An aerial photograph taken from the International Space Station showing Mono Lake and the Mono Basin. The lake is a dark, irregularly shaped body of water in the center-right. The surrounding terrain is rugged and mountainous, with significant snow cover on the peaks and slopes. The lighting suggests a sunrise or sunset, with long shadows and bright highlights on the snow.

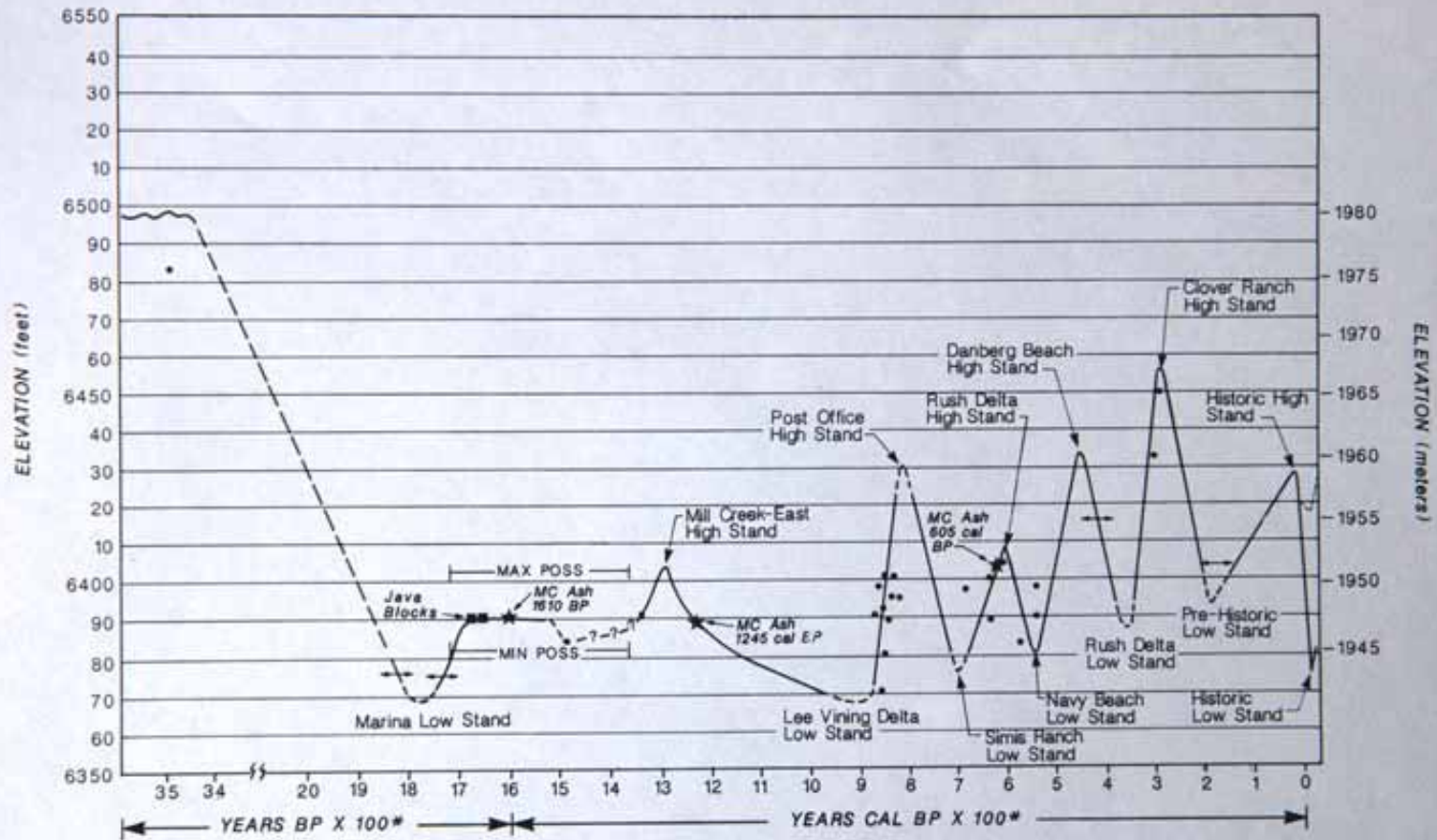
*Climate Change and the
Mono Lake Water Balance:
Implications for Implementing the
Mono Lake Water Rights Decisions*

Peter Vorster
Consulting Hydrologist

Talk Outline

- Change We Can Believe In
- The Water Rights Decisions
- The Lake Level Forecast Models
- Lake Level Projections with different climates
- Operational challenges in a changing climate

Mono Lake Levels in the past 2000 years



* see Stulver & Pearson, 1986, and Pearson & Stulver, 1986.

Change in snowpack in 20th century

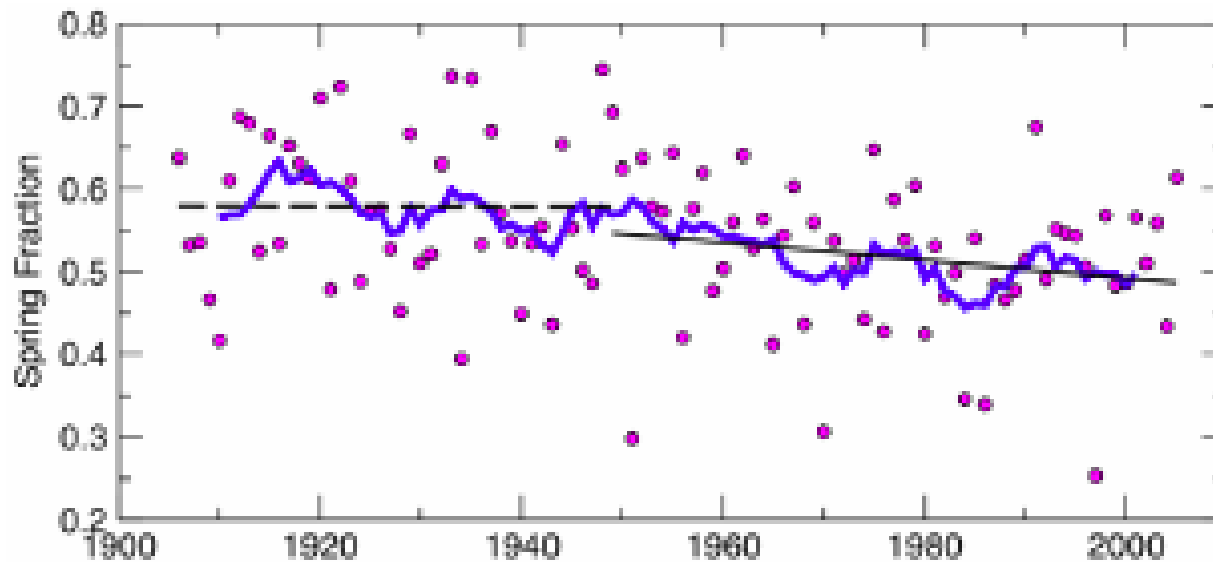


Figure 2-17 Annual April through July Unimpaired Runoff in the Central Valley Compared to Total Unimpaired Annual Runoff

20th century precipitation trends

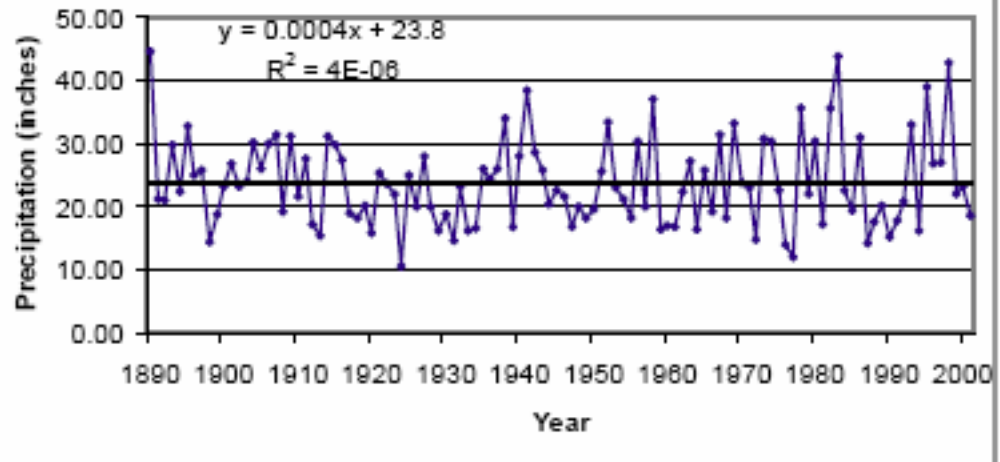


Figure 2-10 Annual Average Precipitation for California from 1890 to 2002 with Linear Trend

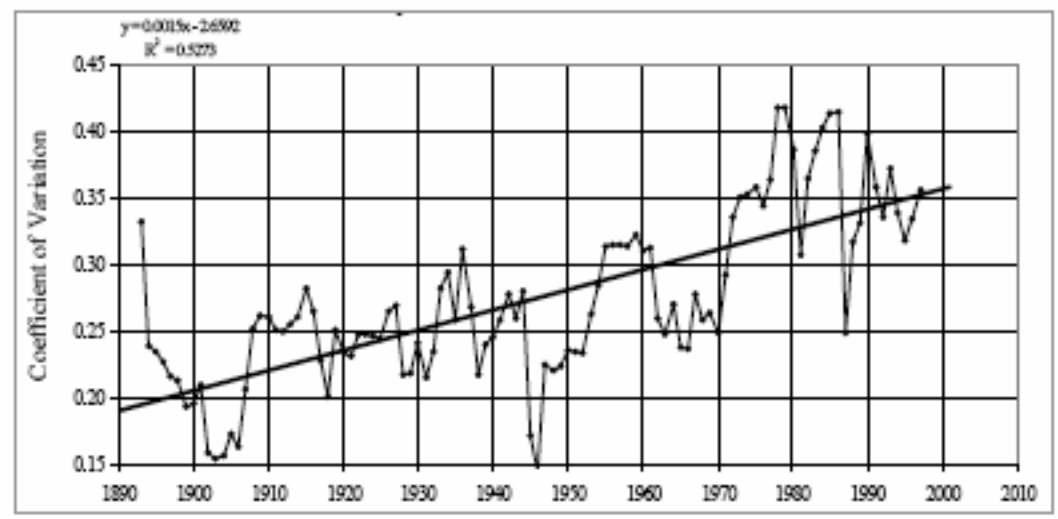
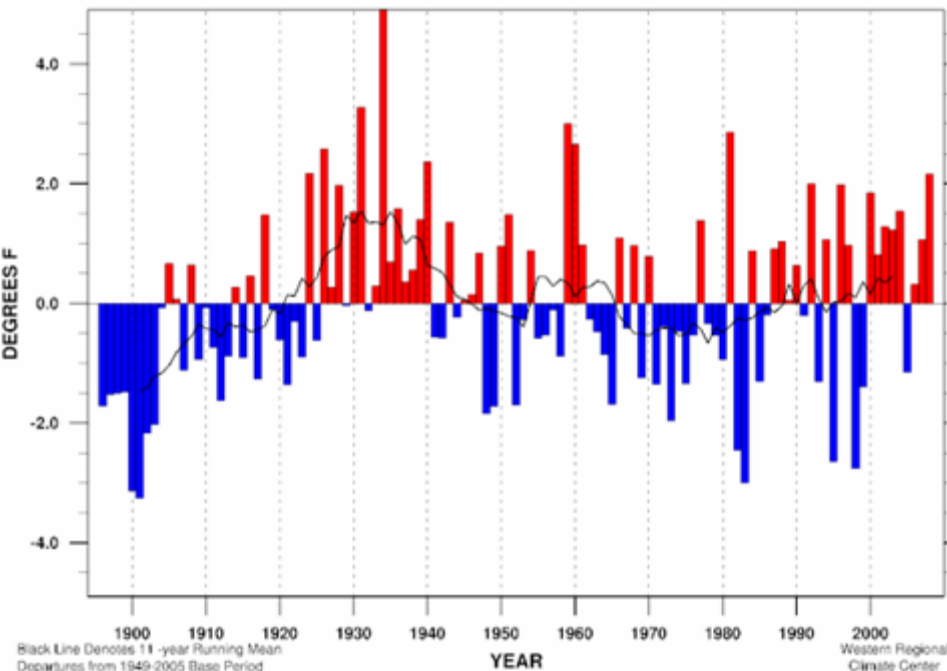


Figure 2-12 Coefficient of Variation for Annual Average Precipitation in California from 1890 to 2001 with Trend Line

Sierra Region

Maximum Temperature Departure Oct-Sep



Linear Trend 1895-present + 0.76 ± 0.83°F/100yr

Linear Trend 1949-present + 0.74 ± 2.18°F/100yr

Linear Trend 1975-present + 3.68 ± 5.65°F/100yr

Warmest Year 66.4°F (+ 4.9°F) in 1934

Coldest Year 58.2°F (- 3.3°F) in 1901

Oct-Sep 2008 63.7°F (+ 2.2°F)

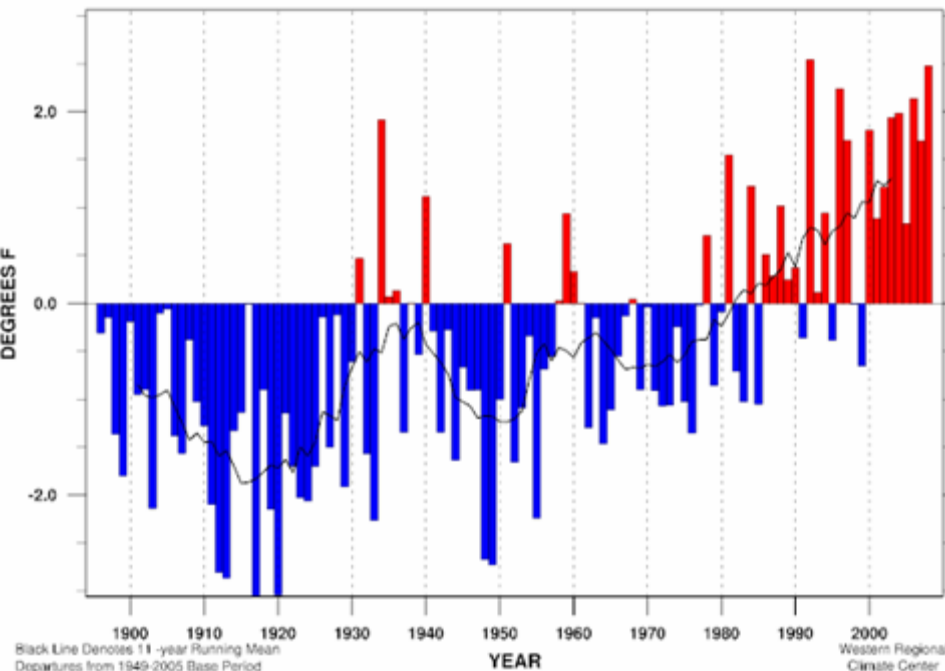
MEAN 61.5°F

STDEV 1.41°F

RANK 105 of 113

Sierra Region

Minimum Temperature Departure Oct-Sep



Linear Trend 1895-present + 2.28 ± 0.57°F/100yr

Linear Trend 1949-present + 4.38 ± 1.33°F/100yr

Linear Trend 1975-present + 7.04 ± 3.36°F/100yr

Warmest Year 39.1°F (+ 2.5°F) in 1992

Coldest Year 33.5°F (- 3.1°F) in 1917

Oct-Sep 2008 39.0°F (+ 2.5°F)

MEAN 36.6°F

STDEV 1.12°F

RANK 112 of 113

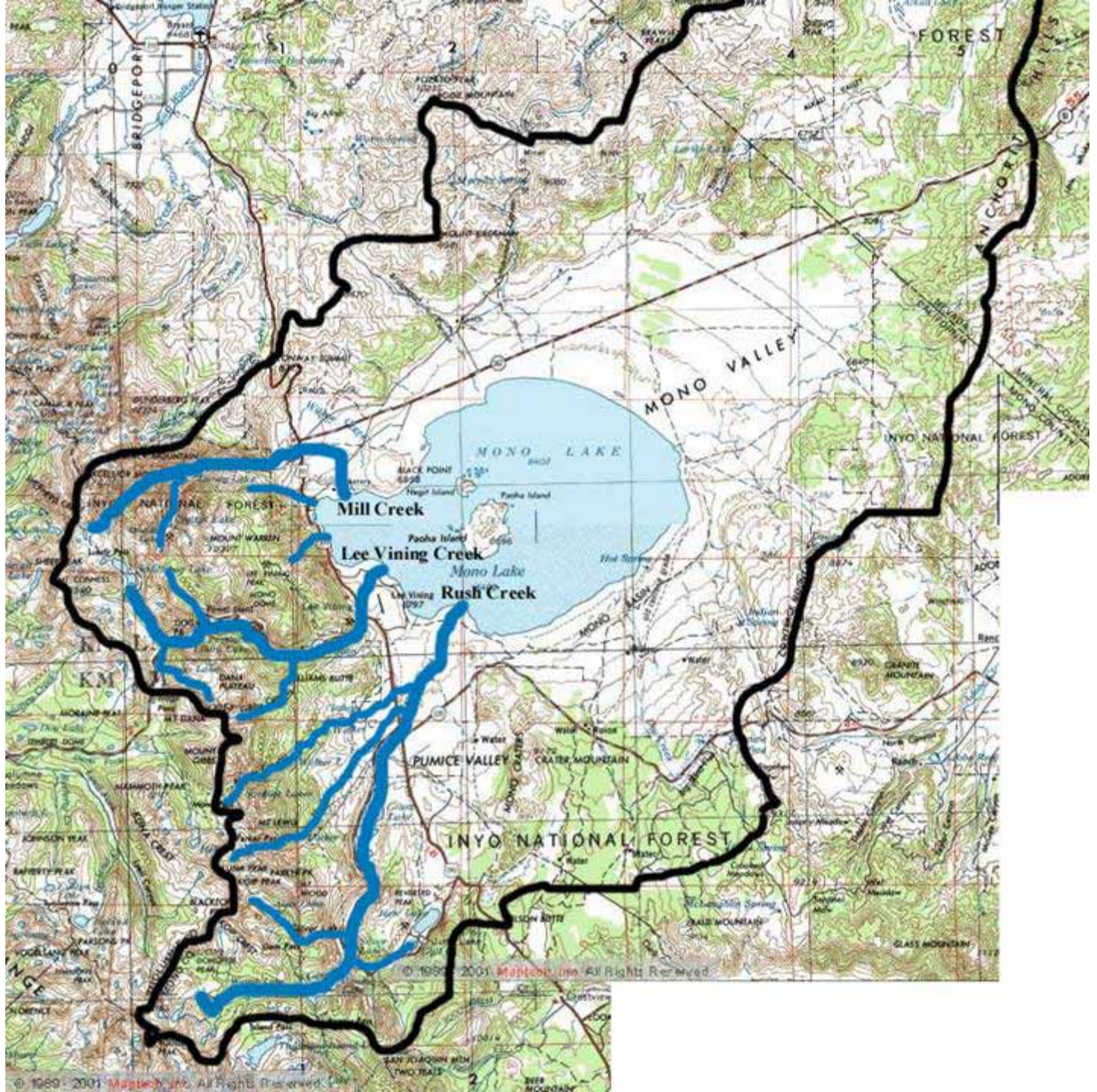
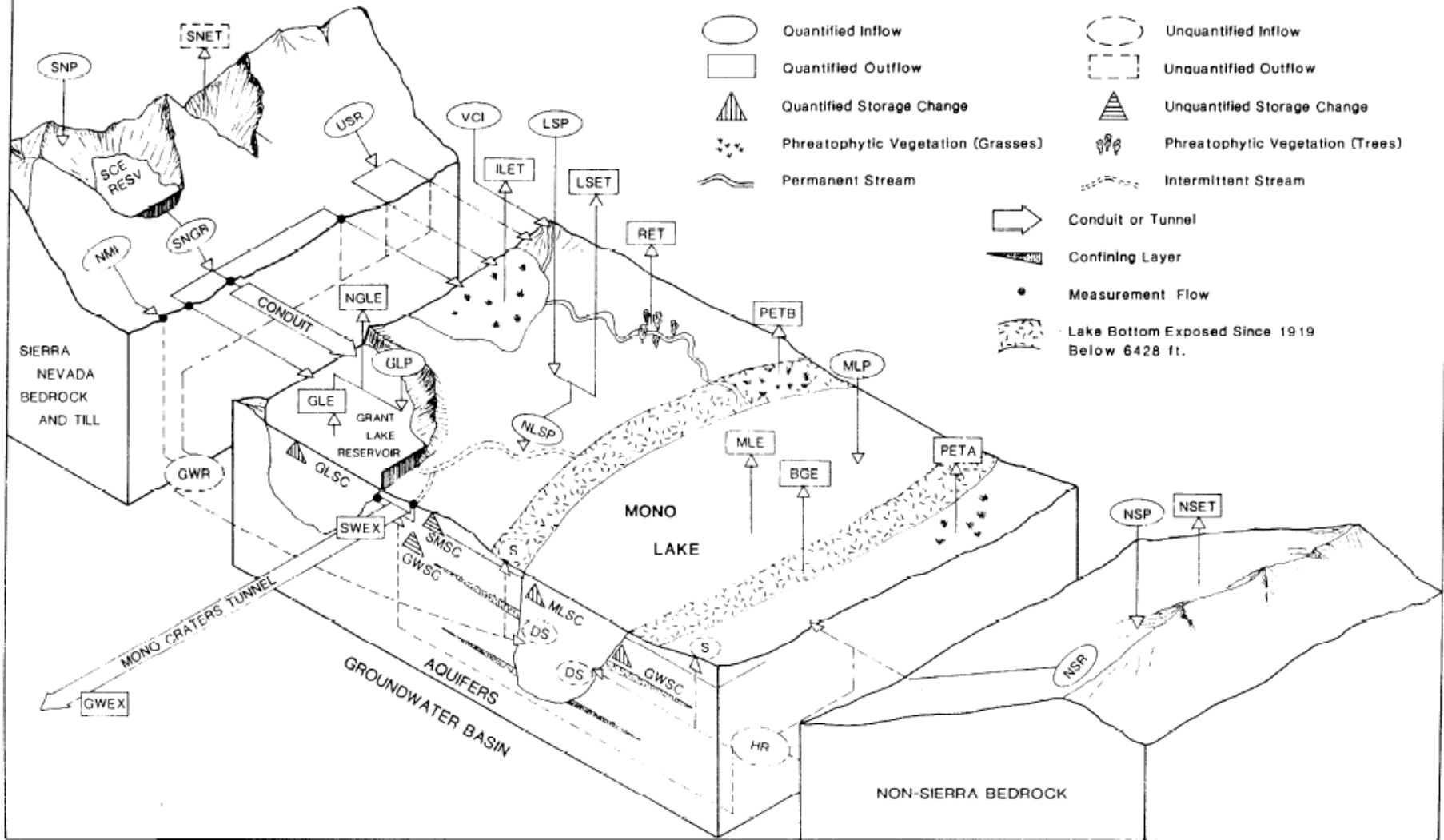


Figure 2-12
Mono Basin Water Balance



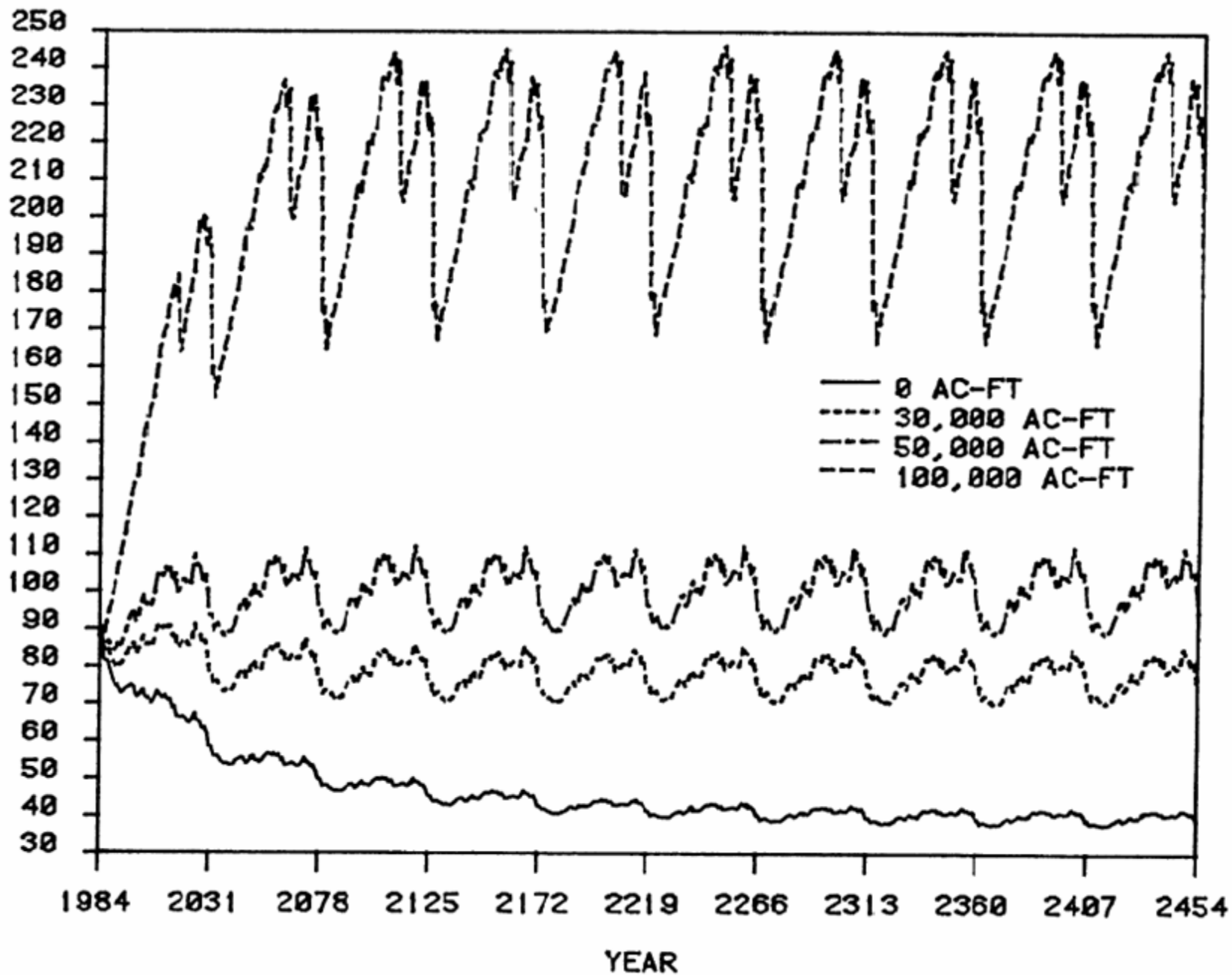


Figure 3-12 Projected Long-Term Salinity Fluctuations, 1985-2454, With Repetition of 1937-83 Hydroclimatic Conditions, For Exports of 0, 30, 50, and 100 Thousand ac-ft/yr

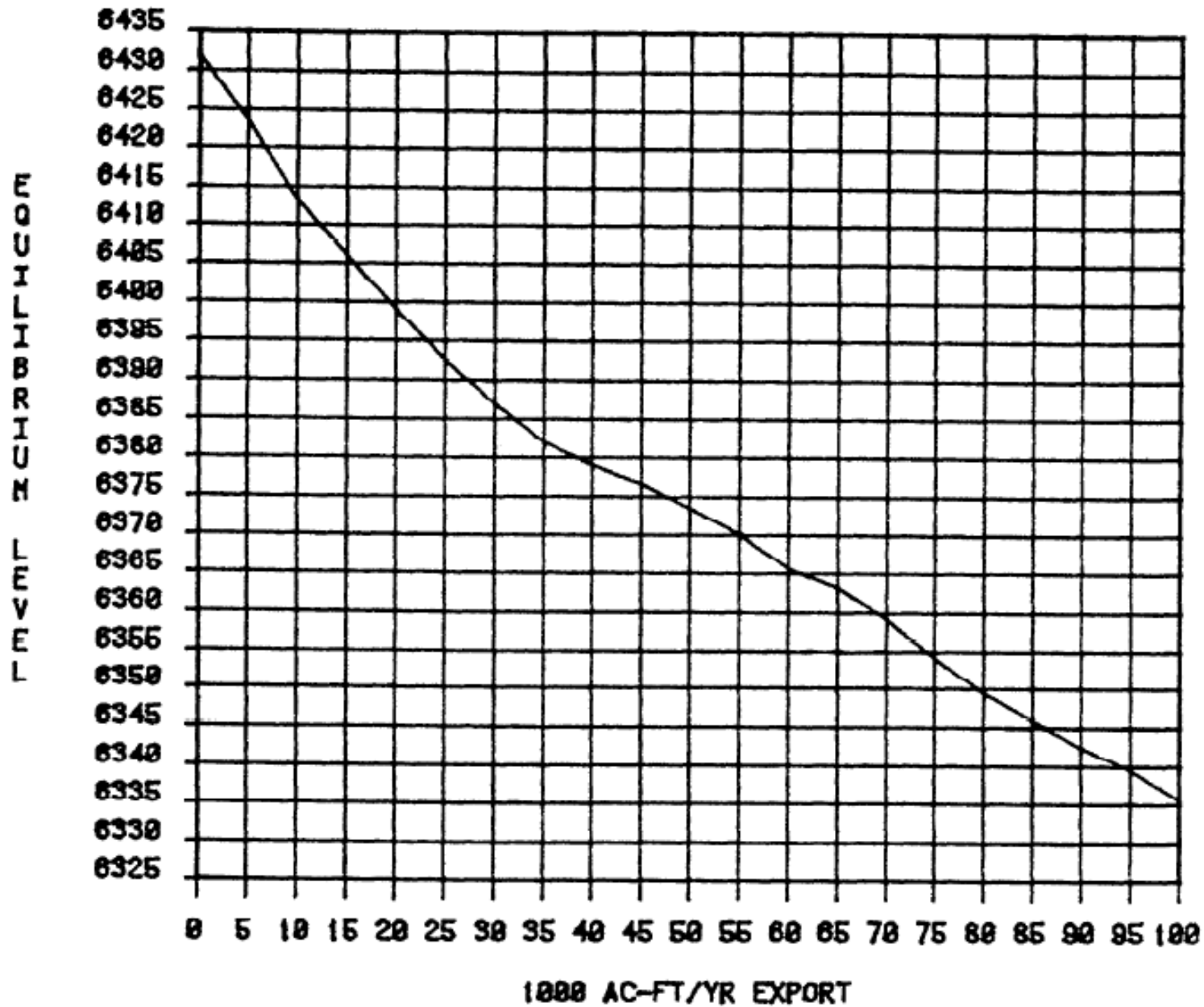


Figure 3-7 Equilibrium Lake Level as a Function of LADWP Surface Water Exports

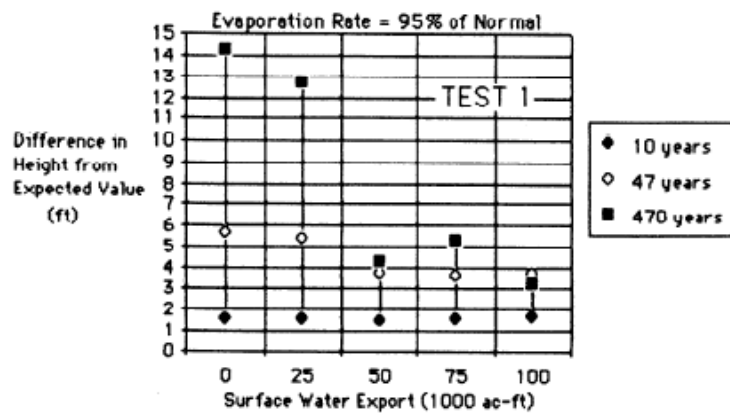
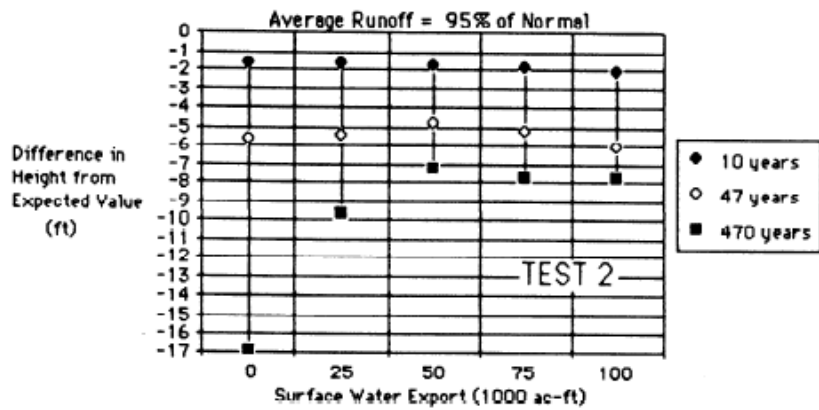
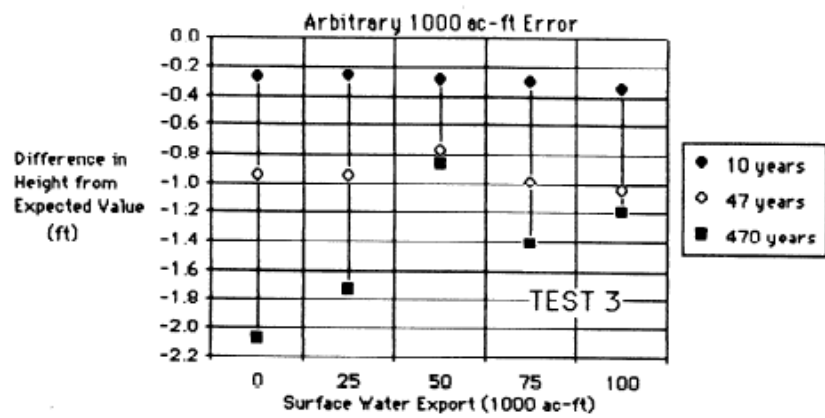


Figure 3-13. Sensitivity of Forecasted Lake Levels to Different Component Values

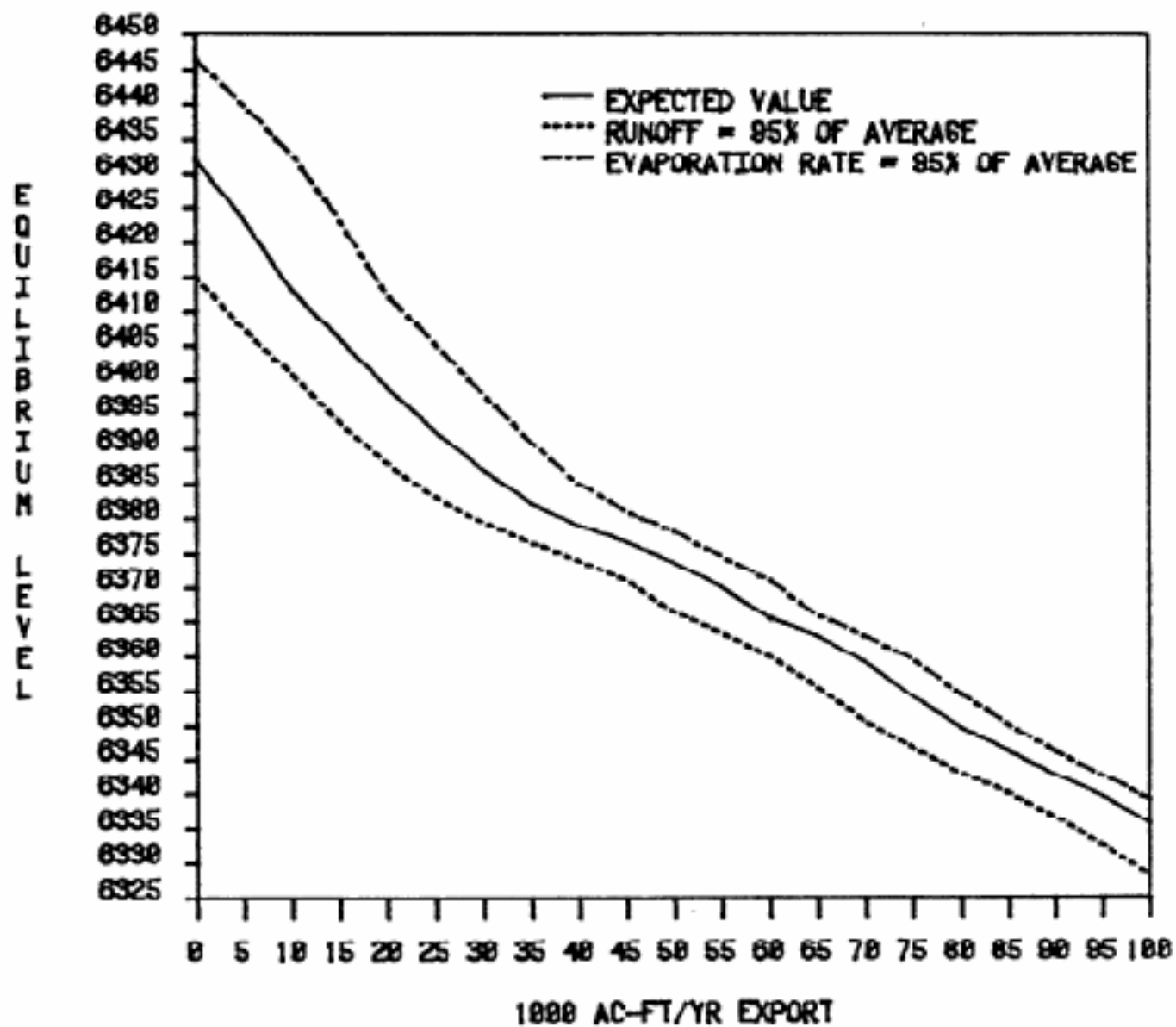
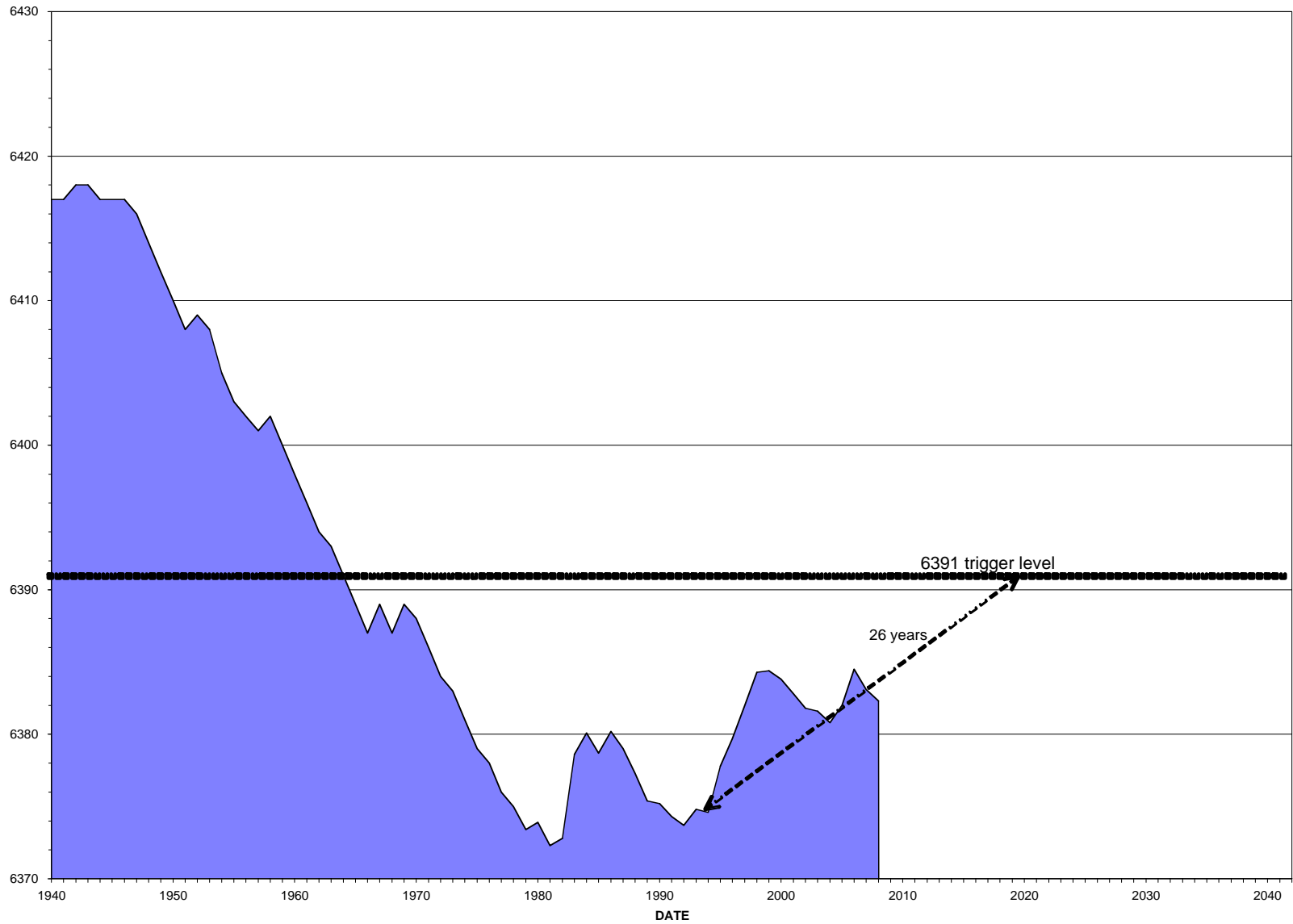
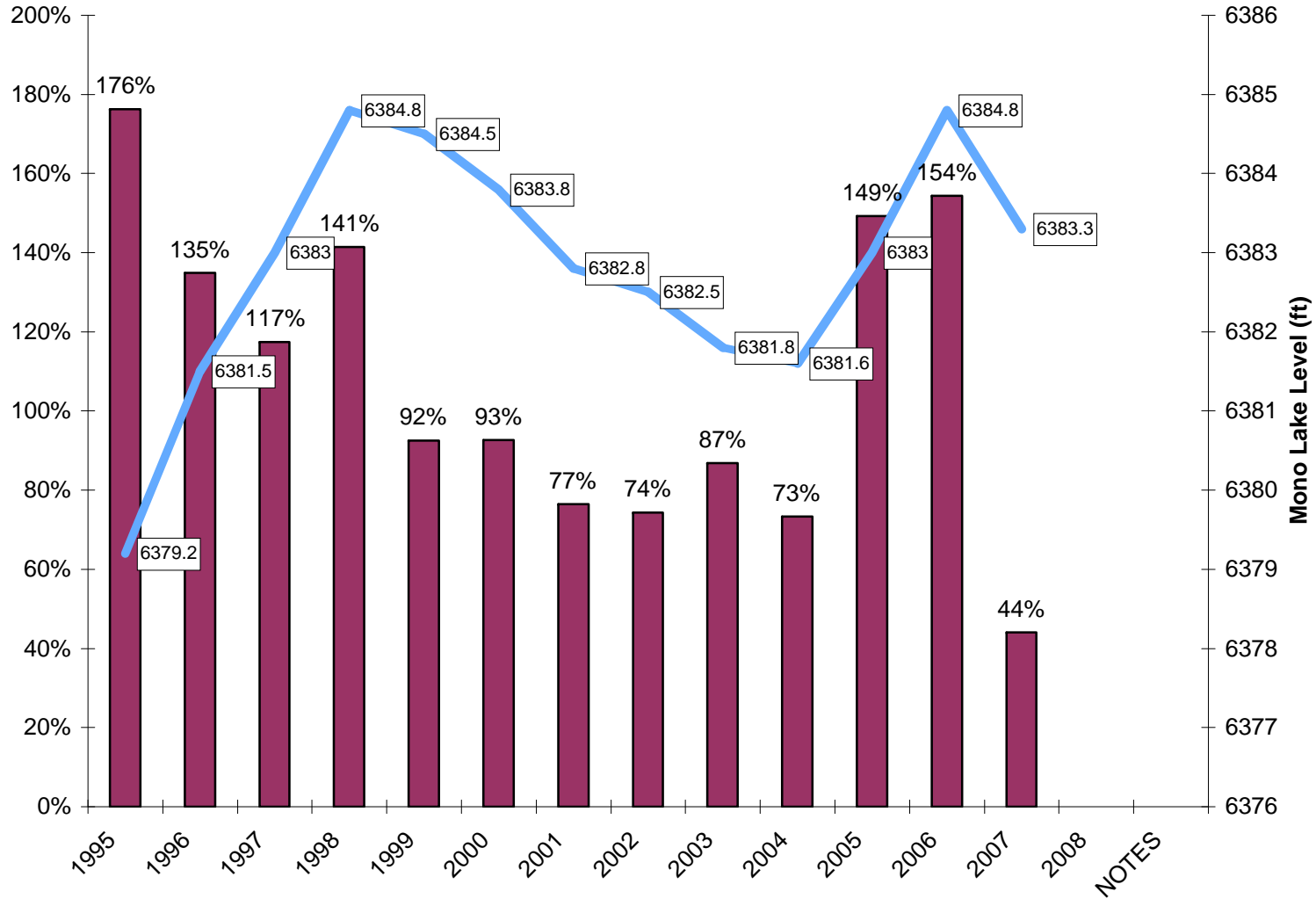
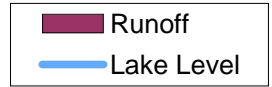


Figure 3-14 Sensitivity of Equilibrium Level to Changes in Component Values as a Function of Export



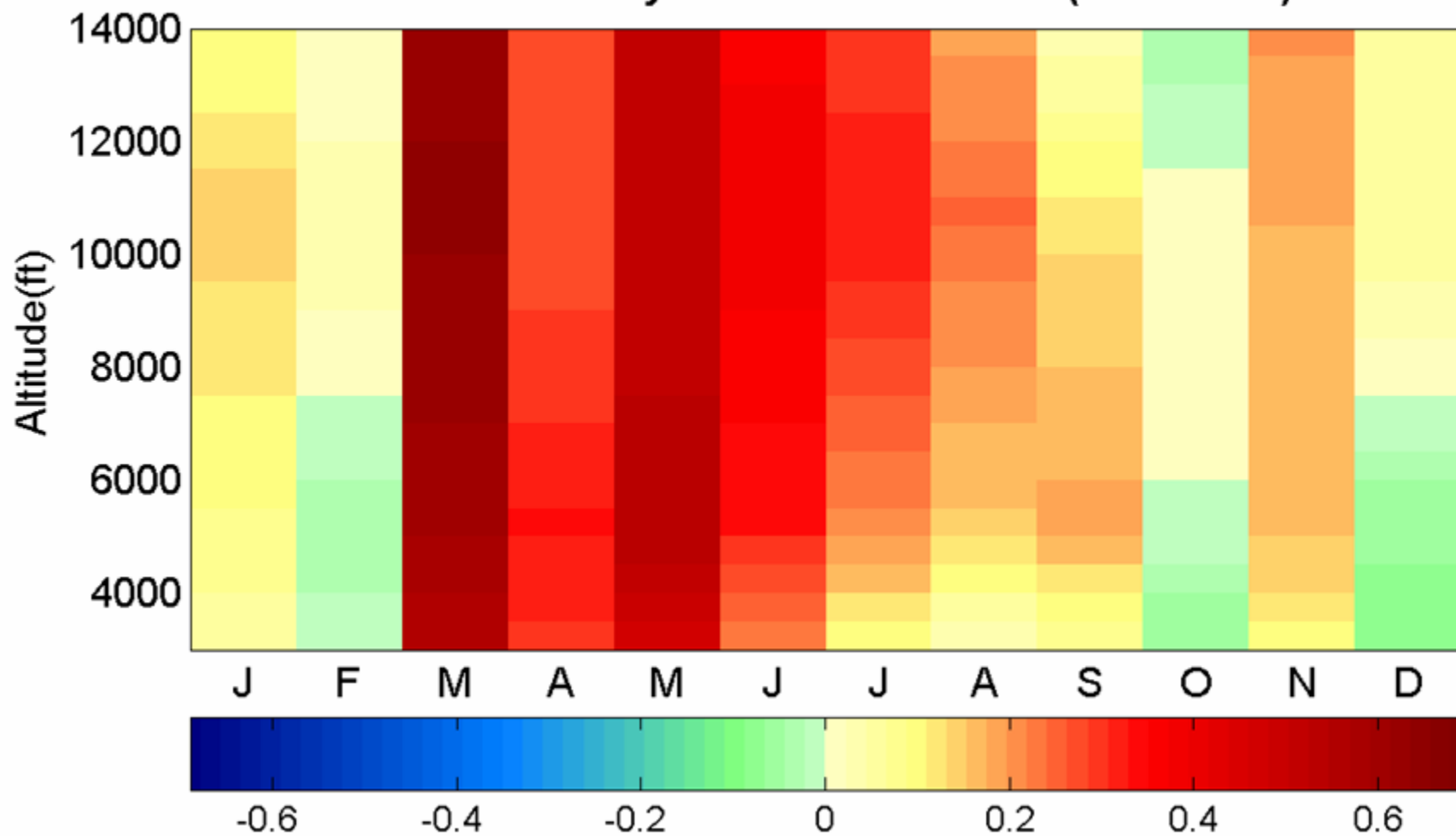
Mono Basin Runoff & Lake Level

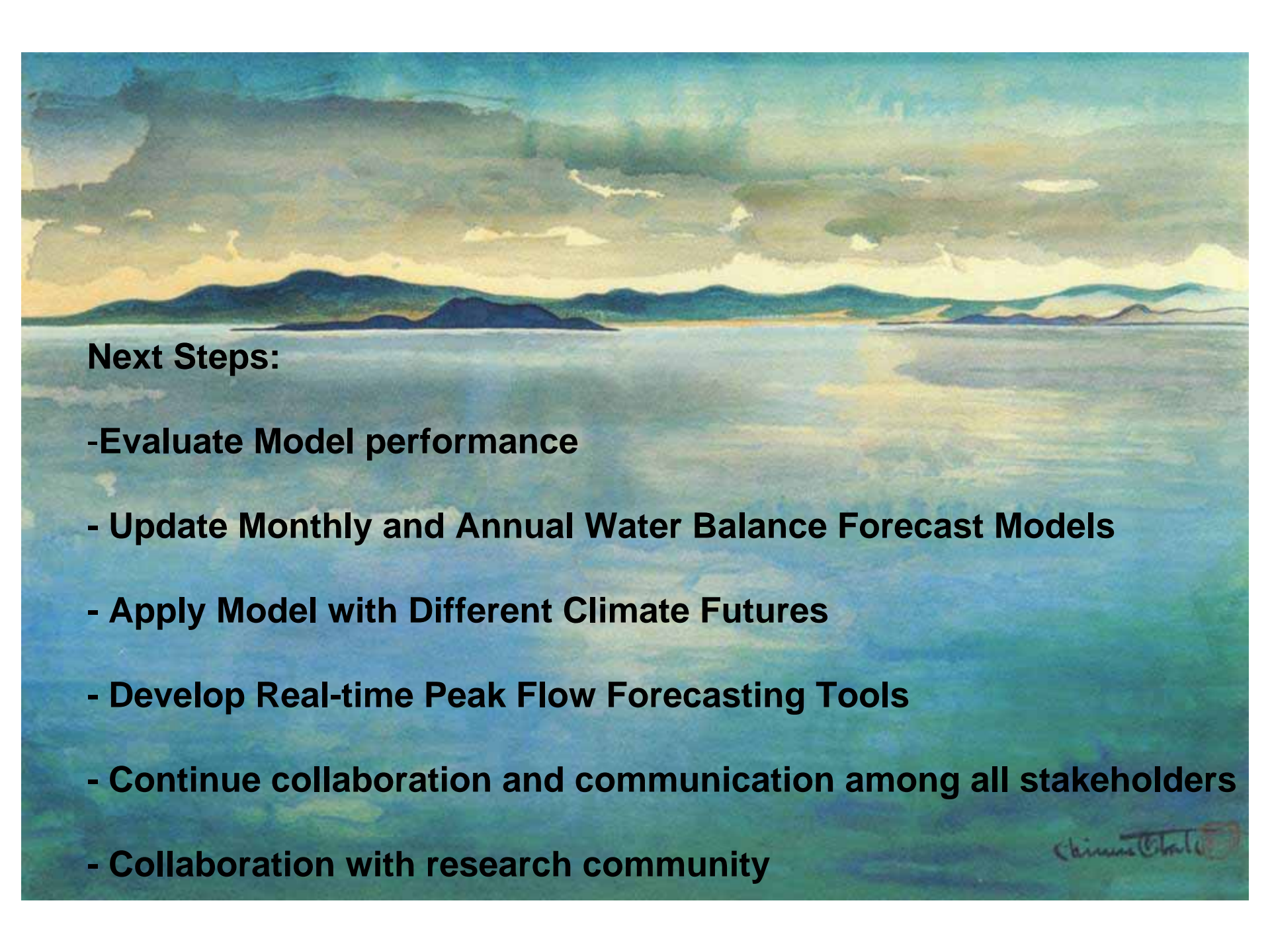


NOTES

*Forecasted

Central Sierra Linear Temperature Trends in °C/decade by Altitude and Month (1958-2007)





Next Steps:

- Evaluate Model performance
 - Update Monthly and Annual Water Balance Forecast Models
 - Apply Model with Different Climate Futures
 - Develop Real-time Peak Flow Forecasting Tools
 - Continue collaboration and communication among all stakeholders
 - Collaboration with research community
- Chinua Okeke*