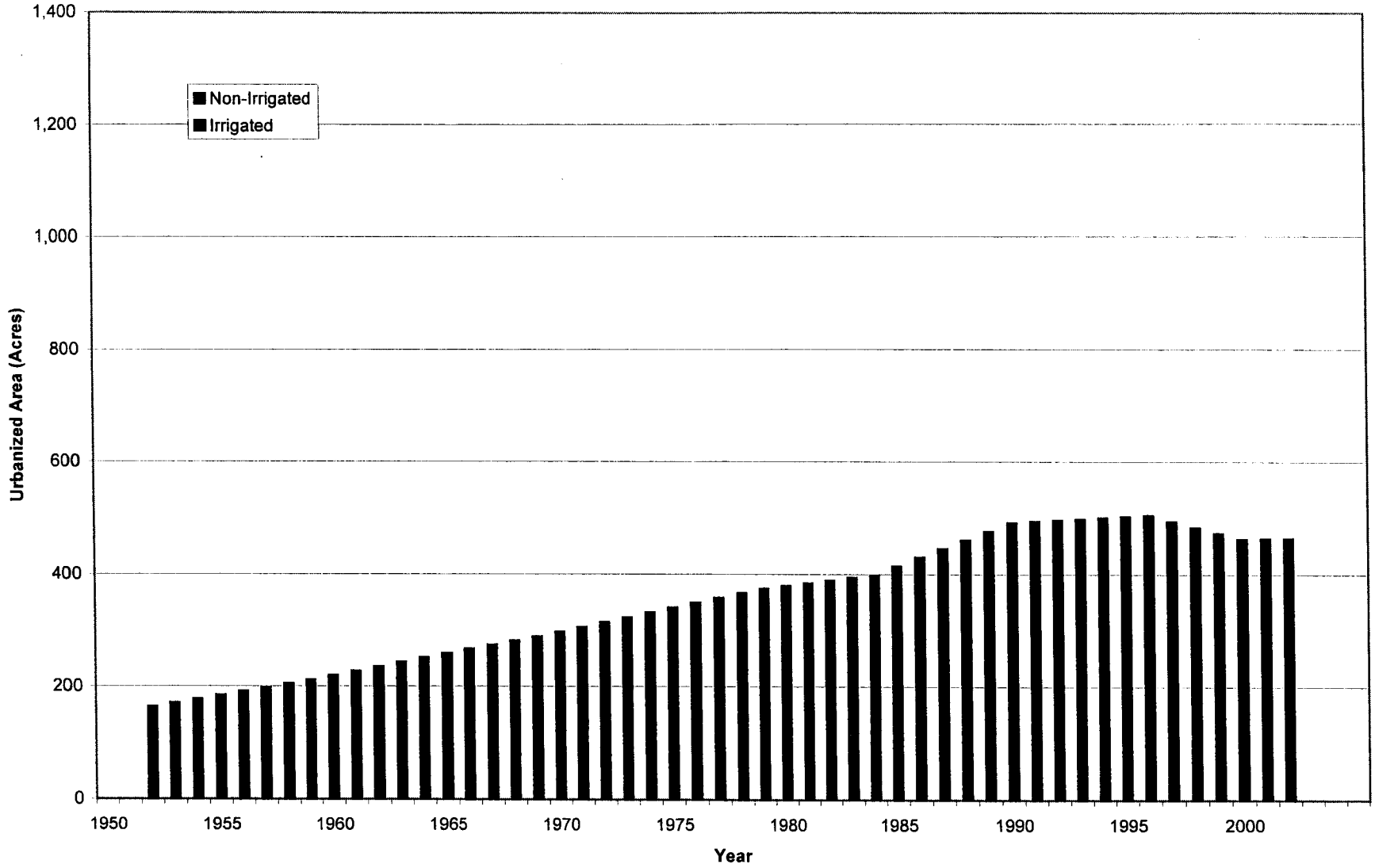

Figure 2.2i Urbanized and Landscaped Area within the Turlock Groundwater Basin, 1952-2002, for Hughson

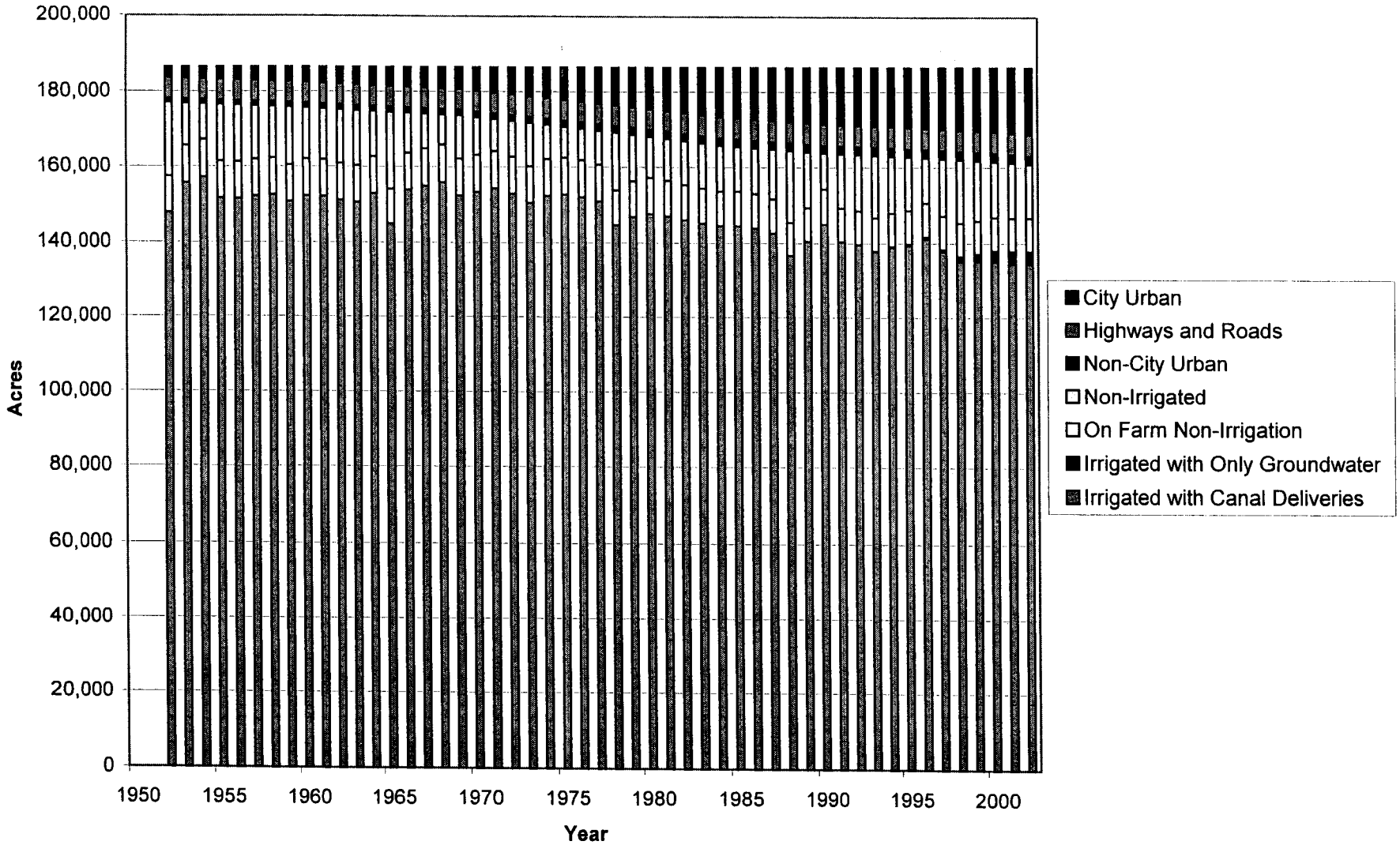

Figure 2.3 Land Use within the Turlock Groundwater Basin, 1952-2002, for Turlock Irrigation District

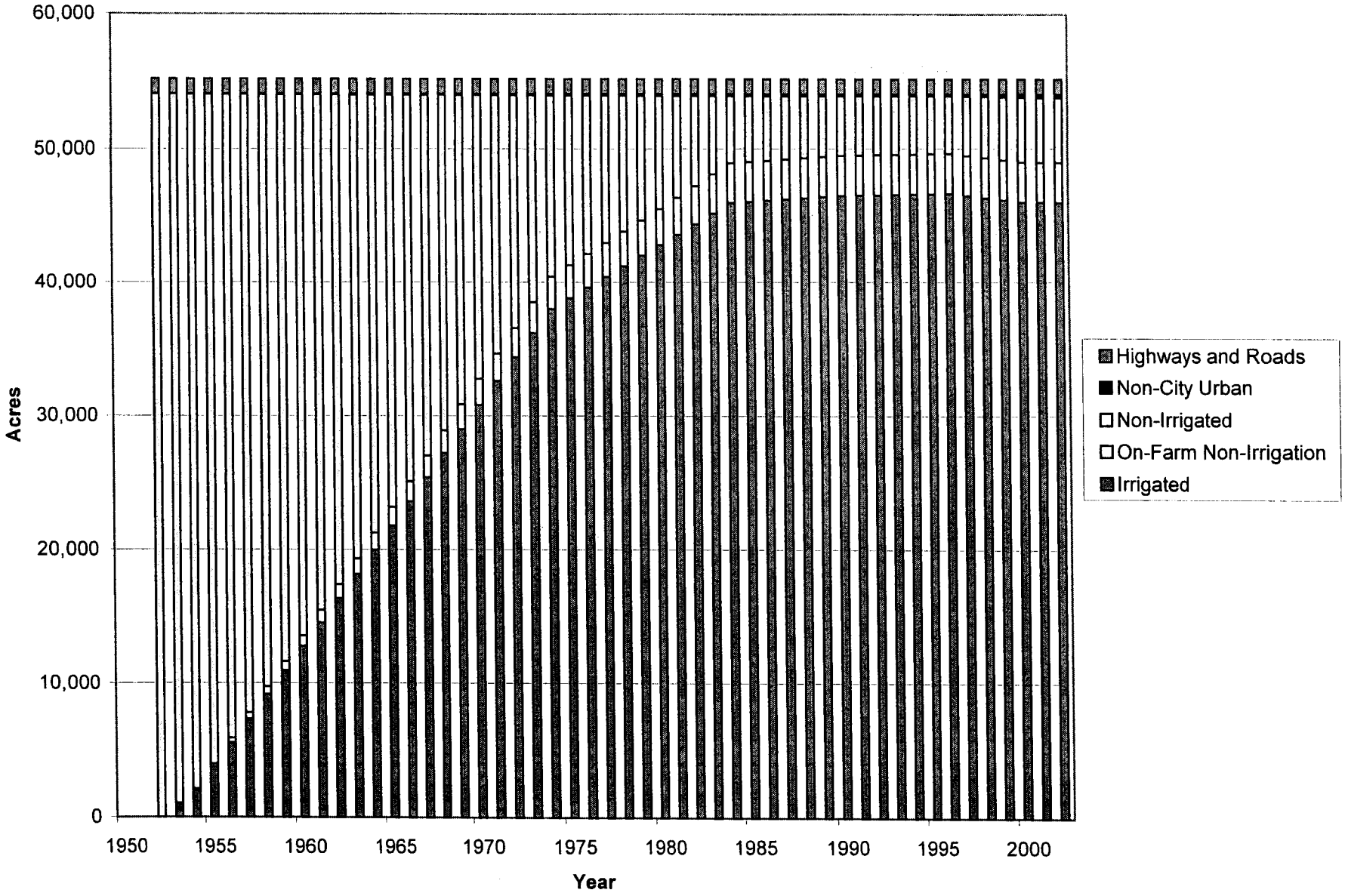

Figure 2.4a Land Use within the Turlock Groundwater Basin, 1952-2002, for Eastside Water District

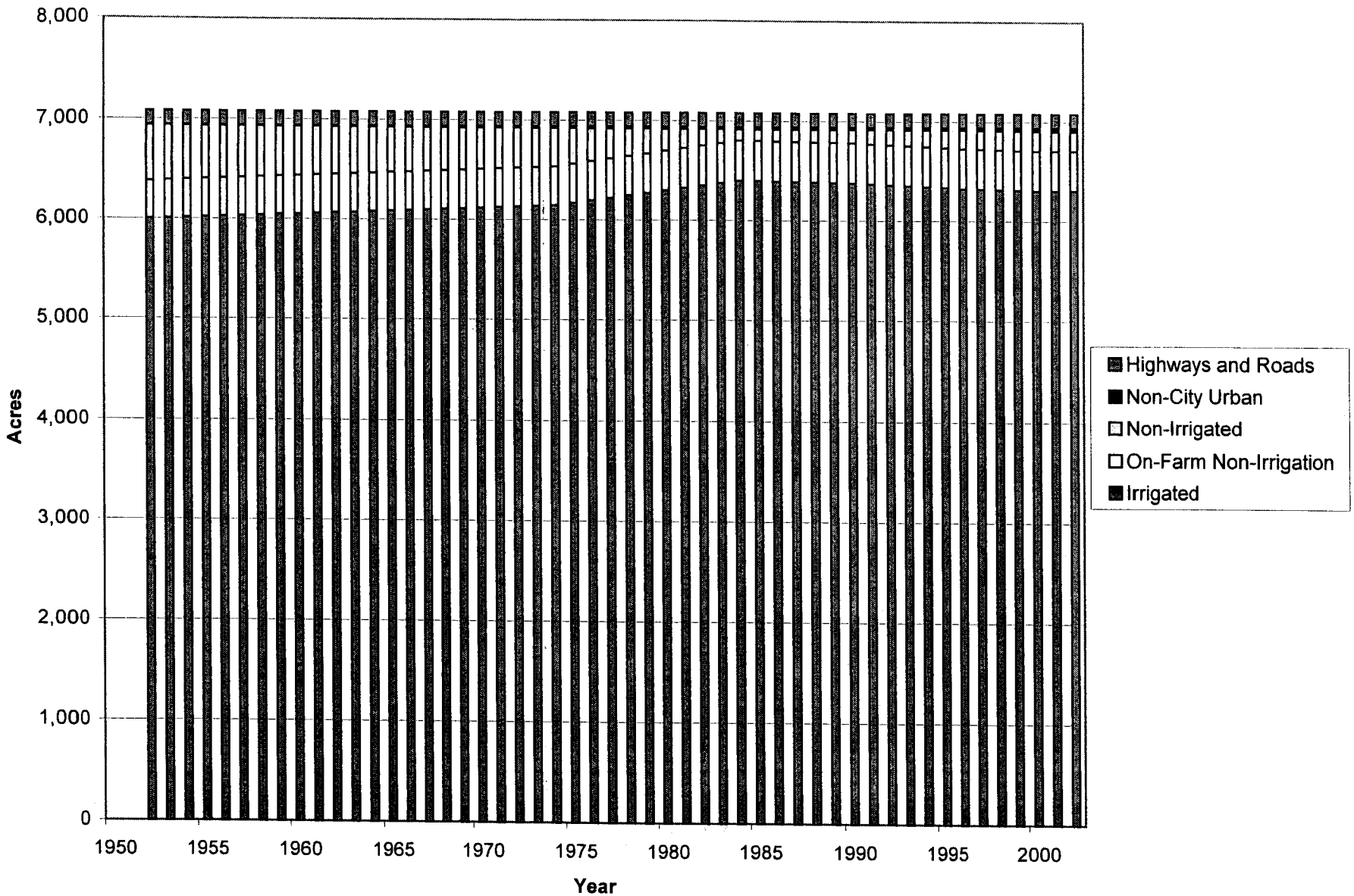

Figure 2.4b Land Use within the Turlock Groundwater Basin, 1952-2002, for Ballico-Cortez Water District

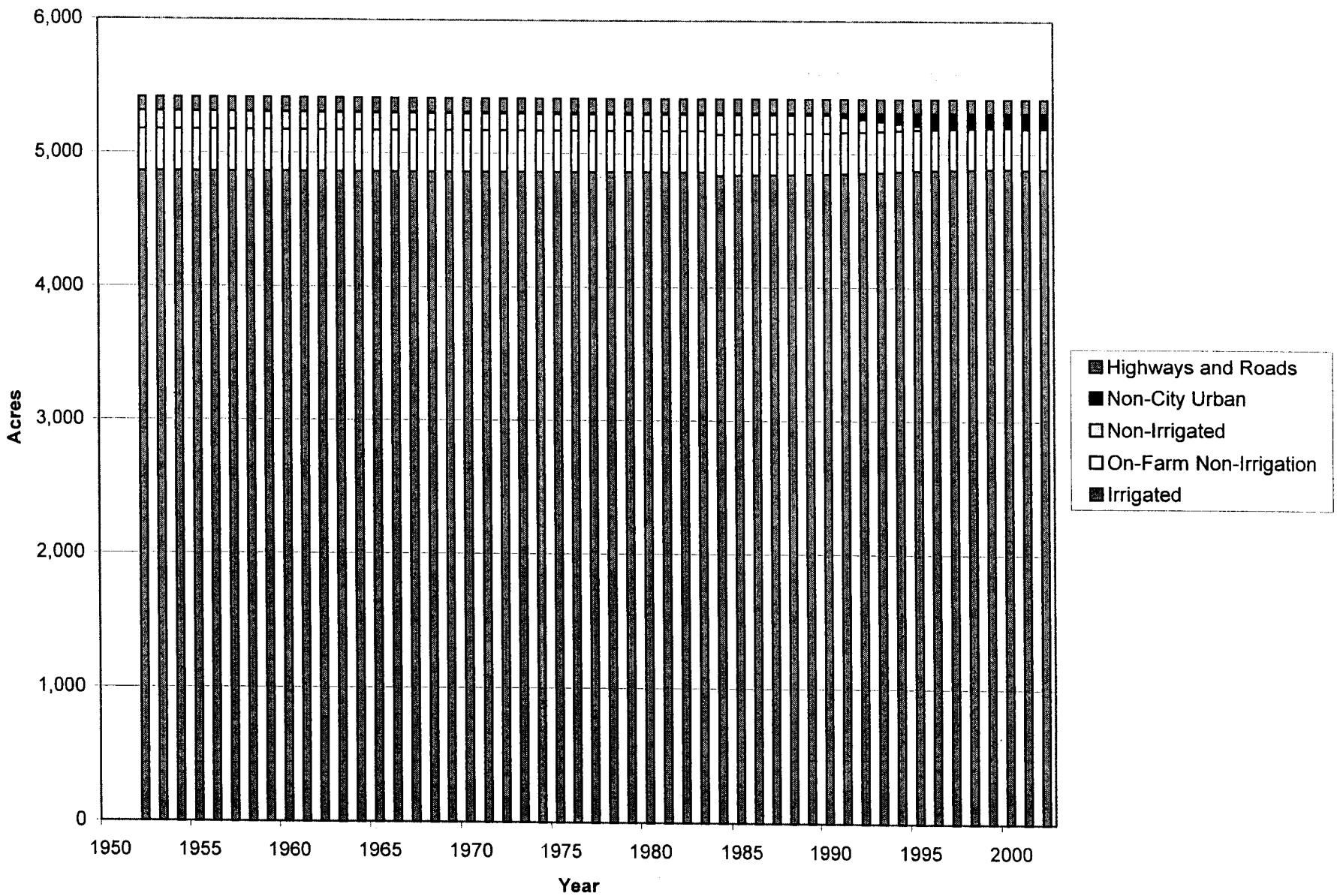

Figure 2.4c Land Use within the Turlock Groundwater Basin, 1952-2002, for Merced Irrigation District

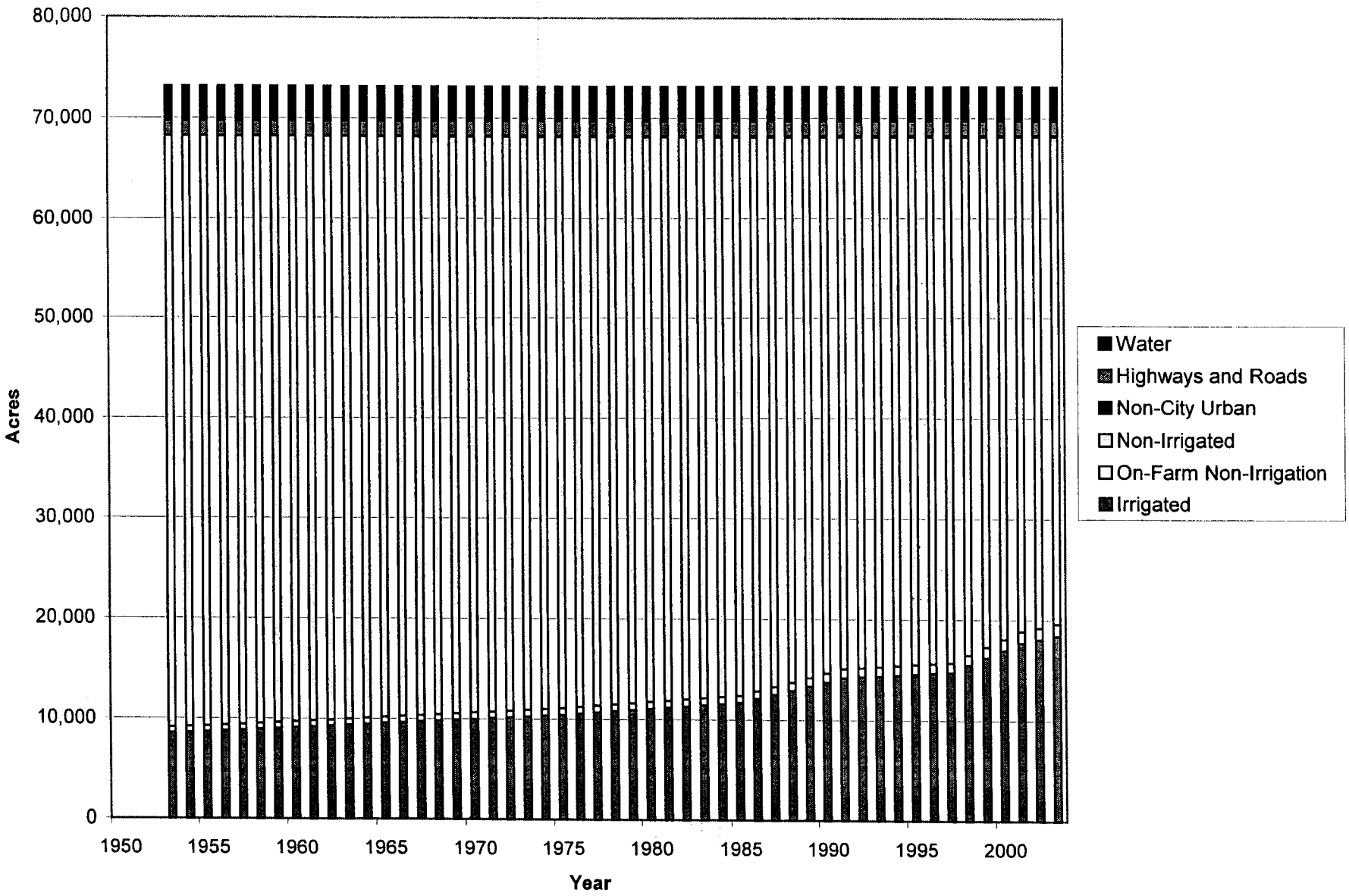

Figure 2.4d Land Use within the Turlock Groundwater Basin, 1952-2002, for Foothills Non-District Area

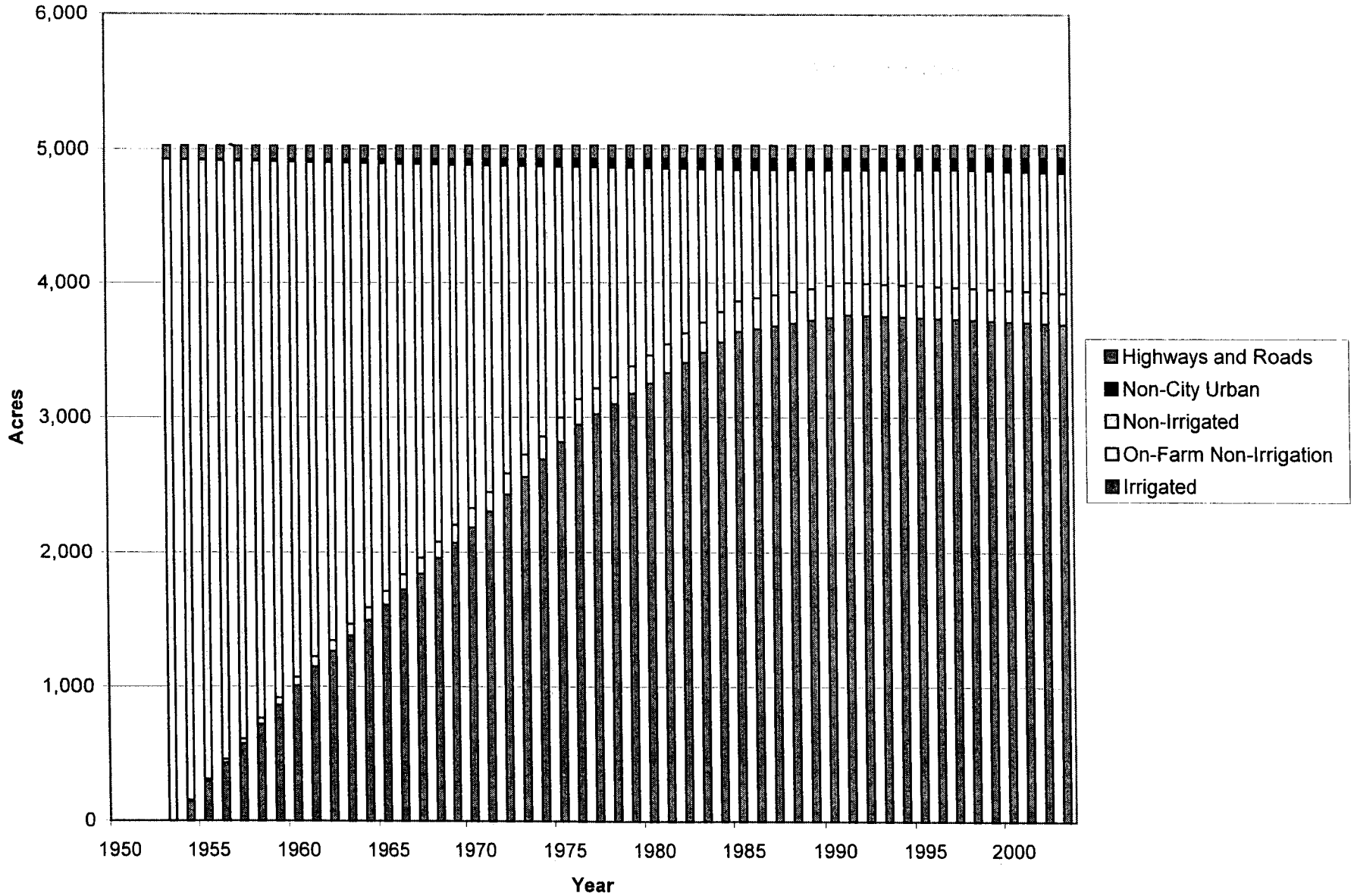

Figure 2.4e Land Use within the Turlock Groundwater Basin, 1952-2002, for Merced River Non-District Area

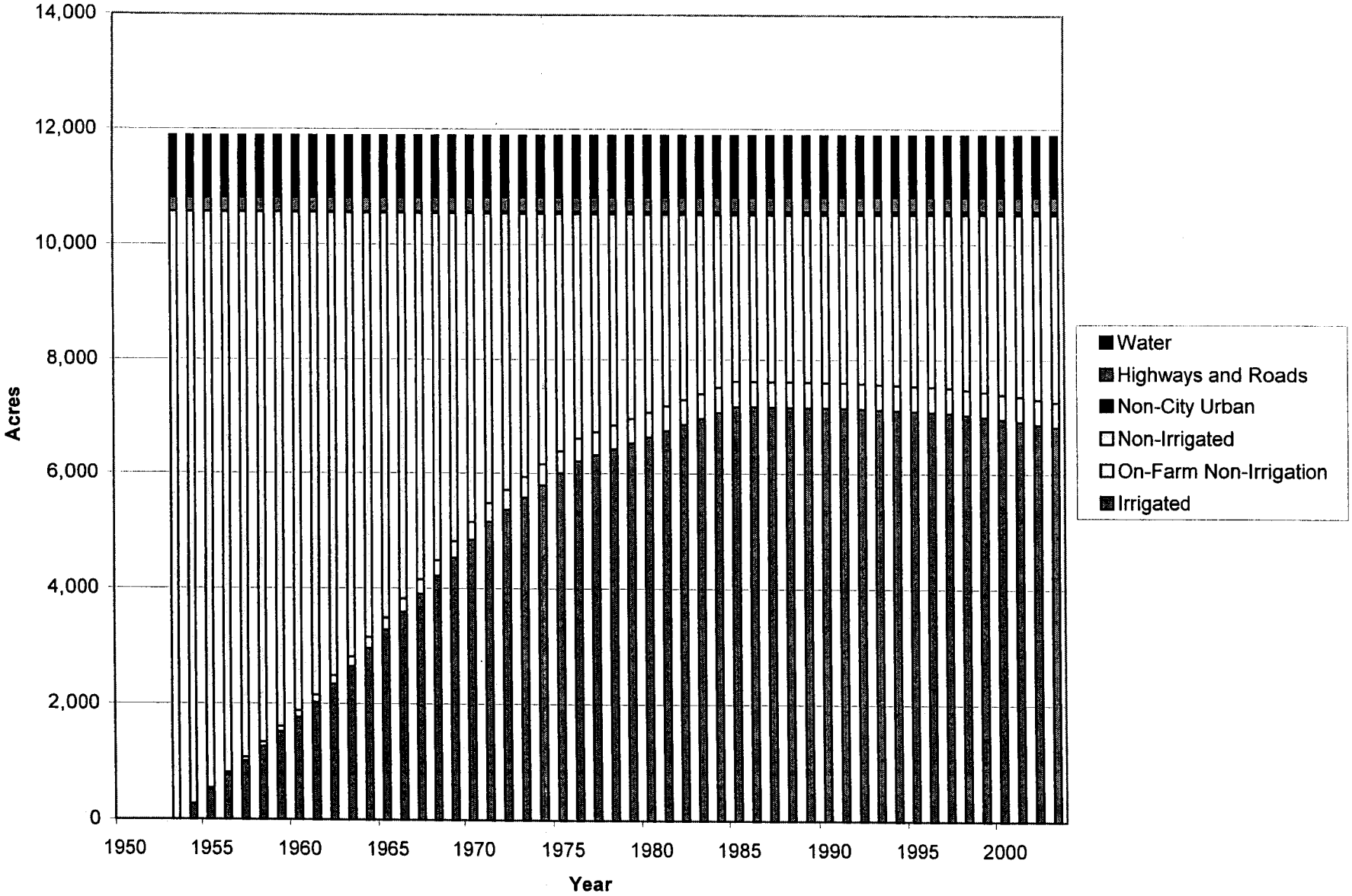

Figure 2.4f Land use within the Turlock Groundwater Basin, 1952-2002, for San Joaquin River Non-District Area

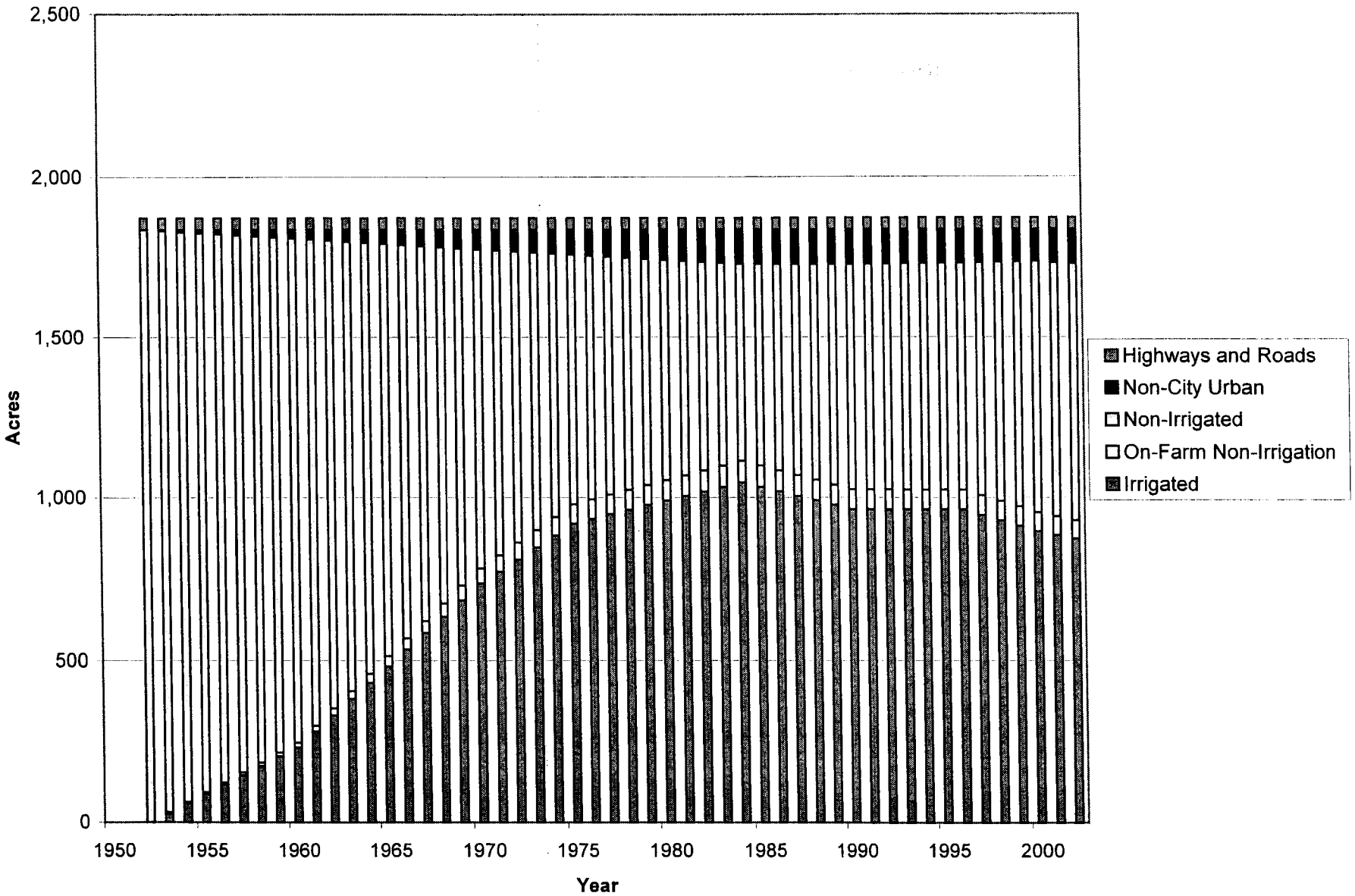

Figure 2.4g Land Use within the Turlock Groundwater Basin, 1952-2002, for Tuolumne River Non-District Area

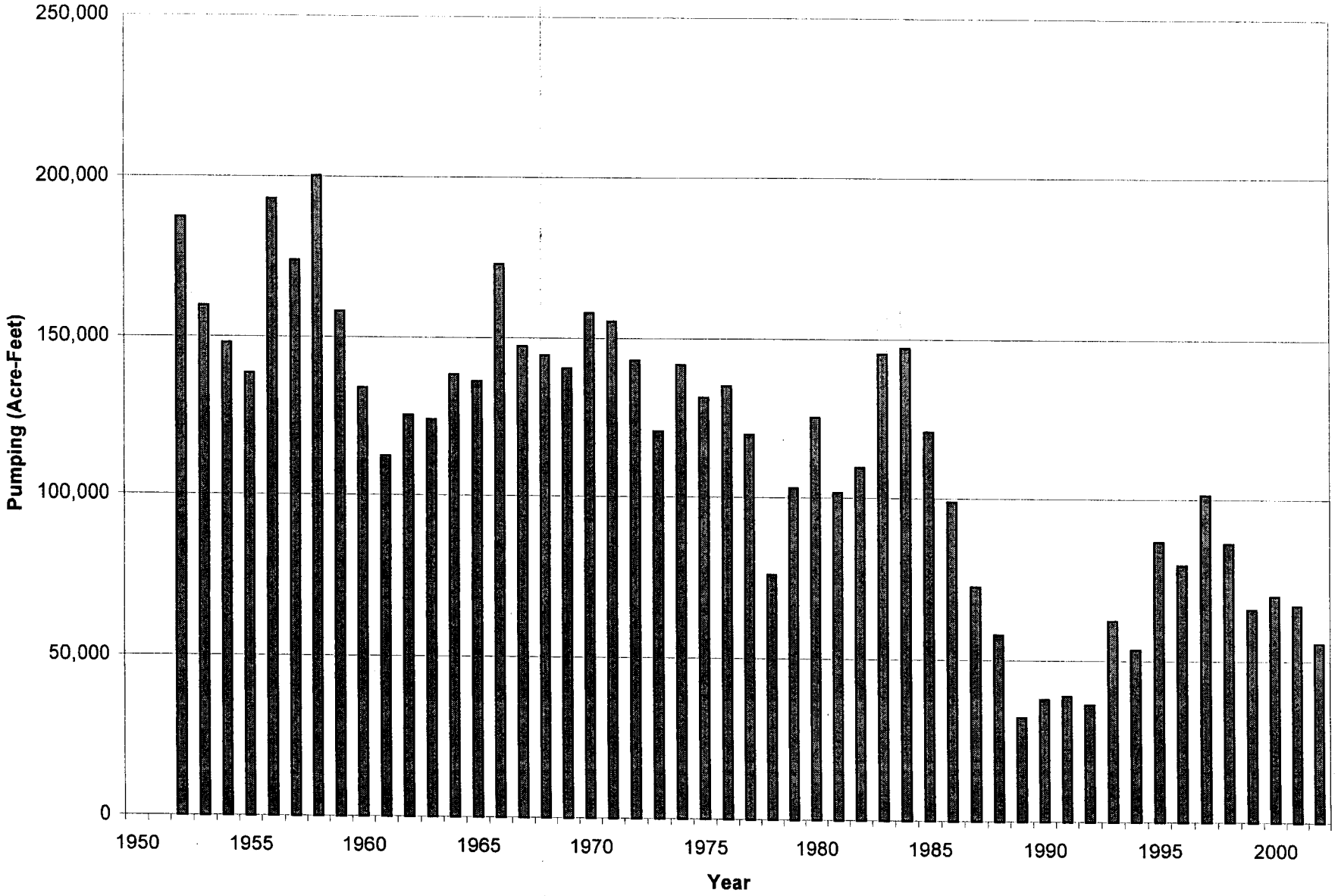

Figure 3.1 Annual Pumpage from Turlock Irrigation District Drainage Wells, 1952-2002

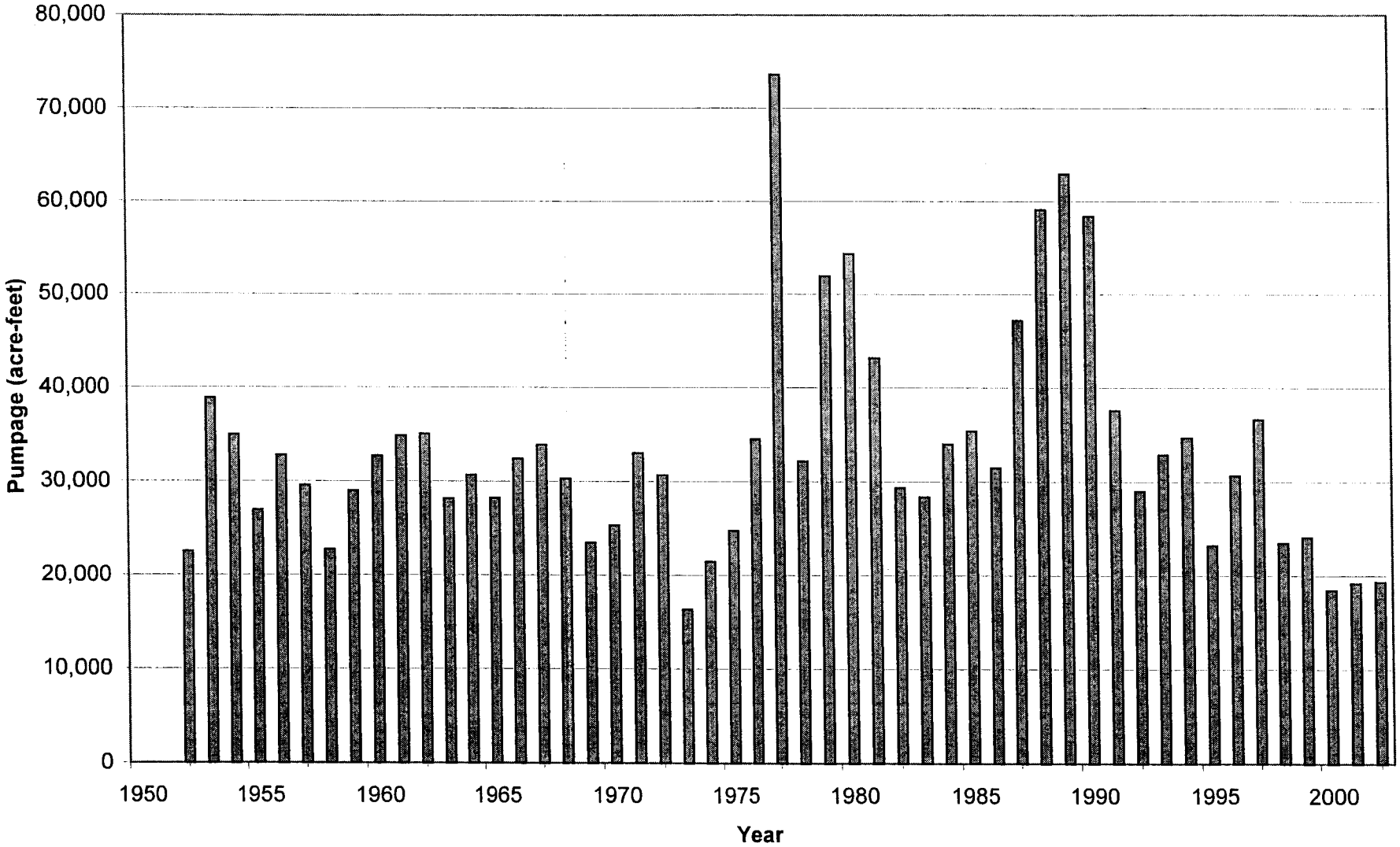

Figure 3.2 Annual Pumpage from Supplemental-Source Private and Improvement District Irrigation Wells Within Turlock Irrigation District, 1952-2002

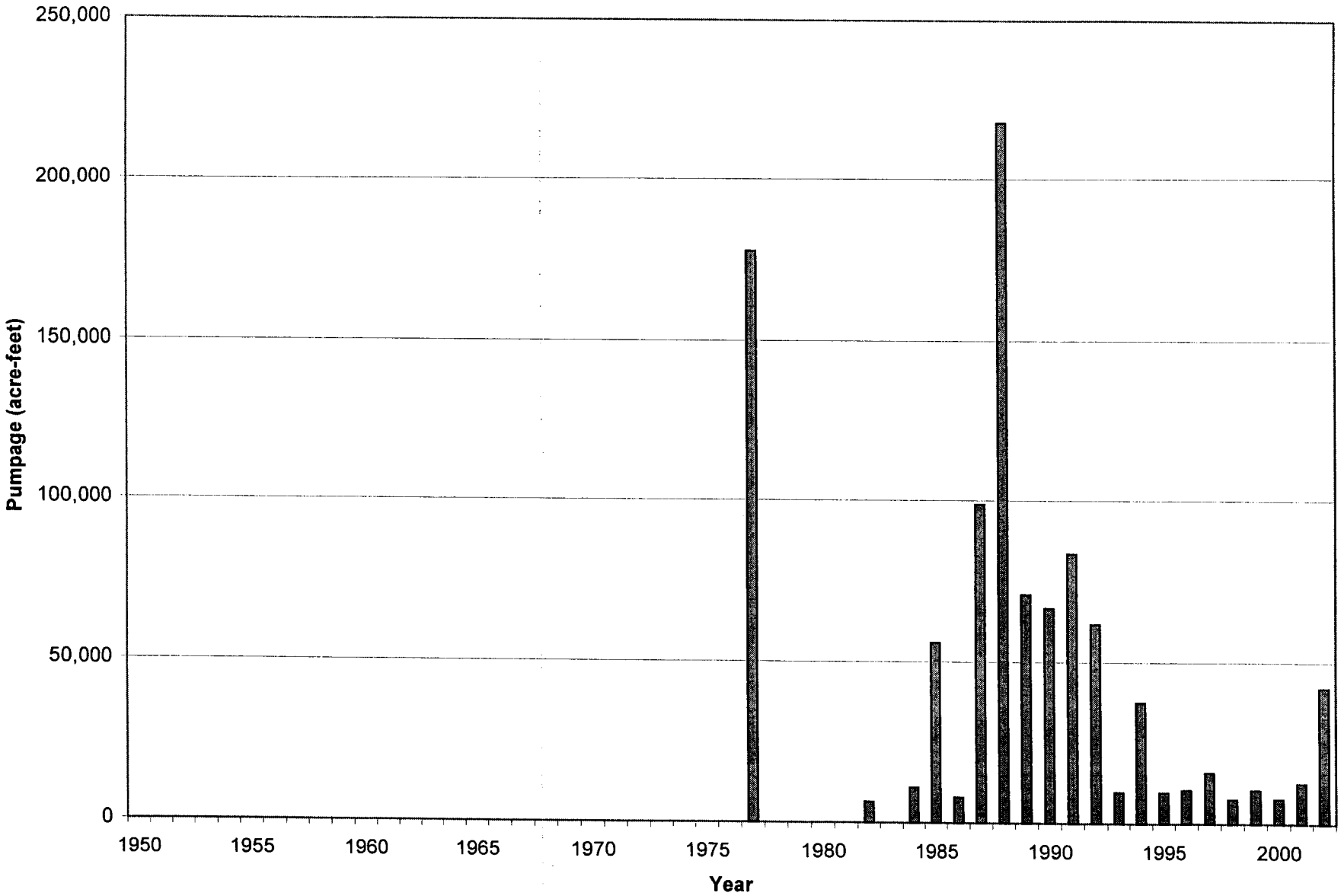

Figure 3.3 Annual Pumpage from Supplemental-Source Private and Improvement District Irrigation Wells Rented Within Turlock Irrigation District, 1977-2002

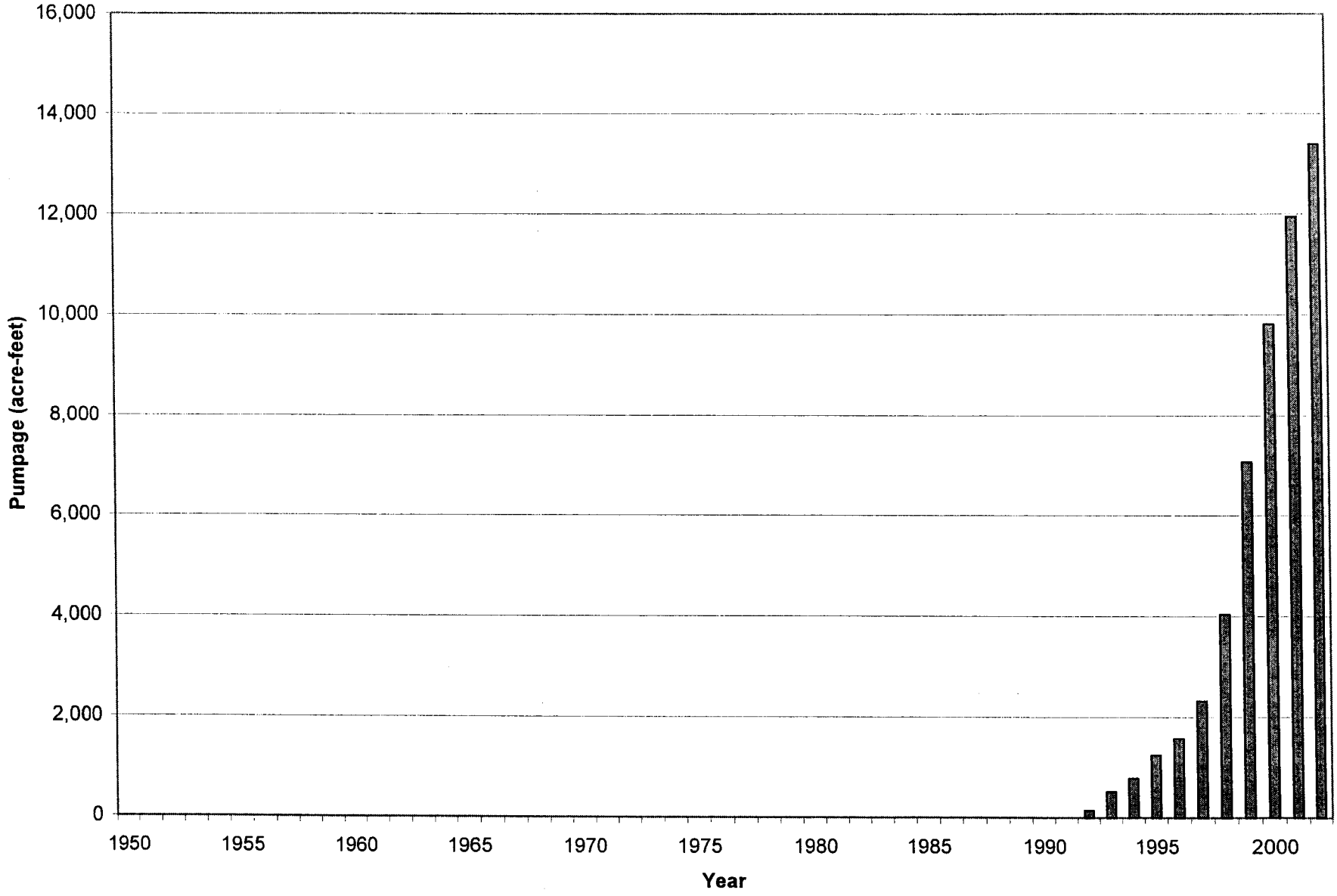

Figure 3.4 Annual Pumpage from Primary-Source Private Irrigation Wells within Turlock Irrigation District, 1952-2002

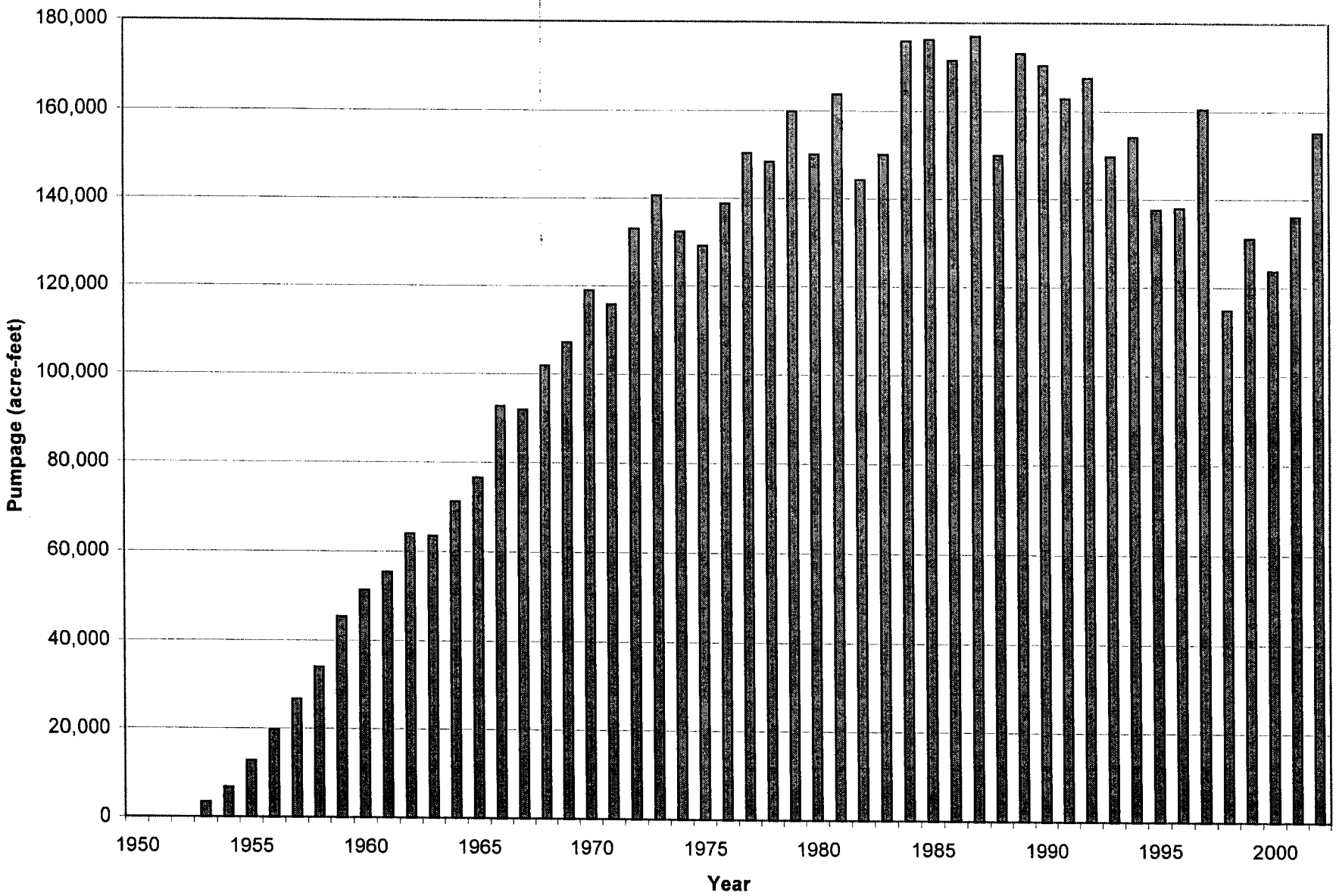

Figure 3.5 Annual Pumpage from Private Irrigation Wells within Eastside Water District, 1952-2002

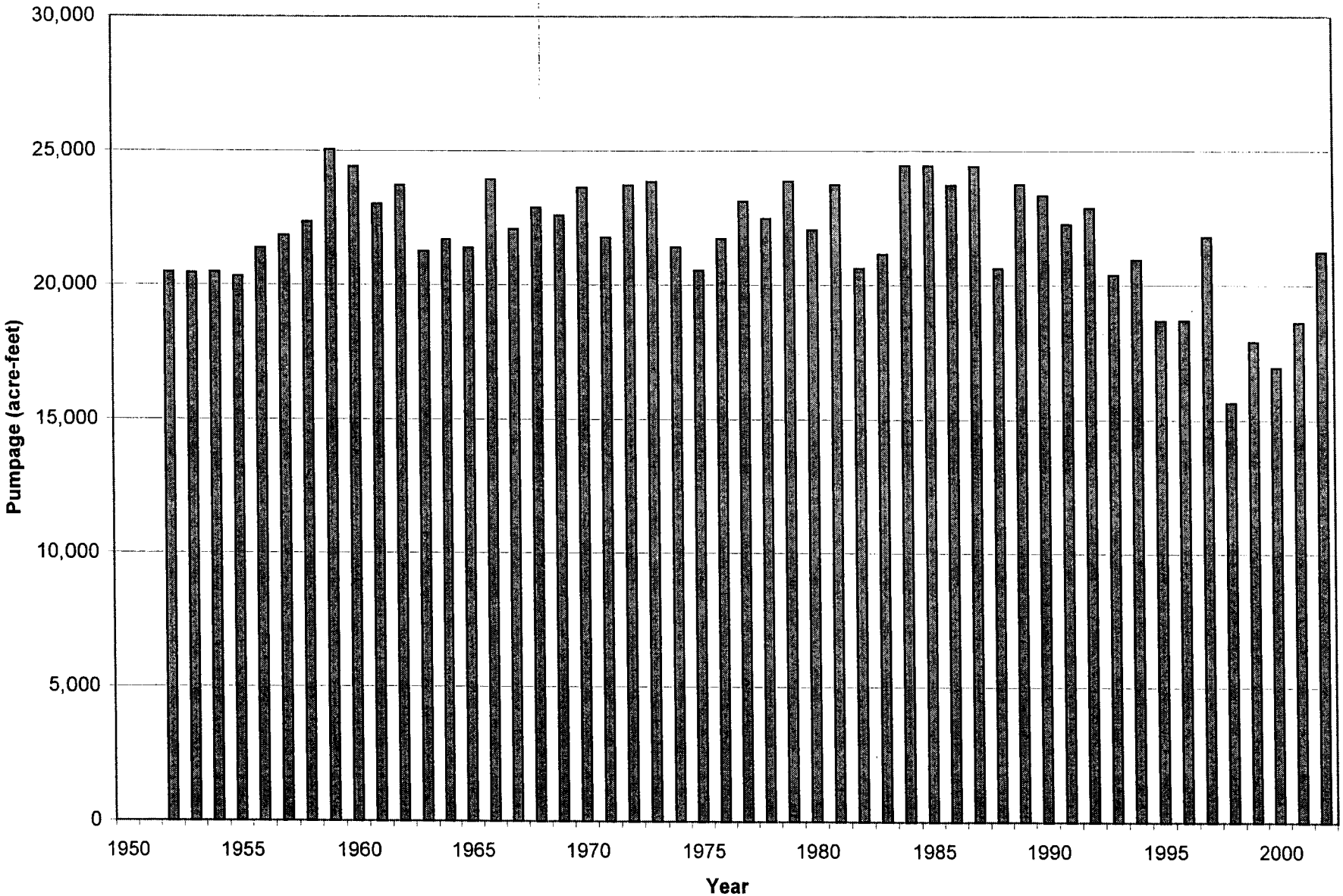

Figure 3.6 Annual Pumpage from Private Irrigation Wells within Ballico-Cortez Water District, 1952-2002

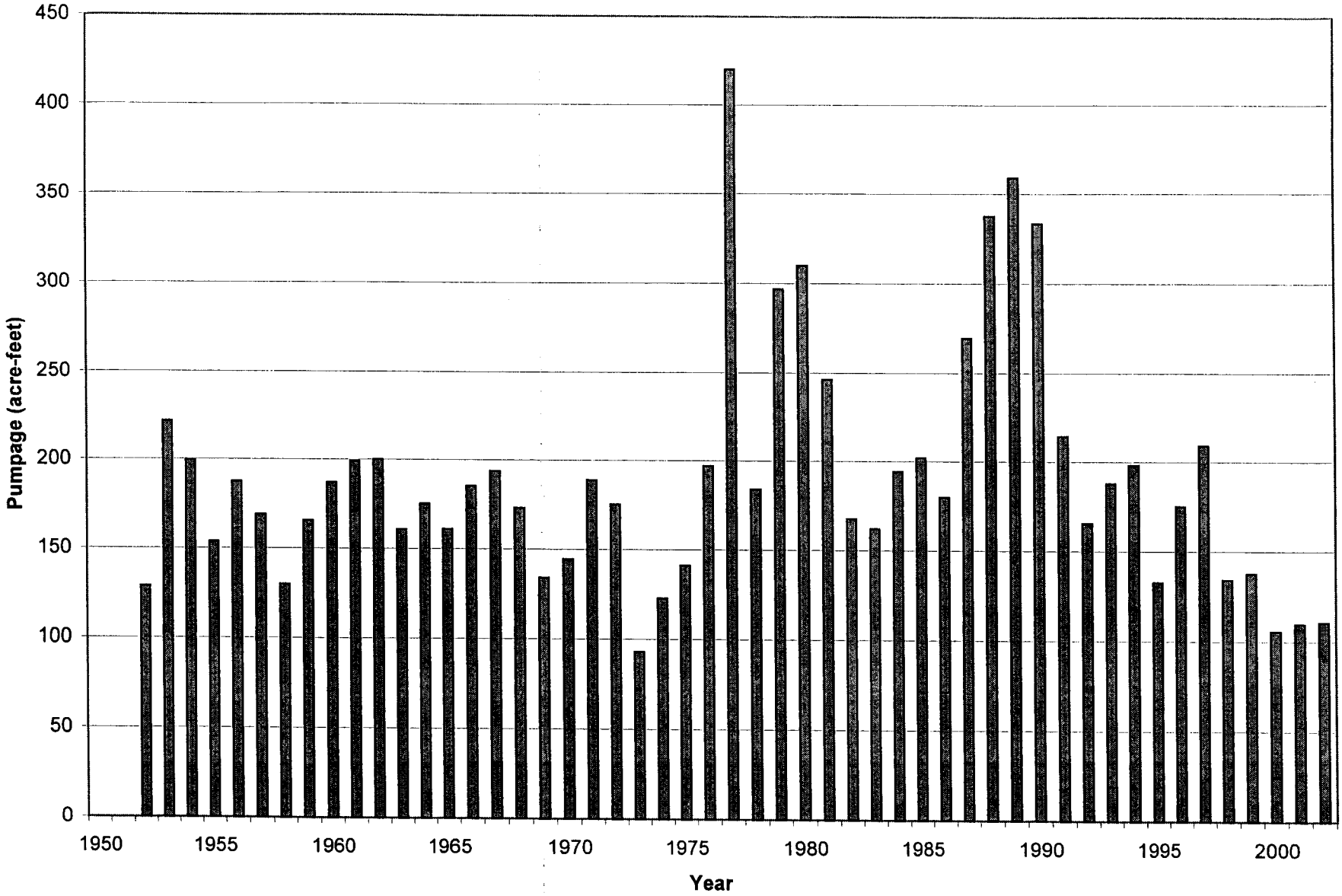

Figure 3.7 Annual Pumpage from Private Irrigation Wells within Merced Irrigation District, 1952-2002

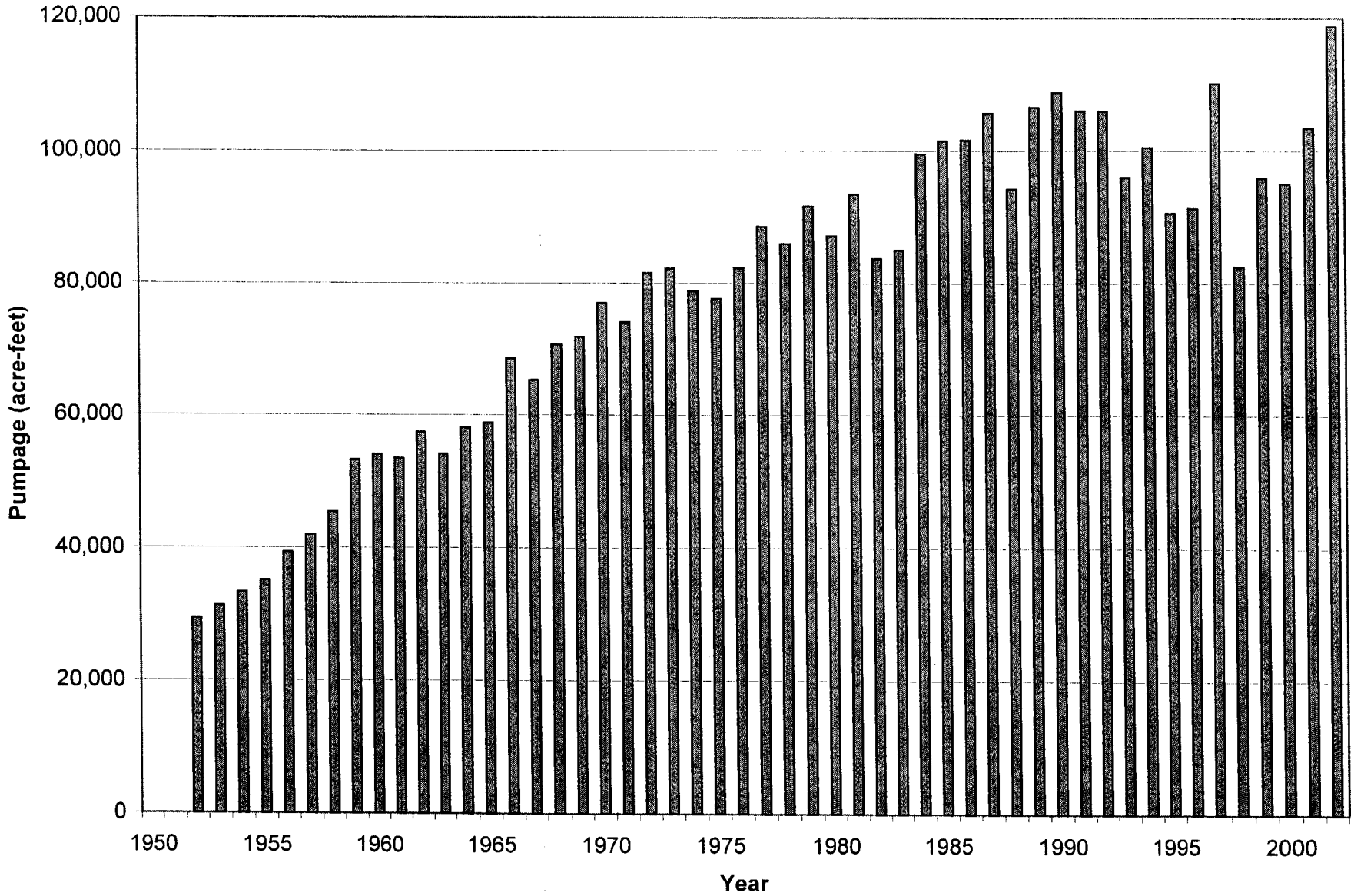

Figure 3.8 Annual Pumpage from Private Irrigation Wells within Non-District Areas, 1952-2002

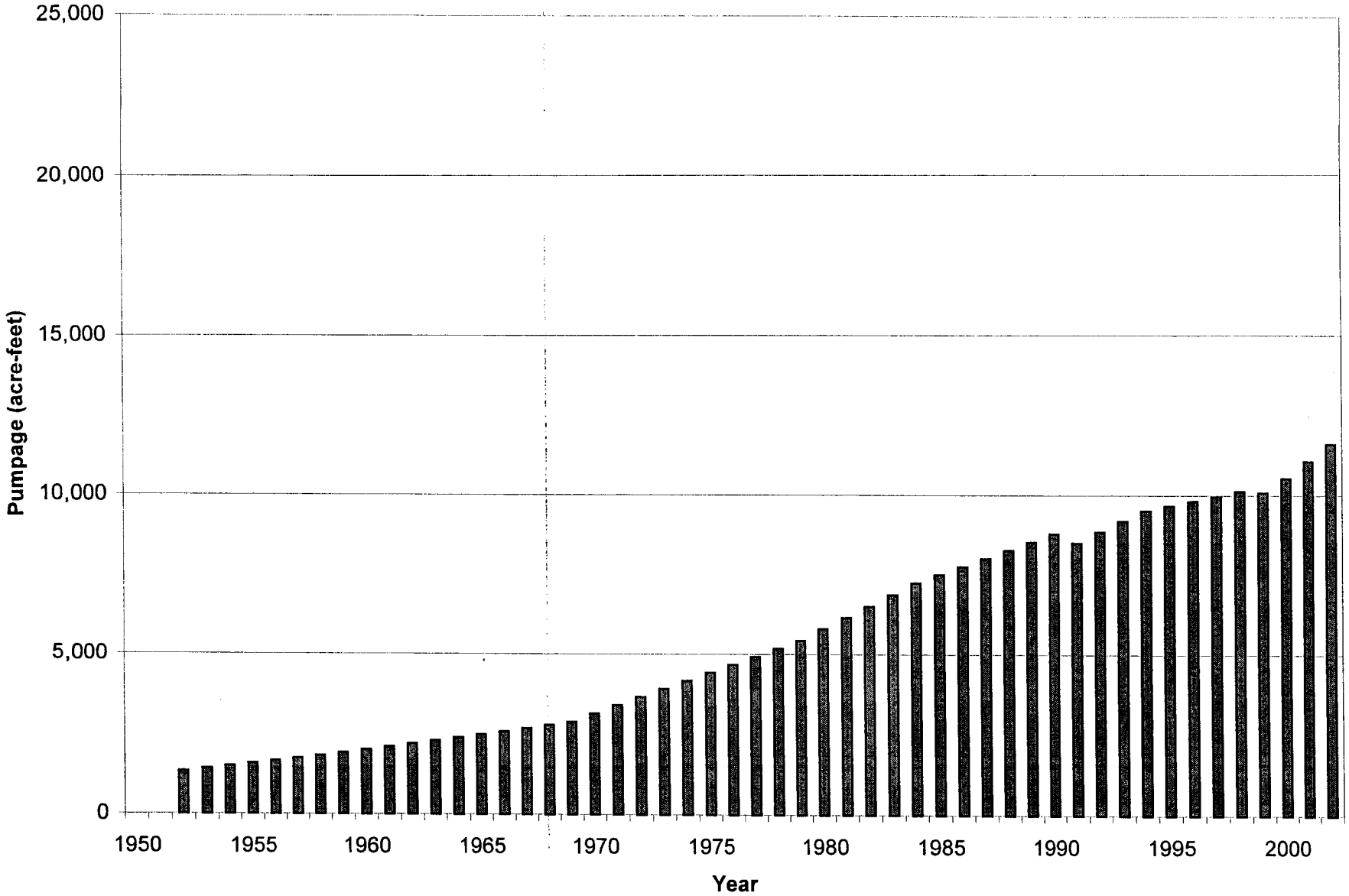

Figure 3.9a Annual Pumpage from Municipal Wells for Ceres, 1952-2002

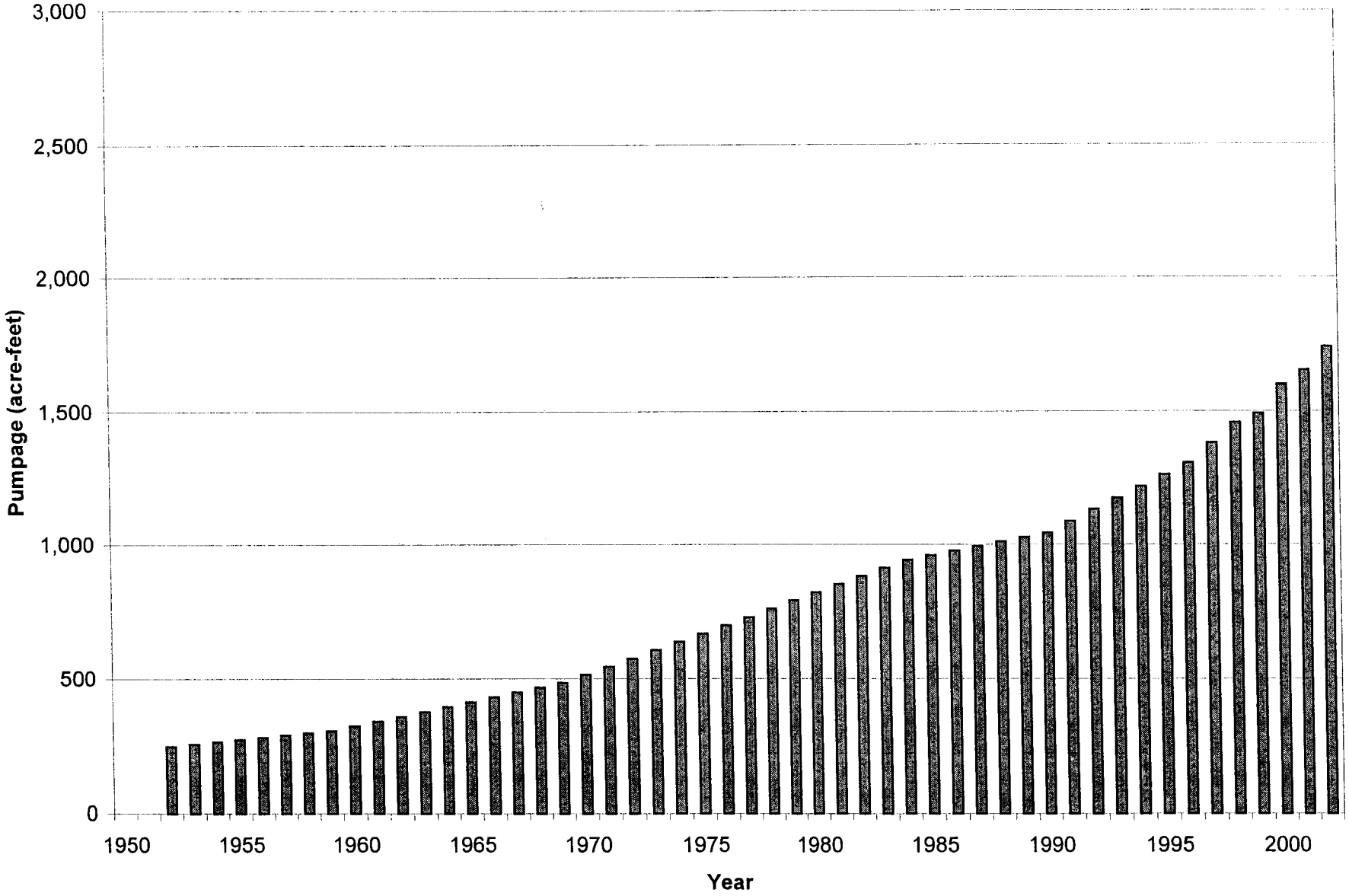

Figure 3.9b Annual Pumpage from Municipal Wells for Delhi, 1952-2002

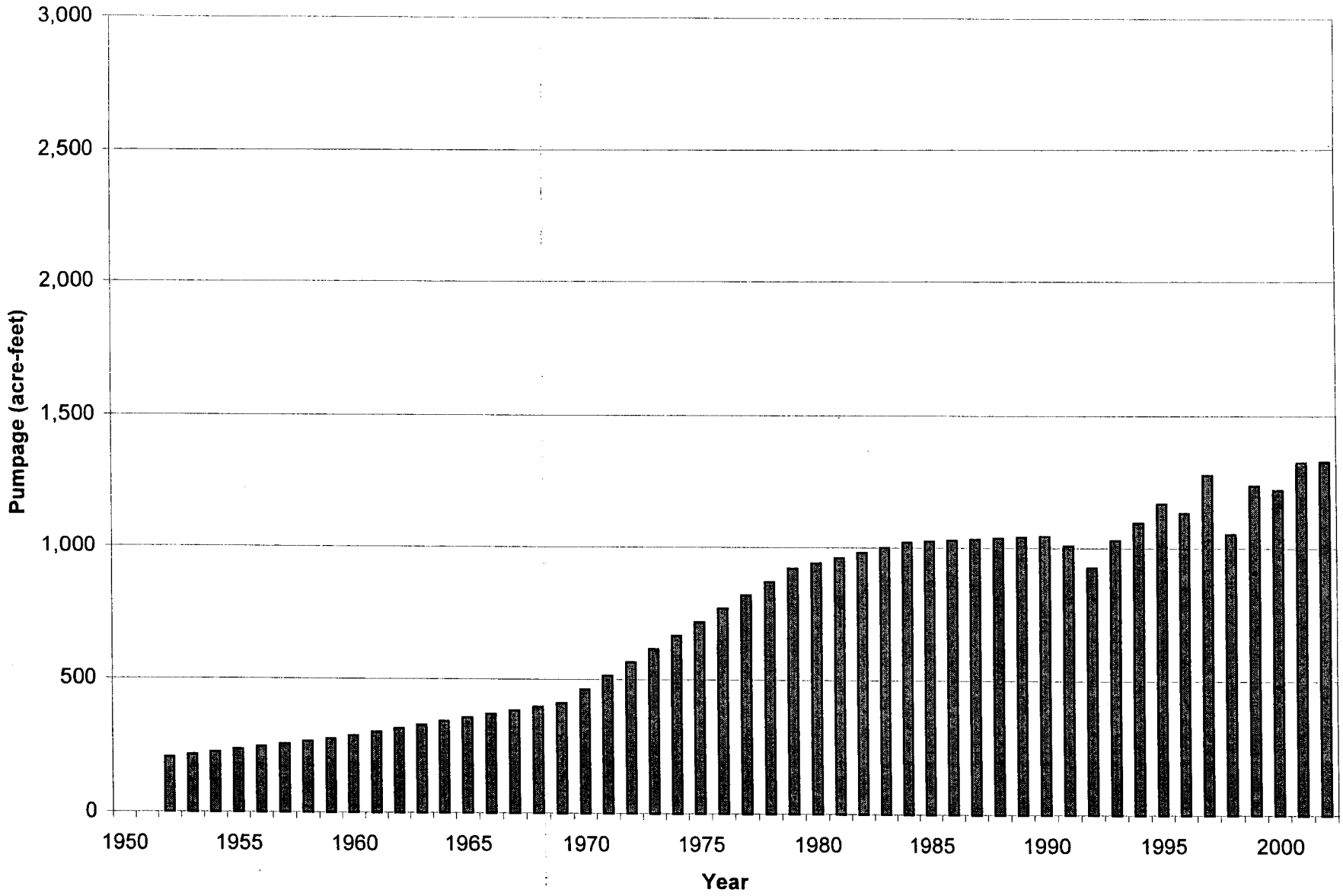

Figure 3.9c Annual Pumpage from Municipal Wells for Denair, 1952-2002

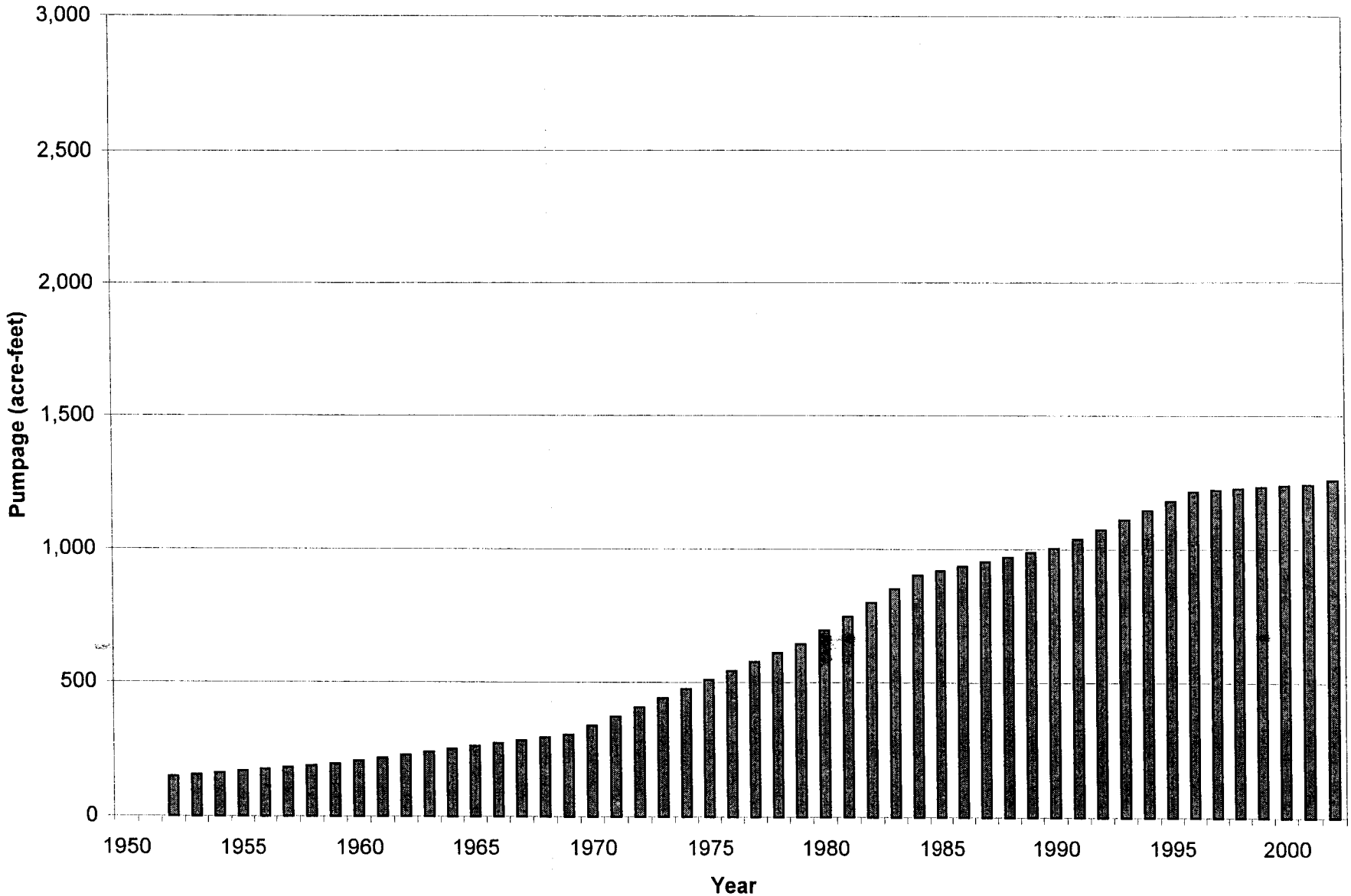

Figure 3.9e Annual Pumpage from Municipal Wells for Hilmar, 1952-2002

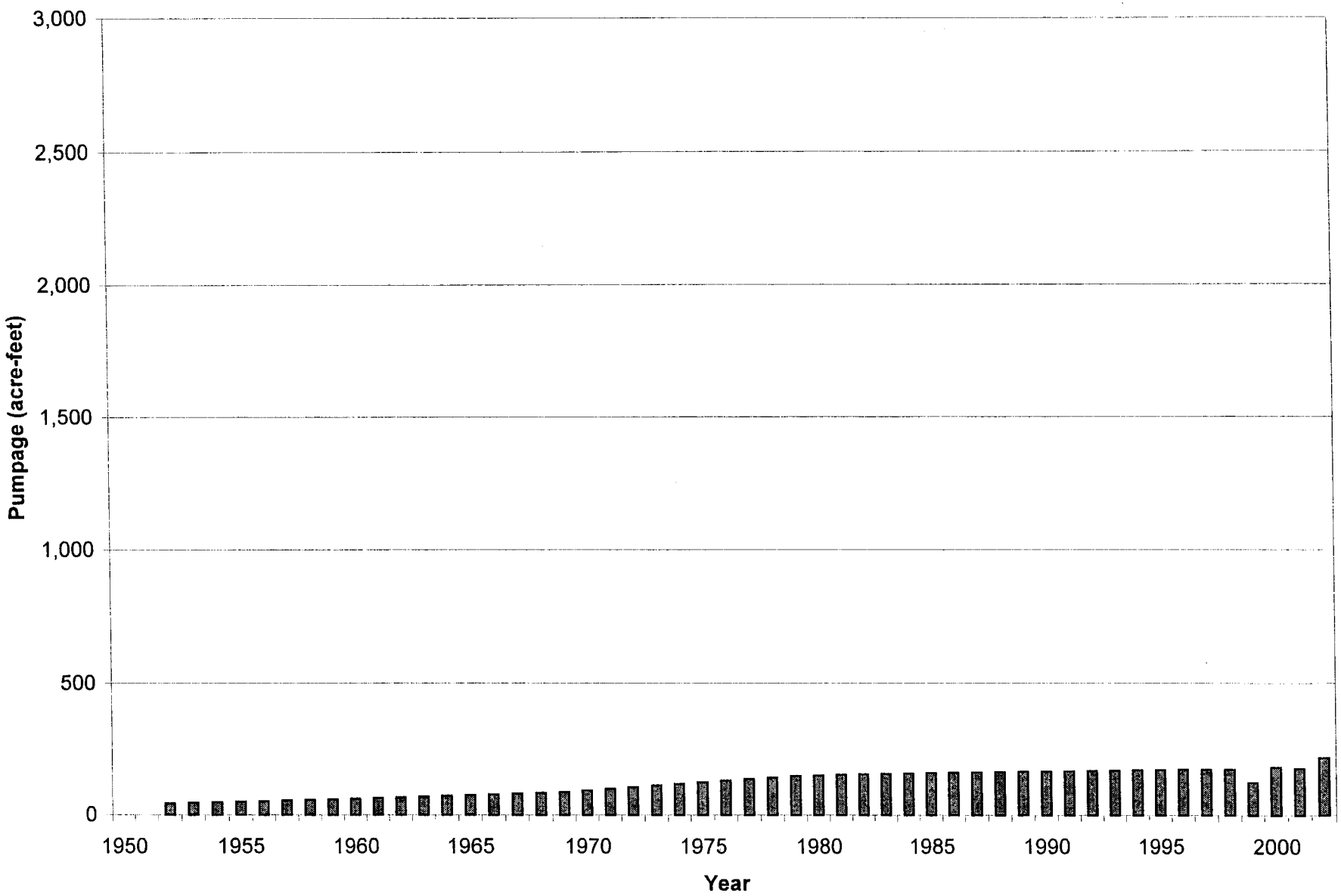

Figure 3.9d Annual Pumpage from Municipal Wells for Hickman, 1952-2002

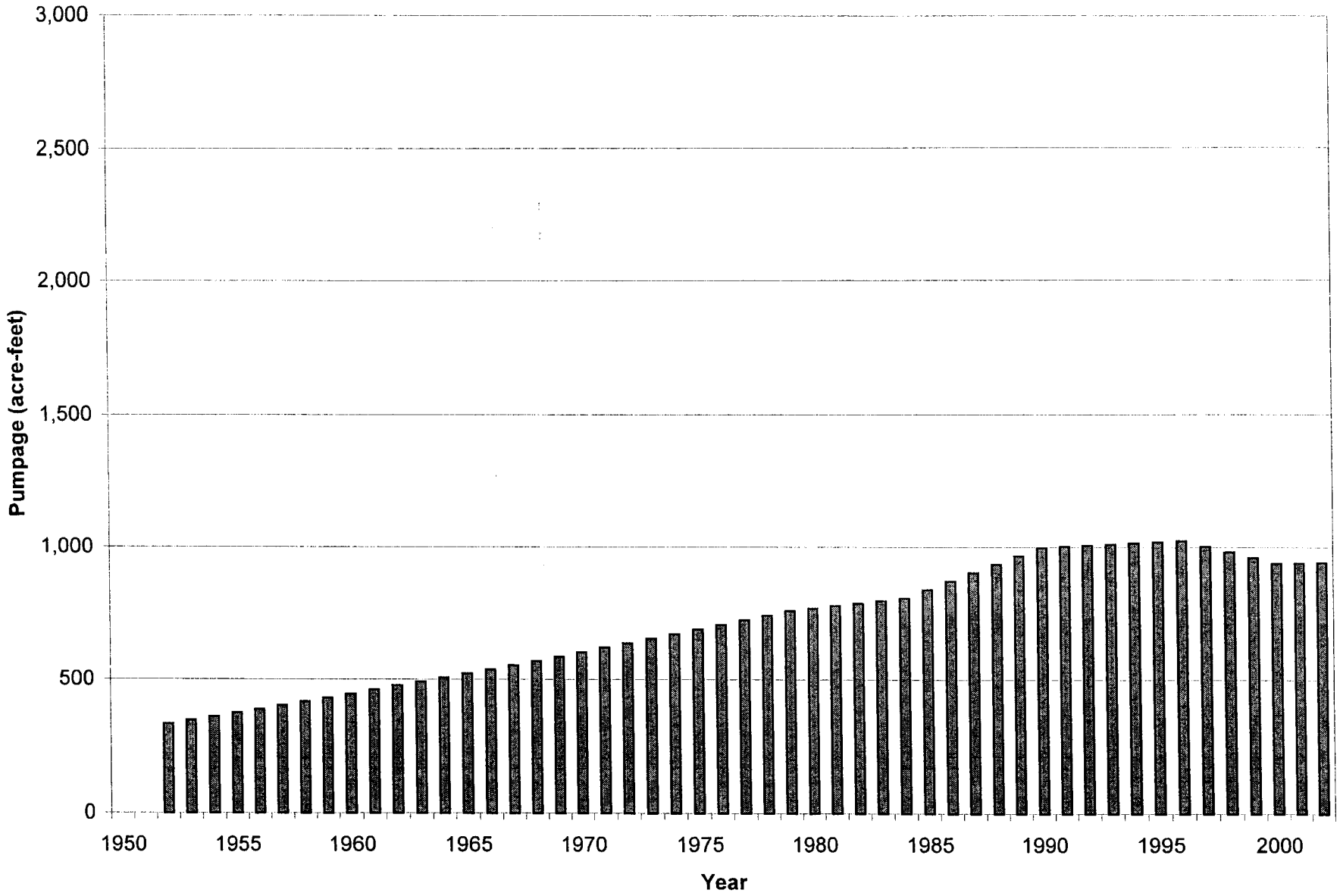

Figure 3.9f Annual Pumpage from Municipal Wells for Hughson, 1952-2002

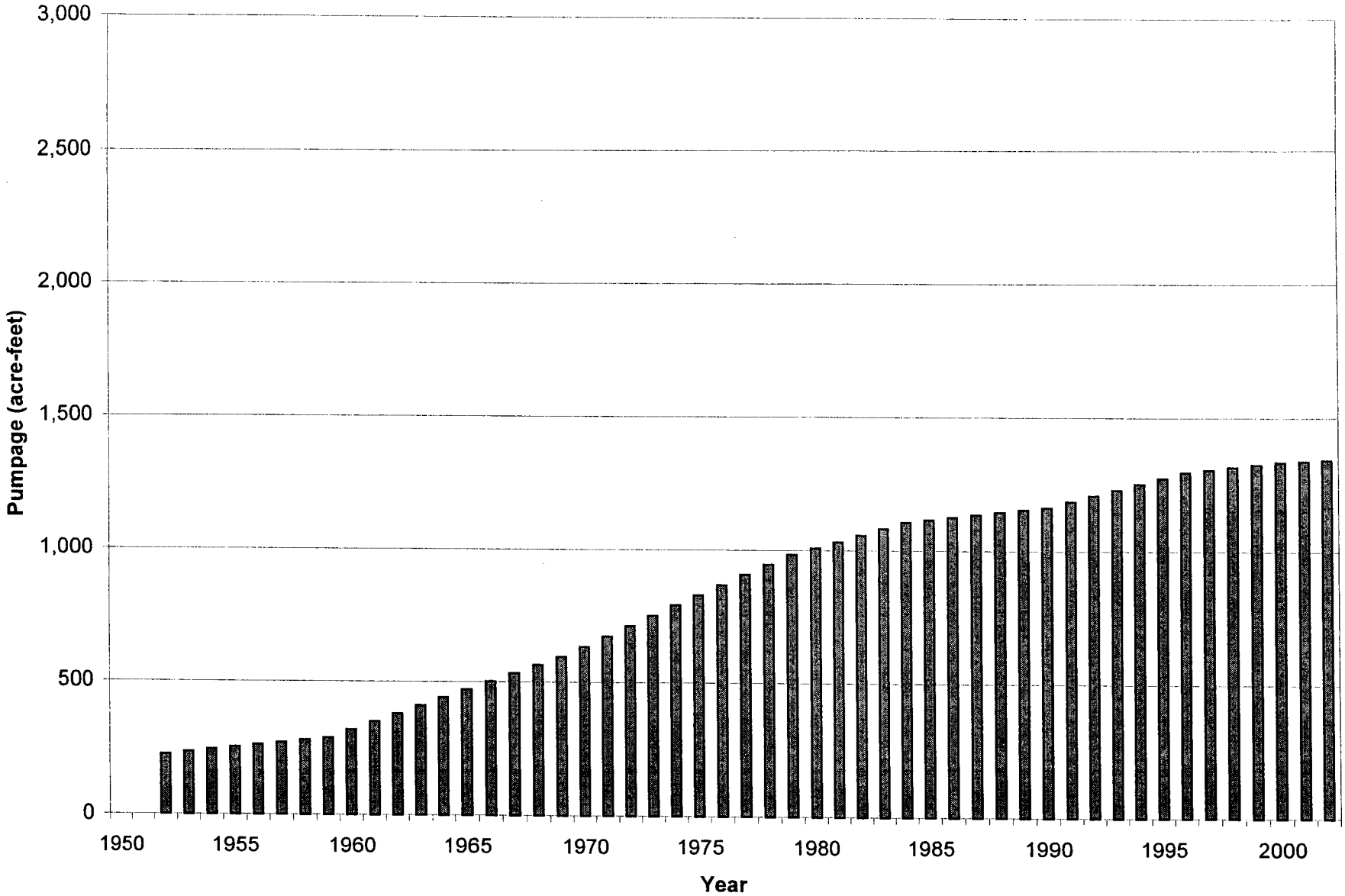

Figure 3.9g Annual Pumpage from Municipal Wells for Keyes, 1952-2002

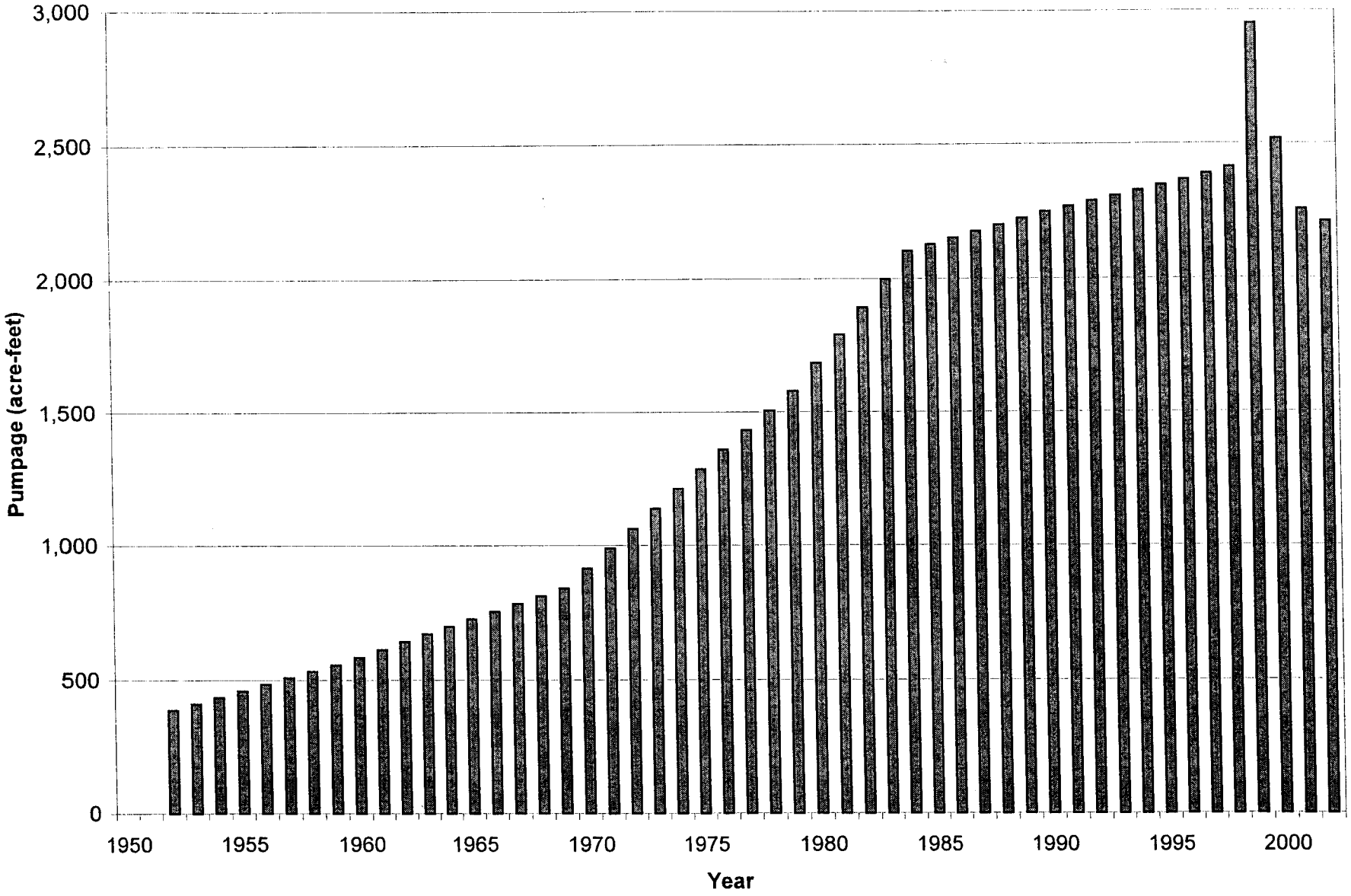

Figure 3.9h Annual Pumpage from Municipal Wells for South Modesto, 1952-2002

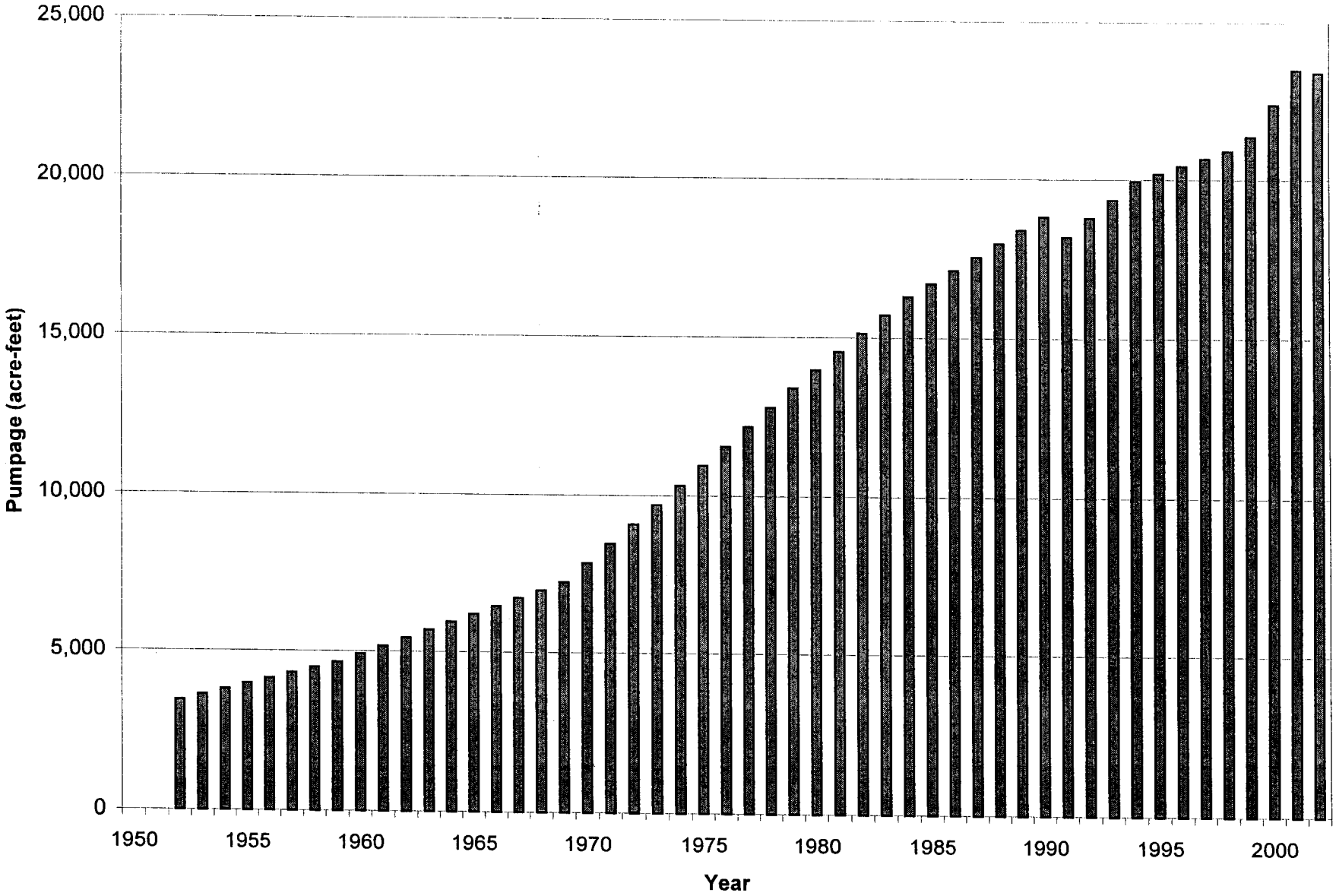

Figure 3.9i Annual Pumpage from Municipal Wells for Turlock, 1952-2002

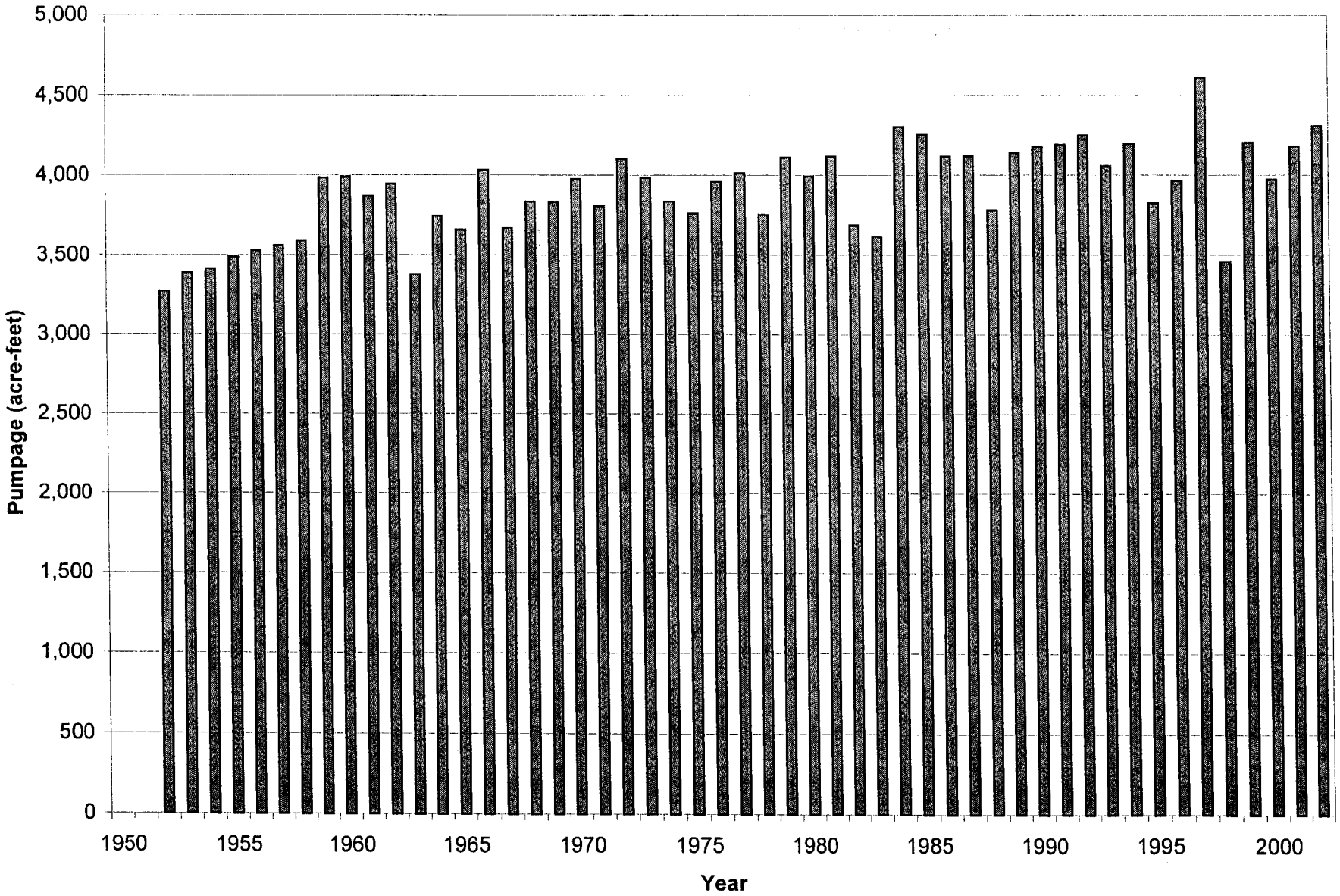

Figure 3.10 Annual Pumpage from Private Domestic Wells, 1952-2002

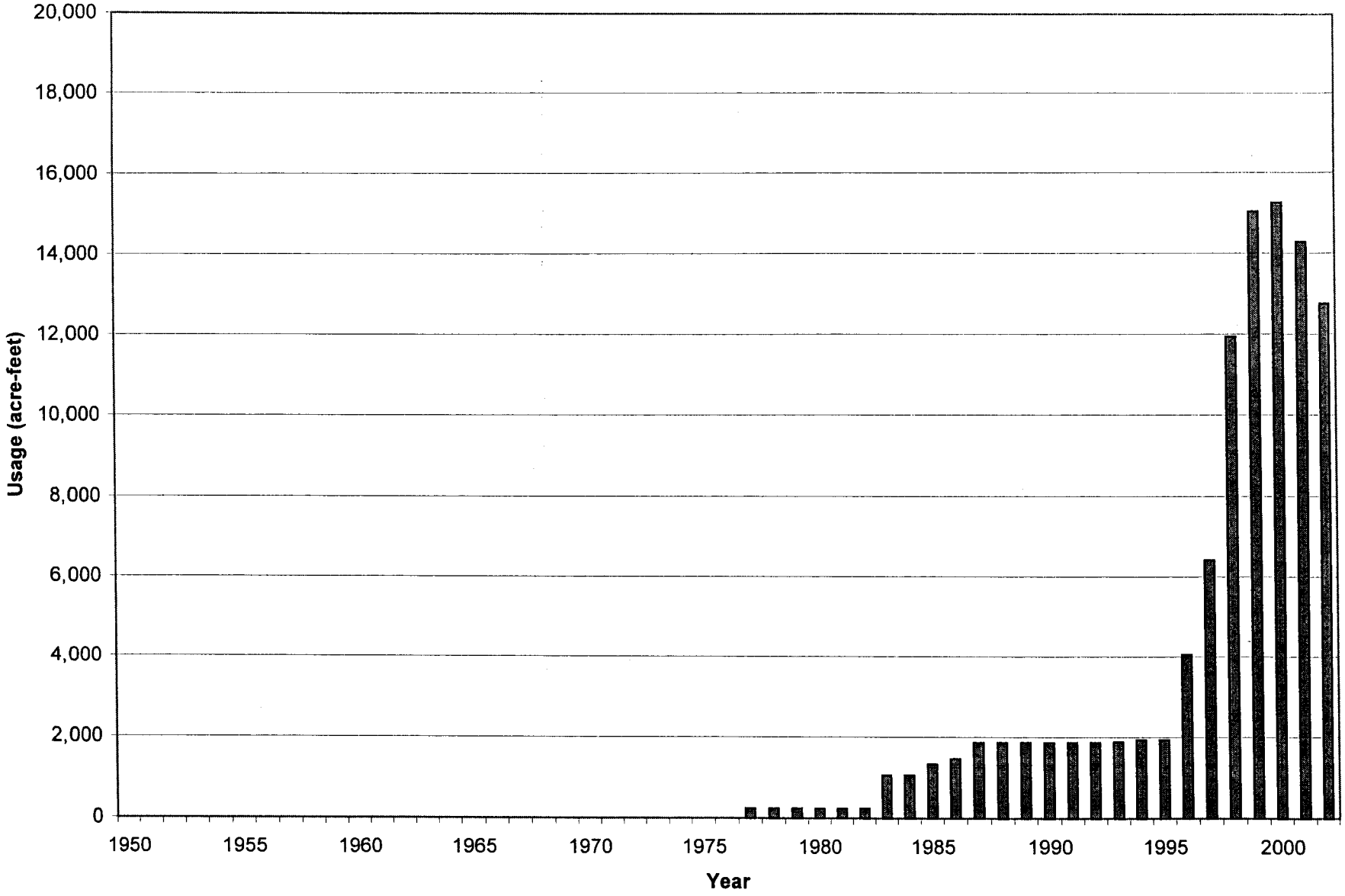

Figure 3.11 Annual Discharge from Subsurface Agricultural Drains, 1952-2002

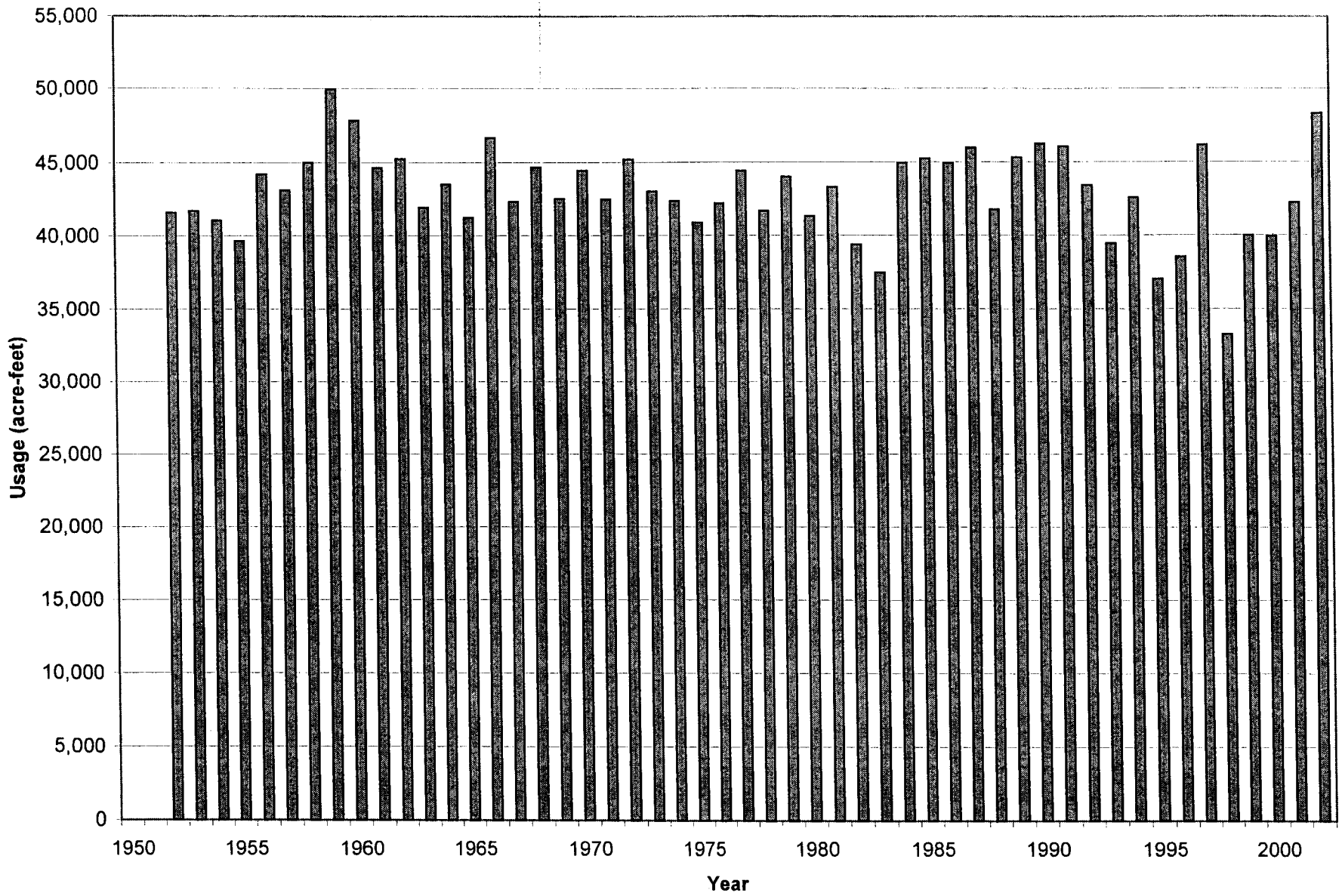

Figure 3.12 Annual Groundwater Usage by Riparian Vegetation, 1952-2002

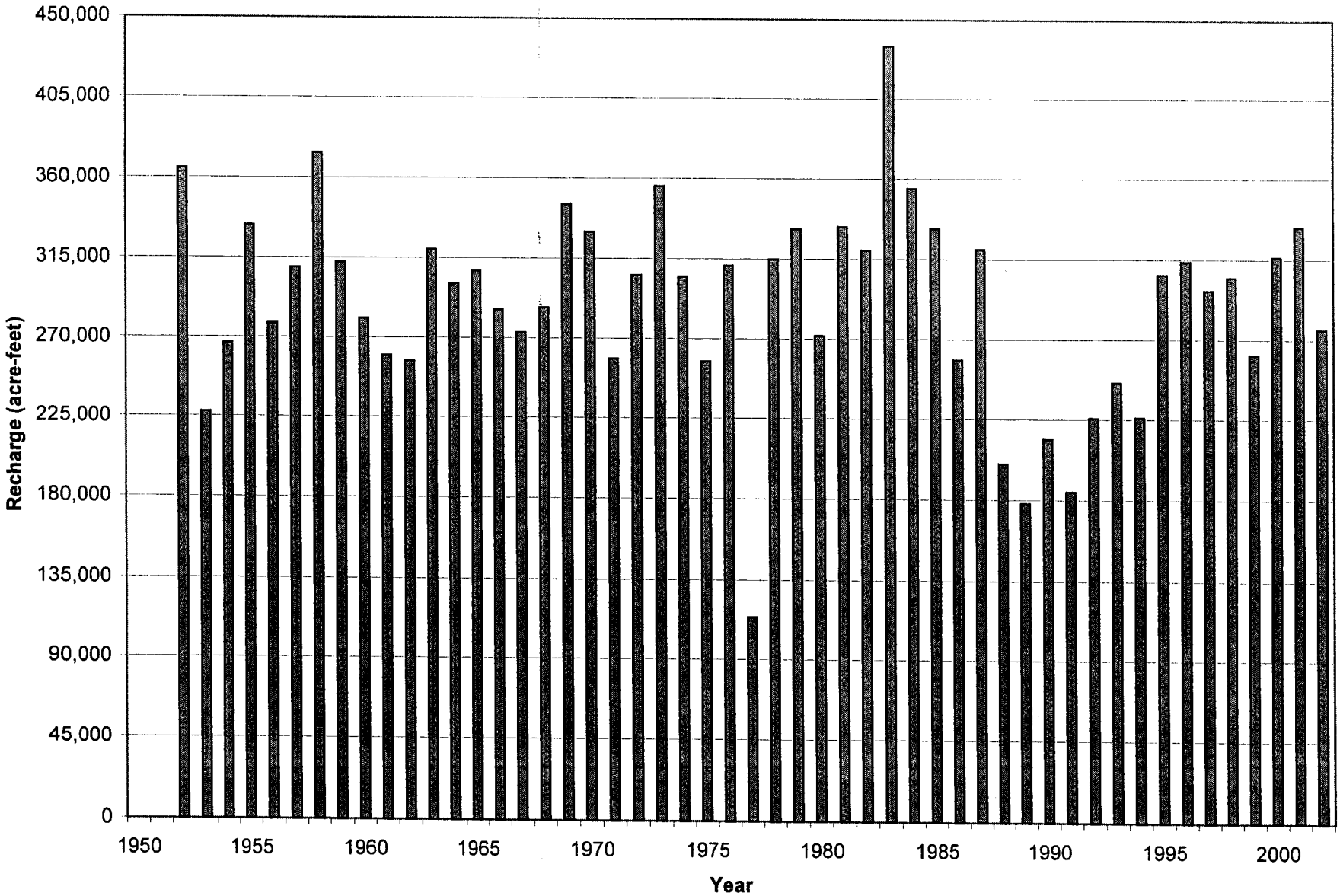

Figure 4.1 Annual Recharge from Turlock Irrigation District Canal-Delivery Lands, 1952-2002

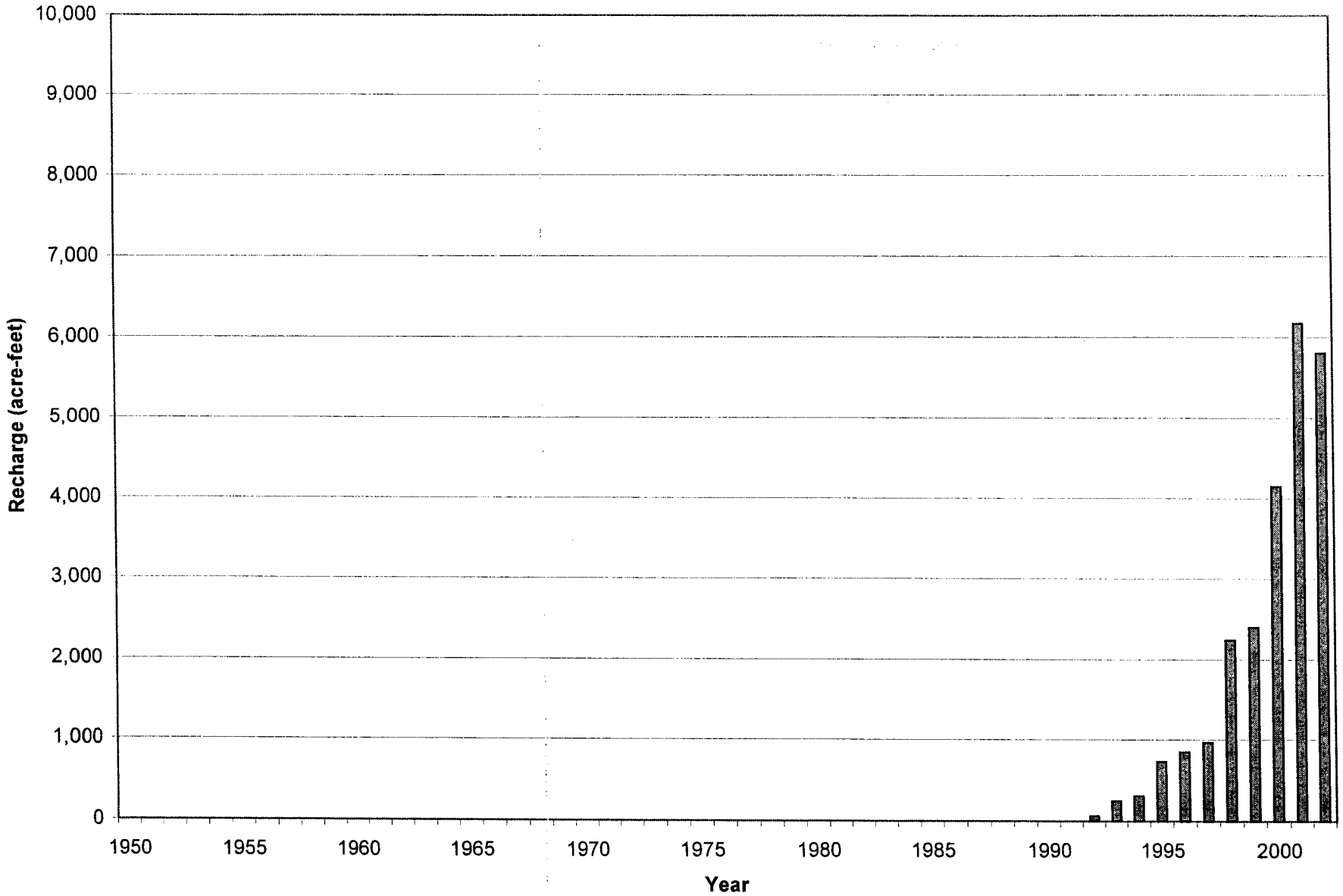

Figure 4.2 Annual Recharge from Turlock Irrigation District Groundwater-Only Lands, 1952-2002

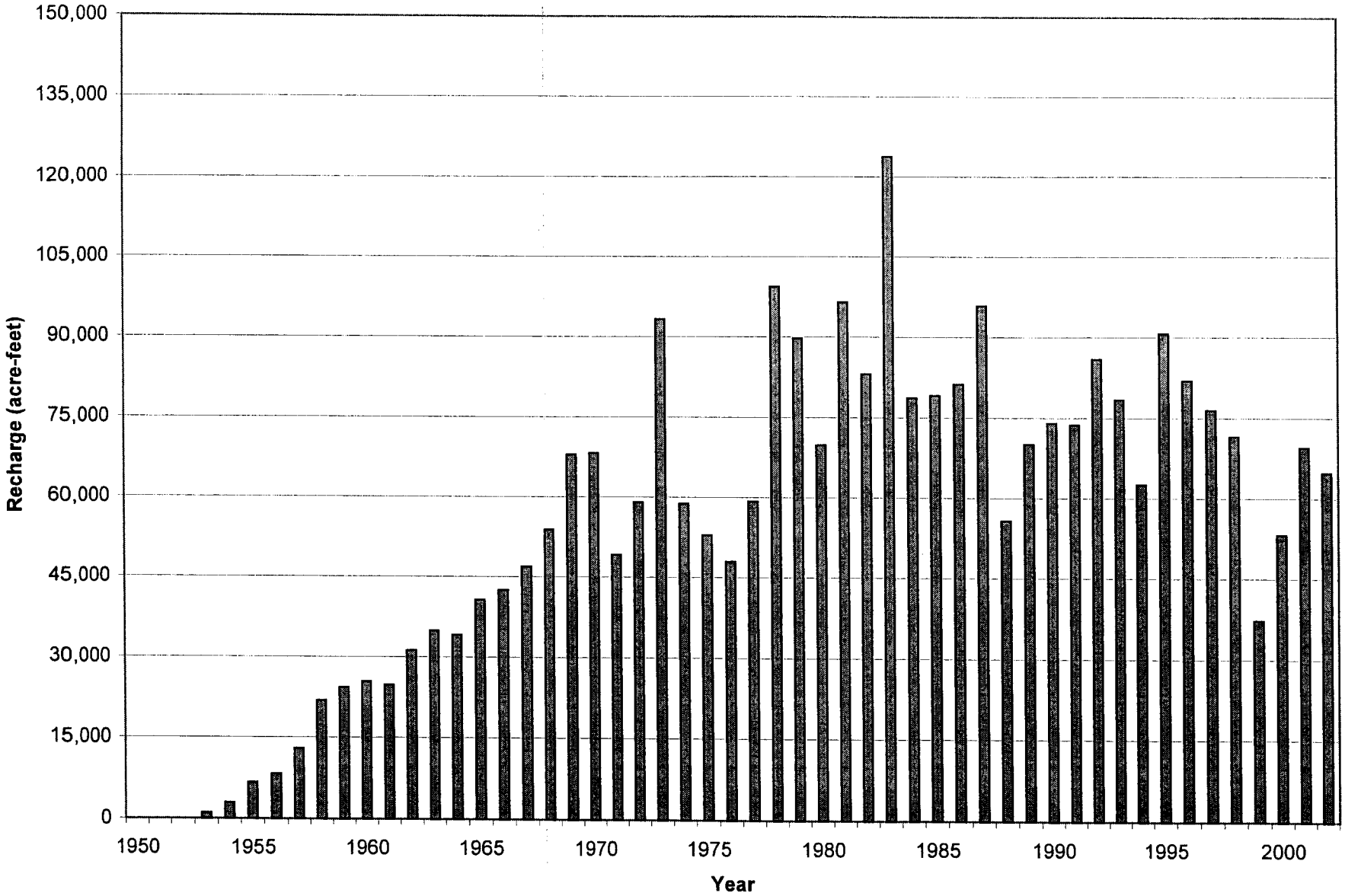

Figure 4.3 Annual Recharge from Eastside Water District, 1952-2002

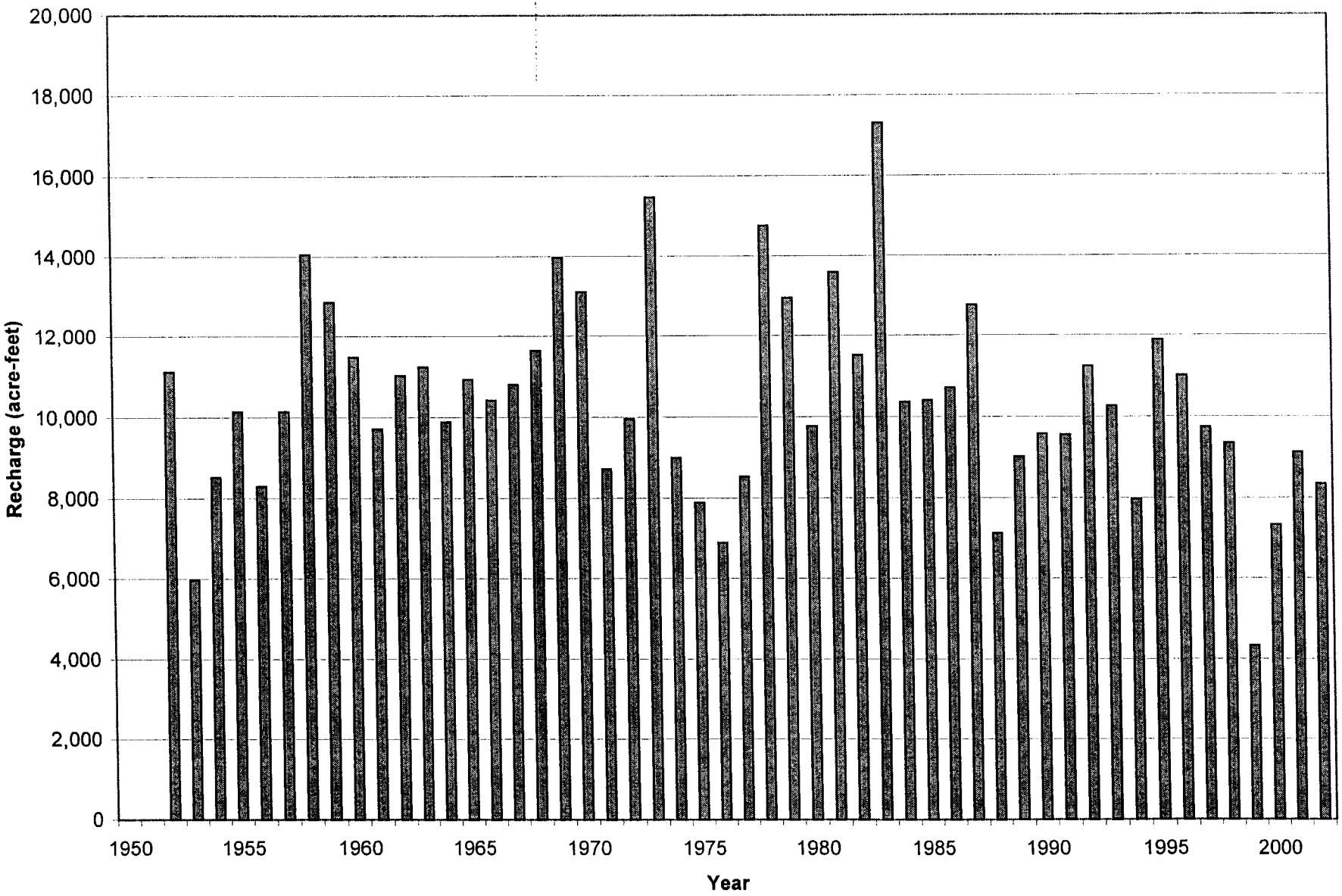

Figure 4.4 Annual Recharge from Ballico-Cortez Water District, 1952-2002

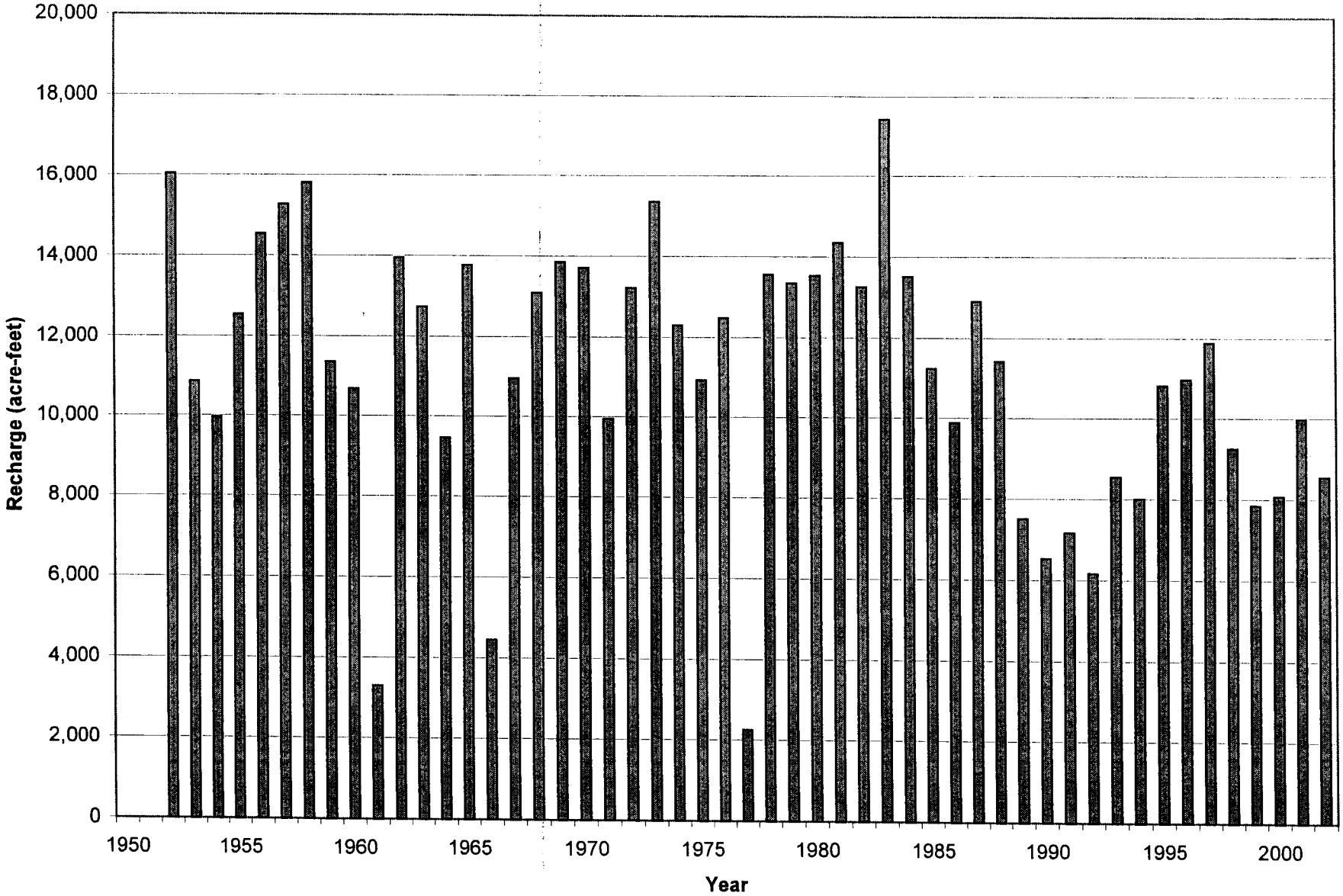

Figure 4.5 Annual Recharge from Merced Irrigation District, 1952-2002

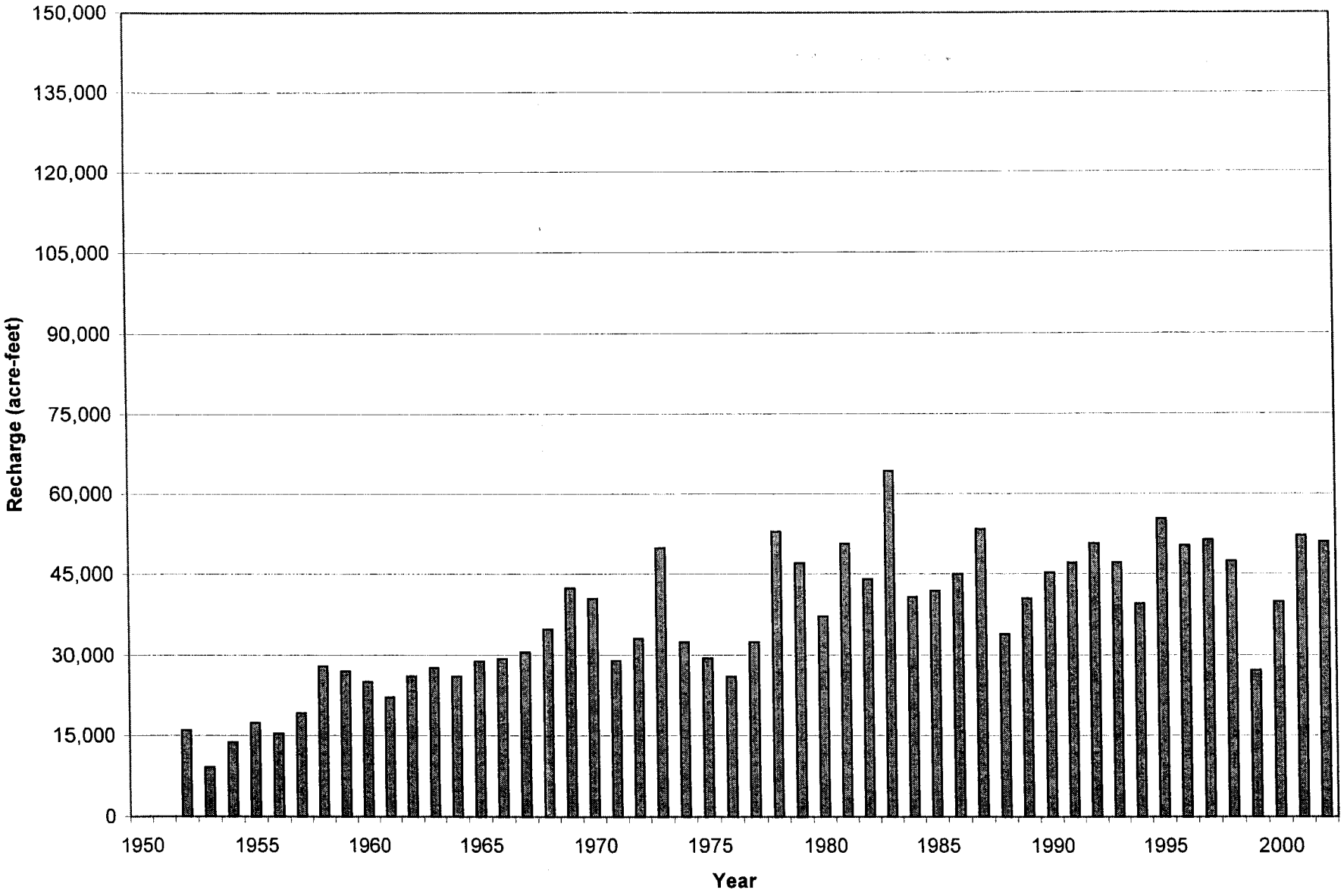

Figure 4.6 Annual Recharge from Non-District Areas, 1952-2002

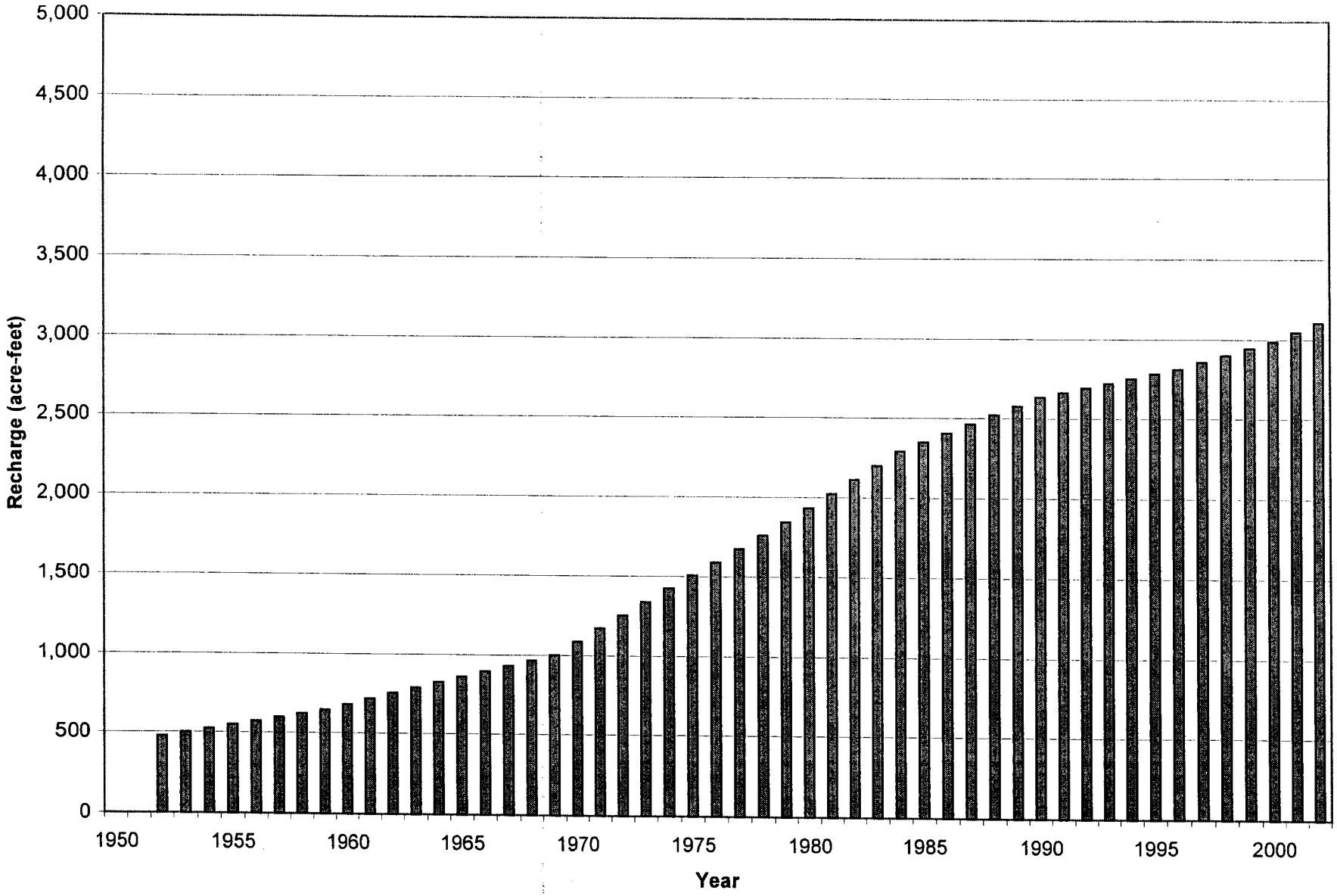

Figure 4.7 Annual Recharge from City Areas, 1952-2002

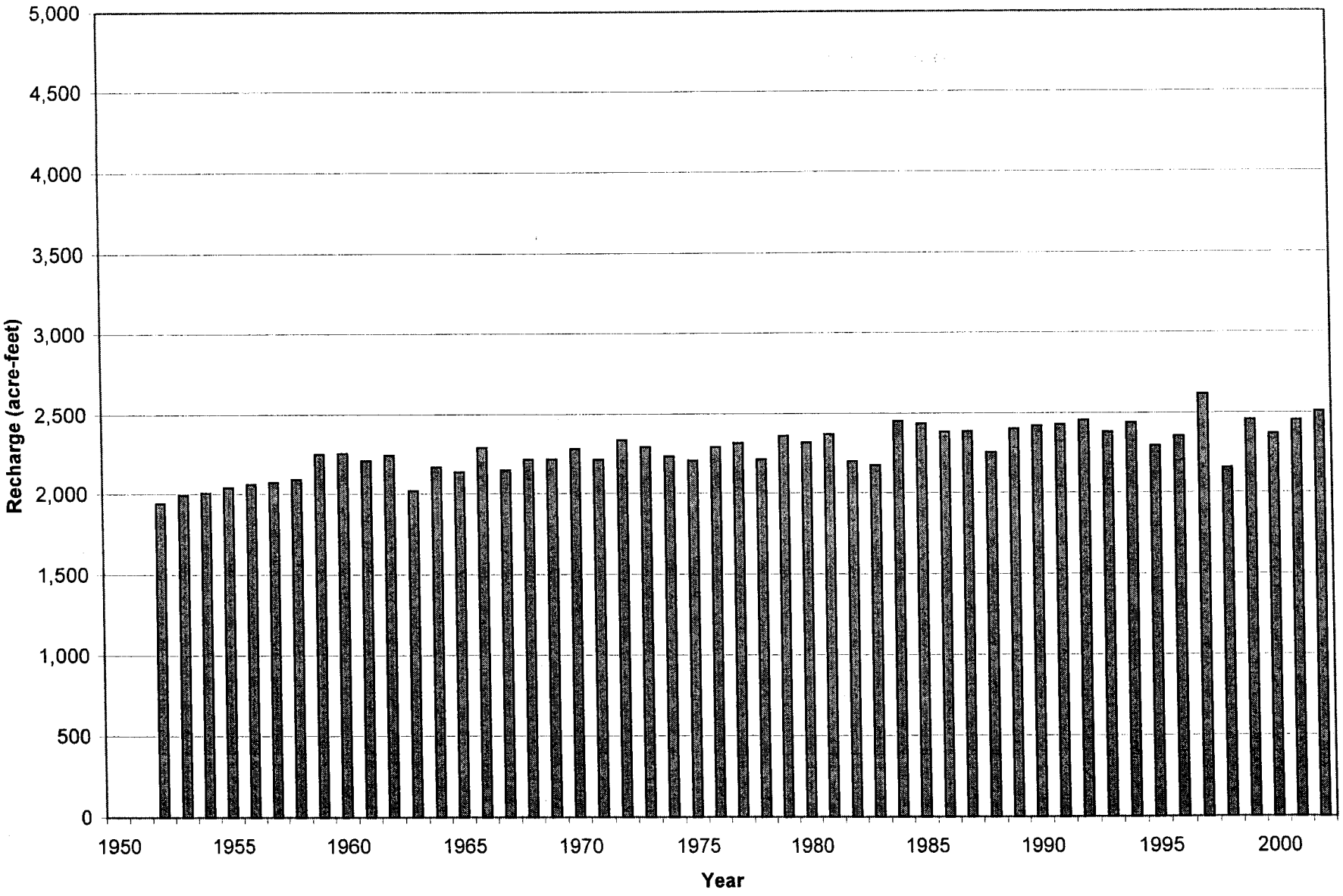

Figure 4.8 Annual Recharge from Rural Residences, 1952-2002

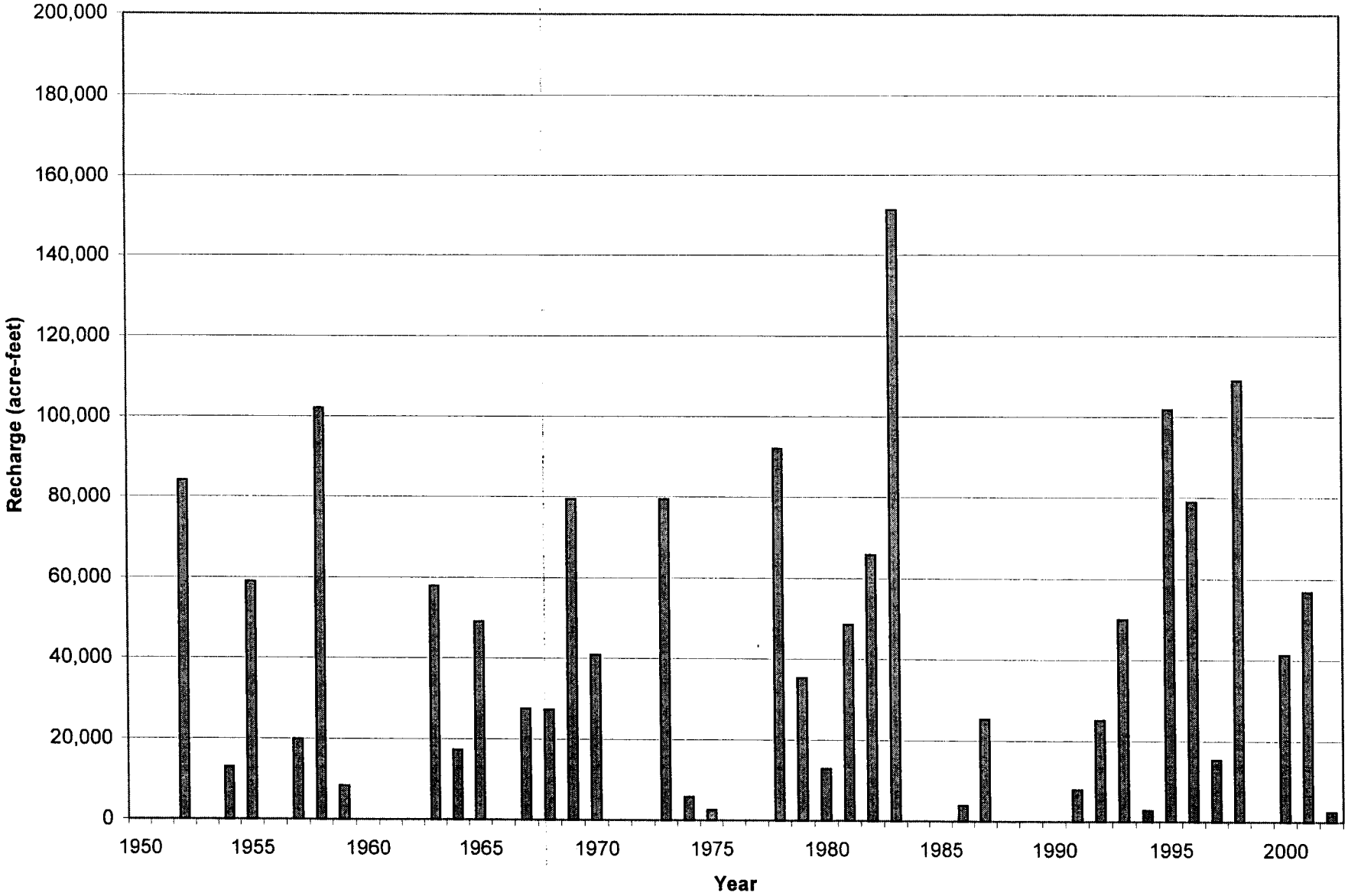

Figure 4.9 Annual Recharge from Non-Irrigated Areas, 1952-2002

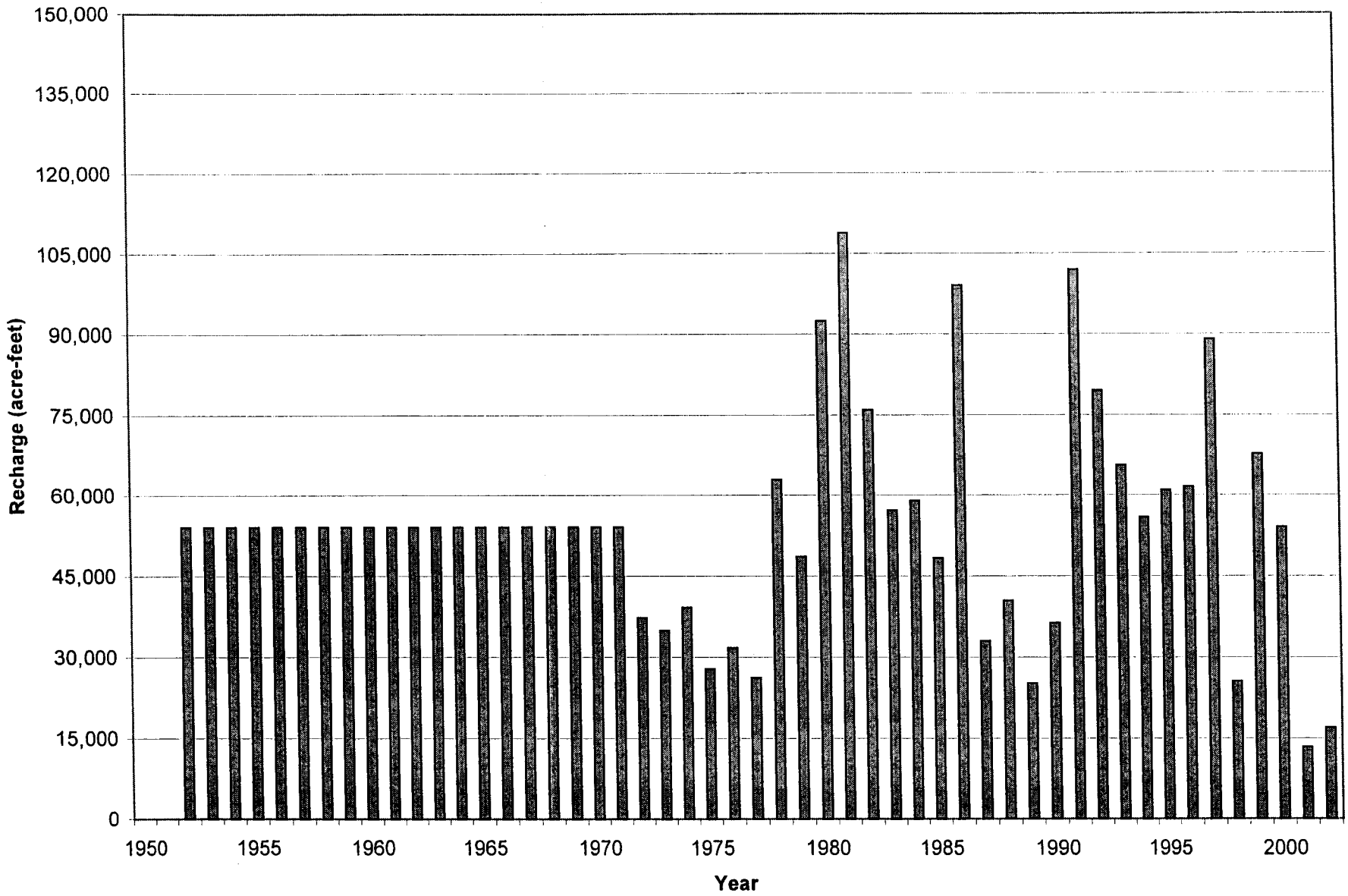

Figure 4.10 Annual Recharge from Turlock Lake, 1952-2002

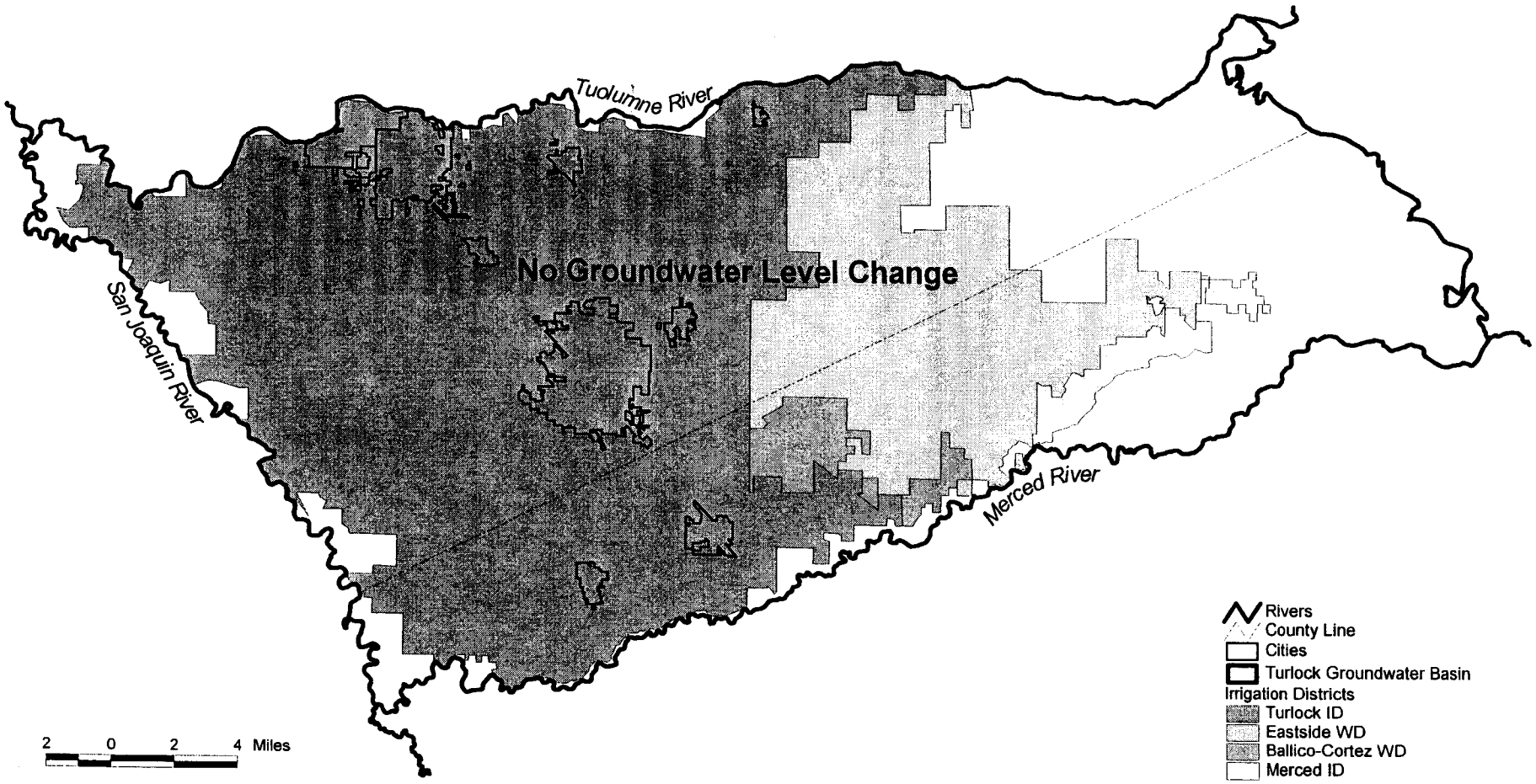

Figure 5.1a Annual Groundwater Level Changes within Turlock Groundwater Basin, 1953-1957

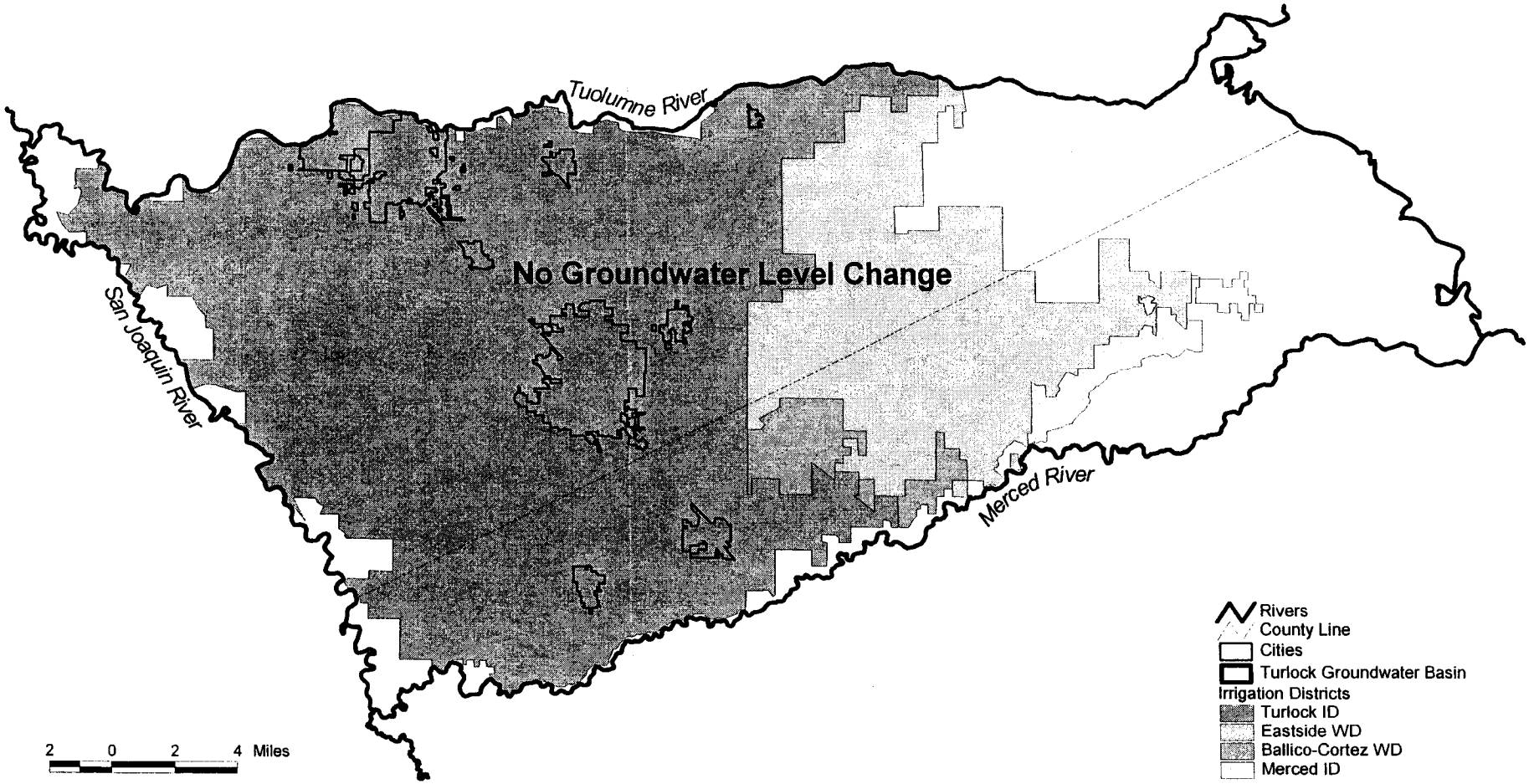

Figure 5.1b Annual Groundwater Level Changes within Turlock Groundwater Basin, 1958-1962

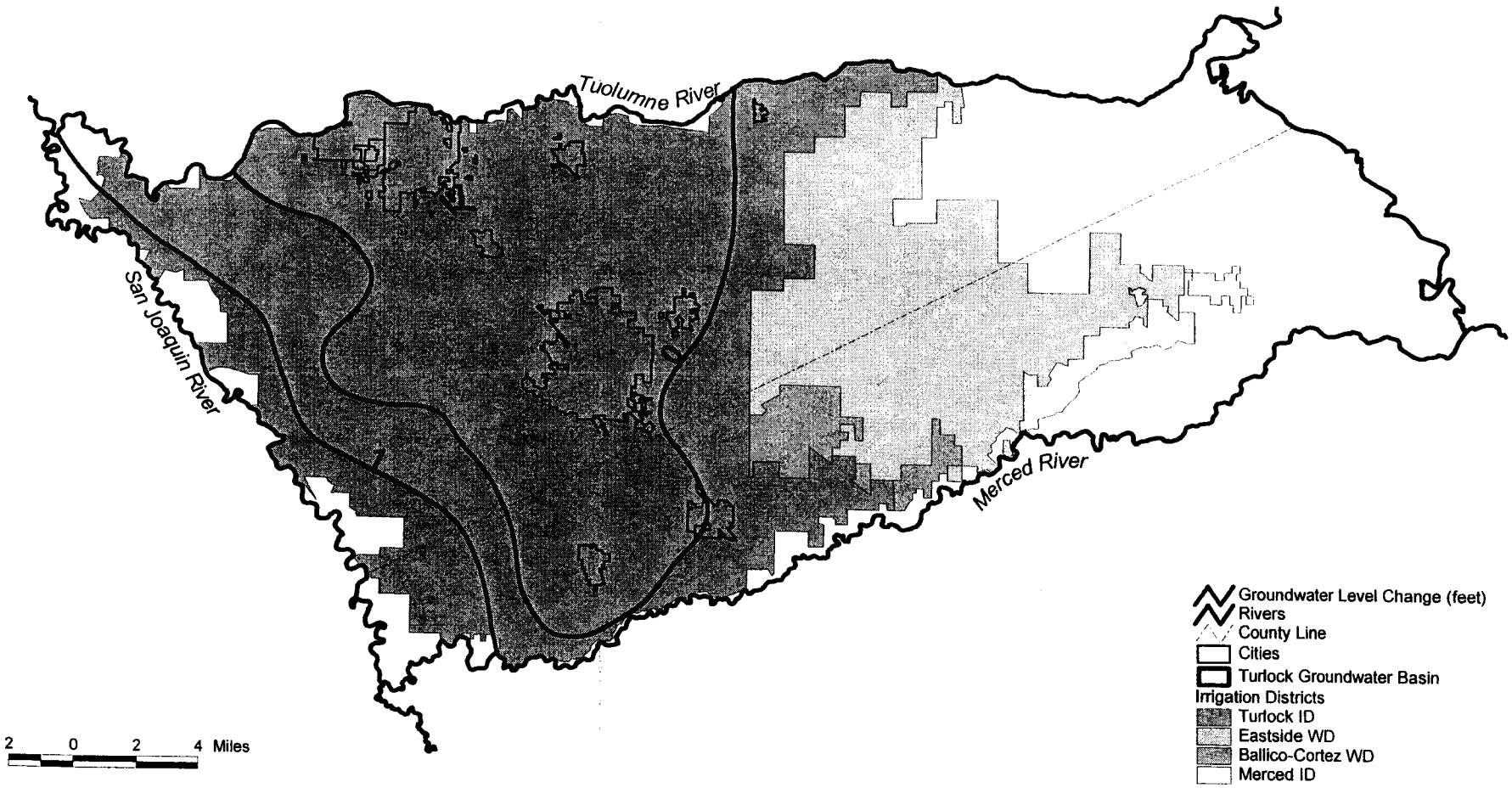

Figure 5.1c Annual Groundwater Level Changes within Turlock Groundwater Basin, 1963-1967

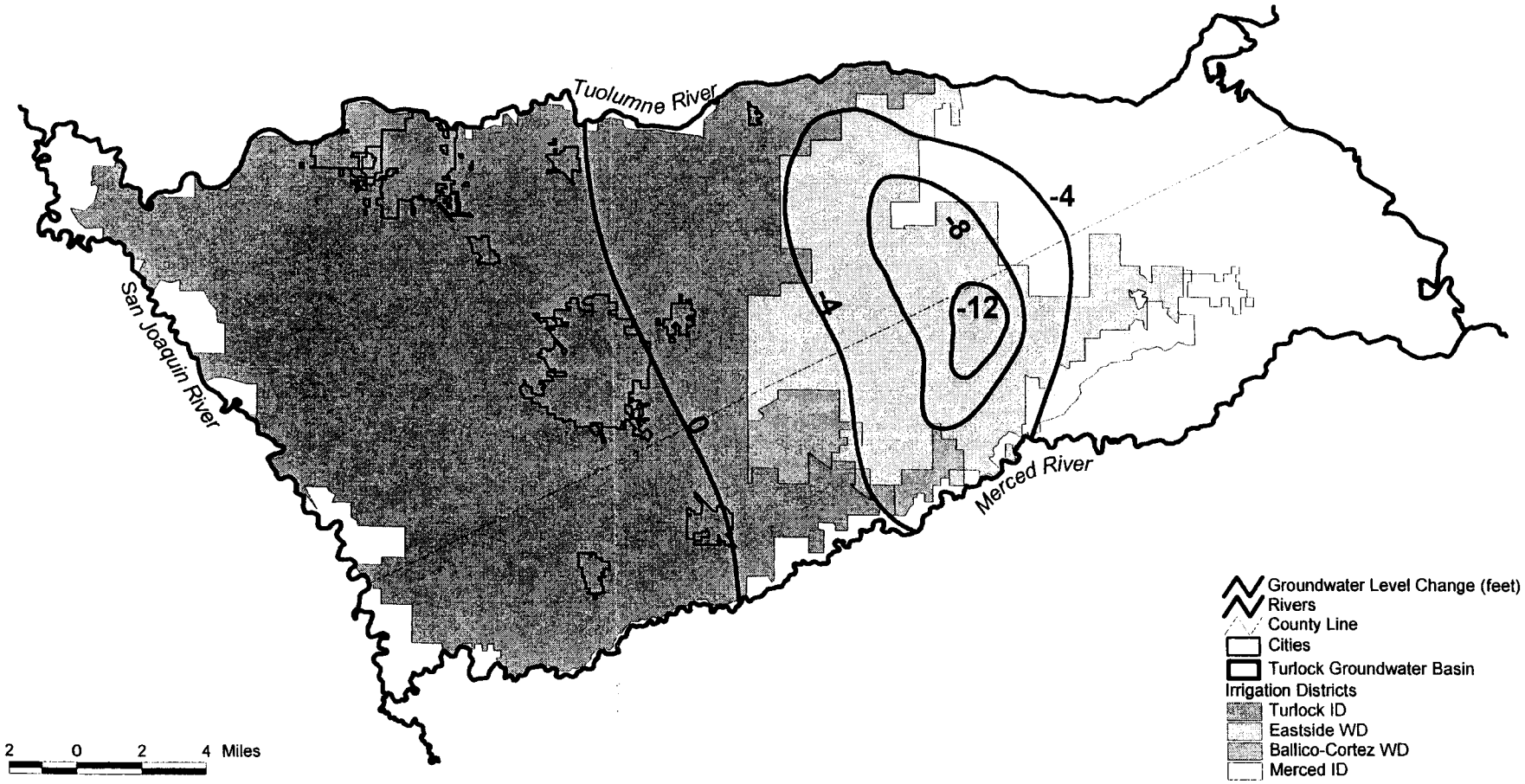

Figure 5.1d Annual Groundwater Level Changes within Turlock Groundwater Basin, 1968-1972

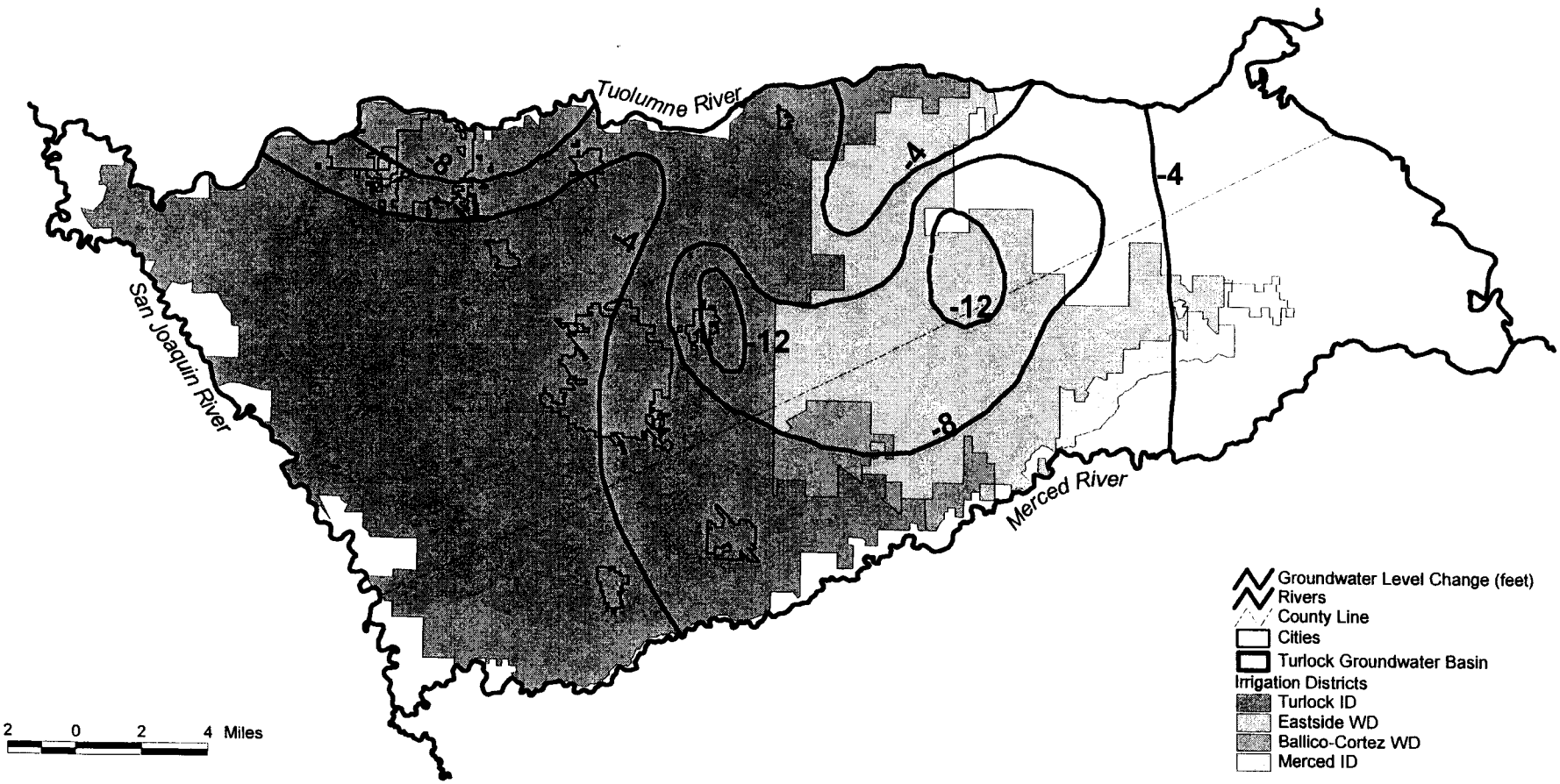

Figure 5.1e Annual Groundwater Level Changes within Turlock Groundwater Basin, 1973-1977

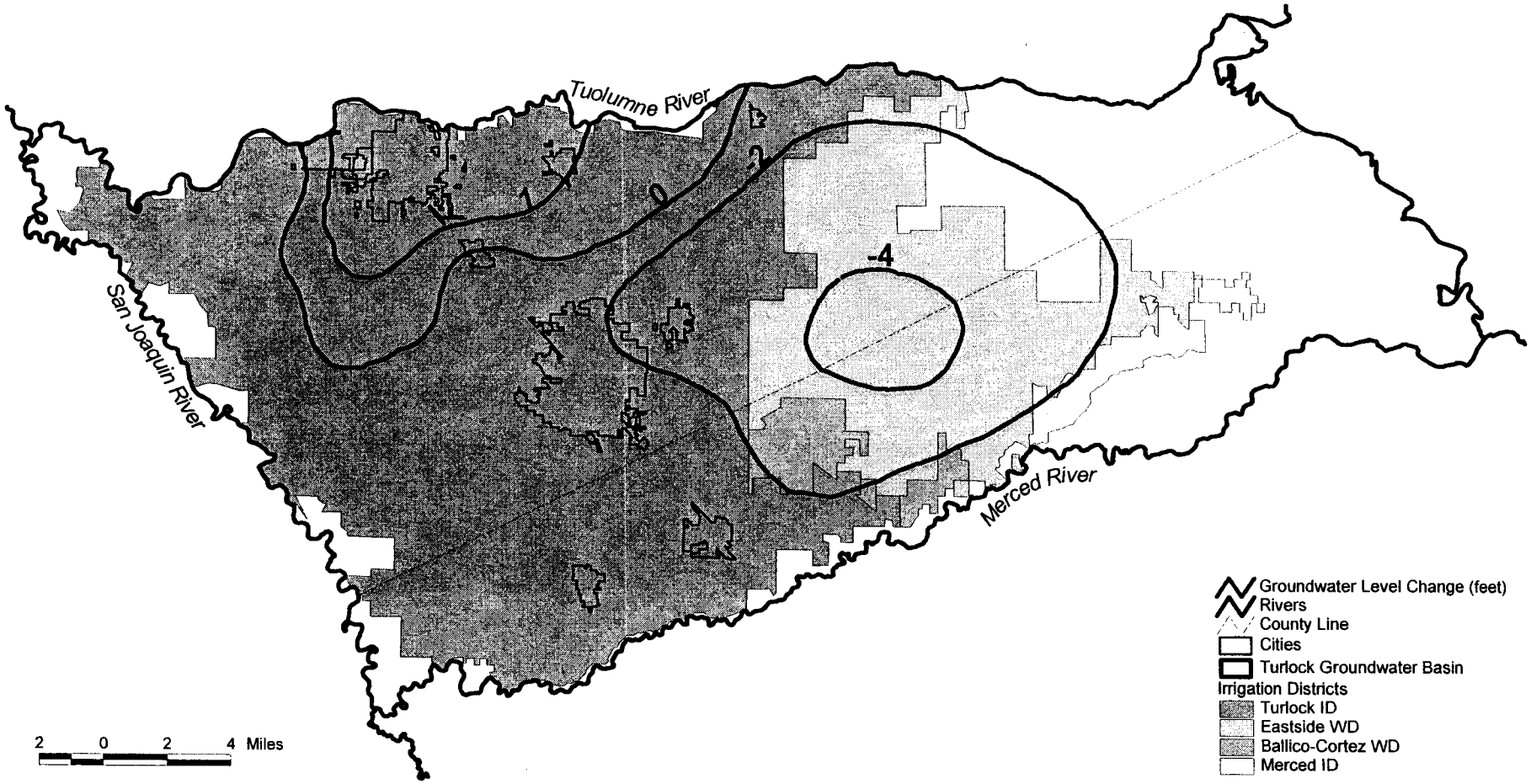

Figure 5.1f Annual Groundwater Level Changes within Turlock Groundwater Basin, 1978-1982

Figure 5.1g Annual Groundwater Level Changes within Turlock Groundwater Basin, 1983-1987

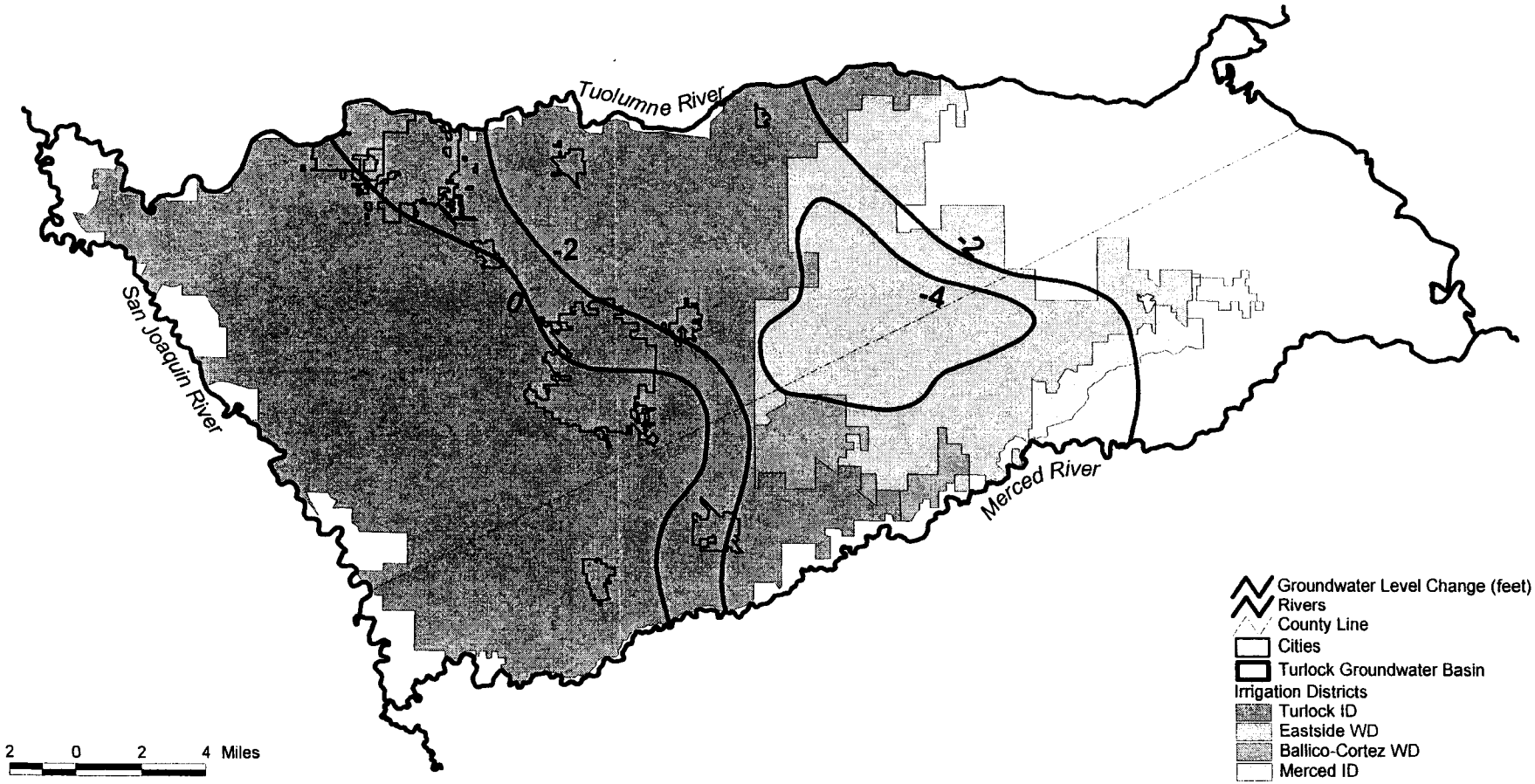

Figure 5.1h Annual Groundwater Level Changes within Turlock Groundwater Basin, 1988-1992

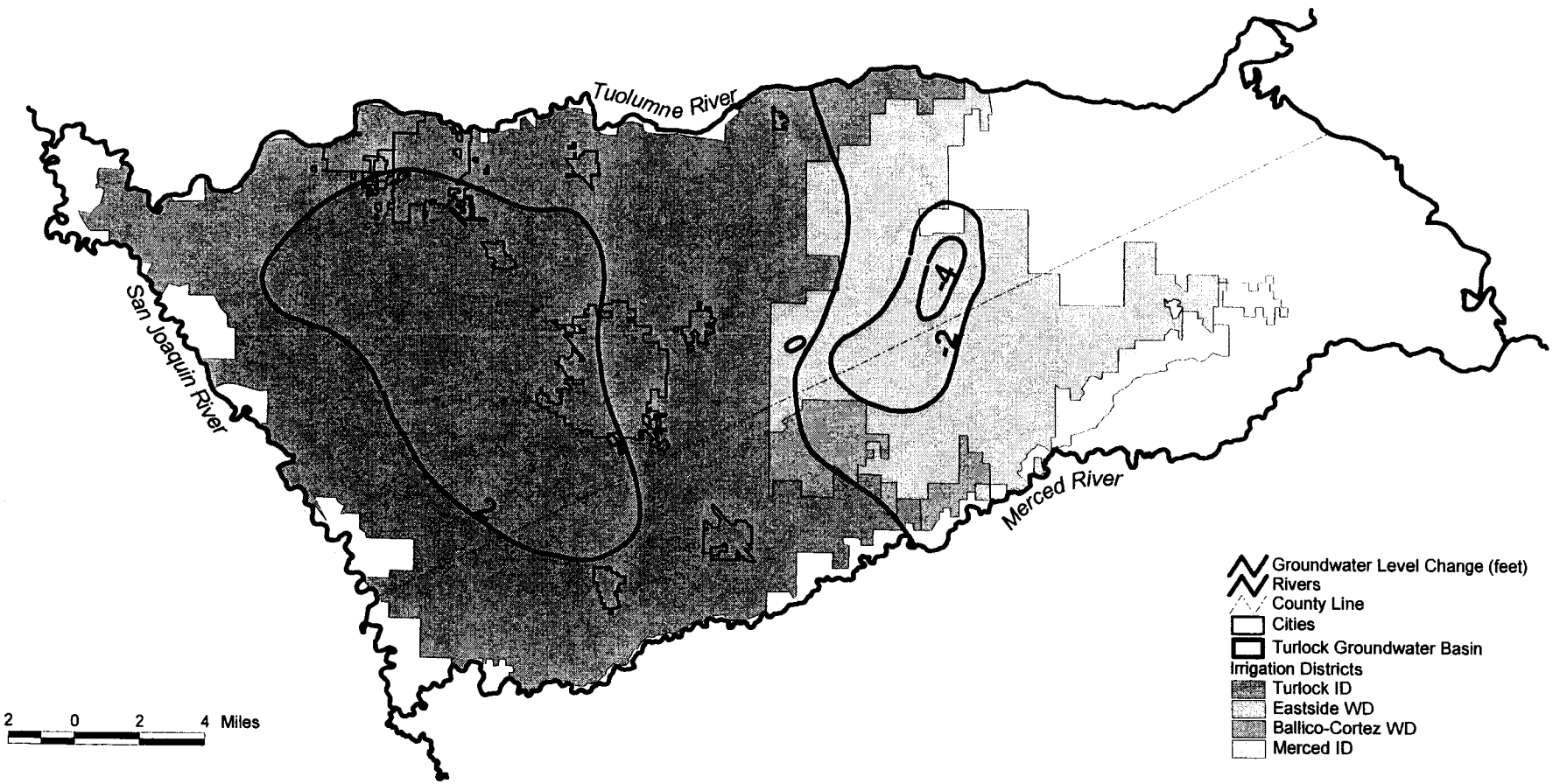

Figure 5.1i Annual Groundwater Level Changes within Turlock Groundwater Basin, 1993-1997

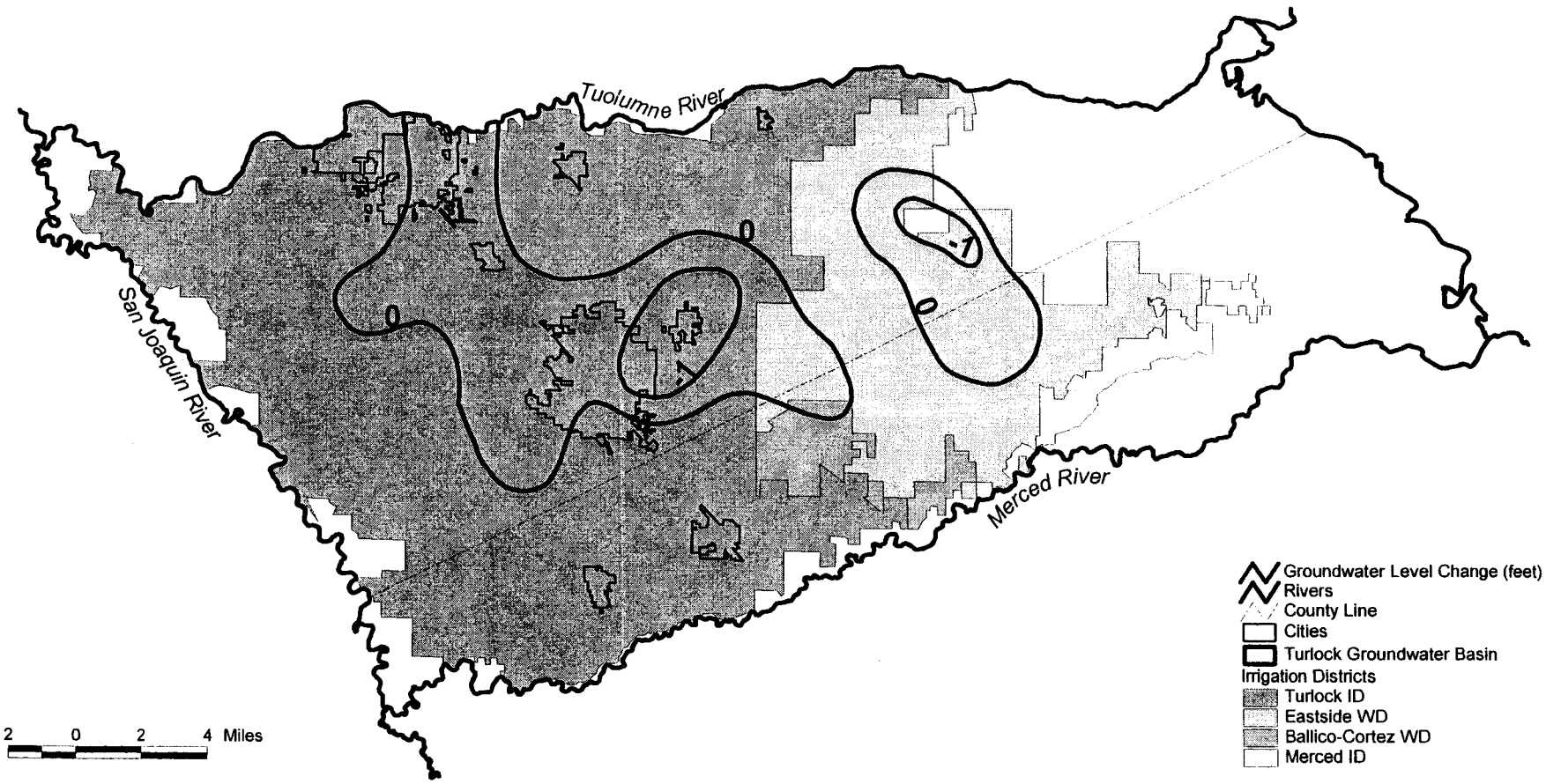

Figure 5.1j Annual Groundwater Level Changes within Turlock Groundwater Basin, 1998-2002

Table 5.1 Change in Groundwater Levels and Storage for Turlock Groundwater Basin, 1953-2002

Period	Average Annual Groundwater-Level Change (Feet/Year)	Average Groundwater-Storage Change (Acre-Feet/Year)
1953-1957	0.00	0
1958-1962	0.00	0
1963-1967	0.37	12,950
1968-1972	-1.98	-69,300
1973-1977	-4.67	-163,450
1978-1982	-0.99	-34,650
1983-1987	-0.59	-20,650
1988-1992	-1.19	-41,650
1993-1997	0.37	12,950
1998-2002	0.05	1,820

Table 6.1a Water Budget for Turlock Groundwater Basin 1953-1977
(Acre-Feet per year)

Water-Budget Component	Period				
	1953-1957	1958-1962	1963-1967	1968-1972	1973-1977
Groundwater Discharge					
Groundwater Pumping					
Turlock irrigation District Drainage Wells	162,735	146,095	143,830	148,366	129,786
Turlock Irrigation District Rented Wells	0	0	0	0	35,547
Turlock Irrigation District Supplemental Wells	32,650	30,900	30,708	28,594	34,169
Turlock Irrigation District Primary-Source Wells	0	0	0	0	0
Eastside Water District	13,859	50,116	79,272	115,486	138,331
Ballico-Cortez Water District	20,913	23,729	22,085	22,939	22,143
Merced Irrigation District	186	176	175	163	195
Non-District Areas	36,258	52,745	61,035	75,060	81,961
Ceres	1,588	2,022	2,509	3,187	4,428
Delhi	277	330	416	519	671
Denair	236	291	358	471	718
Hickman	50	61	75	93	124
Hilmar	167	206	261	344	510
Hughson	374	446	523	603	690
Keyes	254	325	473	635	828
South Modesto	461	586	728	924	1,285
Turlock	3,980	4,944	6,219	7,940	10,946
Rural Residences	3,476	3,876	3,698	3,910	3,910
Groundwater Net Discharge to Rivers	84,501	89,641	68,971	122,918	96,313
Groundwater Discharge from Subsurface Drains	0	0	0	0	243
Groundwater Consumption by Phreatophytes	41,971	46,555	43,152	43,882	42,591
TOTAL	403,939	453,043	464,487	576,034	605,388
Groundwater Recharge					
Groundwater Recharge from Irrigated Areas					
Turlock Irrigation District Canal-Delivery Lands	283,210	296,915	297,483	305,486	268,774
Turlock Irrigation District Groundwater-Only Lands	0	0	0	0	0
Eastside Water District	6,365	25,492	39,863	59,684	62,497
Ballico-Cortez Water District	8,622	11,833	10,668	11,480	9,561
Merced Irrigation District	12,637	11,024	10,283	12,770	10,670
Non-District Areas	14,993	25,650	28,522	35,963	34,027
Ceres	123	156	194	246	342
Delhi	21	26	32	40	52
Denair	22	27	33	43	65
Hickman	5	6	7	9	12
Hilmar	12	15	19	25	37
Hughson	24	29	34	39	45
Keyes	20	25	37	49	64
South Modesto	42	54	67	85	118
Turlock	282	350	440	562	774
Rural Residences	2,035	2,210	2,153	2,253	2,269
Groundwater Recharge from Non-Irrigated Areas	18,400	22,107	30,477	29,635	17,621
Groundwater Recharge from Turlock Lake	54,126	54,126	54,126	50,764	32,010
Groundwater Recharge from Foothills	1,000	1,000	1,000	1,000	1,000
Groundwater Recharge from Deep Formations	2,000	2,000	2,000	2,000	2,000
TOTAL	403,939	453,043	477,437	512,134	441,938
Change in Groundwater Storage	0	0	12,950	-63,900	-163,450

Table 6.1b Water Budget for Turlock Groundwater Basin 1978-2002 (Acre-Feet per Year)

Water-Budget Component	Period				
	1978-1982	1983-1987	1988-1992	1993-1997	1998-2002
Groundwater Discharge					
Groundwater Pumping					
Turlock irrigation District Drainage Wells	103,154	117,146	40,700	76,821	69,148
Turlock Irrigation District Rented Wells	1,288	34,720	100,075	16,586	16,065
Turlock Irrigation District Supplemental Wells	42,231	35,333	49,447	31,658	20,946
Turlock Irrigation District Primary-Source Wells	0	0	30	1,293	9,257
Eastside Water District	153,271	170,082	164,761	148,008	132,249
Ballico-Cortez Water District	22,569	23,652	22,593	20,120	18,087
Merced Irrigation District	241	202	282	181	120
Non-District Areas	88,447	98,732	104,420	97,788	99,216
Ceres	5,829	7,489	8,598	9,640	10,689
Delhi	824	958	1,061	1,269	1,589
Denair	935	1,023	1,013	1,140	1,233
Hickman	150	160	166	172	175
Hilmar	701	914	1,016	1,177	1,242
Hughson	768	844	982	1,016	953
Keyes	1,006	1,112	1,171	1,270	1,329
South Modesto	1,691	2,112	2,246	2,349	2,470
Turlock	13,981	16,694	18,433	20,121	22,316
Rural Residences	3,932	4,084	4,108	4,131	4,026
Groundwater Net Discharge to Rivers	162,348	70,302	-121,310	59,095	40,707
Groundwater Discharge from Subsurface Drains	243	1,358	1,872	3,254	13,857
Groundwater Consumption by Phreatophytes	41,965	43,714	44,566	40,757	40,757
TOTAL	645,573	630,631	446,228	537,844	506,432
Groundwater Recharge					
Groundwater Recharge from Irrigated Areas					
Turlock Irrigation District Canal-Delivery Lands	314,455	340,306	200,625	277,998	298,434
Turlock Irrigation District Groundwater-Only Lands	0	0	13	623	4,158
Eastside Water District	87,776	91,829	71,941	78,060	59,323
Ballico-Cortez Water District	12,519	12,320	9,312	10,182	7,702
Merced Irrigation District	13,616	13,001	7,765	10,052	8,746
Non-District Areas	46,391	49,070	43,504	48,769	43,552
Ceres	450	579	673	724	757
Delhi	64	74	82	98	123
Denair	85	93	95	96	101
Hickman	14	15	16	16	17
Hilmar	51	66	74	85	90
Hughson	50	55	64	66	62
Keyes	78	86	91	98	103
South Modesto	156	194	207	216	228
Turlock	989	1,181	1,320	1,390	1,519
Rural Residences	2,292	2,368	2,393	2,417	2,390
Groundwater Recharge from Non-Irrigated Areas	51,234	36,394	6,666	50,262	42,357
Groundwater Recharge from Turlock Lake	77,793	59,348	56,739	66,641	35,590
Groundwater Recharge from Foothills	1,000	1,000	1,000	1,000	1,000
Groundwater Recharge from Deep Formations	2,000	2,000	2,000	2,000	2,000
TOTAL	611,013	609,981	404,578	550,794	508,252
Change in Groundwater Storage	-34,560	-20,650	-41,650	12,950	1,820