	--	N	45	264	4	5	69	3	339	--	2	247	24	5731K
1975	122	--	N	21	3	--	1	52	280	4	5	64	3	293	--	2	255	21	5533K
1976	122	--	N	24	3	--	1	59	281	4	5	70	3	306	--	2	240	12	5473K
1977	117	--	N	28	3	--	1	54	257	9	6	72	2	220	--	2	233	15	5476K
1978	121	--	N	28	3	--	1	46	220	8	6	54	4	169	--	2	234	15	4232K
1979	113	3	N	28	4	N	1	50	215	8	6	67	3	175	N	2	192	15	4007K
1980	139	5	N	30	5	N	1	67	228	7	6	65	3	199	N	2	248	15	4574K
1981	127	8	N	33	7	N	1	75	225	8	6	65	3	180	N	2	238	15	5361K
1982	75	10	N	38	6	N	1	71	187	9	6	20	4	140	N	2	211	15	4163K
1983	42	1	N	31	5	N	1	49	182	9	6	13	3	82	N	2	222	10	2839K
1984	44	8	N	31	6	N	1	57	162	10	6	19	3	94	N	2	226	10	3687K
1985	45	5	N	26	9	3	1	31	198	12	6	26	3	91	N	2	224	27	3383
1986	42	5	N	37	7	4	1	35	203	10	7	17	3	86	N	2	211	25	3216
TOTAL	2862	45G	-B	384B	62B	7G	12B	965D	9586	102B	76B	1681	40B	7053	-G	74	7047E	2534J	206204

EXPLANATION OF SYMBOLS

N: PUMPAGE OF 500 ACRE-FEET OR LESS.

A: WITHDRAWAL MOSTLY FOR DRAINAGE PURPOSES.

B: PUMPAGE FOR THESE AREAS WAS NOT ESTIMATED PRIOR TO 1974. THUS, TOTAL IS FOR 1974-86 ONLY. ESTIMATED PUMPAGE BEFORE 1974 IS INCLUDED IN "OTHERS."

C: PUMPAGE FOR LHA AREA WAS INCLUDED IN SRV AREA PRIOR TO 1973. THUS, TOTAL IS FOR 1973-86 ONLY.

D: PUMPAGE FOR LSP AND USP AREAS WAS NOT ESTIMATED PRIOR TO 1966. THUS, TOTAL IS FOR 1966-86 ONLY. ESTIMATED PUMPAGE BEFORE 1966 IS INCLUDED IN "OTHERS."

E: YUM AREA INCLUDES SOUTH GILA VALLEY, YUMA MESA, AND YUMA VALLEY. BEGINNING IN 1947 IN YUMA VALLEY, IN 1961 IN SOUTH GILA VALLEY, AND IN 1970 IN YUMA MESA, PART OF THE PUMPAGE WAS FOR DRAINAGE OF WATERLOGGED LANDS.

F: PUMPAGE FOR BIS, HAS, AND SFR AREAS WAS NOT ESTIMATED PRIOR TO 1978. THUS, TOTAL IS FOR 1978-86 ONLY. ESTIMATED PUMPAGE BEFORE 1978 IS INCLUDED IN "OTHERS."

G: PUMPAGE FOR AGF, ARA, BWM, N-C, SSW, TON, AND WMD AREAS WAS NOT ESTIMATED PRIOR TO 1979. THUS, TOTAL IS FOR 1979-86 ONLY. ESTIMATED PUMPAGE BEFORE 1979 IS INCLUDED IN "OTHERS."

H: PUMPAGE FOR LVR AREA WAS NOT ESTIMATED PRIOR TO 1981. THUS, TOTAL IS FOR 1981-86 ONLY. ESTIMATED PUMPAGE BEFORE 1981 IS INCLUDED IN "OTHERS."

I: PUMPAGE FOR ALT, GSK, AND SBV AREAS WAS NOT ESTIMATED PRIOR TO 1983. THUS, TOTAL IS FOR 1983-86 ONLY. ESTIMATED PUMPAGE BEFORE 1983 IS INCLUDED IN "OTHERS."

J: "OTHERS" INCLUDE: BLACK RIVER BASIN, UPPER SALT RIVER BASIN, AND WHITE RIVER BASIN.

K: PREVIOUSLY PUBLISHED FIGURE REVISED.

INTRODUCTION

The U.S. Geological Survey, in cooperation with the State of Arizona, which is represented by the Arizona Department of Water Resources, has conducted studies of ground-water conditions in Arizona since 1939. The primary purposes of the studies are to define the quantity, chemical quality, and areal distribution of the ground-water resources of Arizona and to monitor the effects of large-scale withdrawals of the ground water. The studies include the collection, compilation, and analysis of the geologic and hydrologic data necessary to evaluate the State's ground-water resources. Data collected include areal extent, thickness, lithology, and hydraulic characteristics of the aquifer; occurrence and movement of ground water; quantities and distributions of ground-water recharge and discharge; measured and potential well yields; physical and chemical characteristics of the ground water; and changes that occur within aquifer systems over time.

Geohydrologic data, results of areal studies, and research findings are presented in publications of the U.S. Geological Survey and the Arizona Department of Water Resources, technical journals, and other publications. (See section entitled "Recent Publications.") The basic hydrologic data are in computer storage and are available to the public.

Since 1974, a major effort of the studies has been to inventory ground-water conditions in 68 ground-water areas of the State. Each year, several ground-water areas are selected for an extensive inventory to update ground-water conditions. The data from these inventories are analyzed, and the results are published in book and map reports. Typically, these reports include maps showing depth to water in wells; altitude of the potentiometric surface; changes in water level; and chemical quality of the ground water, such as specific conductance, dissolved solids, and fluoride concentrations.

Water levels are measured annually in selected wells that make up a statewide observation-well network. (See map on sheet 2 of this report.) Changes in water levels in the observation wells between measurements made in the current year and measurements made 5 years before are calculated. Ground-water pumpage is computed or estimated for each of the 68 ground-water areas and totaled for the entire State. This report summarizes ground-water data collected annually and compiled from recent studies of the U.S. Geological Survey or the Arizona Department of Water Resources.

AVAILABILITY AND WITHDRAWAL OF GROUND WATER

In Arizona the availability of adequate and potable water supplies has a great influence on the location of cities and cropland. Surface water is available along the Gila River, in the Verde River Valley, in the Salt River Valley, and along the lower Colorado River; however, the quantity available is not sufficient to meet the continually increasing demand. For many years, more than half of Arizona's water supply has been withdrawn from the ground-water reservoirs. The principal use of the ground water is for irrigation of crops, although municipal and industrial users are steadily increasing.

In 1986, 3.216 million acre-ft of ground water was withdrawn. This quantity is about 0.17 million acre-ft less than the quantity withdrawn in 1985, nearly 0.5 million acre-ft less than in 1984, but 0.38 million acre-ft more than in 1983, when withdrawals were the lowest since 1947 (see pumpage table). The withdrawal in 1986, although more than the quantity withdrawn in 1983, is still much less than the 4.5 to 5.7 million acre-ft of water withdrawn from the 1950's through the 1970's. Most of the differences in annual pumpage are in the quantities of ground water used for irrigation in the Basin and Range lowlands province. More than 2.3 million acre-ft of ground water or 72.7 percent of the total withdrawal was used for agricultural purposes in 1986; most of this water was used for irrigation of crops.

The annual and accumulated pumpage since the beginning of record are shown in the pumpage table. Potential well production, depth to water in selected wells in the spring of 1987, and change in water level in selected wells from 1982 to 1987 are shown on the map on sheet 2. The withdrawal of ground water and its effects on the ground-water reservoirs in each of the three water provinces (see map showing water provinces, sheet 2) are discussed separately in the following sections.

Basin and Range Lowlands Province

The Basin and Range lowlands province is the most highly developed of the three water provinces. The province is characterized by rugged mountain ranges separated by broad elongated basins filled with alluvial deposits. The ground-water reservoirs are mainly the alluvial deposits in the basins, but small supplies of water can be obtained locally from the crystalline and sedimentary rocks in the mountains that bound the basins. In 1986, about 3.03 million acre-ft of ground water was withdrawn in the province, more than 94 percent of the total ground-water withdrawal in the State. About 201 million acre-ft of ground water has been withdrawn from the ground-water reservoirs in the province since pumping began.

The hydrographs of water levels in wells on sheet 2 represent conditions in several ground-water areas in the province. In general, most water levels declined significantly from the 1950's through the 1970's when ground-water withdrawal was the greatest. In recent years, however, because of decreased ground-water withdrawal, the rate of water-level declines has been reduced, and in some instances water levels are rising.

Salt River Valley and the lower Santa Cruz basin are the largest agricultural areas in the State. In the lower Santa Cruz basin, the quantity of ground water withdrawn in 1986 decreased from 1985; in the Salt River Valley, ground water withdrawn in 1986 increased from 1985, but was less than in 1984. The quantity is still considerably less than that withdrawn during the 1960's and 1970's. In many areas where large quantities of ground water are pumped each year, the withdrawal in 1986 was more than that in 1983 because of the discontinuance of the PIK (Payment-In-Kind) program in which farmers were paid to let land be idle.

In 1986 the Central Arizona Project (CAP) Canal delivered Colorado River water to the Harquahala Plains, Lower Hassayampa basin, and the Salt River Valley. The quantity of ground water withdrawn in the Salt River Valley was not affected by the delivery of Colorado River water; however, ground-water withdrawal greatly decreased in the Harquahala Plains and Lower Hassayampa basin where about 61,000 acre-ft of surface water was delivered.

Central Highlands Province

The Central highlands province is a transition zone between the Basin and Range lowlands province and the Plateau uplands province and is the smallest of the three water provinces. Ground water is obtained from thick alluvial deposits in a few areas; from layered sandstone, limestone, and conglomerate in some areas; from alluvial deposits along major stream channels; and locally from fractured crystalline and sedimentary rocks. Only a few thousand acres of land is under cultivation, and the quantity of ground water withdrawn in 1986 was 89,000 acre-ft, which is 4,000 acre-ft more than in 1985 and 41,000 acre-ft more than in 1984. The quantity of ground water withdrawn has not resulted in notable water-level declines.

Plateau Uplands Province

In the Plateau uplands province, ground-water development is small compared with that in the Basin and Range lowlands province. The area is underlain by layers of sandstone, siltstone, and limestone that are overlain locally by volcanic rocks and "shoestring" deposits of thin alluvium. Most of the ground water is pumped from layered sandstone that stores ground water in confined or unconfined aquifers and from thin deposits of alluvium along the major streams. The use of ground water is limited largely to scattered farms and homesites; industrial and utility sites; and a few population centers, such as Flagstaff, Holbrook, and the White Mountains recreational area. In 1986, about 96,000 acre-ft of ground water was withdrawn in the province, about 10,000 acre-ft more than in 1985 and 7,000 more than in 1984. For the most part, no pattern of rise or decline in water levels is discernible, although a few feet of decline has occurred in the Black Mesa, Snowflake, and Holbrook areas.

RECENT PUBLICATIONS

The following reports on the water resources and geology of Arizona were published from July 1, 1986, through June 30, 1987. The reports were prepared by the Water Resources Division of the U.S. Geological Survey in Arizona and by the Arizona Department of Water Resources.

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Kister, L.R., and Radtke, D.B., 1987, Arizona ground-water quality, *in* Moody, D.W., Carr, Jerry, Chase, E.B., and Paulson, R.W., Compilers, National Water Summary, 1986—Hydrologic Events and Ground-Water Quality: U.S. Geological Survey Water-Supply Paper 2325, p. 157-164.

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Leake, S.A., and Hanson, R.T., 1987, Distribution and movement of trichloroethylene in ground water in the Tucson area, Arizona: U.S. Geological Survey Water-Resources Investigations Report 86-4313, 40 p.

Littin, G.R., 1987, Ground-water resources of the Bisbee-Naco area, Cochise County, Arizona: U.S. Geological Survey Water-Resources Investigations Report 87-4103, 34 p.

Myers, S.M., 1987, Map showing groundwater conditions in the Peach Springs basin, Mohave, Coconino, and Yavapai Counties, Arizona—1987: Arizona Department of Water Resources Hydrologic Map Series Report Number 15, 1 sheet.

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CONVERSION FACTORS AND VERTICAL DATUM

Multiply	*By*	*To obtain*
foot (ft)	0.3048	meter
gallon per minute (gal/min)	0.06309	liter per second
acre-foot (acre-ft)	0.001233	cubic hectometer

Sea level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929—A geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called *Sea Level Datum of 1929*.

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By
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