

Application of Tree Ring Research Results

Salt River Project



Technical Workshop on Tree-Ring Based Streamflow Reconstructions

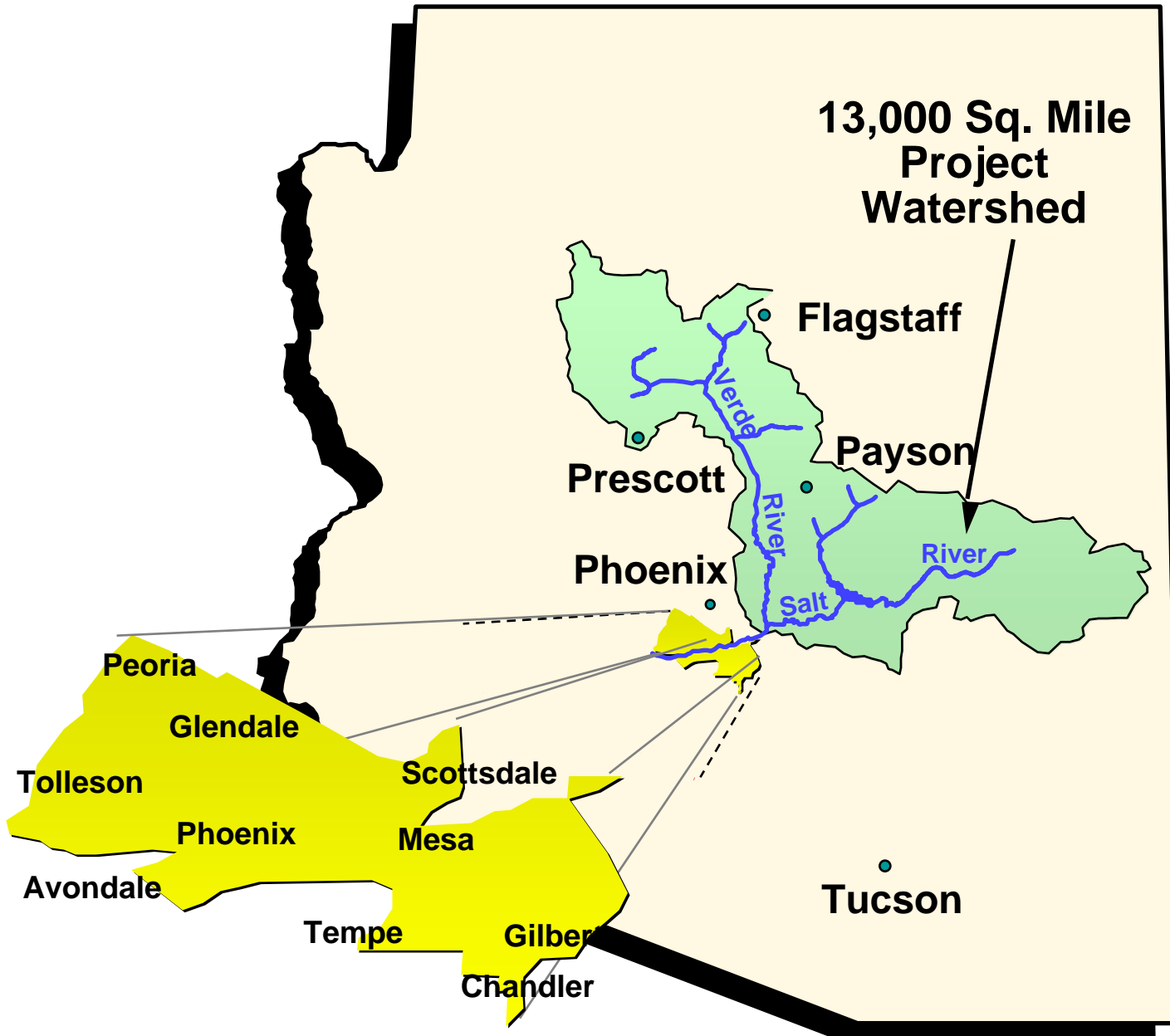
Albuquerque, New Mexico

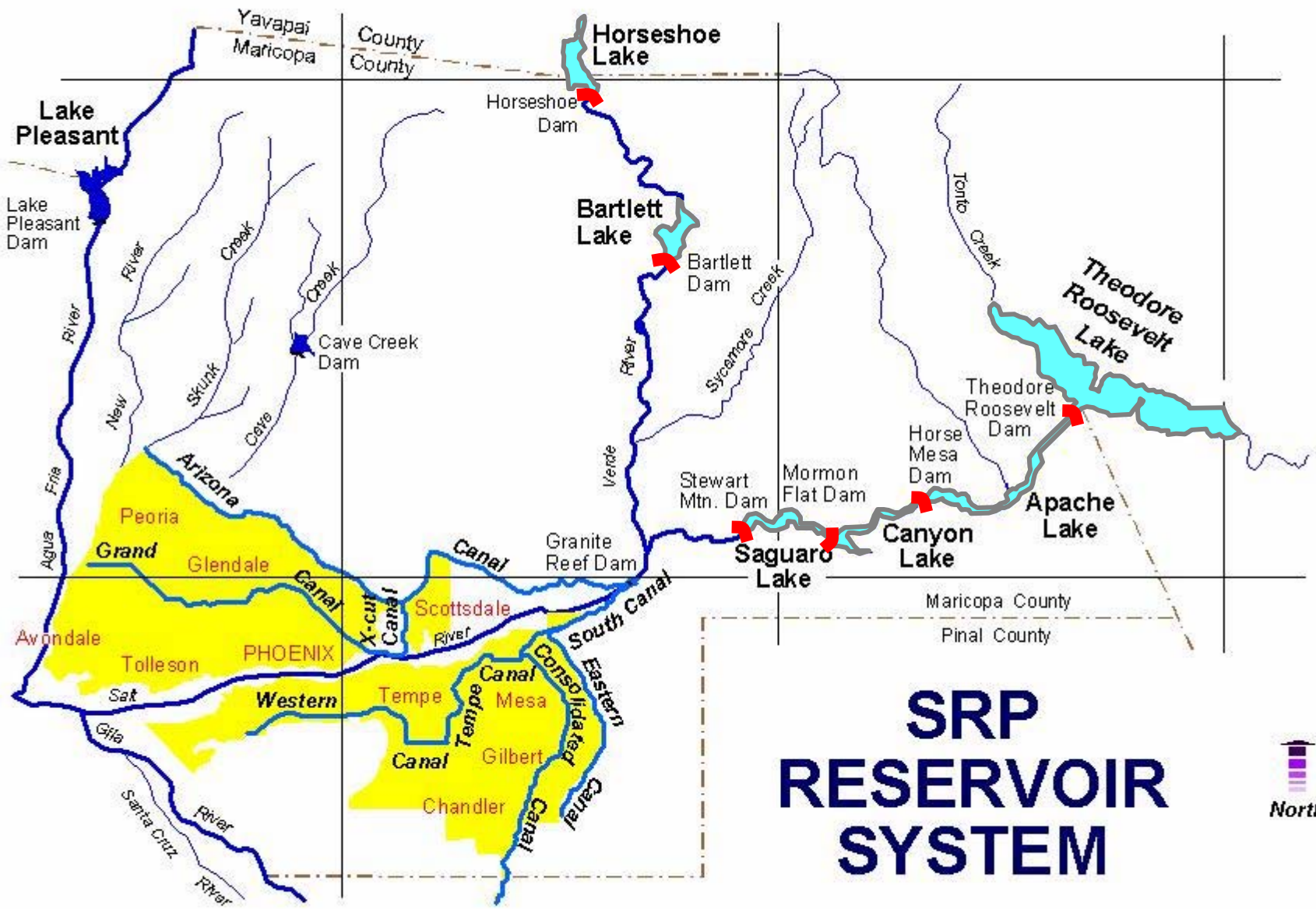
November 2, 2007

Charles Ester

Manager, Water Resource Operations

SRP Water Service Area



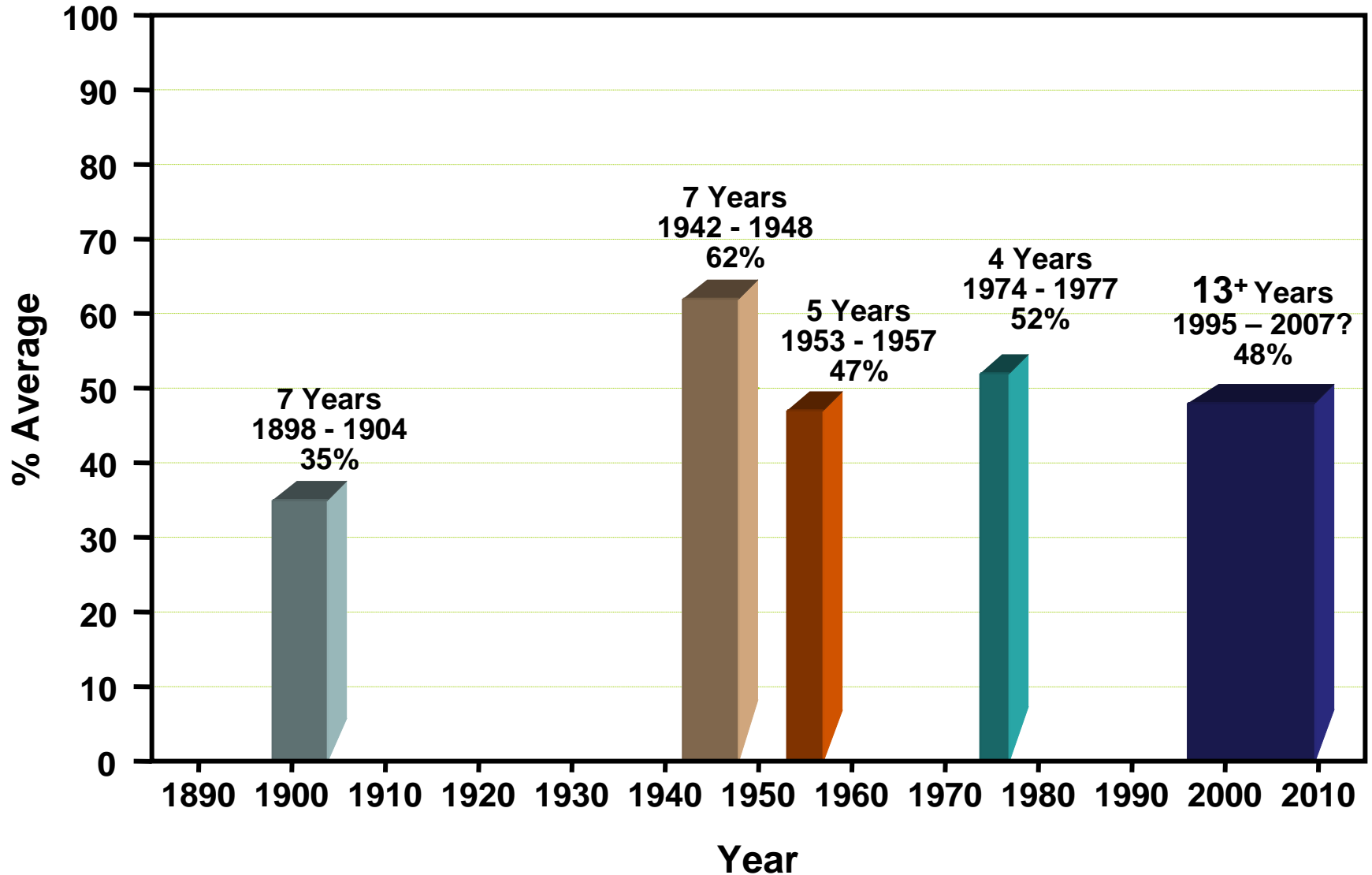


SRP RESERVOIR SYSTEM

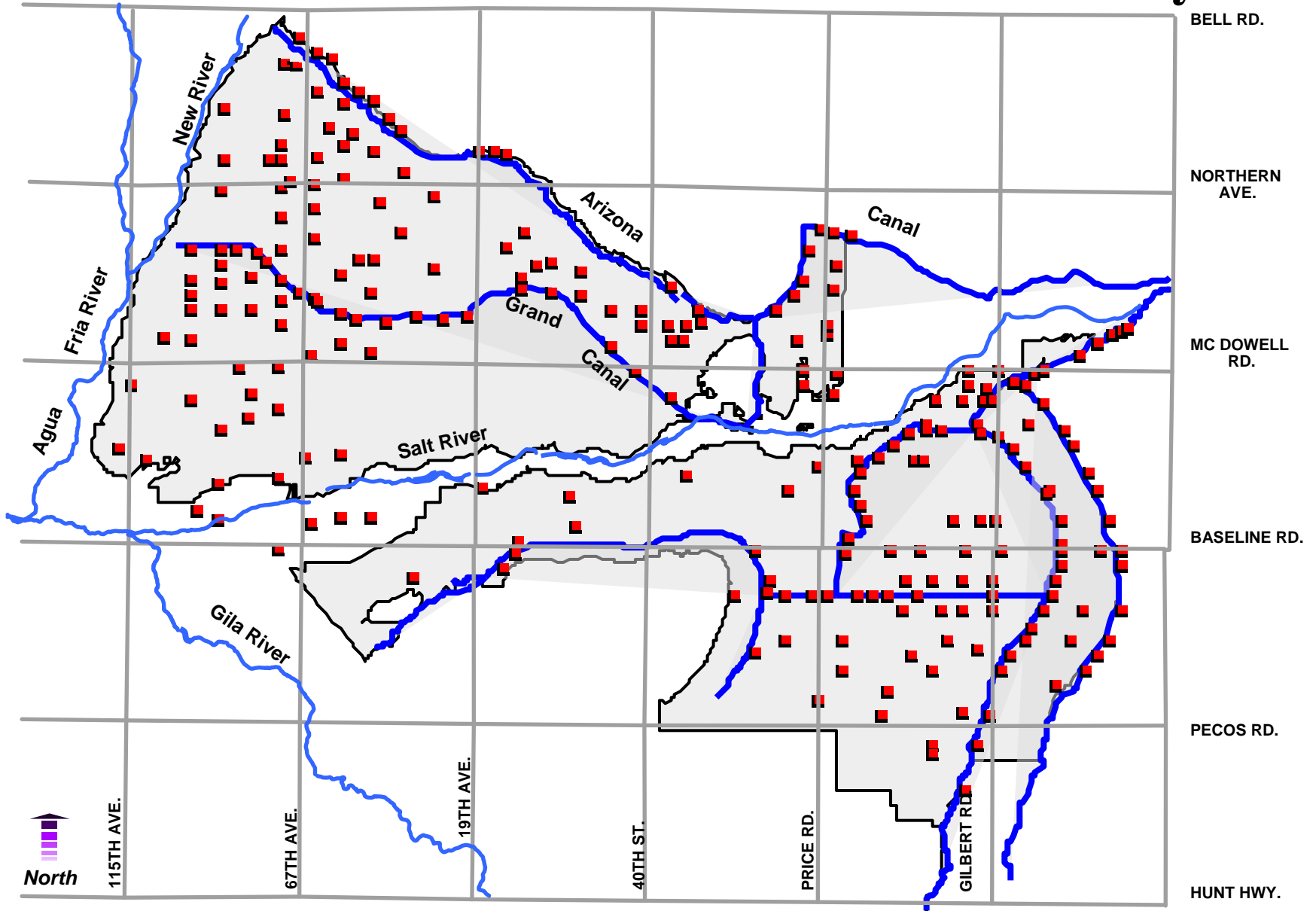


Salt River Project Historic Drought Periods

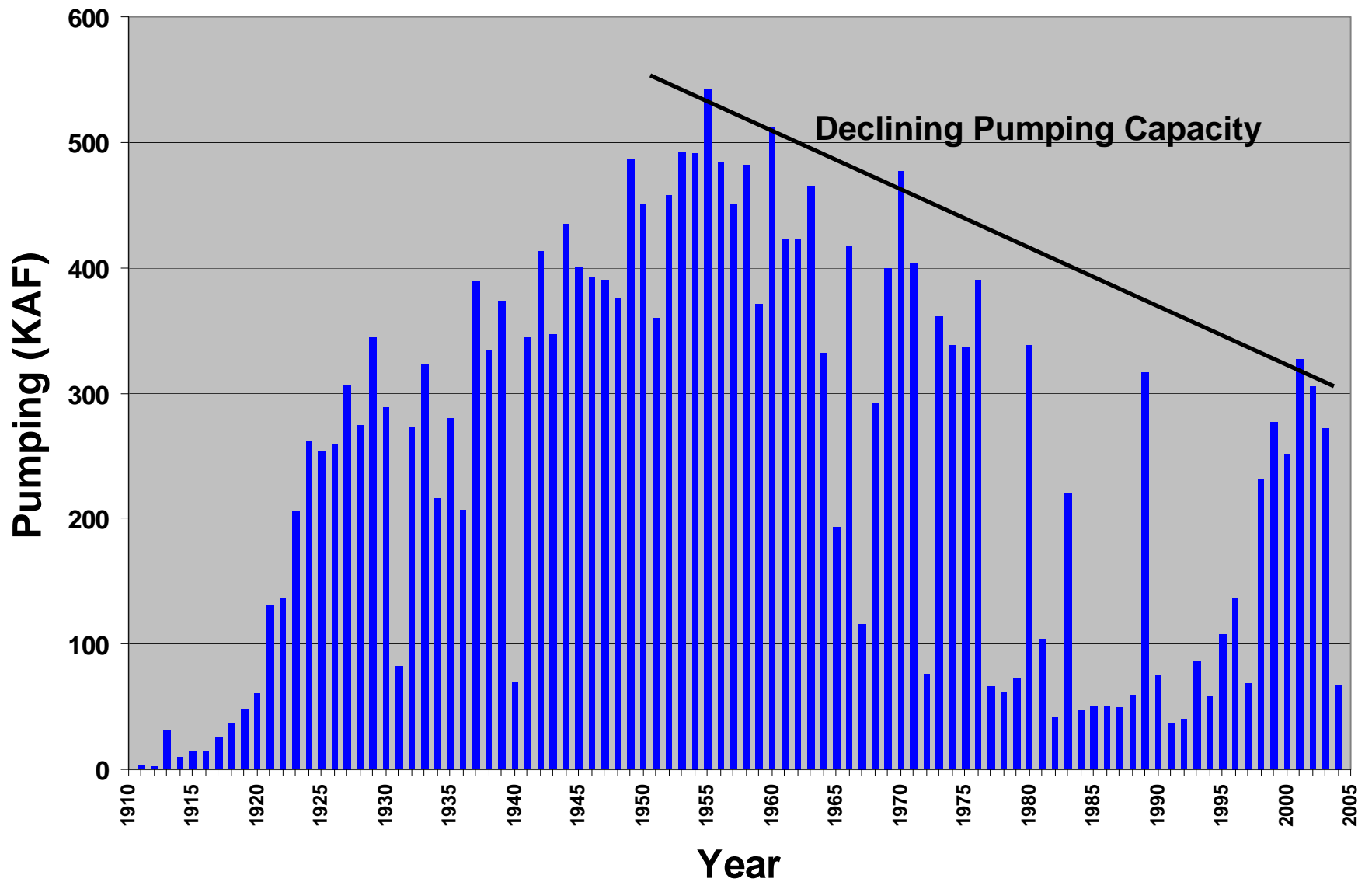
(Average Runoff 1889–2003 = 1,212,890 AF)



Well Locations Within SRP Service Territory



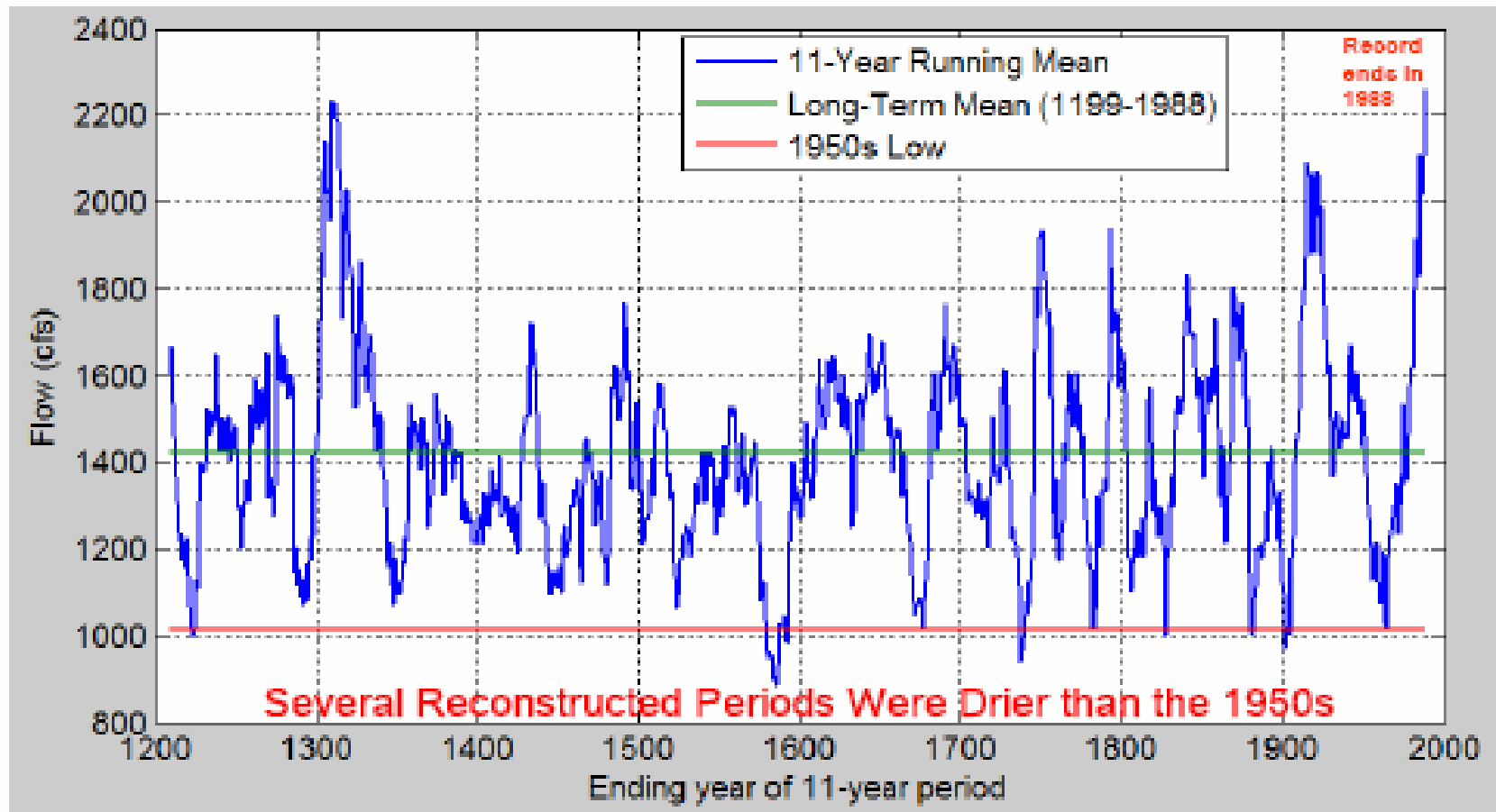
SRP Annual Pumping



Severity of Current Drought in Context of Reconstructed Record:

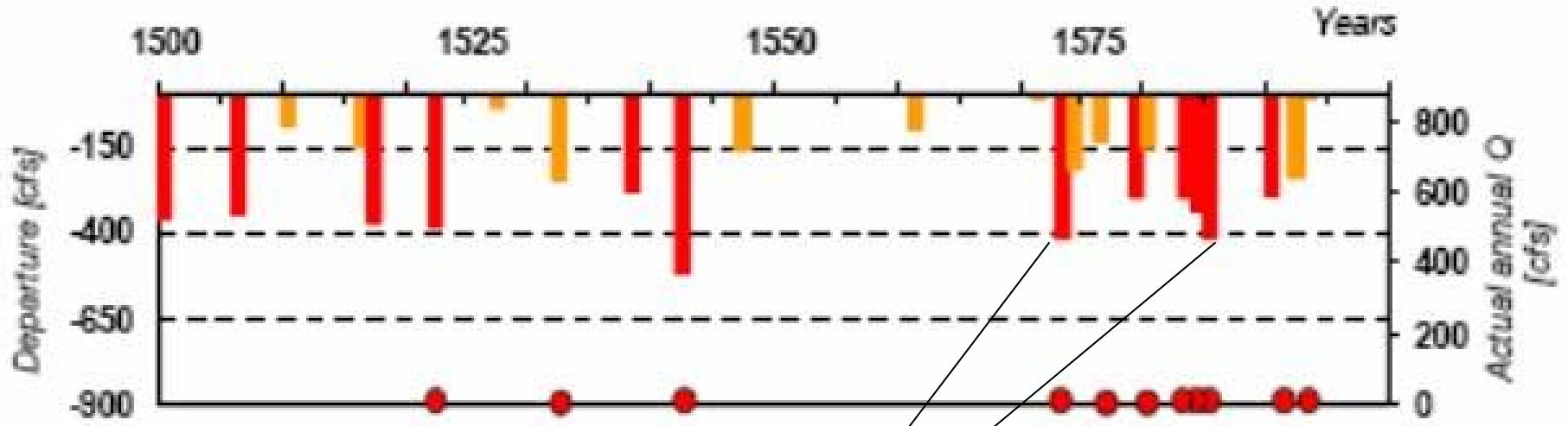
Figure 23b

Salt + Verde + Tonto Reconstruction



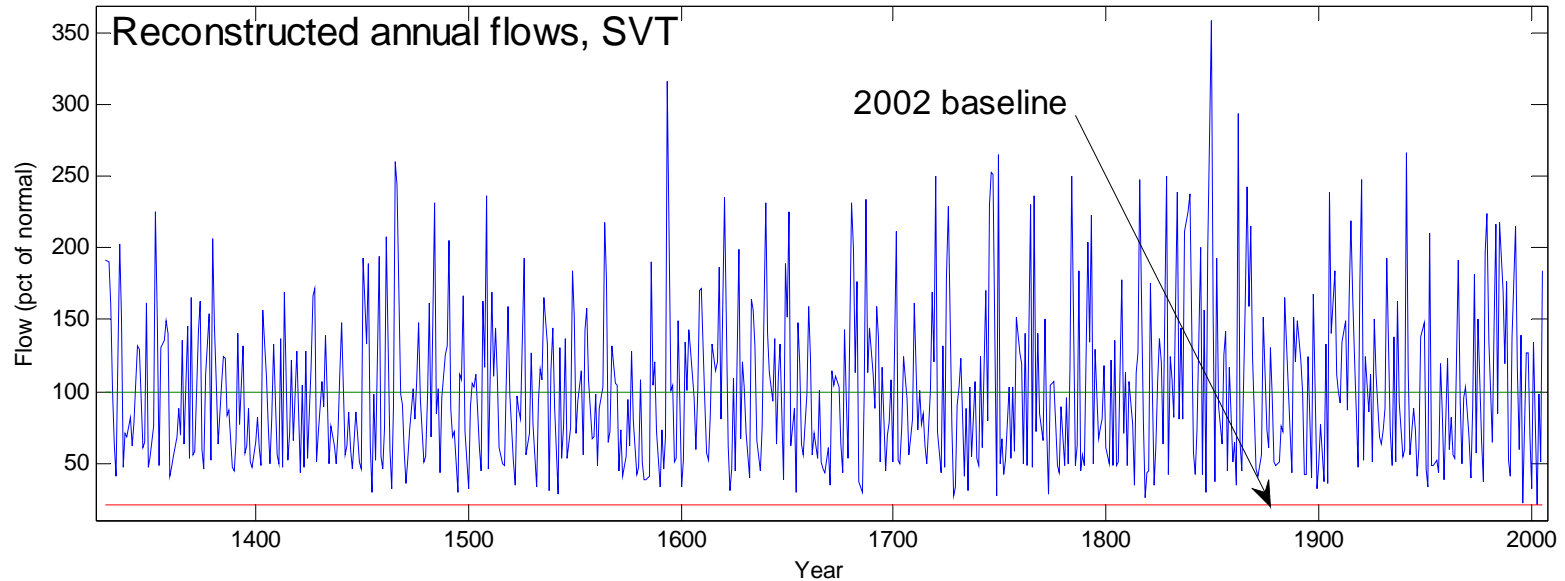
- Current drought was about as severe as 1950s in terms of flows averaged over 11 years
- 8 other droughts were as severe, according the tree-ring record
- Late 1500s megadrought was much more severe

The 11-year period was 1575 - 1585.

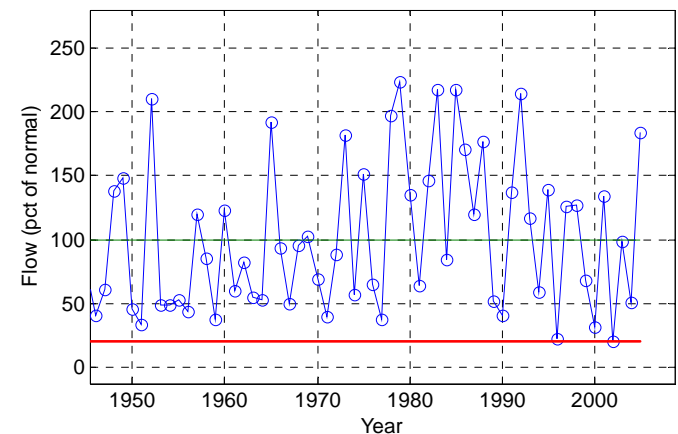


**11-Year Drought with 70% of
Historical Median Inflow**

2002 and 1996: long-term extreme lows

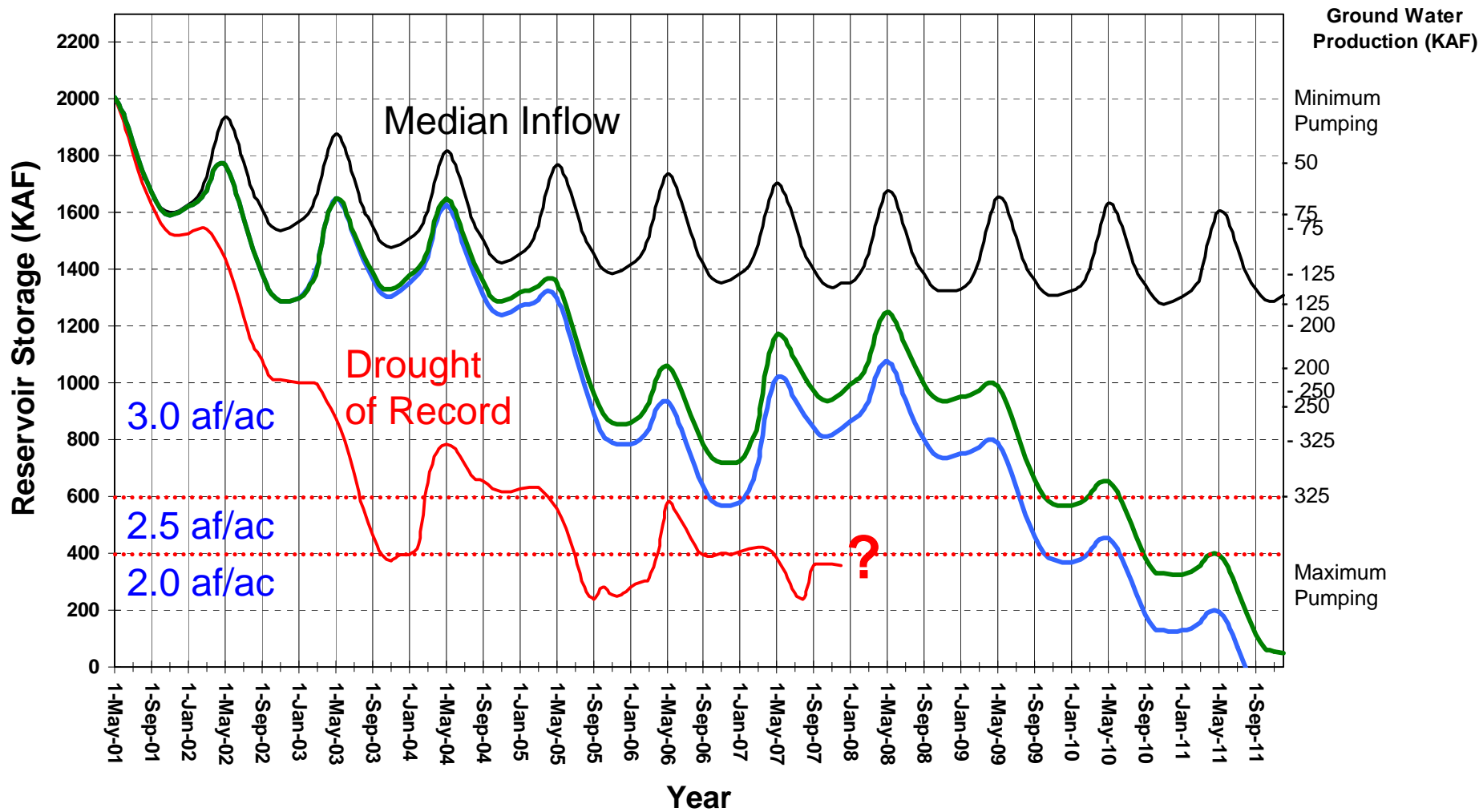


- Reconstructed flow was 21% of normal* in 2002, 22% of normal in 1996
- No other reconstructed flow from 1330 to 2005 was lower than 25% of normal.
- Tree growth recovered with wetter conditions in 2005



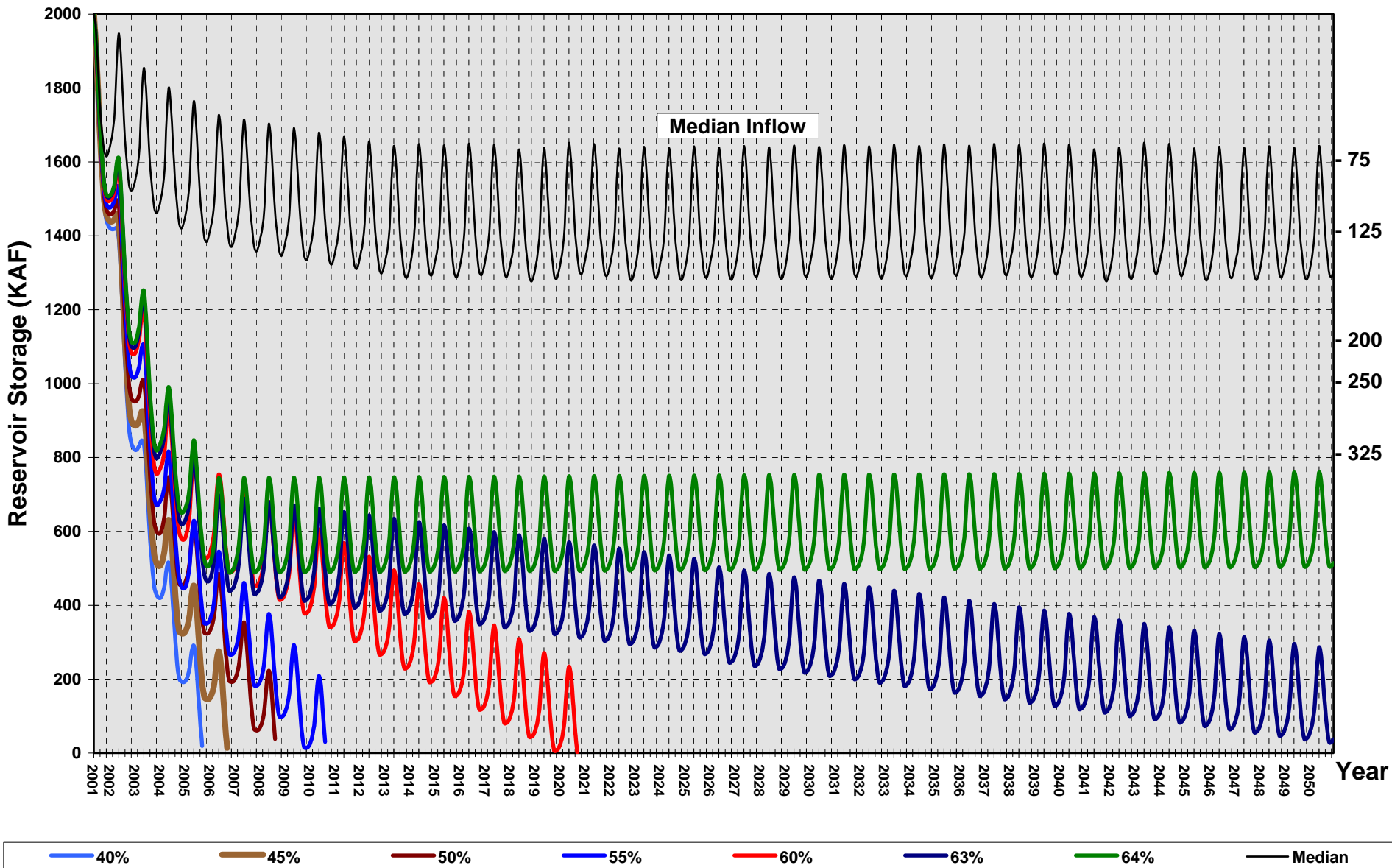
*normal is 1914-2007 mean, water year, Salt+Verde+Tonto

SRP Storage, Pumping & Water Allotment Planning



11-year Training Drought with new planning scenario

SRP Storage, Pumping & Water Allotment Planning

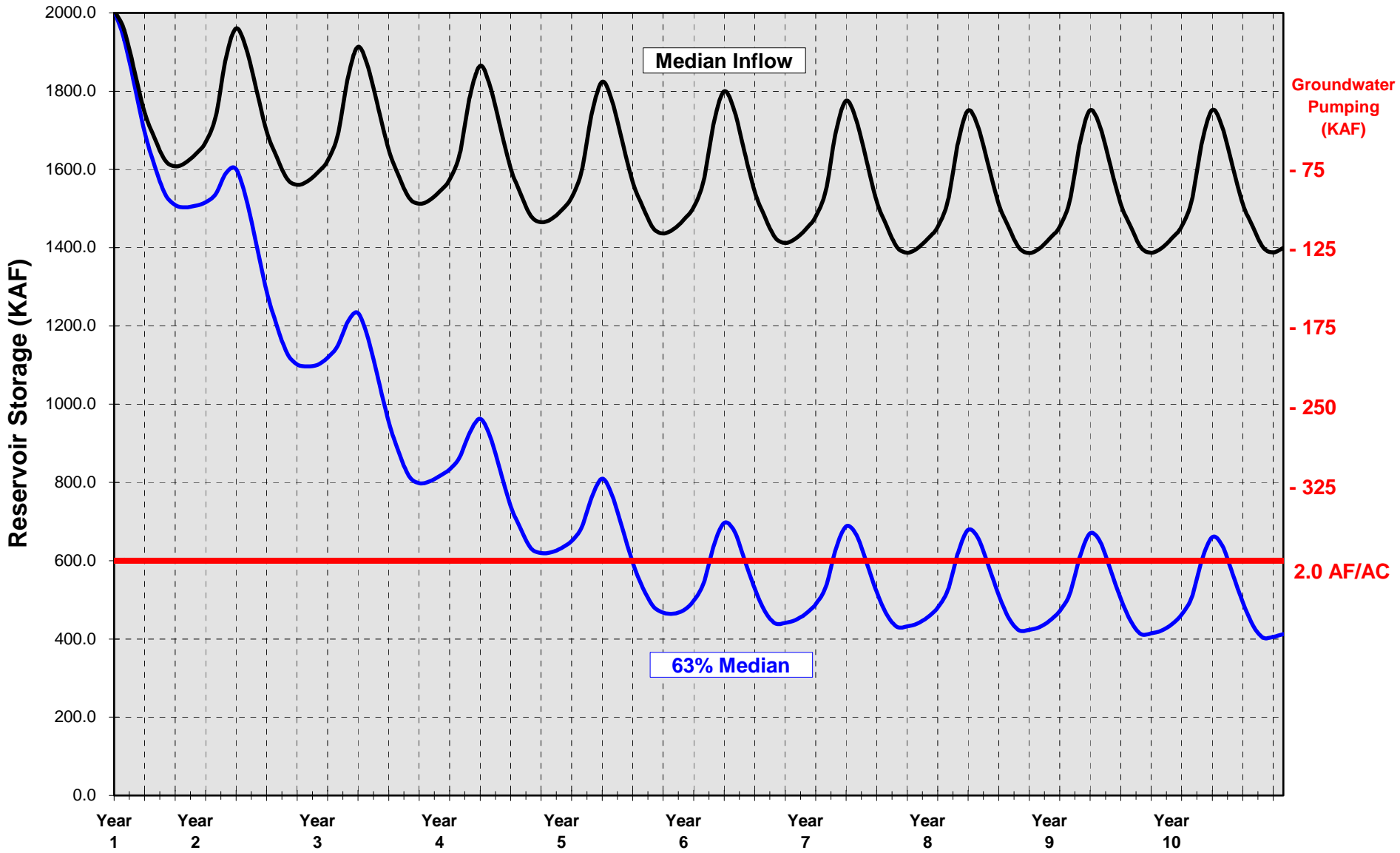


**Simulated Reservoir Storage for a Range of Perpetually Reduced Inflows
(as a percent of historical median)**

TABLE 1

PERCENT OF MEDIAN INFLOW	YEARS TO RESERVOIR DRYUP
64	INDEFINITE
63	50+
60	19.5
55	9.3
50	7.3
48	6.4
45	5.4
40	4.4

SRP Storage, Pumping & Water Allotment Planning



When Storage Drops Below The Target 63% Line:

Activate Augmentation Efforts To Raise Storage Back To 63% Line....

Menu Of Options:

Increase Groundwater Pumping (Restoration Program)

Reduce Allocation Of Water

Purchase Central Arizona Project Water

Exercise Lease Options—Indian And NonIndian Agriculture

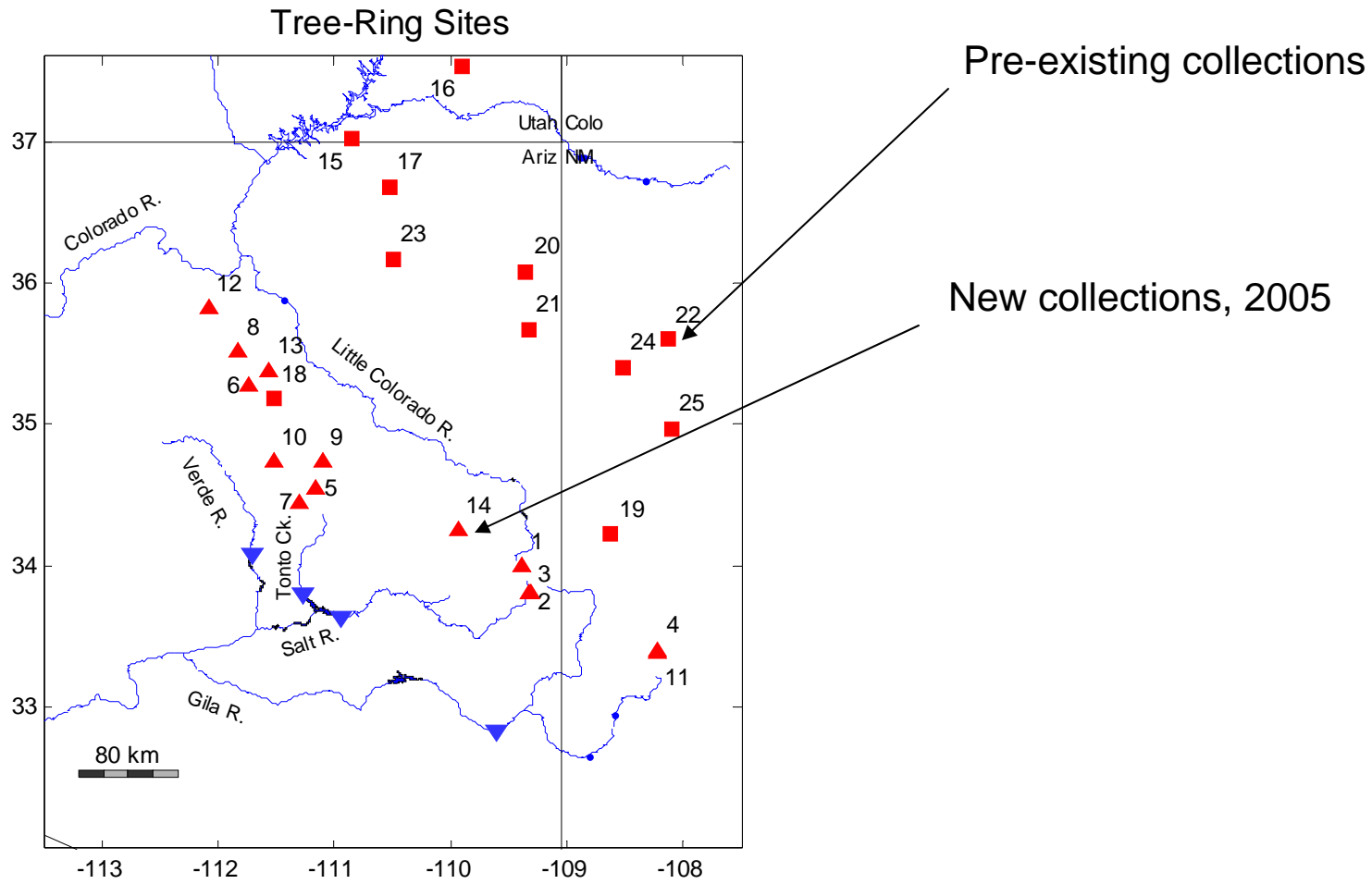
Recover Long Term Underground Storage Credits

Conservation Efforts

Watershed Management Activities

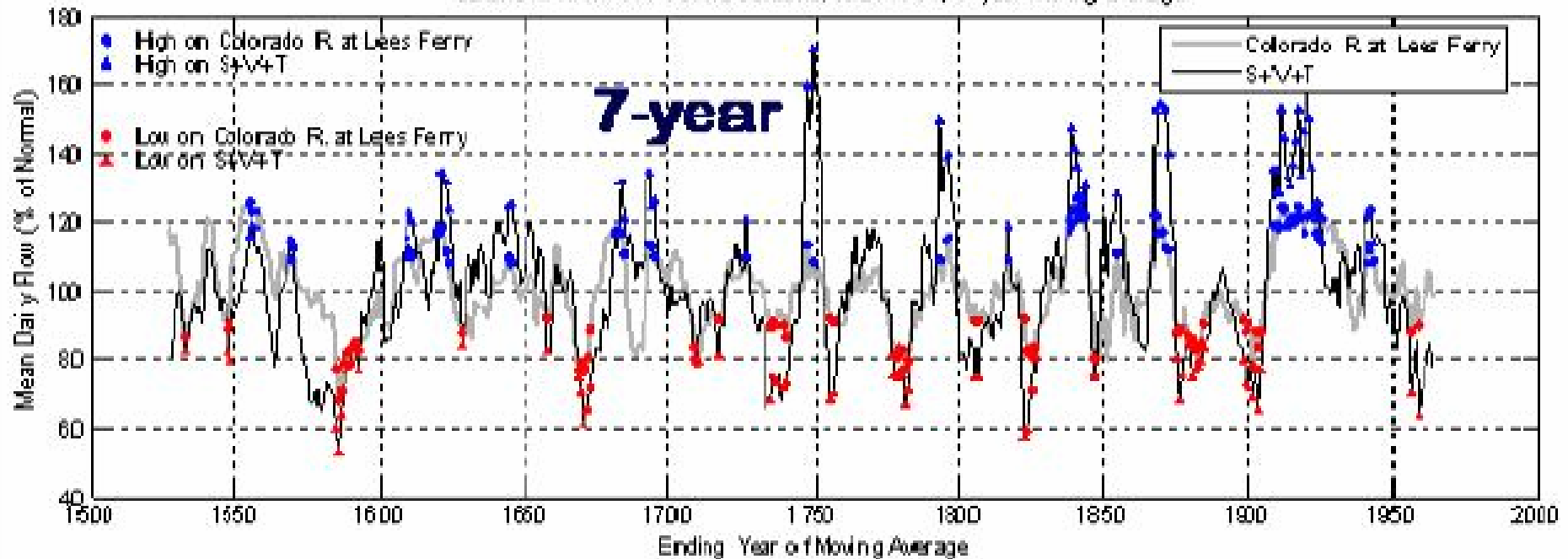
End

Tree-Ring Network for Flow Reconstructions



Running-Mean Streamflow & LL / HH Thresholds

LL and HH from SHP reconstructions, to 21-1964; 7-year moving average



The 11-year period was 1575 - 1585.