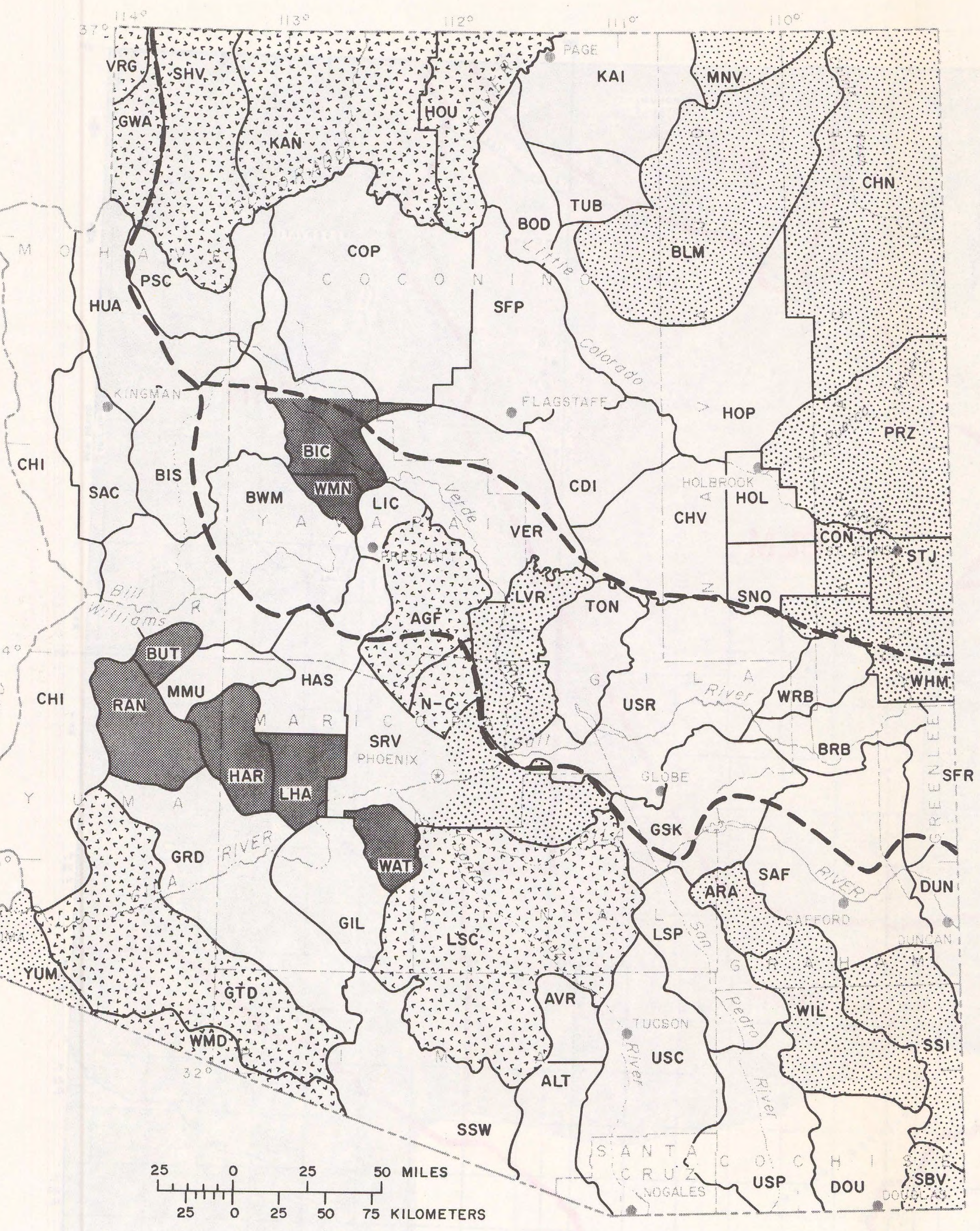
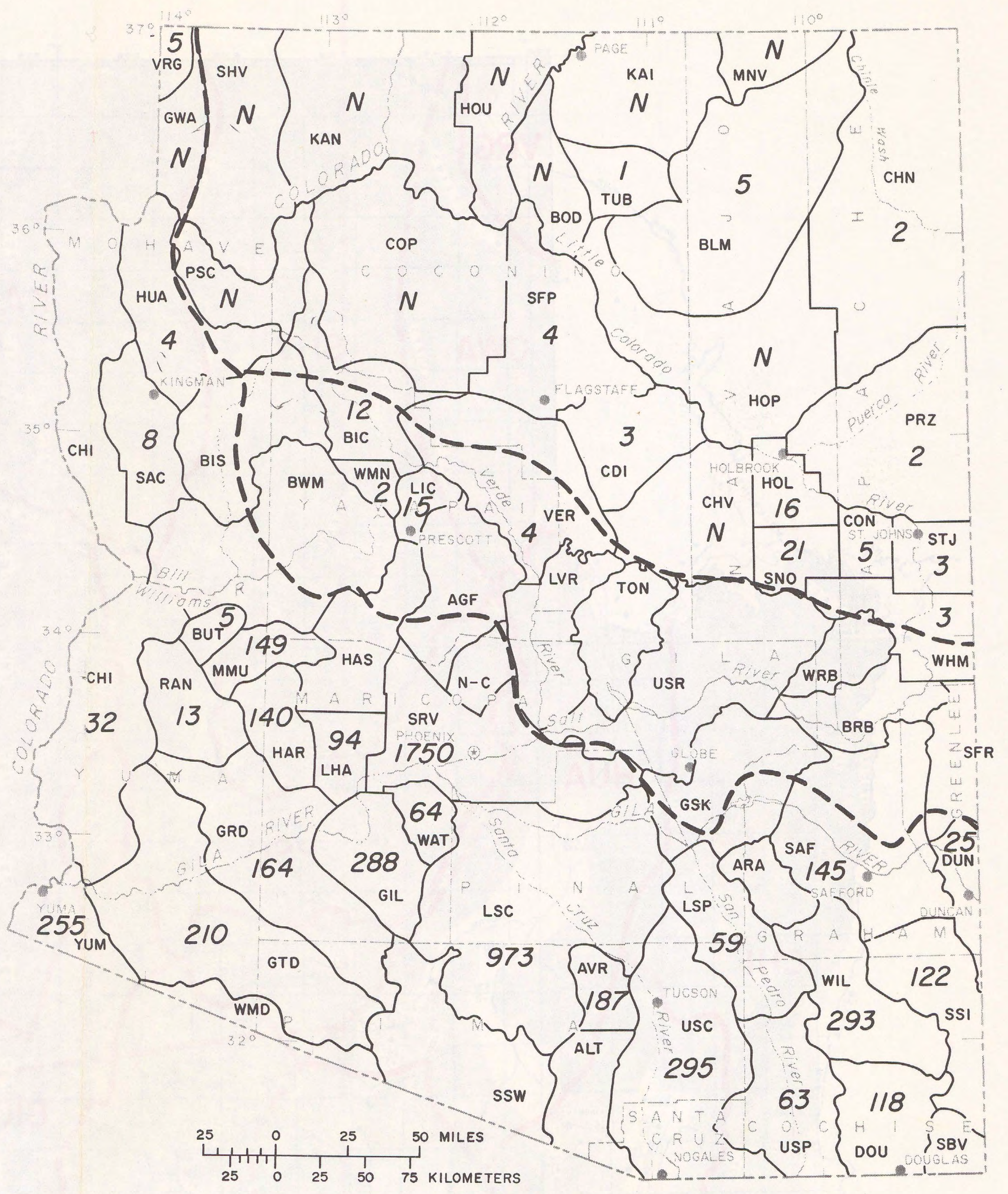
(200) WRi no. 77-10

(200) WRi 77-10



AREAS AND ABBREVIATIONS

AGF = Agua Fria basin
ALT = Altar Valley
ARA = Aravaipa Valley
AVR = Avra Valley
BIC = Big Chino Valley
BIS = Big Sandy Valley
BWM = Bill Williams
BLM = Black Mesa
BRB = Black River basin
BOD = Bodaway Mesa
BUT = Butler Valley
CDI = Canyon Diablo
CHV = Chevelon
CHN = Chinle
COP = Coconino Plateau
CHI = Colorado River, Hoover Dam to Imperial Dam
CON = Concho
DOU = Douglas basin
DUN = Duncan basin
GIL = Gila Bend basin
GRD = Gila River drainage from Painted Rock Dam to Texas Hill
GSK = Gila River from head of San Carlos Reservoir to Kelvin
GTD = Gila River from Texas Hill to Dome
GWA = Grand Wash
HAR = Harquahala Plains
HAS = Hassayampa basin
HOL = Holbrook
HOP = Hopi
HOU = House Rock
HUA = Hualapai Valley
KAI = Kaibito
KAN = Kanab
LIC = Little Chino Valley
LHA = Lower Hassayampa
LSP = Lower San Pedro basin
LSC = Lower Santa Cruz basin
LVR = Lower Verde Valley
MMU = McMullen Valley
MNV = Monument Valley
N-C = New River-Cave Creek
PSC = Peach Spring Canyon
PRZ = Puerco-Zuni
RAN = Ranegras Plain
SAC = Sacramento Valley
SAF = Safford basin
SRV = Salt River Valley
SBV = San Bernardino Valley
SFP = San Francisco Peaks
SFR = San Francisco River basin
SSI = San Simon basin
SSW = San Simon Wash
SHV = Shivwits
SNO = Snowflake
STJ = St. Johns
TON = Tonto basin
TUB = Tuba City
USR = Upper Salt River basin
USP = Upper San Pedro basin
USC = Upper Santa Cruz basin
VER = Upper Verde Valley
VRG = Virgin River
WAT = Waterman Wash
WMD = Western Mexican drainage
WHM = White Mountains
WRB = White River basin
WIL = Willcox basin
WMN = Williamson Valley
YUM = Yuma



EXPLANATION

AREA FOR WHICH GROUND-WATER BASIC-DATA INVENTORY IS IN PROGRESS—As of July 1976

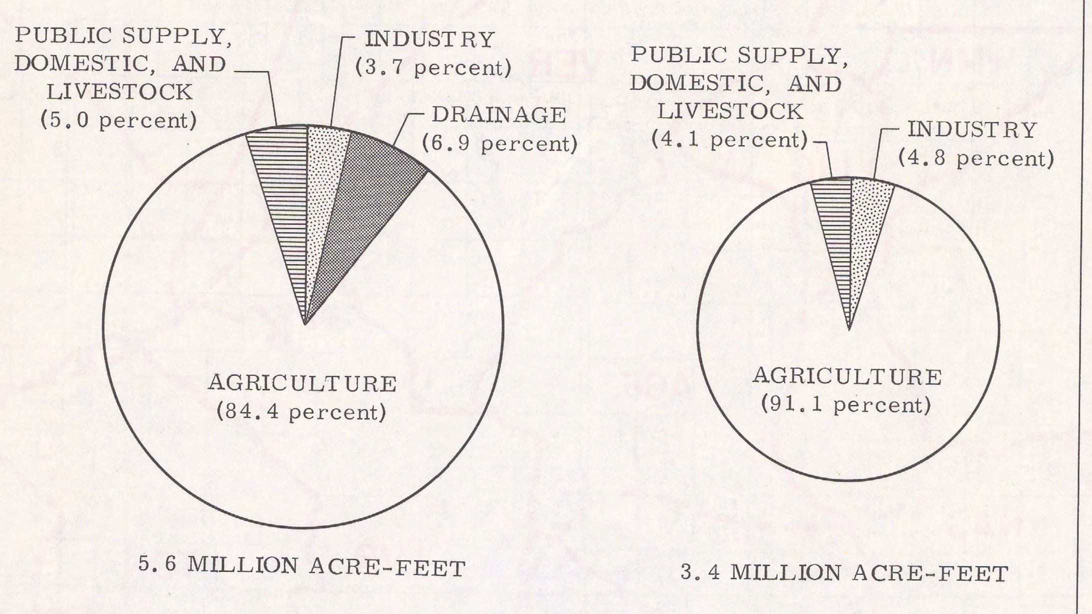
AREA FOR WHICH A REPORT IS IN PREPARATION—As of July 1976

AREA FOR WHICH A REPORT HAS BEEN RELEASED

AREA BOUNDARY

WATER-PROVINCE BOUNDARY

STATUS OF GROUND-WATER INVENTORY



ESTIMATED WATER WITHDRAWAL IN ARIZONA IN 1975

EXPLANATION

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

N PUMPAGE LESS THAN 500 ACRE-FEET

AREA BOUNDARY

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 total pumpage in these areas is estimated to be about 21,000 acre-feet for 1975 (see table).

ESTIMATED GROUND-WATER PUMPAGE IN ARIZONA DURING 1975

ESTIMATED ANNUAL GROUND-WATER PUMPAGE, IN THOUSANDS OF ACRE-FEET, IN ARIZONA, BY AREA
[NUMBERS ROUNDED TO NEAREST THOUSAND ACRE-FEET. AREA: AVR, SEE MAPS FOR LOCATION]

YEAR	AVR	BIC	BLM	BOD	BUT	CDI	CHV	CHN	COP	CHI	CON	DOU	DUN	GIL	GRD	GTD	GWA	HAR
PRIOR TO 1915	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--
1915	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	4	--	--
1916	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	4	--	--
1917	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	4	--	--
1918	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	4	--	--
1919	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	6	--	--
1920	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	6	--	--
1921	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	3	--	--
1922	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	3	--	--
1923	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	10	--	--
1924	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	15	--	--
1925	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	15	--	--
1926	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	20	--	--
1927	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	20	--	--
1928	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	20	--	--
1929	--	--	--	--	--	--	--	--	--	--	--	N	--	--	--	10	--	--
1930	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	15	--	--
1931	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	20	--	--
1932	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	20	--	--
1933	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	15	--	--
1934	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	15	--	--
1935	1	--	--	--	--	--	--	--	--	--	--	2	N	2	--	20	--	--
1936	1	--	--	--	--	--	--	--	--	--	--	2	N	2	--	20	--	--
1937	4	--	--	--	--	--	--	--	--	--	--	2	N	2	--	25	--	--
1938	8	--	--	--	--	--	--	--	--	--	--	2	1	2	--	25	--	--
1939	9	--	--	--	--	--	--	--	--	--	--	2	1	2	--	25	--	--
1940	12	--	--	--	--	--	--	--	--	--	--	5	2	19	1	25	--	1
1941	10	--	--	--	--	--	--	--	--	--	--	5	1	19	1	25	--	1
1942	6	--	--	--	--	--	--	--	--	--	--	5	2	19	2	30	--	1
1943	20	--	--	--	--	--	--	--	--	--	--	5	7	20	2	35	--	1
1944	19	--	--	--	--	--	--	--	--	--	--	5	8	20	6	37	--	1
1945	23	--	--	--	--	--	--	--	--	--	--	8	6	20	9	35	--	1
1946	23	--	--	--	--	--	--	--	--	--	--	12	17	33	11	38	--	1
1947	34	--	--	--	--	--	--	--	--	--	--	17	21	40	11	43	--	1
1948	38	--	--	--	--	--	--	--	--	--	--	22	21	61	7	50	--	1
1949	48	--	--	--	--	--	--	--	--	--	--	30	11	67	13	45	--	1
1950	41	20	--	--	--	--	--	--	--	--	--	35	23	59	15	46	--	5
1951	75	20	--	--	--	--	--	--	--	--	--	38	33	104	21	50	--	7
1952	80	20	--	--	--	--	--	--	--	--	--	42	17	120	32	40	--	10
1953	85	20	--	--	--	--	--	--	--	--	--	45	30	145	42	16	--	20
1954	90	20	--	--	--	--	--	--	--	--	--	42	27	139	37	9	--	33
1955	95	20	--	--	--	--	--	--	--	--	--	50	25	140	31	8	--	30
1956	100	20	--	--	--	--	--	--	--	--	--	60	20	180	30	5	--	40
1957	110	20	--	--	--	--	--	--	--	--	--	55	20	180	30	5	--	50
1958	120	20	--	--	--	--	--	--	--	5	--	55	25	200	30	2	--	60
1959	130	20	--	--	--	--	--	--	--	10	--	55	25	250	40	2	--	95
1960	140	20	--	--	--	--	--	--	--	10	--	60	25	250	50	2	--	125
1961	145	20	--	--	--	--	--	--	--	10	--	65	25	200	50	140A	--	100
1962	140	20	--	--	--	--	--	--	--	10	--	65	25	170	50	215A	--	200
1963	115	20	--	--	--	--	--	--	--	10	--	65	25	130	60	201A	--	200
1964	115	20	--	--	--	--	--	--	--	15	--	60	25	130	65	181A	--	200
1965	125	20	--	--	--	--	--	--	--	13	--	90	25	115	65	186A	--	200
1966	95	20	--	--	--	--	--	--	--	12	--	105	25	145	80	217A	--	160
1967	121	9	--	--	--	--	--	--	--	20	--	120	25	198	100	213A	--	170
1968	134	9	--	--	--	--	--	--	--	17	--	120	25	153	126	220A	--	165
1969	155	9	--	--	--	--	--	--	--	12	--	104	25	166	120	218A	--	145
1970	157	9	--	--	--	--	--	--	--	12	--	103	25	162	108	218A	--	111
1971	140	9	--	--	--	--	--	--	--	16	--	95	25	212	122	215A	--	99
1972	146	8	--	--	--	--	--	--	--	19	--	89	25	238	125	201A	--	108
1973	152	8	--	--	--	--	--	--	--	25	--	110	25	198	143	208A	--	109
1974	156	11	5	N	4	2	N	1	N	28	3	138	25	249	191	206A	N	137
1975	187	12	5	N	5	3	N	2	N	32	5	118	25	288	164	210A	N	140
TOTAL	3405	424	10B	-B	9B	5B	-B	3B	-B	276	8B	2118	743	4849	1990	3946	-B	2729

YEAR	HOL	HOP	HOU	HUA	KAI	KAN	LIC	LHA	LSP	LSC	MMU	MNV	PSC	PRZ	RAN	SAC	SAF
PRIOR TO 1915	--	--	--	--	--	--	--	--	--	200	--	--	--	--	--	--	--
1915	--	--	--	--	--	--	--	--	--	82	--	--	--	--	--	--	--
1916	--	--	--	--	--	--	--	--	--	83	--	--	--	--	--	--	--
1917	--	--	--	--	--	--	--	--	--	84	--	--	--	--	--	--	--
1918	--	--	--	--	--	--	--	--	--	85	--	--	--	--	--	--	--
1919	--	--	--	--	--	--	--	--	--	86	--	--	--	--	--	--	--
1920	--	--	--	--	--	--	--	--	--	88	--	--	--	--	--	--	--
1921	--	--	--	--	--	--	--	--	--	90	--	--	--	--	--	--	--
1922	--	--	--	--	--	--	--	--	--	93	--	--	--	--	--	--	--
1923	--	--	--	--	--	--	--	--	--	96	--	--	--	--	--	--	--
1924	--	--	--	--	--	--	--	--	--	99	--	--	--	--	--	--	--
1925	--	--	--	--	--	--	--	--	--	101	--	--	--	--	--	--	--
1926	--	--	--	--	--	--	--	--	--	104	--	--	--	--	--	--	--
1927	--	--	--	--	--	--	--	--	--	106	--	--	--	--	--	--	--
1928	--	--	--	--	--	--	--	--	--	109	--	--	--	--	--	--	--
1929	--	--	--	--	--	--	--	--	--	111	--	--	--	--	--	--	--
1930	--	--	--	--	--	--	--	--	--	135	--	--	--	--	--	--	--
1931	--	--	--	--	--	--	--	--	--	160	--	--	--	--	--	--	--
1932	--	--	--	--	--	--	--	--	--	185	--	--	--	--	--	--	--
1933	--	--	--	--	--	--	--	--	--	210	--	--	--	--	--	--	--
1934	--	--	--	--	--	--	--	--	--	235	--	--	--	--	--	--	--
1935	--	--	--	--	--	--	--	--	--	260	--	--	--	--	--	--	20
1936	--	--	--	--	--	--	--	--	--	285	--	--	--	--	--	--	20
1937	--	--	--	--	--	--	2	--	--	305	--	--	--	--	--	--	20
1938	--	--	--	--	--	--	3	--	--	325	--	--	--	--	--	--	20
1939	--	--	--	--	--	--	4	--	--	352	--	--	--	--	--	--	20
1940	--	--	--	--	--	--	4	--	--	372	N	--	--	--	--	N	25
1941	--	--	--	--	--	--	4	--	--	421	N	--	--	--	--	N	9
1942	--	--	--	--	--	--	5	--	--	500	N	--	--	--	--	N	19
1943	--	--	--	--	--	--	6	--	--	515	N	--	--	--	--	N	35
1944	--	--	--	--	--	--	7	--	--	530	N	--	--	--	--	N	52
1945	--	--	--	--	--	--	7	--	--	610	2	--	--	--	--	N	35
1946	--	--	--	--	--	--	8	--	--	660	2	--	--	--	--	N	115
1947	--	--	--	--	--	--	9	--	--	700	2	--	--	--	--	N	100
1948	--	--	--	--	--	--	12	--	--	950	2	--	--	--	--	N	110
1949	--	--	--	--	--	--	12	--	--	1100	2	--	--	--	--	N	40
1950	--	--	--	--	--	--	13	--	--	1000	2	--	--	--	2	N	90
1951	--	--	--	--	--	--	13	--	--	1030	2	--	--	--	5	N	125
1952	--	--	--	--	--	--	12	--	--	950	5	--	--	--	15	N	70
1953	--	--	--	--	--	--	13	--	--	1400	6	--	--	--	22	N	120
1954	--	--	--	--	--	--	12	--	--	1200	7	--	--	--	19	N	90
1955	--	--	--	--	--	--	13	--	--	1200	9	--	--	--	16	N	90
1956	--	--	--	--	--	--	14	--	--	1100	15	--	--	--	16	N	90
1957	--	--	--	--	--	--	14	--	--	1100	21	--	--	--	9	N	100
1958	--	--	--	--	--	--	14	--	--	1200	38	--	--	--	10	N	50
1959	--	--	--	--	--	--	14	--	--	1200	50	--	--	--	10	N	100
1960	--	--	--	N	--	--	14	--	--	1100	60	--	--	--	11	N	90
1961	--	--	--	1	--	--	15	--	--	1150	70	--	--	--	12	N	140
1962	--	--	--	1	--	--	15	--	--	1050	65	--	--	--	15	N	60
1963	--	--	--	1	--	--	13	--	--	1000	75	--	--	--	17	N	80
1964	--	--	--	2	--	--	13	--	--	1150	90	--	--	--	7	N	110
1965	--	--	--	2	--	--	14	--	--	910	90	--	--	--	6	4	150
1966	--	--	--	3	--	--	14	--	30	915	105	--	--	--	7	4	90
1967	--	--	--	4	--	--	12	--	29	1120	98	--	--	--	12	4	145
1968	--	--	--	4	--	--	12	--	42	910	95	--	--	--	15	6	78
1969	--	--	--	4	--	--	12	--	51	1043	98	--	--	--	16	5	140
1970	--	--	--	4	--	--	12	--	58	890	86	--	--	--	15	4	120
1971	--	--	--	4	--	--	12	--	51	819	101	--	--	--	15	5	190
1972	--	--	--	4	--	--	12	--	53	798	112	--	--	--	19	6	130
1973	--	--	--	4	--	--	12	91	57	990	113	--	--	--	19	5	140
1974	16	N	N	5	N	N	13	89	61	1130	139	N	N	1	22	7	110
1975	16	N	N	4	N	N	15	94	59	973	149	N	N	2	13	8	145
TOTAL	32B	-B	-B	47	-B	-B	425	274C	491D	37755	1711	-B	-B	3B	345	58	3483

YEAR	SRV	SFP	SSI	SHV	SNO	STJ	TUB	USP	USC	VER	VRG	WAT	WHM	WIL	WMN	YUM	OTHERS	TOTAL	YEAR
PRIOR TO 1915	57	--	5	--	--	--	--	--	80	--	--	--	--	--	--	--	--	347	PRIOR TO 1915
1915	15	--	10	--	--	--	--	--	7	--	--	--	--	2	--	2	--	123	1915
1916	15	--	8	--	--	--	--	--	7	--	--	--	--	2	--	2	--	122	1916
1917	15	--	8	--	--	--	--	--	8	--	--	--	--	1	--	2	--	122	1917
1918	40	--	6	--	--	--	--	--	8	--	--	--	--	N	--	3	--	146	1918
1919	60	--	6	--	--	--	--	--	10	--	--	--	--	N	--	4	--	172	1919
1920	95	--	5	--	--	--	--	--	35	--	--	--	--	N	--	4	--	233	1920
1921	100	--	5	--	--	--	--	--	20	--	--	--	--	N	--	4	--	222	1921
1922	200	--	5	--	--	--	--	--	30	--	--	--	--	N	--	4	--	335	1922
1923	400	--	5	--	--	--	--	--	37	--	--	--	--	N	--	4	--	552	1923
1924	500	--	5	--	--	--	--	--	45	--	--	--	--	N	--	4	--	668	1924
1925	500	--	5	--	--	--	--	--	42	--	--	--	--	N	--	5	--	668	1925
1926	500	--	4	--	--	--	--	--	40	--	--	--	--	1	--	6	--	675	1926
1927	500	--	4	--	--	--	--	--	40	--	--	--	--	1	--	7	--	678	1927
1928	500	--	4	--	--	--	--	--	45	--	--	--	--	2	--	8	--	688	1928
1929	600	--	4	--	--	--	--	--	40	--	--	--	--	2	--	9	--	776	1929
1930	650	--	4	--	--	--	--	--	38	--	--	--	--	1	--	10	--	854	1930
1931	600	--	4	--	--	--	--	--	25	--	--	--	--	1	--	11	--	822	1931
1932	300	--	3	--	--	--	--	--	20	--	--	--	--	1	--	12	--	543	1932
1933	572	--	3	--	--	--	--	--	16	--	--	--	--	1	--	13	--	832	1933
1934	711	--	3	--	--	--	--	--	30	--	--	--	--	1	--	14	--	1011	1934
1935	554	--	3	--	--	--	--	--	28	--	--	--	--	1	--	15	5	911	1935
1936	684	--	3	--	--	--	--	--	32	--	--	--	--	1	--	16	5	1071	1936
1937	665	--	3	--	--	--	--	--	35	--	--	--	--	1	--	17	10	1091	1937
1938	905	--	3	--	--	--	--	--	40	--	--	--	--	2	--	18	10	1364	1938
1939	738	--	3	--	--	--	--	--	50	--	--	--	--	2	--	19	20	1247	1939
1940	943	--	3	--	--	--	--	--	62	--	--	N	--	2	--	19	25	1520	1940
1941	444	--	3	--	--	--	--	--	70	--	--	N	--	5	--	20	25	1063	1941
1942	1004	--	4	--	--	--	--	--	94	--	--	N	--	5	--	21	25	1742	1942
1943	1104	--	4	--	--	--	--	--	95	--	--	N	--	5	--	22	25	1901	1943
1944	1017	--	4	--	--	--	--	--	100	--	--	N	--	5	--	20	25	1856	1944
1945	1143	--	5	--	--	--	--	--	106	--	--	N	--	9	--	22	25	2066	1945
1946	1360	--	6	--	--	--	--	--	109	--	--	N	--	15	--	32	30	2472	1946
1947	1406	--	6	--	--	--	--	--	136	--	--	N	--	20	--	39	30	2615	1947
1948	1670	--	6	--	--	--	--	--	135	--	--	1	--	23	--	62	35	3206	1948
1949	1644	--	6	--	--	--	--	--	132	--	--	1	--	28	--	65	35	3280	1949
1950	1852	--	6	--	--	--	--	--	160	--	--	5	--	35	2	64	40	3515	1950
1951	1910	--	6	--	--	--	--	--	180	--	--	10	--	38	2	70	50	3789	1951
1952	2020	--	15	--	--	--	--	--	195	--	--	17	--	39	2	68	50	3819	1952
1953	2300	--	25	--	--	--	--	--	200	--	--	28	--	94	2	69	50	4732	1953
1954	2300	--	32	--	--	--	--	--	200	--	--	30	--	105	2	69	50	4513	1954
1955	2240	--	40	--	--	--	--	--	200	--	--	40	--	110	2	72	50	4481	1955
1956	2300	--	40	--	--	--	--	--	200	--	--	40	--	120	2	87	60	4539	1956
1957	2300	--	48	--	--	--	--	--	200	--	--	40	--	135	2	114	60	4613	1957
1958	2300	--	50	--	--	--	--	--	175	--	--	45	--	155	2	121	60	4737	1958
1959	2206	--	50	--	--	--	--	--	165	--	--	50	--	183	2	122	60	4839	1959
1960	2005	--	60	--	--	--	--	--	165	--	--	60	--	195	2	122	75	4641	1960
1961	2178	--	65	--	--	--	--	--	175	--	--	65	--	184	2	124	90	5026	1961
1962	1976	--	65	--	--	--	--	--	200	--	--	50	--	180	2	121	110	4805	1962
1963	2134	--	65	--	--	--	--	--	180	--	--	50	--	180	2	121	110	4854	1963
1964	1972	--	75	--	--	--	--	--	175	--	--	50	--	220	2	154	120	4951	1964
1965	1500	--	70	--	--	--	--	--	200	--	--	45	--	250	2	179	150	4411	1965
1966	1350	--	72	--	--	--	--	35	190	--	--	45	--	240	2	178	100	4239	1966
1967	1763	--	76	--	--	--	--	34	200	--	--	52	--	300	2	229	100	5156	1967
1968	1264	--	81	--	--	--	--	29	210	--	--	54	--	290	2	234	100	4395	1968
1969	1600	--	78	--	--	--	--	28	236	--	--	60	--	291	2	231	100	4949	1969
1970	1700	--	105	--	--	--	--	33	240	--	--	55	--	289	2	220	100	4838	1970
1971	1800	--	107	--	--	--	--	36	258	--	--	55	--	309	2	233	100	5030	1971
1972	1800	--	104	--	--	--	--	38	253	--	--	57	--	292	2	257	100	4996	1972
1973	1200	--	115	--	--	--	--	41	280	--	--	55	--	305	2	272	100	4779	1973
1974	1800	2	135	N	29	1	N	45	279	4	5	69	3	339	2	247	24	5733	1974
1975	1750	4	122	N	21	3	1	63	295	4	5	64	3	293	2	255	21	5580	1975
TOTAL	71731	6B	1875	-B	50B	4B	1B	382D	7258	8B	10B	1193	6B	5311	52	4568E	2364F	159958	TOTAL

EXPLANATION OF SYMBOLS

N: PUMPAGE OF 500 ACRE-FEET OR LESS.

A: WITHDRAWAL FOR DRAINAGE PURPOSES ONLY.

B: PUMPAGE FOR THESE AREAS WAS NOT COMPUTED PRIOR TO 1974. THUS, TOTAL IS FOR 1974-75 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 1973-75 ONLY.

D: PUMPAGE FOR USP AND LSP AREAS WAS NOT ESTIMATED PRIOR TO 1966. THUS, TOTAL IS FOR 1966-75 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 AND IN 1961 IN SOUTH GILA VALLEY, PART OF THE PUMPAGE WAS FOR DRAINAGE OF WATERLOGGED LANDS.

F: "OTHERS" INCLUDES: AGUA FRIA BASIN, ALTAR VALLEY, ARAVAIPA VALLEY, BIG SANDY VALLEY, BILL WILLIAMS, BLACK RIVER BASIN, GILA RIVER FROM HEAD OF SAN CARLOS RESERVOIR TO KELVIN, HASSAYAMPA BASIN, LOWER VERDE VALLEY, NEW RIVER-CAVE CREEK, SAN BERNARDINO VALLEY, SAN FRANCISCO RIVER BASIN, SAN SIMON WASH, TONTO BASIN, UPPER SALT RIVER BASIN, WESTERN MEXICAN DRAINAGE, AND WHITE RIVER BASIN. PUMPAGE IN THESE AREAS IS MOSTLY FROM DOMESTIC AND STOCK WELLS AND THE AMOUNT IS UNKNOWN. TOTAL ANNUAL PUMPAGE FOR THESE AREAS IS ESTIMATED.

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Introduction

In arid and semiarid regions such as Arizona, the availability of adequate water supplies has an effect on the type and extent of economic development. The nature and extent of the ground-water reservoirs must be known for proper management of this valuable resource. Since 1939, the U.S. Geological Survey has conducted a program of ground-water studies in cooperation with the State of Arizona, which is represented by the Arizona Water Commission. The program includes the collection and analysis of the geologic and hydrologic data necessary to evaluate the ground-water resources of the State. The basic data collected, the results of areal studies, and research findings are presented mainly in publications of the U.S. Geological Survey and the Arizona Water Commission, but some appear in technical journals and other publications. (See section entitled "Recent publications prepared by personnel of the U.S. Geological Survey in Arizona.")

In spring 1974 the U.S. Geological Survey in cooperation with the Arizona Water Commission revised the system of collecting ground-water data in Arizona. Under the revised system, several selected areas (see map showing status of ground-water inventory) are studied in detail each year. The types of data collected include information on wells drilled since previous inventories, water-level measurements, pumpage data, and chemical quality-of-water data. The data collected for an area are entered into computer storage, and computer printouts are available to the public. In areas where sufficient data are available the computer printouts consist of three parts: (1) spring and well information, including construction and production data; (2) chemical analyses of ground water; and (3) water-level measurements for the period of record. The data are analyzed, and the results are presented in a series of maps. Typically, the maps show depth to water; change in water levels; altitude of the water table; and quality-of-water data, such as specific conductance, dissolved solids, and fluoride.

Reporting of Data

For use of those readers who may prefer to use metric units rather than English units, the conversion factors for the terms used in this report are listed below:

Multiply English units	By	To obtain metric units
feet (ft)	0.3048	meters (m)
gallons per minute (gal/min)	.06309	liters per second (L/s)
acre-feet (acre-ft)	.001233	cubic hectometers (hm^3)

Availability and Use of Water

In Arizona the availability of adequate and potable water supplies has as great an influence on the location of cities and cropland as any other factor. Agriculture is dependent almost entirely on irrigation because rainfall is inadequate for raising crops. Some surface water is available in a few areas, but the amount is not sufficient to meet the continually increasing demand. For many years, nearly two-thirds of Arizona's water supply has been withdrawn from the ground-water reservoirs; the principal use of the ground water is for the irrigation of crops, although municipal and industrial uses are increasing steadily.

The principal map (see sheet 2) shows potential well production, depth to water in selected wells in spring 1976, and change in water levels in selected wells from 1971 to 1976. The map showing estimated ground-water pumpage gives the amount of water pumped in 1975; the annual and accumulated pumpage since the beginning of record are shown in the table. In 1975 the withdrawal of ground water was about 5.6 million acre-ft. In the last 5 years the withdrawal of ground water has averaged 5.2 million acre-ft per year. About 4.7 million acre-ft of ground water was used for the irrigation of crops in 1975; the rest was for public supply, industrial, domestic, and livestock uses, and some ground water was pumped for drainage of waterlogged lands. Through 1975, about 160 million acre-ft of ground water had been withdrawn from the ground-water reservoirs in Arizona. In addition to the ground water pumped about 3.4 million acre-ft of surface water was diverted and used in the State in 1975. Thus, the total water use was about 9.0 million acre-ft in 1975. The use of ground water and the effects of this use on the ground-water reservoirs in each of the three water provinces (see maps) 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. Although the province covers only about 45 percent of the State, it contains more than 90 percent of the cultivated land and more than 80 percent of the population. The major ground-water reservoirs are mainly sedimentary deposits in the central parts of the basins, but small supplies of water can be obtained locally from the crystalline and consolidated sedimentary rocks in the mountains bounding the basins. In 1975 about 5.5 million acre-ft of water was withdrawn in the province; through 1975 nearly 157 million acre-ft of ground water had been withdrawn. As a result, water levels are declining in much of the area.

Central highlands province.--The Central highlands province is the smallest of the three water provinces. In this province ground water is obtained from thick sedimentary deposits in a few areas, from thin sedimentary deposits along stream channels, and locally from fractured crystalline and consolidated sedimentary rocks that are the dominant rock types in the province. Only a few thousand acres of land is under cultivation, and the amount of ground water withdrawn is small—about 33,000 acre-ft in 1975. The small amount of ground-water withdrawal has not resulted in any notable water-level declines except in parts of Chino Valley, where a decline of a few feet per year has been measured in the artesian aquifer.

Plateau uplands province.--In the Plateau uplands province ground-water development is small compared with that in the Basin and Range lowlands province, but it is somewhat greater than that in the Central highlands province. Most of the ground water is pumped from layered sandstone that stores ground water under both confined and unconfined conditions and from thin deposits of sediment 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 areas. In 1975 about 70,000 acre-ft of ground water was withdrawn in the province. For the most part, no pattern of rise or decline in water levels is discernible.

Recent Publications Prepared by Personnel of the U.S. Geological Survey in Arizona

The following reports on the water resources and geology of Arizona were published or released to the open file from July 1, 1975, through June 30, 1976.

Babcock, H. M., 1976, Annual summary of ground-water conditions in Arizona, spring 1974 to spring 1975: U.S. Geol. Survey Water-Resources Inv. 76-59, maps.

Burkham, D. E., 1976, Flow from small watersheds adjacent to the study reach of the Gila River Phreatophyte Project, Arizona: U.S. Geol. Survey Prof. Paper 655-I, 19 p.

________ 1976, Hydraulic effects of changes in bottom-land vegetation on three major floods, Gila River in southeastern Arizona: U.S. Geol. Survey Prof. Paper 655-J, 14 p.

________ 1976, Effects of changes in an alluvial channel on the timing, magnitude, and transformation of flood waves, southeastern Arizona: U.S. Geol. Survey Prof. Paper 655-K, 25 p.

Denis, E. E., 1975, Maps showing ground-water conditions in the Waterman Wash area, Maricopa and Pinal Counties, Arizona—1975: Arizona Water Comm. Hydrol. Map Ser., Map H-1, maps.

________ 1976, Maps showing ground-water conditions in the Harquahala Plains area, Maricopa and Yuma Counties, Arizona—1975: U.S. Geol. Survey Water-Resources Inv. 76-33, maps.

Hanson, R. L., and Dawdy, D. R., 1976, Accuracy of evapotranspiration rates determined by the water-budget method, Gila River flood plain, southeastern Arizona: U.S. Geol. Survey Prof. Paper 655-L, 35 p.

Hjalmarson, H. W., 1975, Possible effects of vegetation conversion on runoff and sediment yield, Sycamore Creek watersheds, Maricopa County, Arizona—Calibration-period analysis: U.S. Geol. Survey open-file report 75-425, 77 p.

Laney, R. L., 1975, Weathering of granodioritic rocks and geochemistry of water in the Rose Canyon Lake area, Santa Catalina Mountains, Arizona [abs.]: Geol. Soc. America Abstracts with programs, v. 7, no. 7, p. 1160.

McDonald, C. C., and Loeltz, O. J., 1976, Water resources of lower Colorado River-Salton Sea area as of 1971, summary report: U.S. Geol. Survey Prof. Paper 486-A, 34 p.

Mann, L. J., 1975, Geohydrology of the Coconino aquifer in southern Navajo County, Arizona [abs.]: Geol. Soc. America Abstracts with programs, v. 7, no. 7, p. 1188.

________ 1975, Ground-water resources and water use in southern Navajo County, Arizona: Arizona Water Comm. Bull. 10, 106 p.

Moore, R. T., and Varga, R. J., 1976, Maps showing nonmetallic mineral deposits in the Phoenix area, Arizona: U.S. Geol. Survey Misc. Inv. Ser. Map I-845-J, 1 sheet.

Schumann, H. H., 1975, Operational applications of satellite snowcover observations and LANDSAT data-collection system operations in central Arizona, in Proceedings of a workshop on operational applications of satellite snowcover observations: Natl. Aeronautics and Space Adm. SP-391, p. 13-28.

Stulik, R. S., and Laney, R. L., 1976, Maps showing ground-water conditions in the lower Hassayampa area, Maricopa County, Arizona—1975: U.S. Geol. Survey Water-Resources Inv. 76-35, maps.

U.S. Geological Survey, 1975, Water resources data for Arizona, 1974—Part 2. Water quality records: U.S. Geol. Survey duplicated report, 192 p.

Wallace, B. L., and Laney, R. L., 1976, Maps showing ground-water conditions in the lower Big Chino Valley and Williamson Valley areas, Yavapai and Coconino Counties, Arizona—1975-76: U.S. Geol. Survey Water-Resources Inv. 76-78, maps.

Wilkins, D. W., and Webb, W. C., 1976, Maps showing ground-water conditions in the Ranegras Plain and Butler Valley areas, Yuma County, Arizona—1975: U.S. Geol. Survey Water-Resources Inv. 76-34, maps.

Winikka, C. C., and Schumann, H. H., 1975, Arizona land-use experiment, in Proceedings of the NASA earth resources survey symposium—volume 1-C: Natl. Aeronautics and Space Adm. TM X-58168, JSC-09930, p. 1553-1572.

ANNUAL SUMMARY OF GROUND-WATER CONDITIONS IN ARIZONA, SPRING 1975 TO SPRING 1976

By

H. M. Babcock