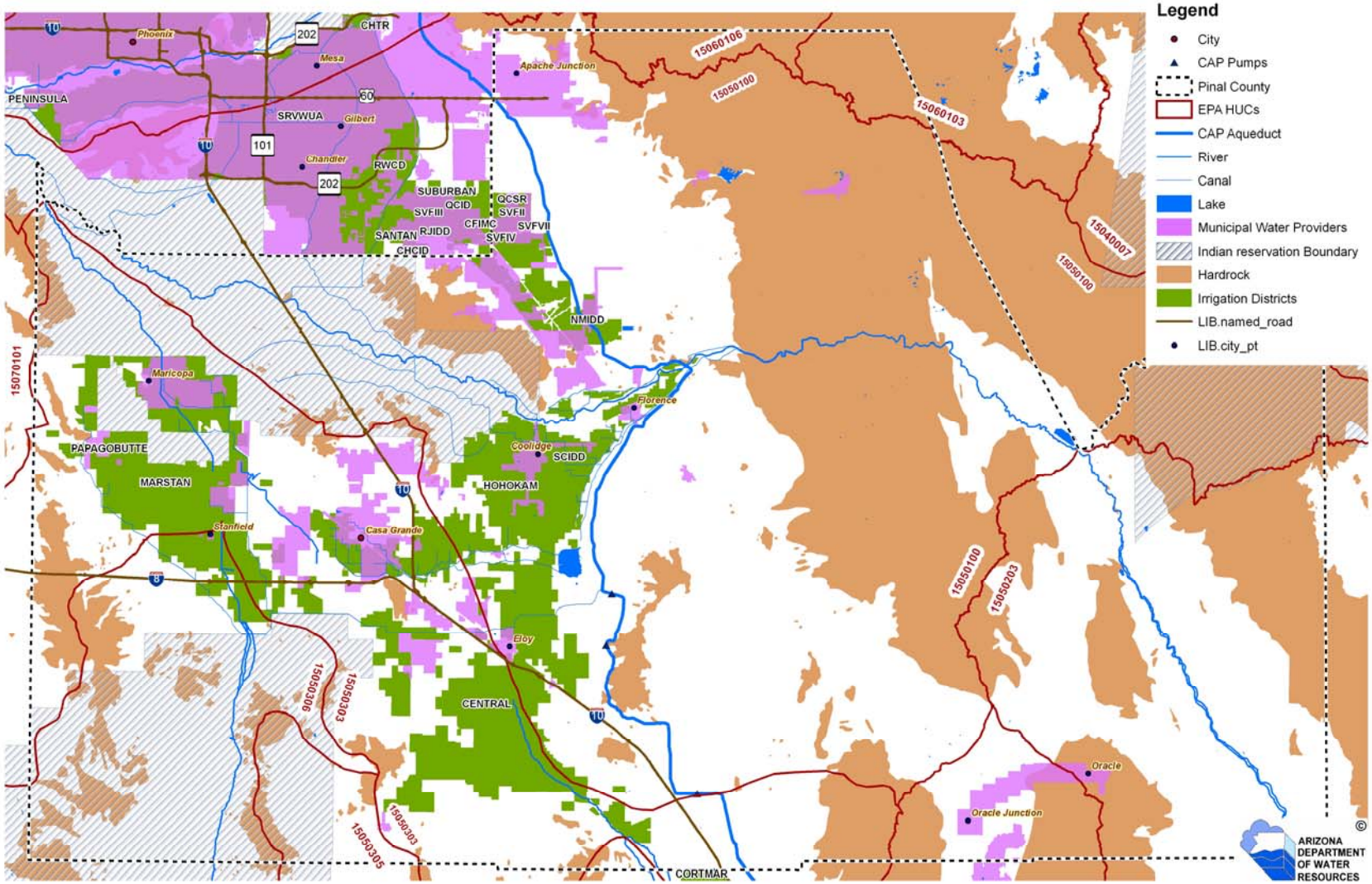
Sources of Water, Water Level Changes and Related Hydrologic Data for Pinal County and the Pinal Active Management Area 1980 -2005

Presented to the Pinal County Local Drought Impact Group 01/11/2007

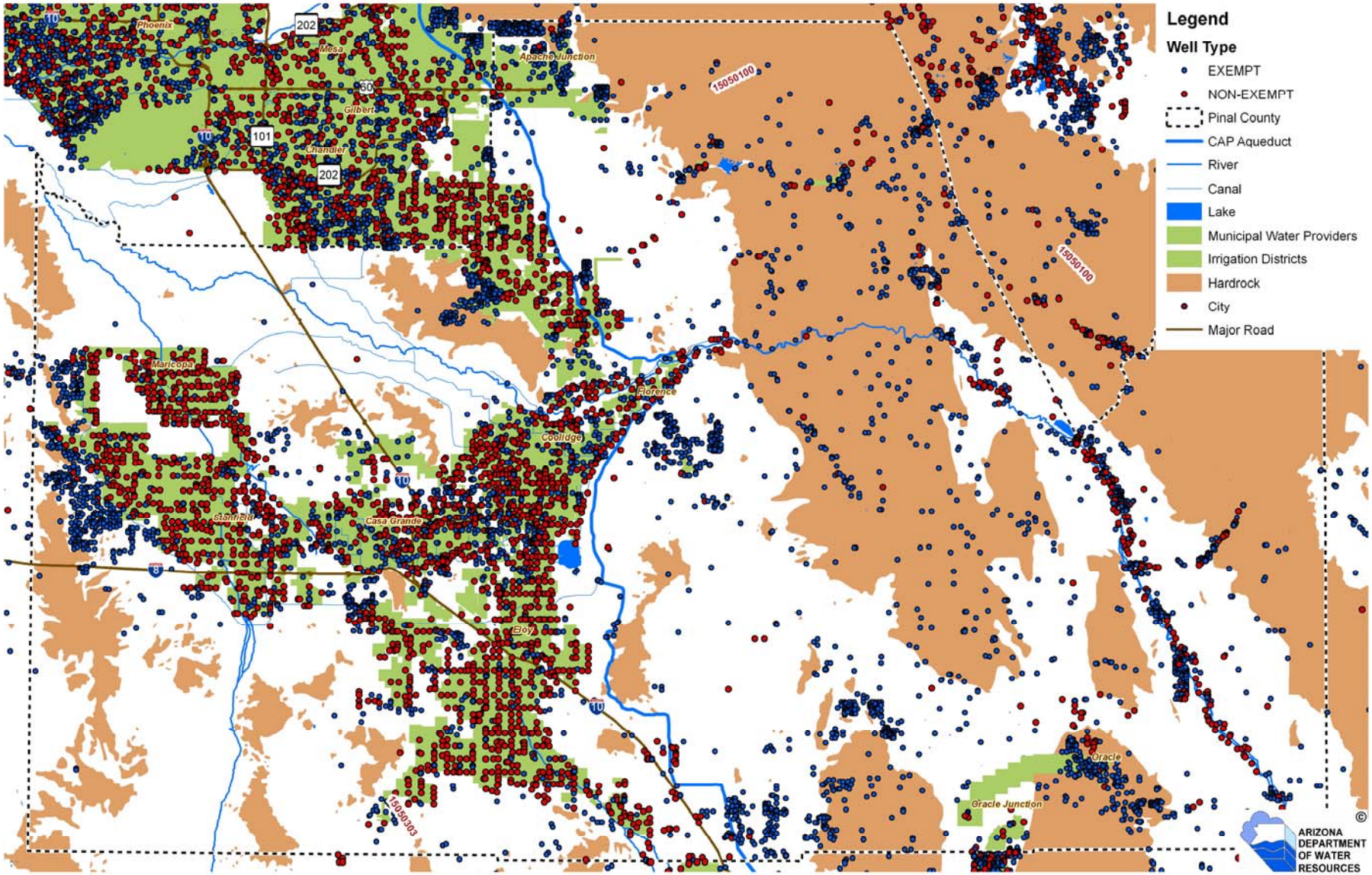
By Frank Corkhill

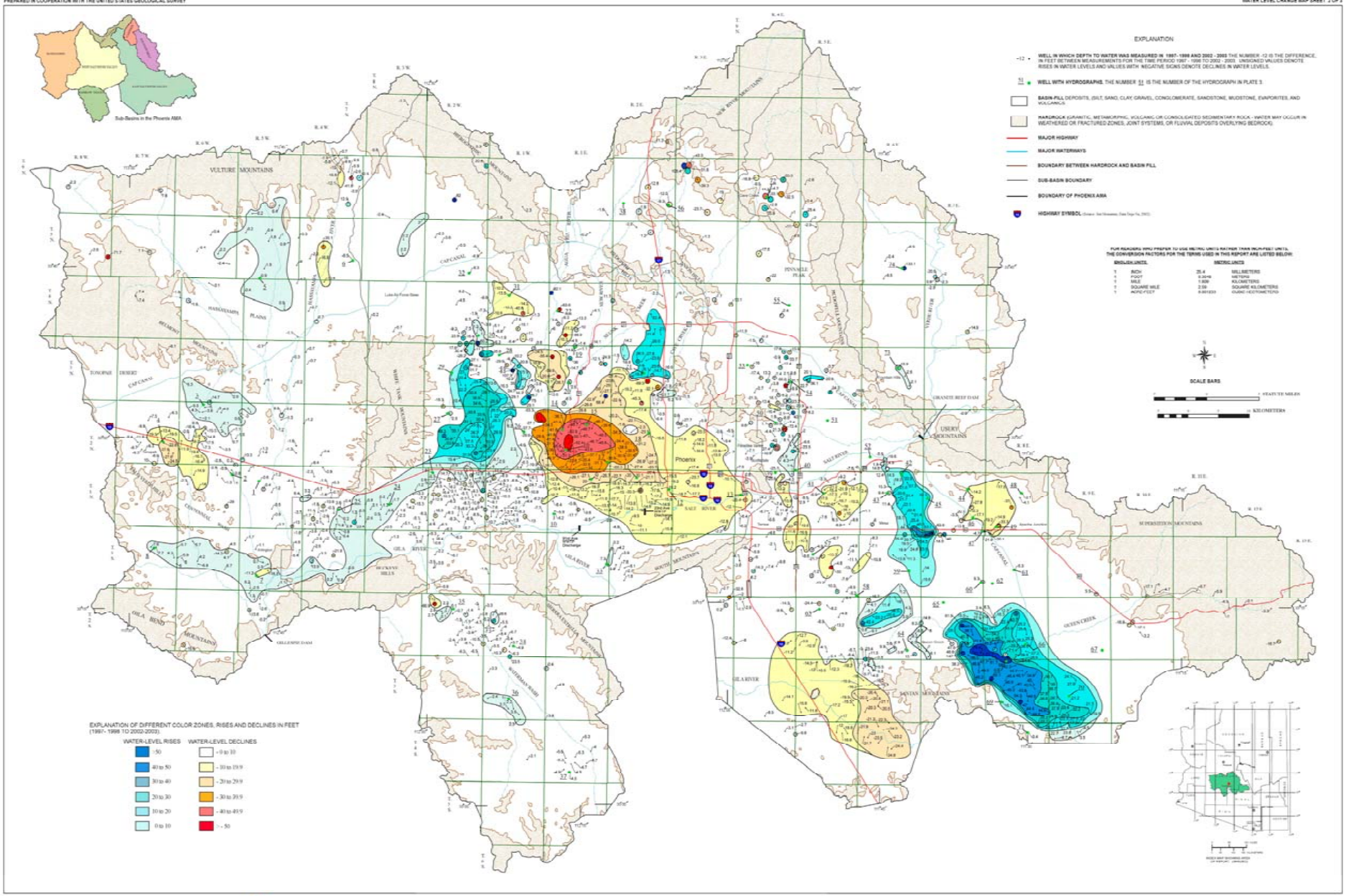
Arizona Department of Water Resources - Hydrology Division

Irrigation Districts, Municipal Water Providers and HUCs in Pinal County 2006



Locations of Exempt and Non-Exempt Wells In Pinal County 2006



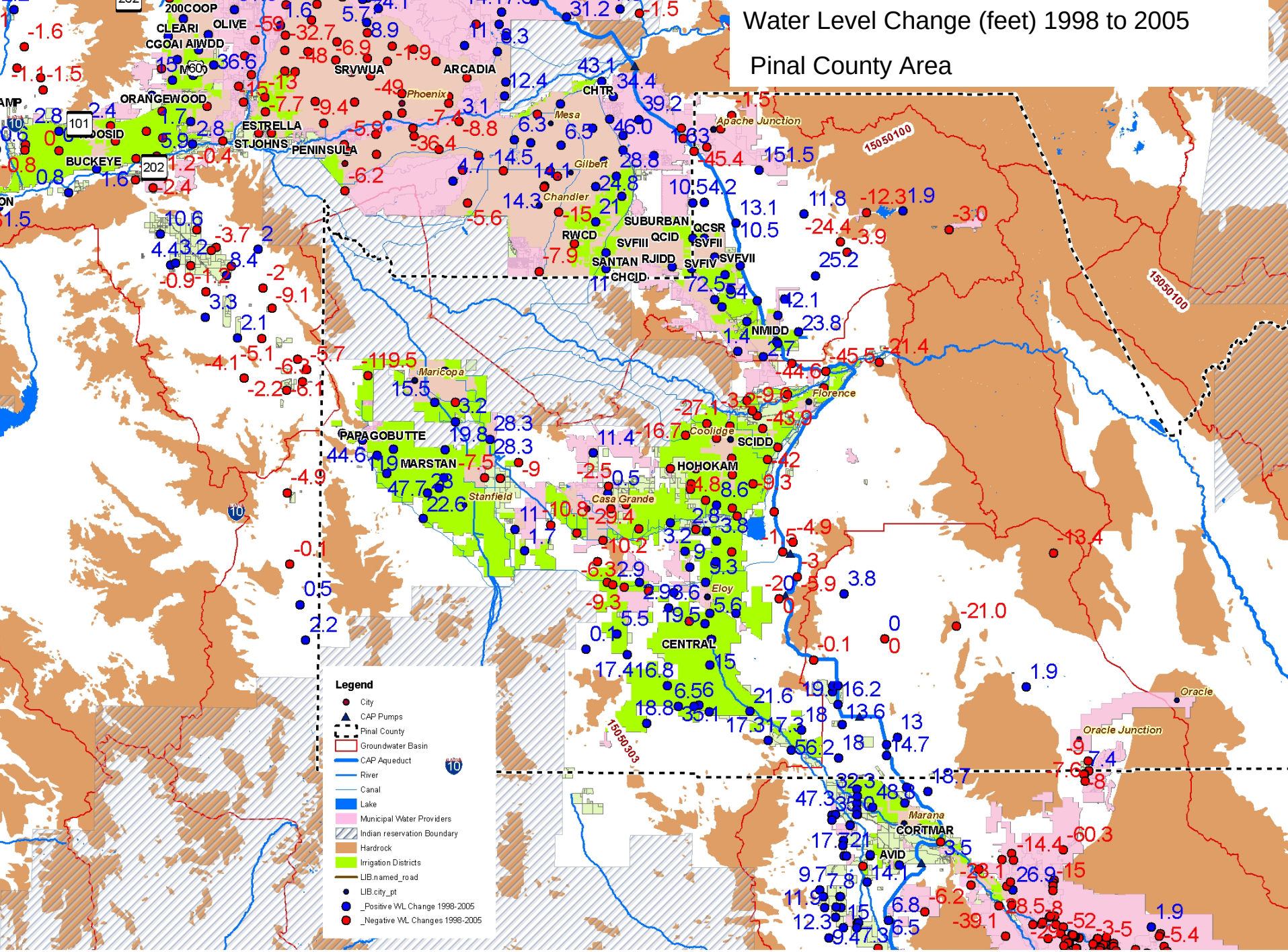


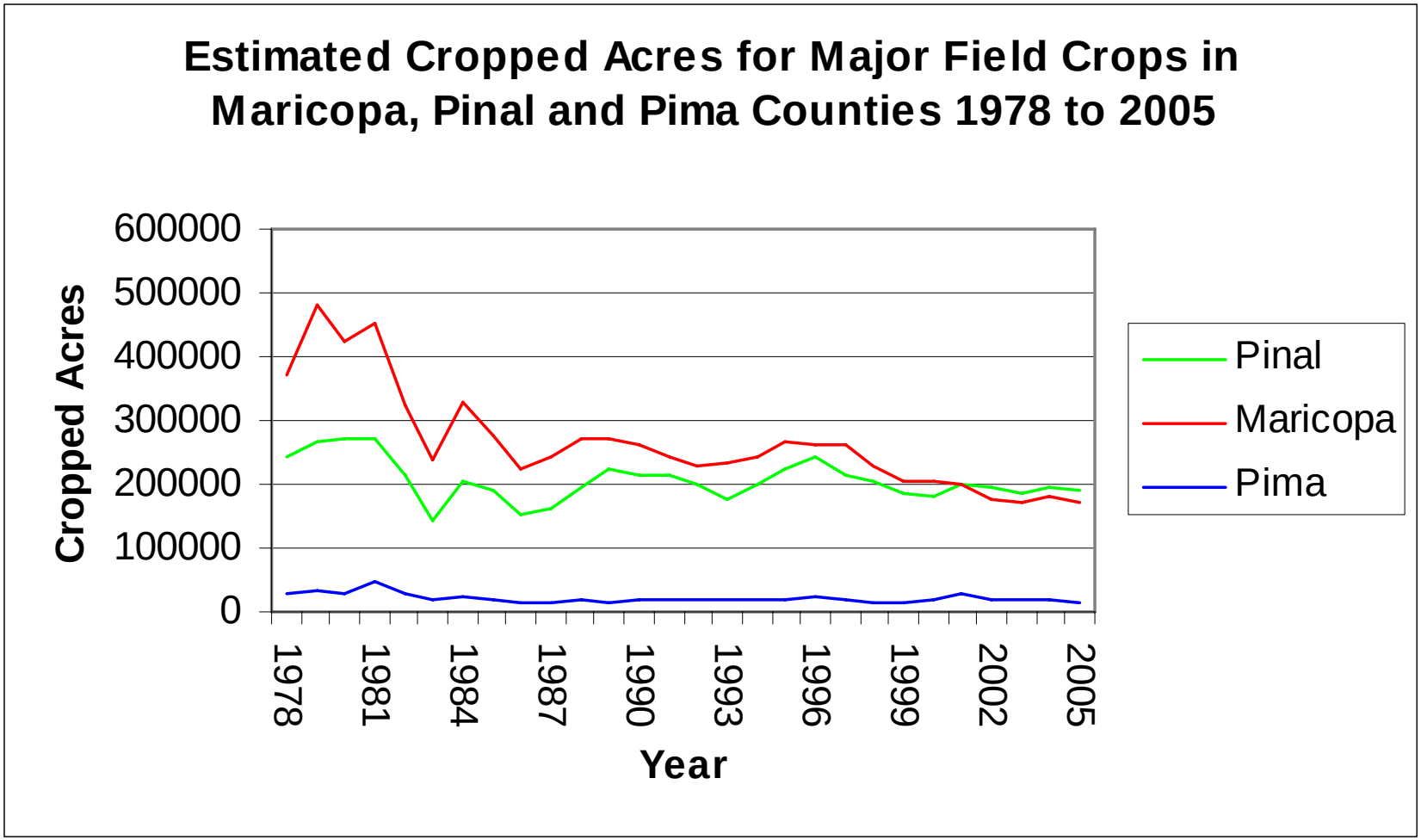
MAP SHOWING GROUNDWATER CONDITIONS IN THE PHOENIX ACTIVE MANAGEMENT AREA
MARICOPA, PINAL, AND YAVAPAI COUNTIES, ARIZONA—NOV. 2002- FEB. 2003

BY
S.J. RASCONA

Water Level Change (feet) 1998 to 2005

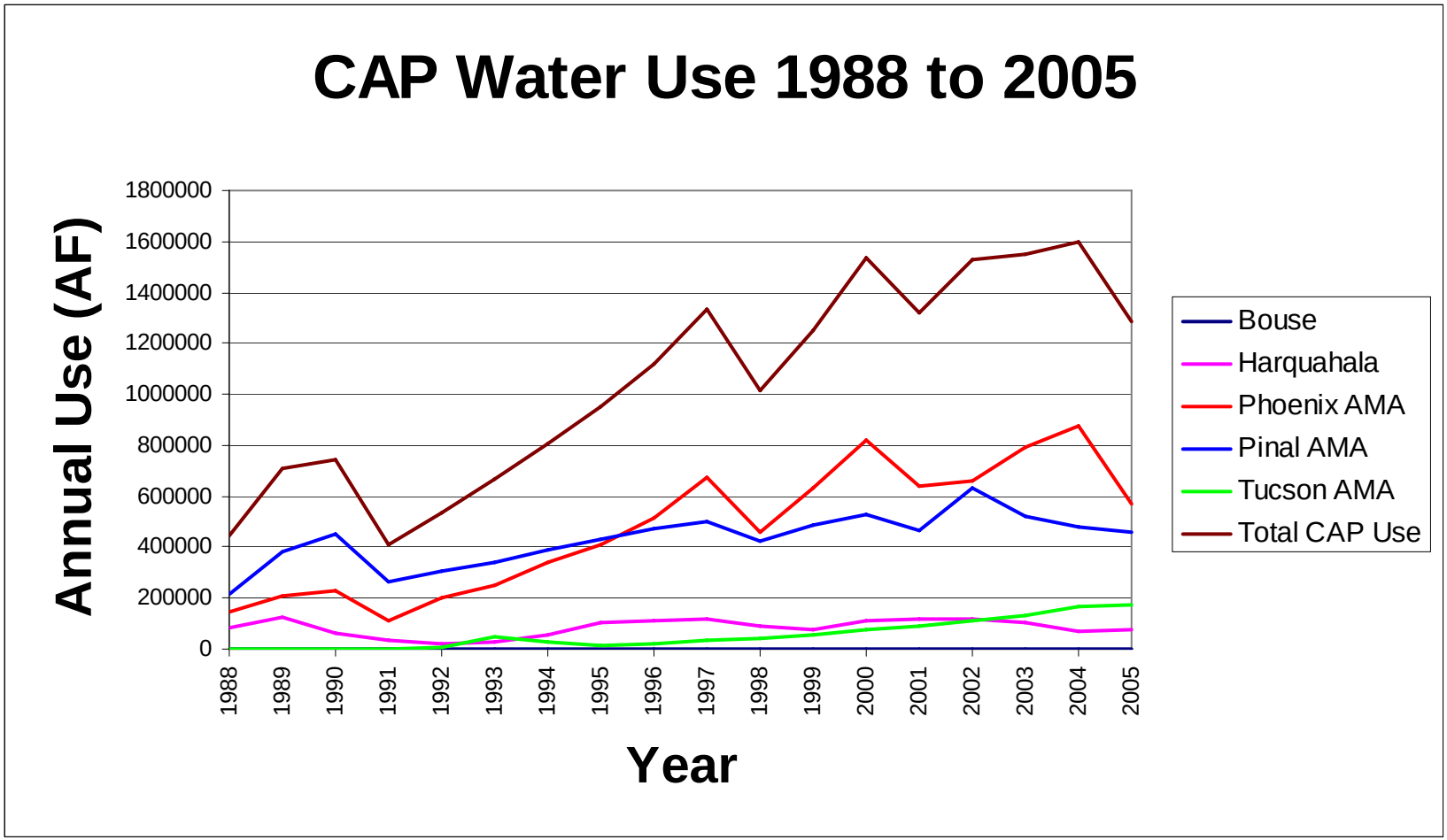
Pinal County Area

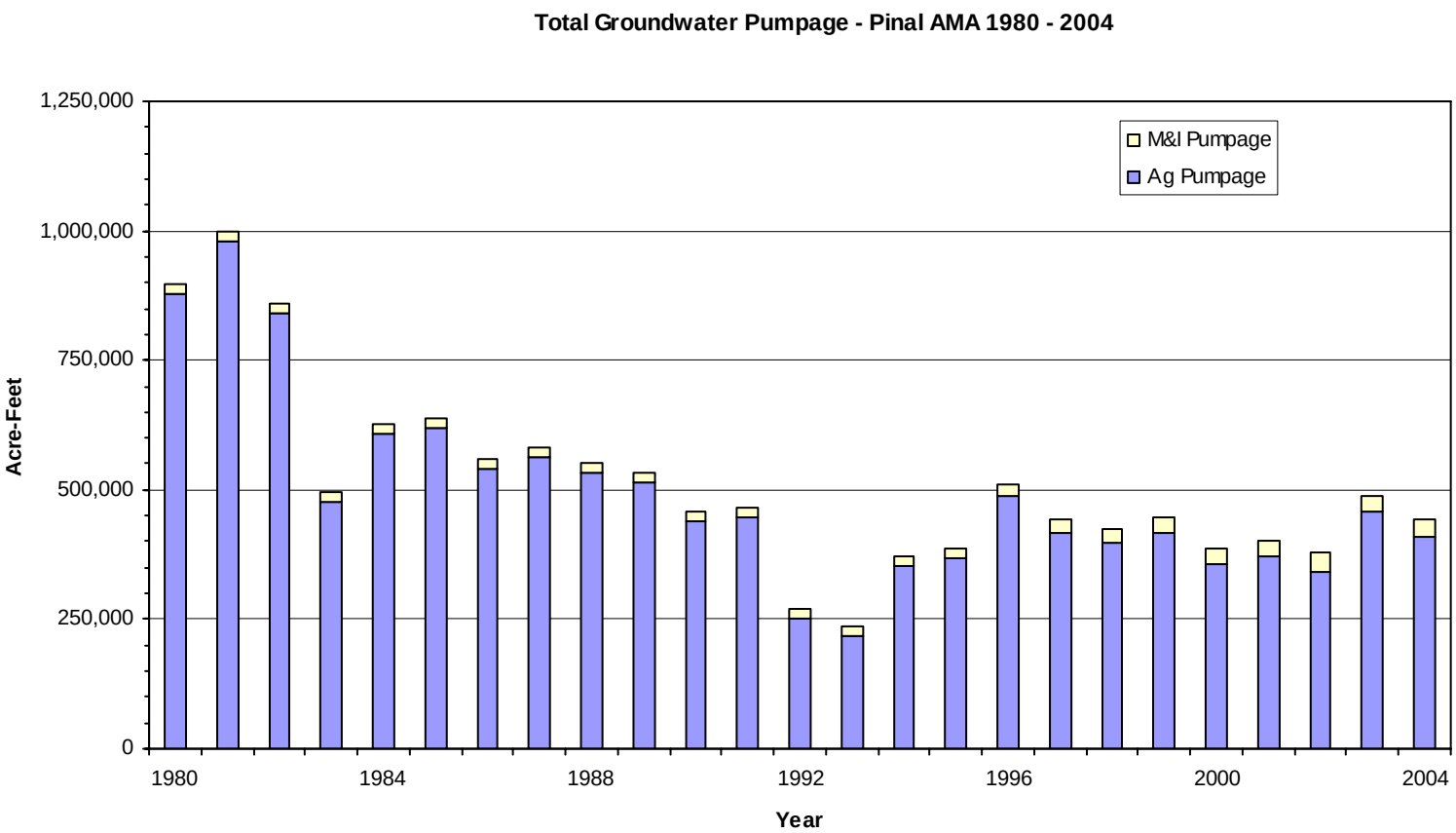




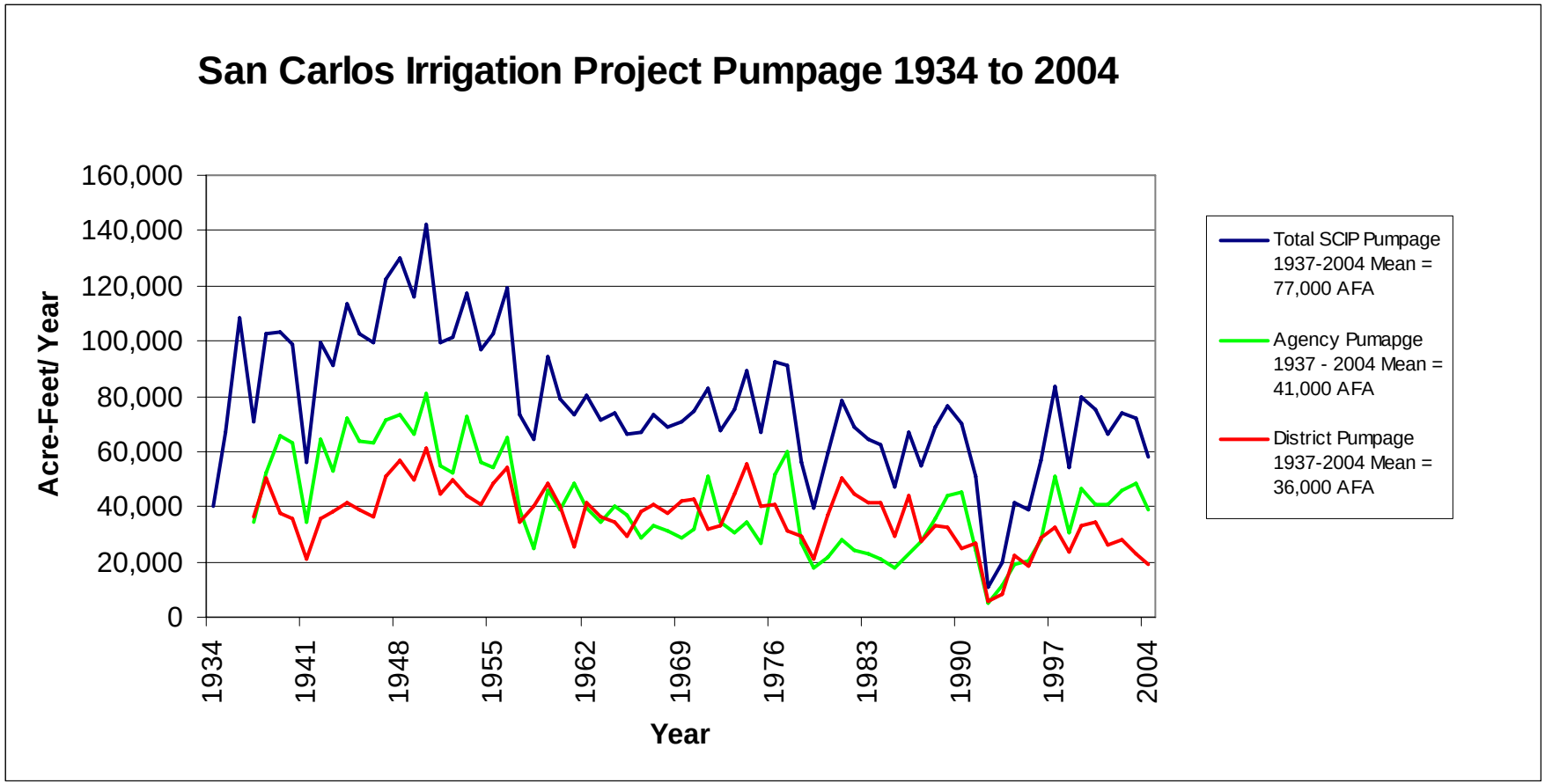
Major Field Crops Include: Cotton, Hay, Wheat, Barley, Corn

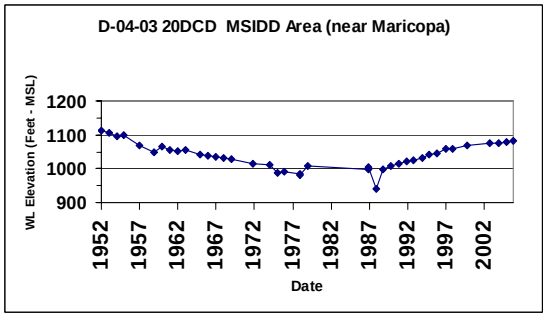
Source: Arizona Agricultural Statistics Reports (1982, 1984, 1988, 1992, 1999, 2004, 2005)

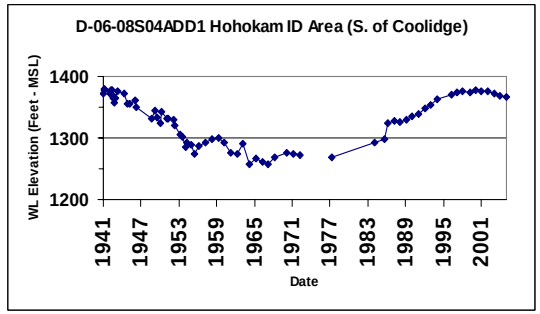

CAP Water Use 1988 to 2005
Annual Use (AF)
1800000
1600000
1400000
1200000
1000000
800000
600000
400000
200000
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year
Bouse
Harquahala
Phoenix AMA
Pinal AMA
Tucson AMA
Total CAP Use

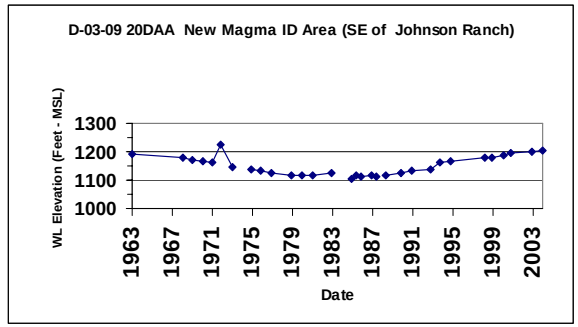


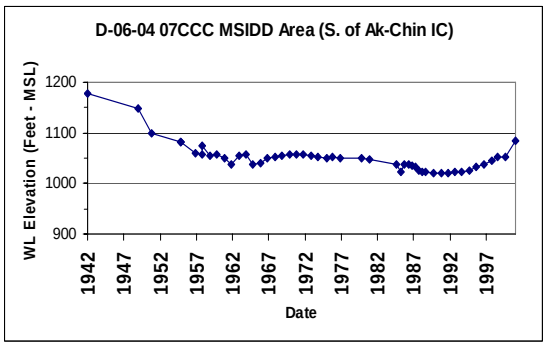
1980 - 1987 Annual Average: 706,700 ac-ft/year
1988 - 2004 Annual Average: 423,600 ac-ft/year
Percent Change: -40%

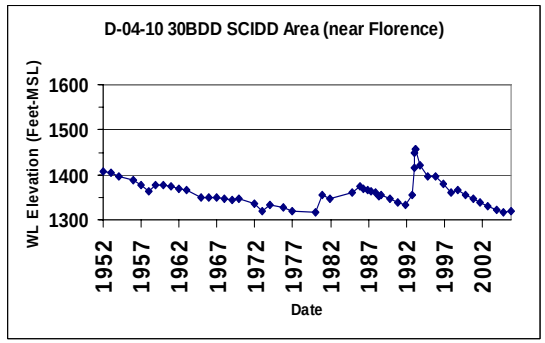

San Carlos Irrigation Project Pumpage 1934 to 2004
Acre-Feet/ Year
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1934
1941
1948
1955
1962
1969
1976
1983
1990
1997
2004
Year
Total SCIP Pumpage 1937-2004 Mean = 77,000 AFA
Agency Pumapge 1937 - 2004 Mean = 41,000 AFA
District Pumpage 1937-2004 Mean = 36,000 AFA

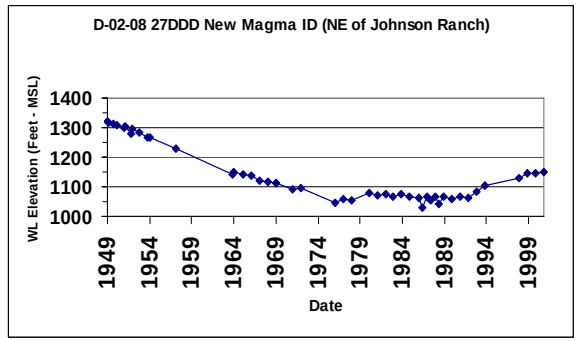


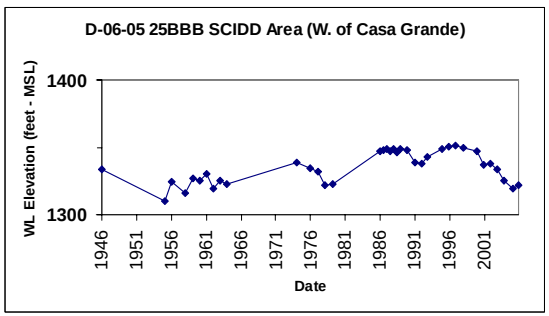


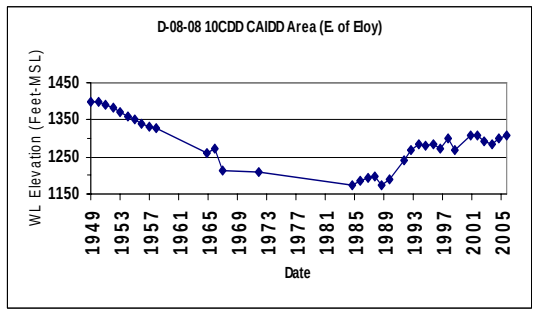


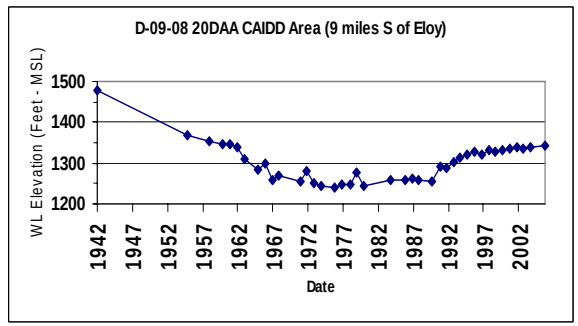






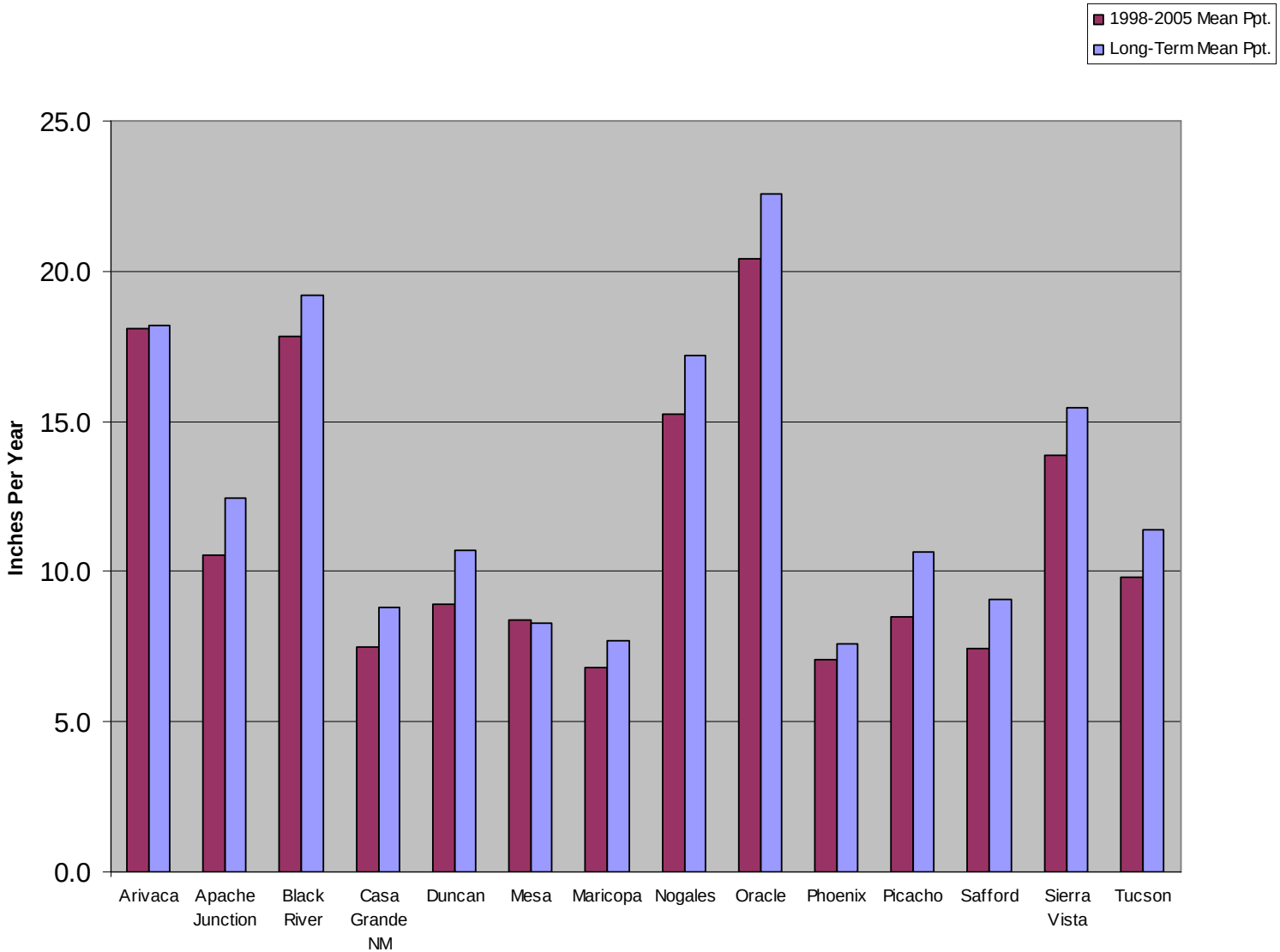






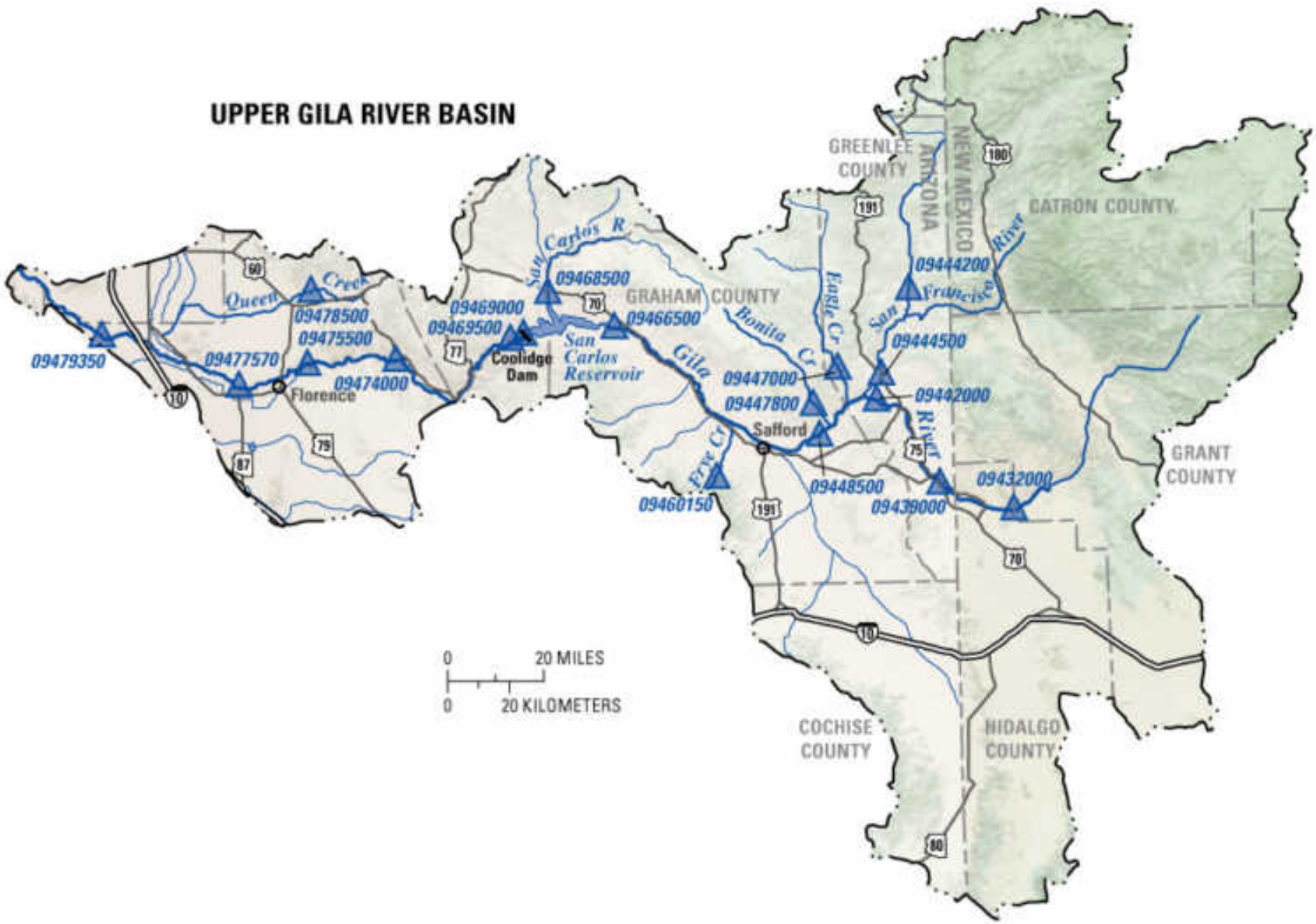
Hydrographs for Selected Wells In Pinal County Irrigation District Areas

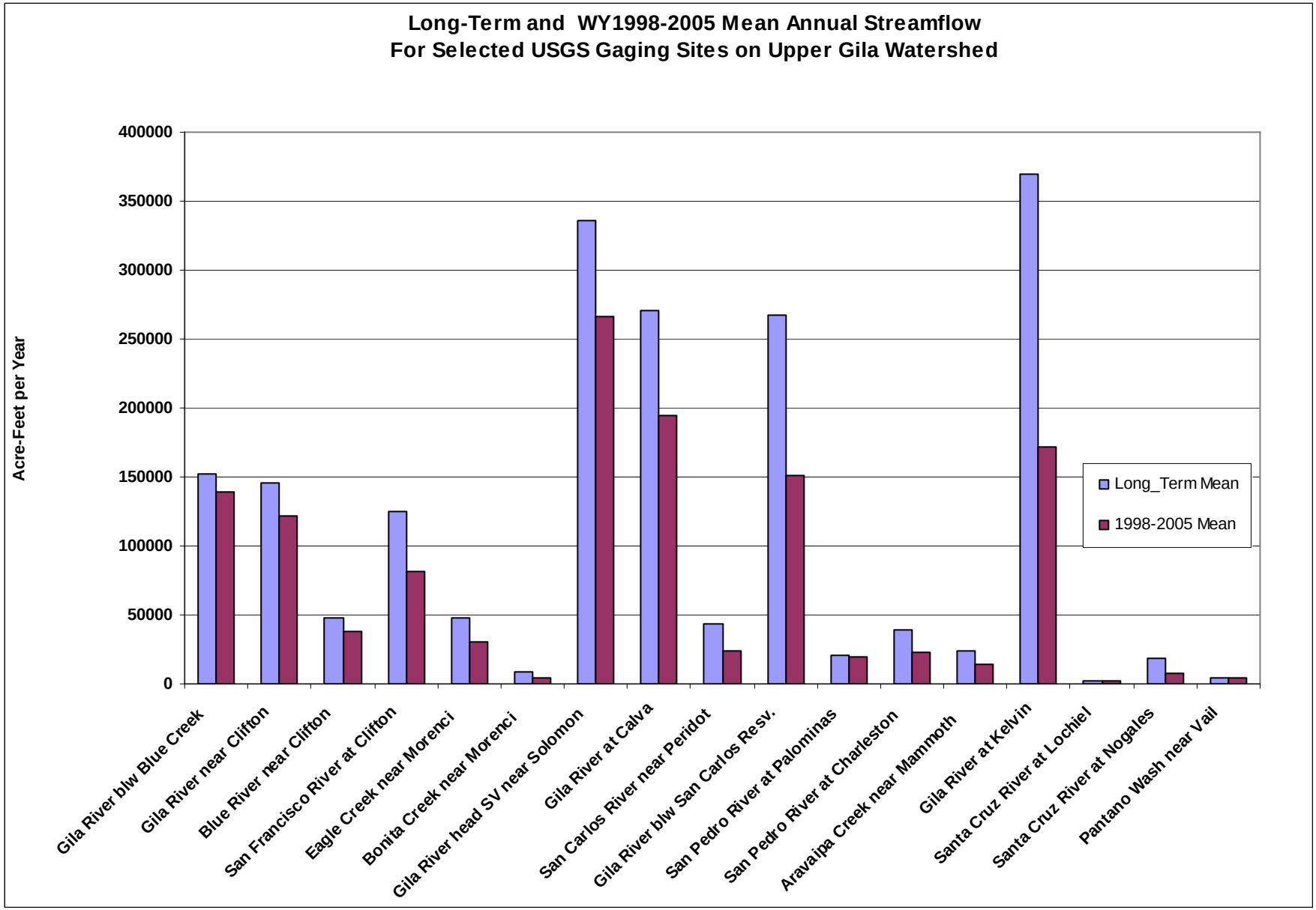
Mean Precipitation Data For Selected Stations In Arizona

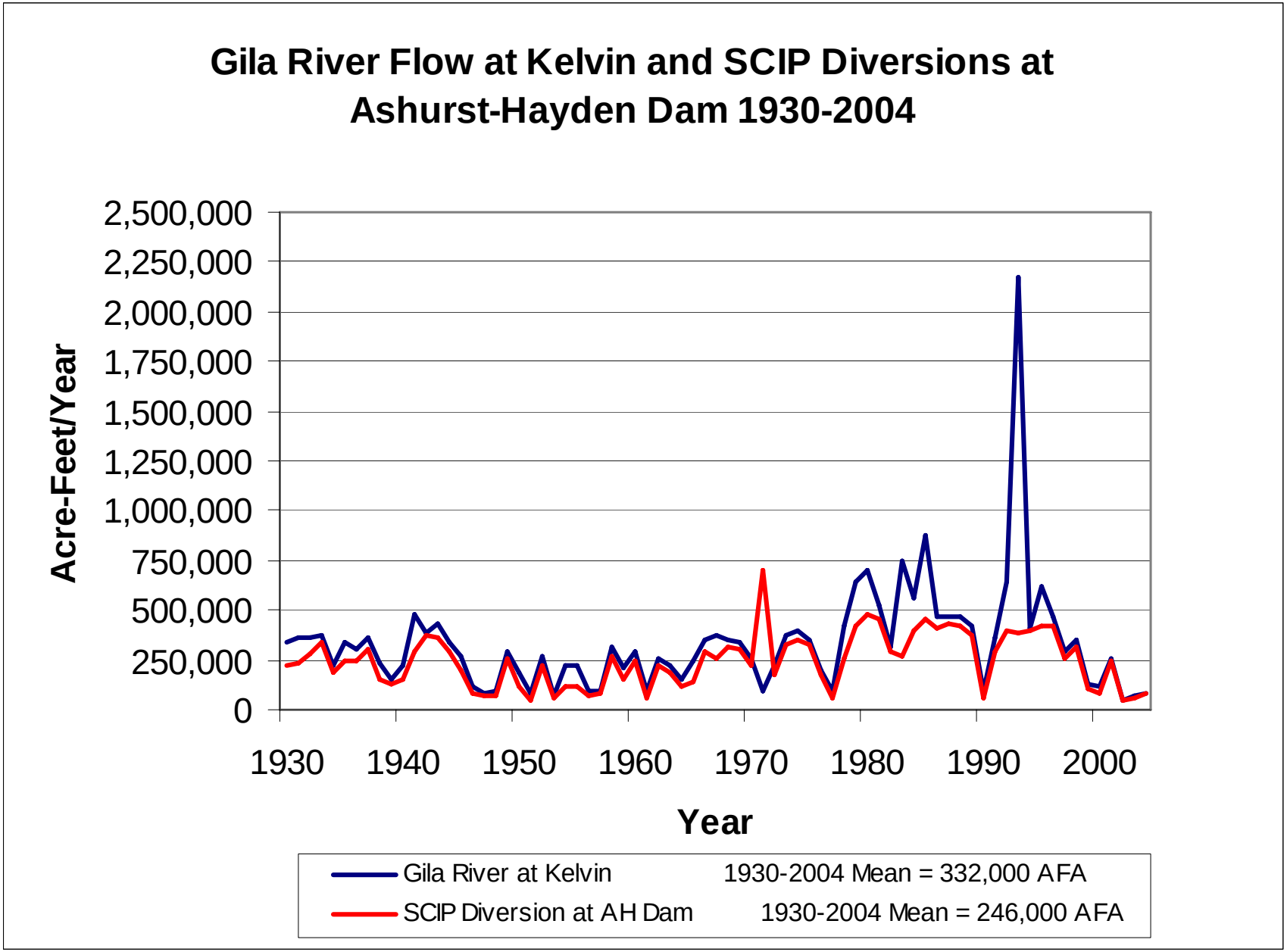


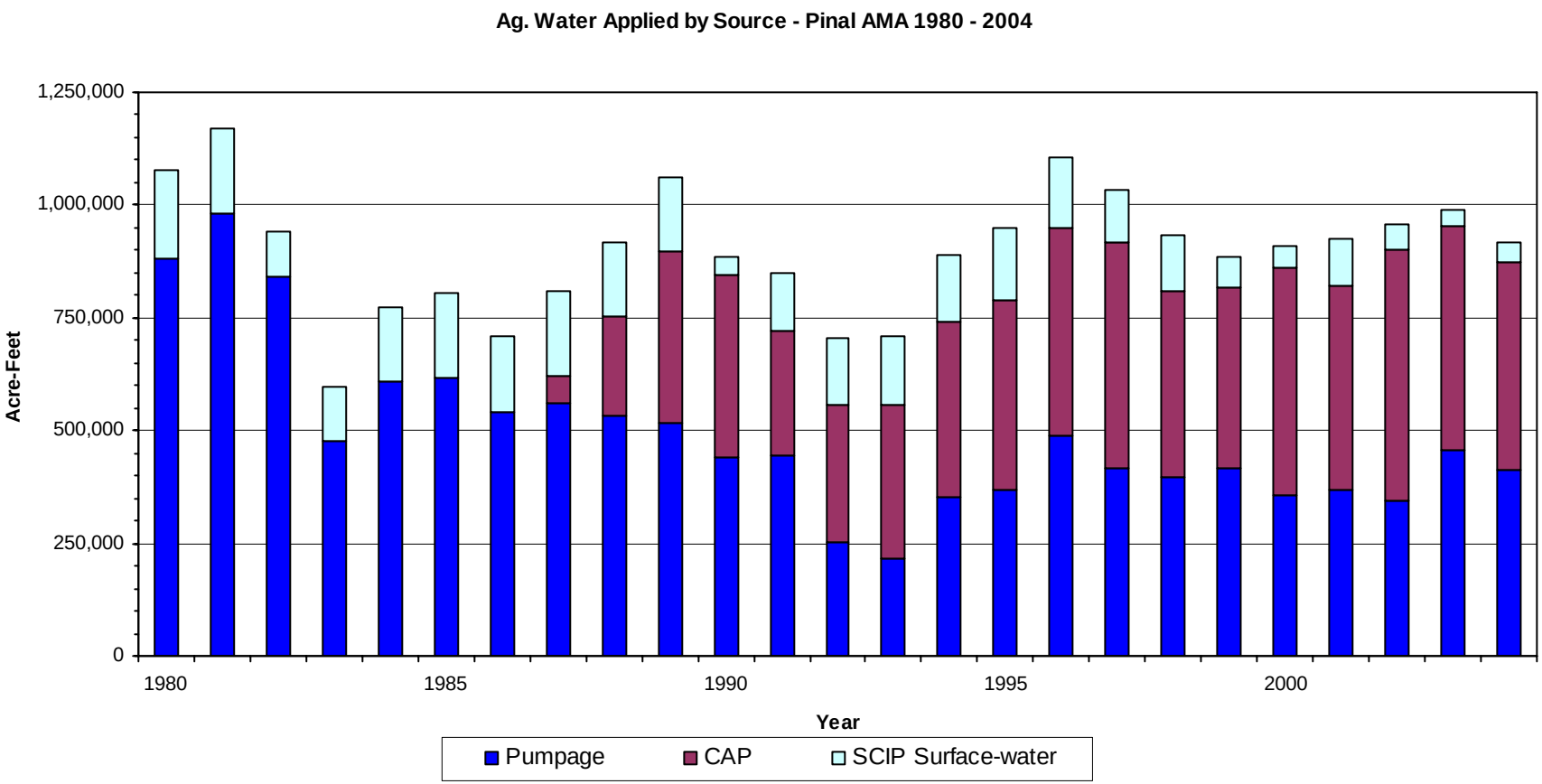
Note: Long-term periods of record vary for stations. Also annual precipitation data are incomplete for some stations for some years. Therefore some 1998-2005 annual means are calculated using less than 8 years of record.

Paria
UTAH
ARIZONA
COLORADO
NEW MEXICO
San Juan
Upper
San Juan
Virgin
NEVADA
COCONINO
MOHAVE
Flagstaff
Little Colorado
NAVAJO
APACHE
Verde
YAVAPAI
Bill
Williams
Lower
Colorado
Agua Fria
Salt
GILA
LA PAZ
GEENLEE
Phoenix
Metropolitan area
MARICOPA
Upper Gila
YUMA
Lower Gila
PINAL
GRAHAM
Yuma
Santa Cruz
PIMA
San Pedro
Tucson
COCHISE
Rio Sonoyta
0
50 MILES
0
50 KILOMETERS
SANTA
CRUZ
Whitewater
Draw


UPPER GILA RIVER BASIN
GREENLEE COUNTY
ARIZONA
NEW MEXICO
CATRON COUNTY
GRAHAM COUNTY
GRANT COUNTY
COCHISE COUNTY
HIDALGO COUNTY
San Carlos R
Queen Creek
Gila
Bonita Cr
Eagle Cr
San Francisco River
Pye Cr
San Carlos Reservoir
Coolidge Dam
Florence
Safford
09479350
09477570
09478500
09475500
09474000
09469000
09469500
09468500
09466500
09447000
09447800
09460150
09448500
09439000
09444200
09444500
09442000
09432000
0 20 MILES
0 20 KILOMETERS


Long-Term and WY1998-2005 Mean Annual Streamflow
For Selected USGS Gaging Sites on Upper Gila Watershed
Acre-Feet per Year
400000
350000
300000
250000
200000
150000
100000
50000
0
Long_Term Mean
1998-2005 Mean
Gila River blw Blue Creek
Gila River near Clifton
Blue River near Clifton
San Francisco River at Clifton
Eagle Creek near Morenci
Bonita Creek near Morenci
Gila River head SV near Solomon
Gila River at Calva
San Carlos River near Peridot
Gila River blw San Carlos Resv.
San Pedro River at Palominas
San Pedro River at Charleston
Aravaipa Creek near Mammoth
Gila River at Kelvin
Santa Cruz River at Lochiel
Santa Cruz River at Nogales
Pantano Wash near Vail

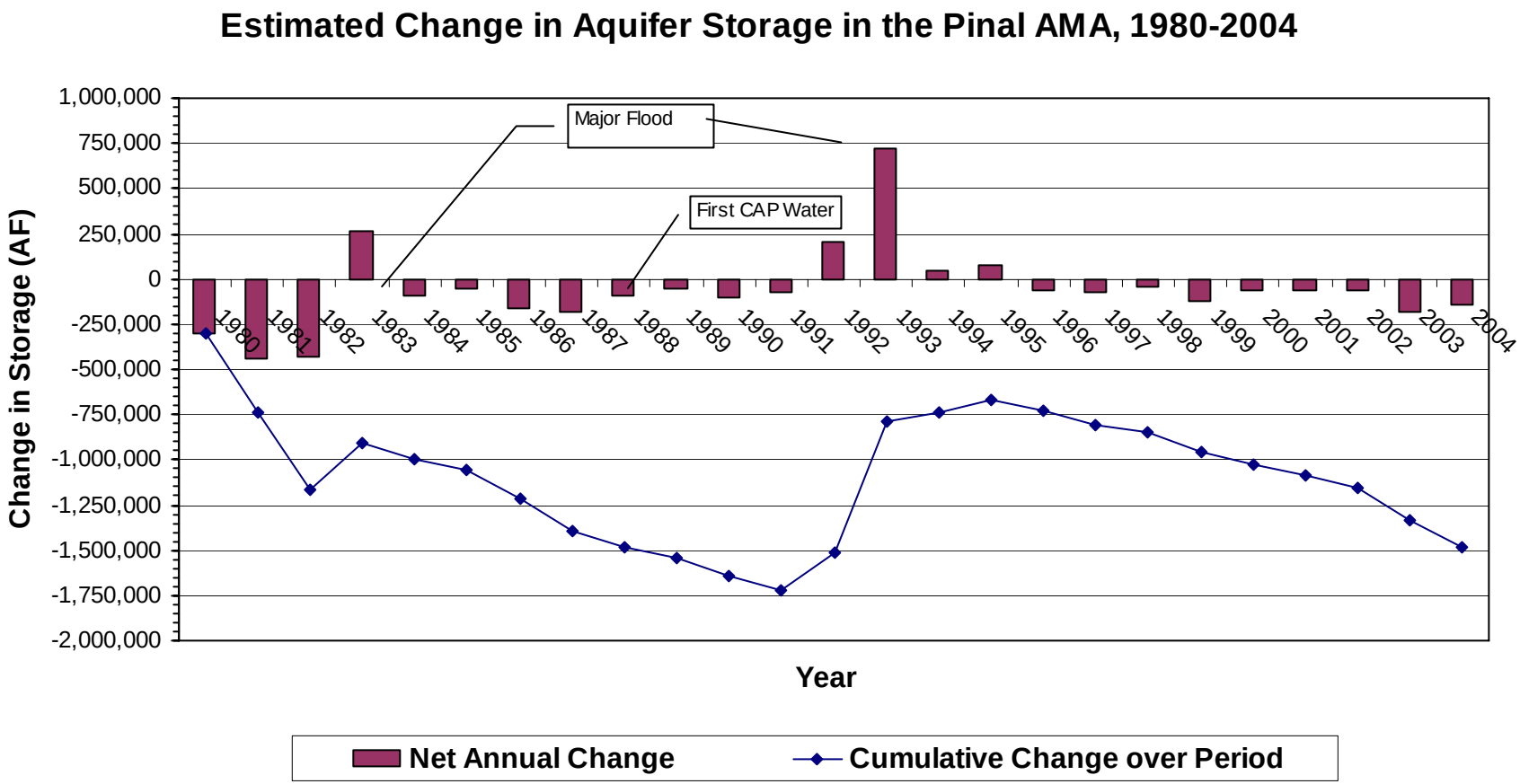

Gila River Flow at Kelvin and SCIP Diversions at Ashurst-Hayden Dam 1930-2004
Acre-Feet/Year
2,500,000
2,250,000
2,000,000
1,750,000
1,500,000
1,250,000
1,000,000
750,000
500,000
250,000
0
1930
1940
1950
1960
1970
1980
1990
2000
Year
Gila River at Kelvin
1930-2004 Mean = 332,000 AFA
SCIP Diversion at AH Dam
1930-2004 Mean = 246,000 AFA



Annual Average Ag Water Applied 1980 - 1987: 860,500 ac-ft / year

Annual Average Ag Water Applied 1988 - 2004: 919,600 ac-ft/ year

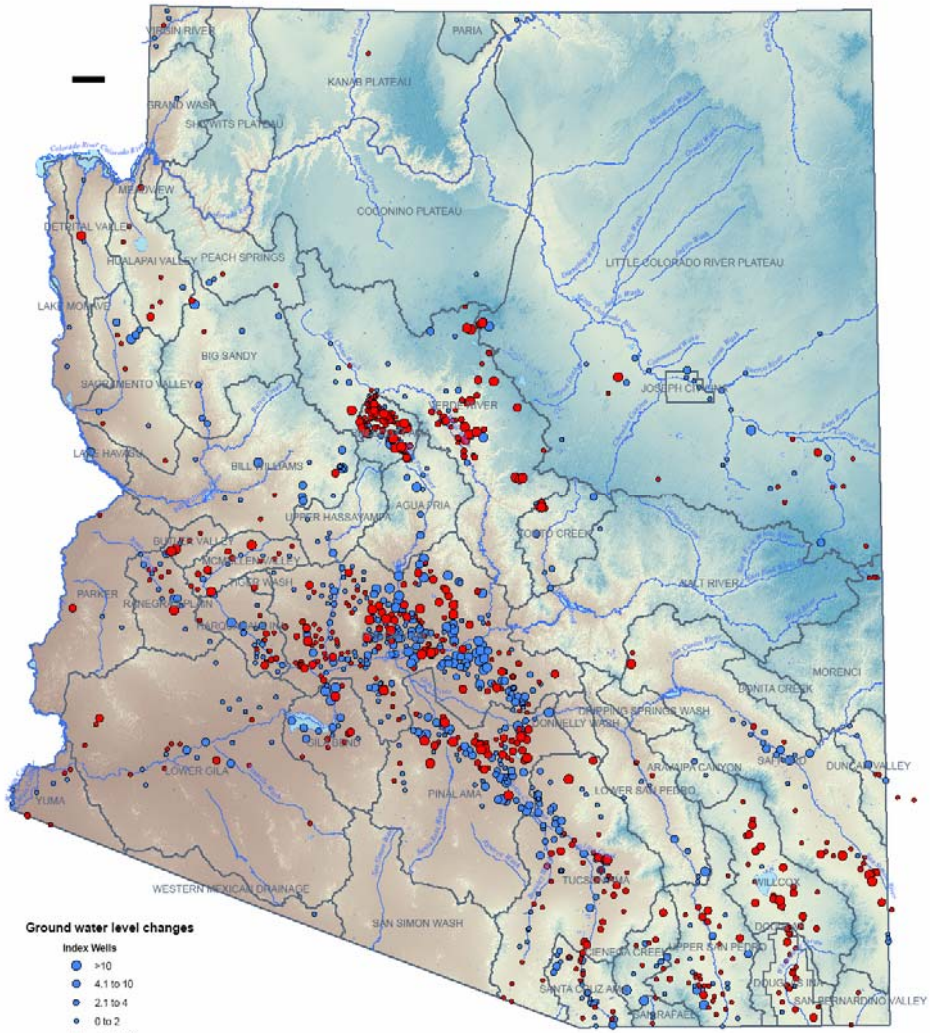
Percent Change: = +7


Estimated Change in Aquifer Storage in the Pinal AMA, 1980-2004
Change in Storage (AF)
1,000,000
750,000
500,000
250,000
0
-250,000
-500,000
-750,000
-1,000,000
-1,250,000
-1,500,000
-1,750,000
-2,000,000
Major Flood
First CAP Water
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Year
Net Annual Change
Cumulative Change over Period

ADWR Index Well Network:

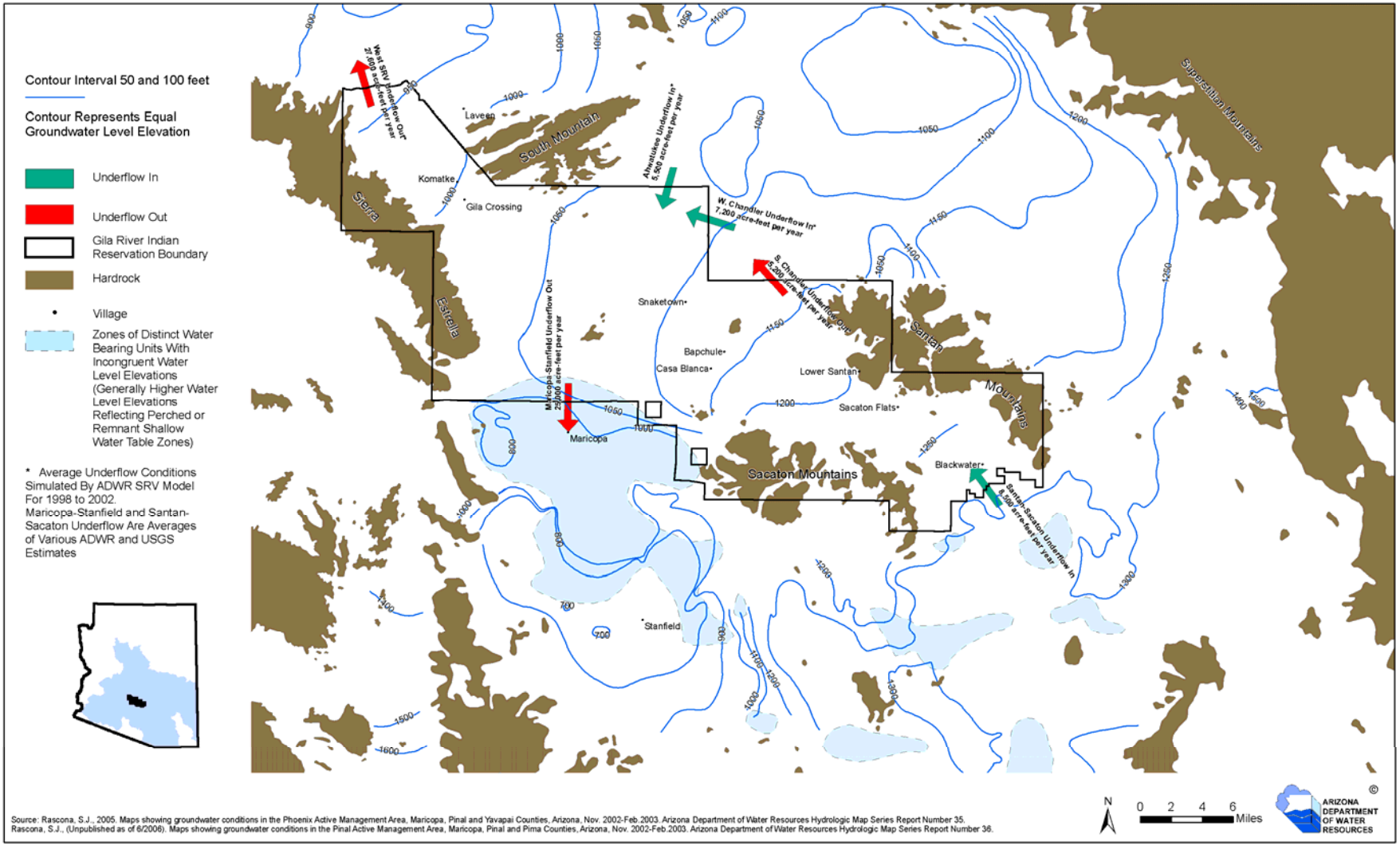
Groundwater Level Changes from Water Year 2005 to Water Year 2006*

* A Water Year, as defined by the USGS, is the 12 month period from October 1 through September 30. The water year is designated by the calender year in which it ends, and includes 9 of the 12 months.

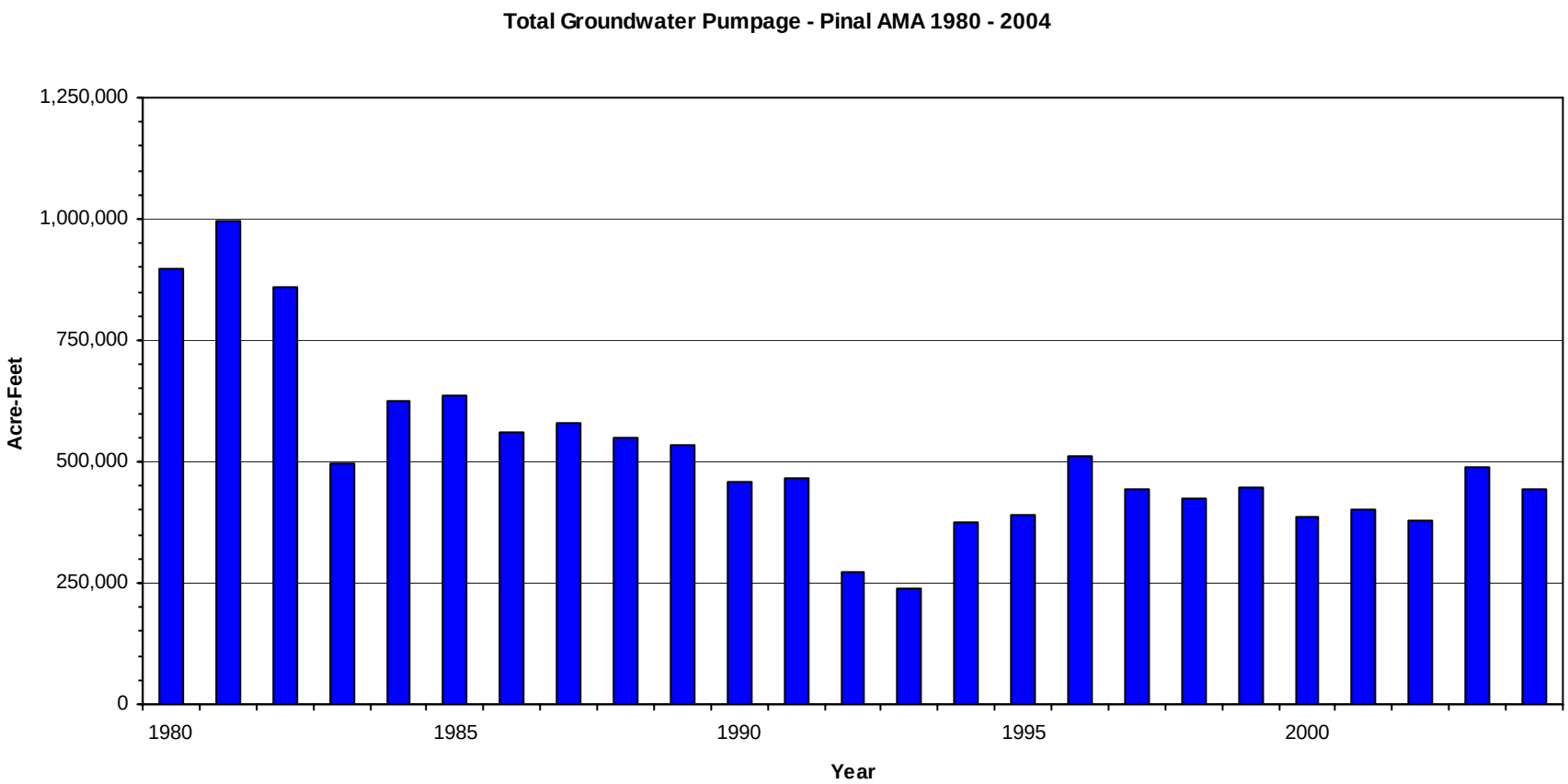


END

Figure 6 - 2. 2003 Water Level Elevations and Average* Underflow Conditions in the Basin Fill Aquifer Beneath and Adjacent to the Gila River Indian Community



Source: Rascona, S.J., 2005. Maps showing groundwater conditions in the Phoenix Active Management Area, Maricopa, Pinal and Yavapai Counties, Arizona, Nov. 2002-Feb.2003. Arizona Department of Water Resources Hydrologic Map Series Report Number 35.
Rascona, S.J., (Unpublished as of 6/2006). Maps showing groundwater conditions in the Pinal Active Management Area, Maricopa, Pinal and Pima Counties, Arizona, Nov. 2002-Feb.2003. Arizona Department of Water Resources Hydrologic Map Series Report Number 36.



1980 - 1987 Annual Average: 676,000 ac-ft/year

1988 - 2004 Annual Average: 376,000 ac-ft/year

Percent Change: -45%