El Dorado Irrigation District
Daily Operations Model and Forecasting Tool

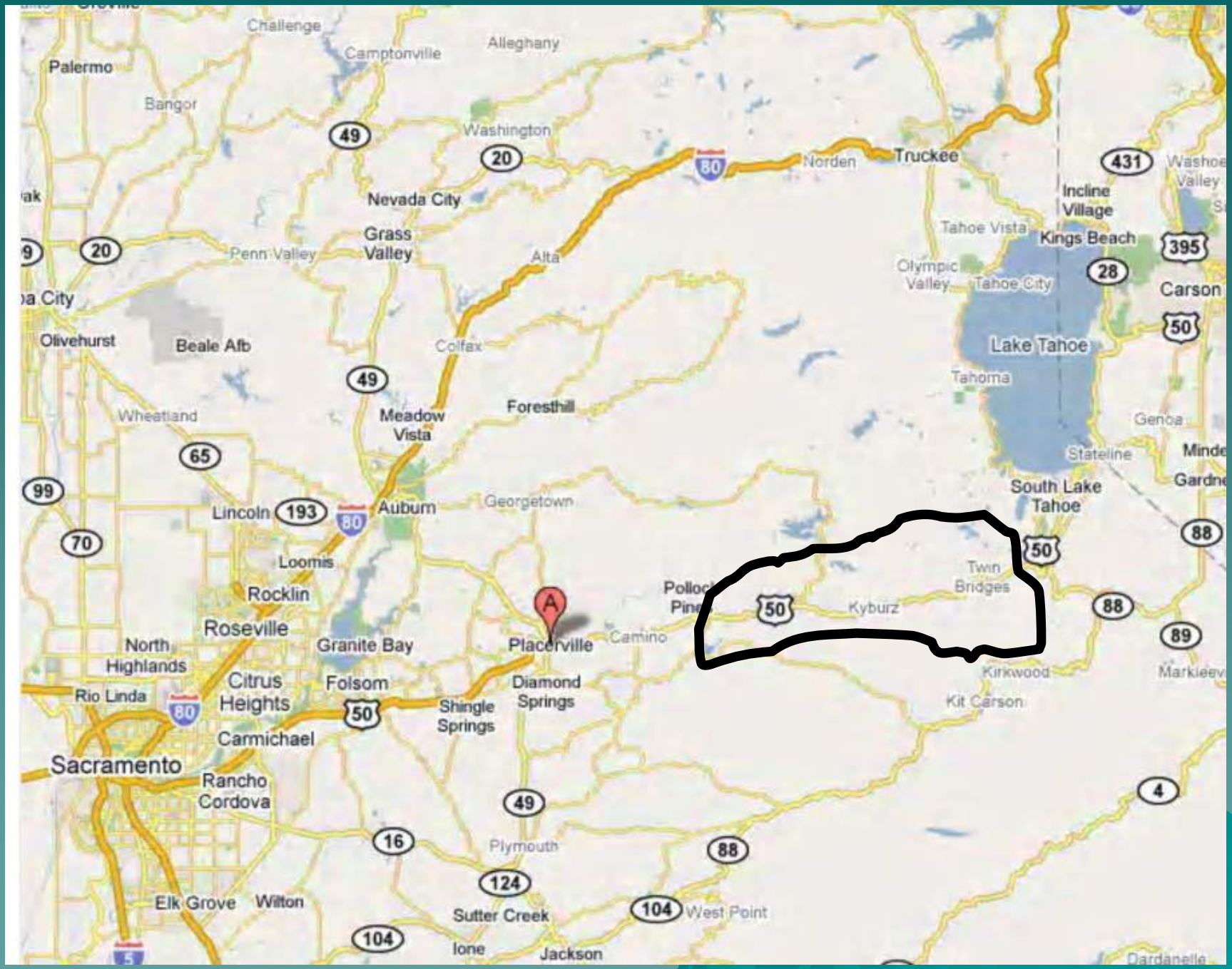
Steve Setzer

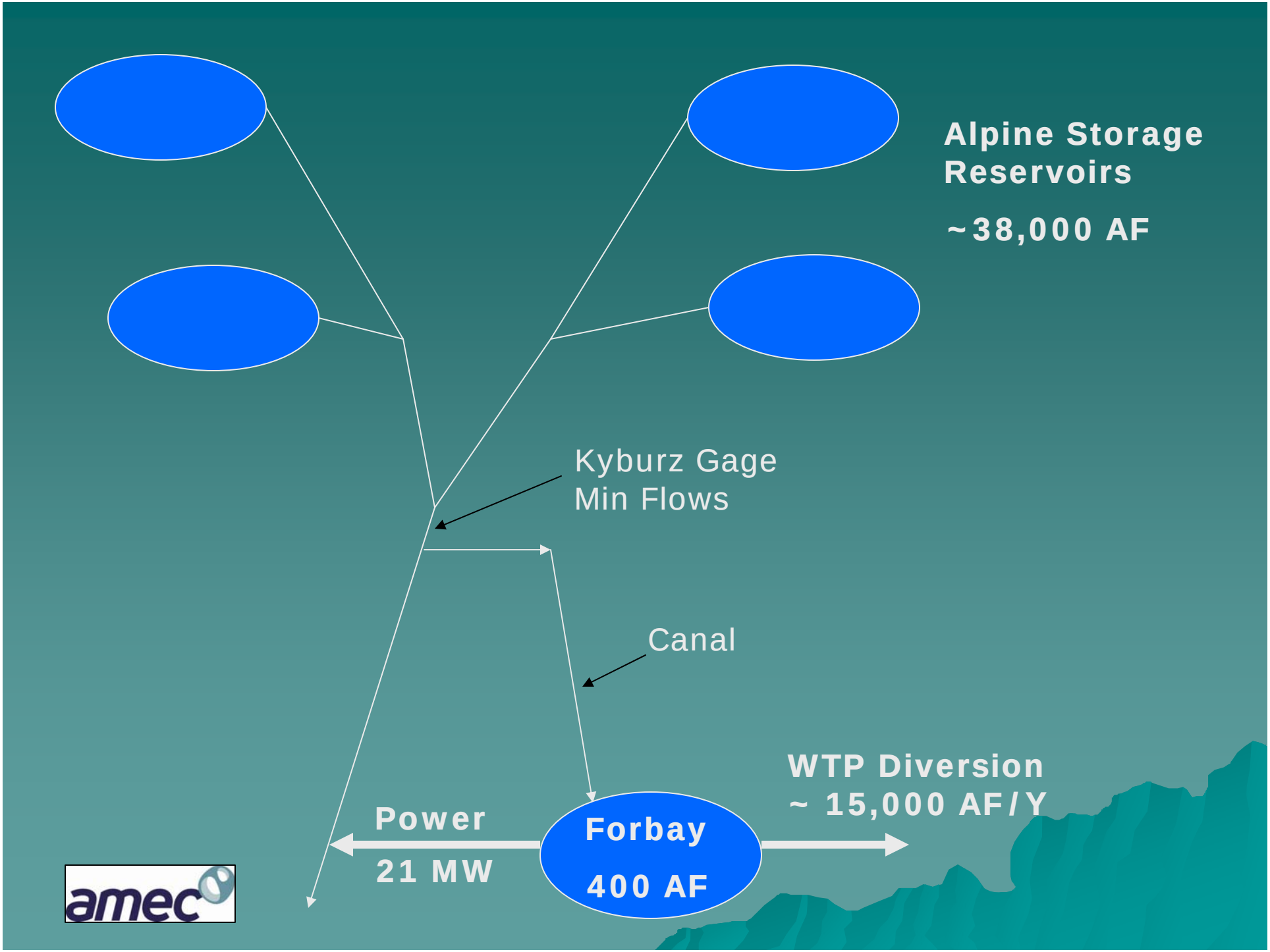
AMEC Earth & Environmental

August 14, 2008

Overview

- System background
- EID's need for a model and forecasting tool
- Forecasting tool details
- Model use
  - Emphasis on building "client friendly" models


Challenge
Camptonville
Alleghany
Palermo
Bangor
Washington
49
20
80
Nevada City
Grass Valley
Penn Valley
Alta
Norden
Truckee
431
Incline Village
Tahoe Vista
Kings Beach
395
Olympic Valley
Tahoe City
28
Carson
50
Lake Tahoe
Tahoma
Olivehurst
Beale Afb
Colfax
Foresthill
Meadow Vista
Wheatland
65
99
Lincoln
193
Auburn
Georgetown
70
Loomis
Rocklin
Roseville
North Highlands
Granite Bay
Placerville
Camino
Rio Linda
Citrus Heights
Folsom
Diamond Springs
Shingle Springs
Carmichael
Sacramento
Rancho Cordova
Elk Grove
Wilton
16
Plymouth
124
Sutter Creek
104
West Point
Ione
Jackson
Stateline
South Lake Tahoe
Twin Bridges
Kyburz
Kirkwood
Kit Carson
88
89
4
A


Alpine Storage Reservoirs
~38,000 AF
Kyburz Gage Min Flows
Canal
WTP Diversion
~ 15,000 AF/Y
Power
21 MW
Forbay
400 AF
amec

Need for Model and Forecasting Tool

- New FERC License Issued in 2006
  - Established EOM target lake levels
  - Established minimum flows below each lake
  - Established mimumum flows at Kyburz (above canal diversions)
  - All target elevations and minimum flows depend on the forecasted year type (i.e. Critically Dry, Dry, Below Normal, Above Normal, and Wet)

Need for Model and Forecasting Tool

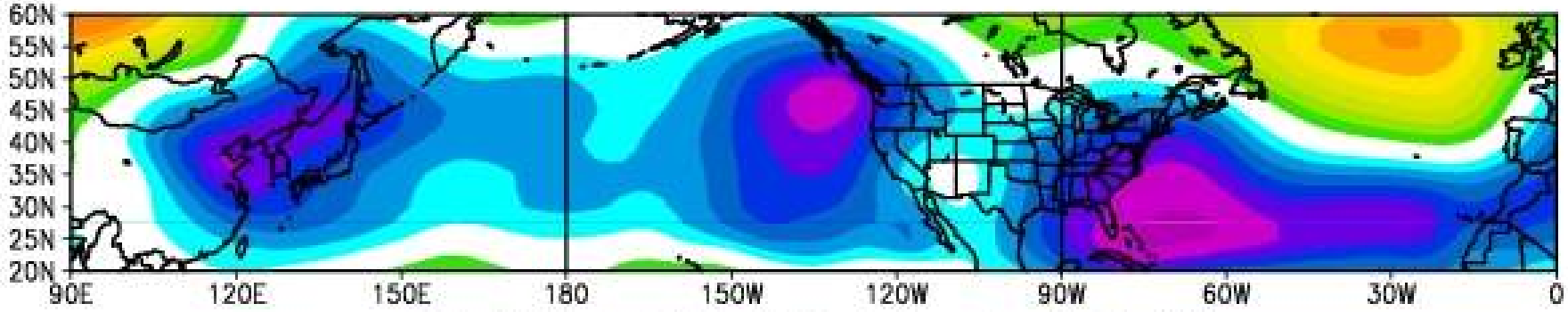
- Daily operations model required to meet new FERC requirements
  - AMEC developed in 2007
- FERC license allowed development of alt. forecasting tool for January and February (Apr-July runoff)
  - AMEC developed in 2008

Need for Model and Forecasting Tool

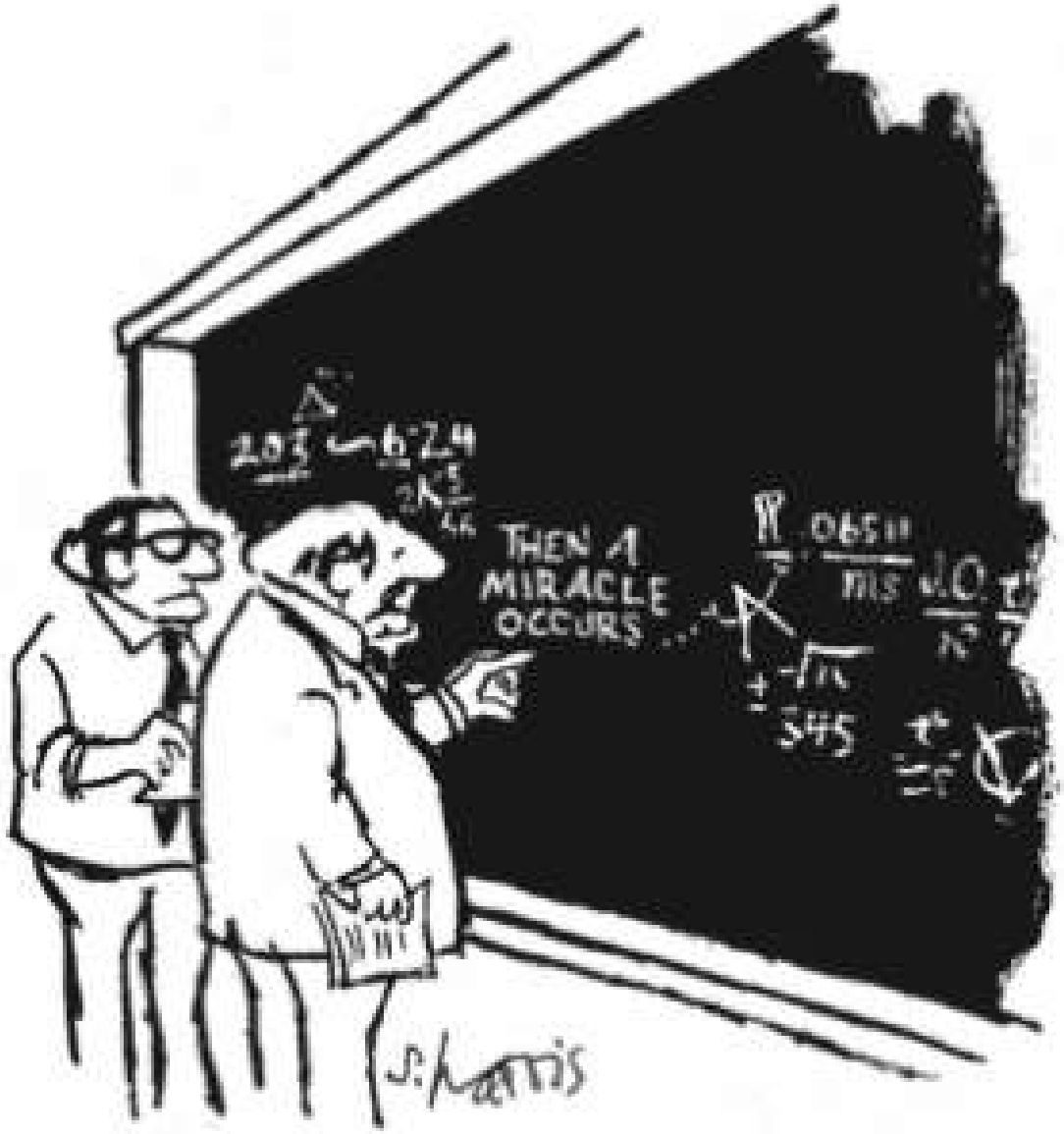
- We developed an alternative forecasting tool for Jan. and Feb.
- We revised the existing operations model to use forecasting results and MRM scenarios

Forecasting Tool

- Based on local data (PDSI and snow pack) as well as large scale climate data
- Climate data: 4 variables used
  - Zonal Wind
  - Meridional Wind
  - Sea Surface Temp
  - 500mb Geopotential Height
- Determine areas of high correlation



Feb 1949 to 1996: 500mb Geopotential Height
Seasonal Correlation w/ Feb = Apr–Jul runoff: KyburzFebMarFcst.txt
NCEP/NCAR Reanalysis



"I THINK YOU SHOULD BE MORE EXPLICIT HERE IN STEP TWO."

Forecasting Tool

- Simple answer: given current climate data and local data, the forecasting tool determines the similarity of the current year to all historic years
- A weighting coefficient is assigned to each historic year
- The expected year type can then be determined

Forecasting Tool

- Demo Forecasting Tool

Model Enhancements

- Ability to run a series of historical years (using MRM) and analyze the results in GPAT to determine, for example, probabilities associated with certain lake levels

Model Demo

- MRM tool and simulating multiple historic years
  - Caples Lake study
- Using GPAT
- Using SCT for operators (rules or input)