

San Jacinto Watershed Model Update

LAKE ELSINORE / CANYON LAKE TMDL TASK FORCE

September 27, 2010

Agenda

- Draft Report Comments
- Spreadsheet Tool
- Next Steps

Modeling Tasks

- Update Watershed Model
 - Compile recent data
 - Develop proposed model update methods
 - Develop Modeling Report
- Perform Additional Model Runs
 - Calculate annual & landuse loads
 - Jurisdictional estimates
 - Current vs. pre-development
- Develop Simplified Lake Management Spreadsheet

Model Framework / Representation of Watershed Processes

- Model uncertainty/accuracy (CT1, RC4) – comments recognize inherent limitations in model predictions due to watershed complexity and other factors
- In-stream processes (CT2, CT5) – as in 2003, complex in-stream processes and sediment transport were not represented. Standard practice is to model nutrients in-stream using a constant decay-rate, given available data
- Meteorological station selection (CT3, RC14) – weather parameters used: hourly precip and evapotranspiration. Detail on weather stations used will be provided
- Seasonal variability and sources (CT4, RC5) – additional detail will be provided for wet/dry season loads. As in 2003, irrigation and WWTPs were not represented.
- Land use grouping (CT6) – landuses were consistent with 2003 model setup
- Imperviousness (CT9, RB5) – clarification will be provided
- Hydrology calibration (CT10, RC5) – update text to recognize limitations in weather data and influence on model calibration
- Loading Rates (RC5, RC17) – update text to recognize limitations in representing nutrient sources due to data gaps. Include additional information on urban increase

Landuse Data and Lake Modeling

- Jurisdiction loads (CT7, RC10) – jurisdictional loads by landuse can be included
- Landuse data and roads (CT8, RB3) – information from landuse memo will be included. Future update would be needed to represent Caltrans road areas
- Impacts on model results from updated land use coverage (RC16, RC17, RB4) – updated loading rates, landuse information, etc. resulted in changes in landuse loads from 2003. Open space/forest loading rates were increased based on USFS data. Agricultural loads downstream are lower, in part due to refined Mystic Lake representation (increased storage). Model landuse comparison table will be included (2003 v. 2010)
- Linkage to in-lake loading / lake model updates (RC8, RC9, RC11) – project scope included developing update to 2003 watershed model report. Lake model updates and results would be needed to compare to the 2003 TMDL report
- Comparison to USGS flows downstream of CL and LE (EV4, EV5) – these data will be summarized in the report, however, lake model results would be needed for calibration to observed data

Mystic Lake

- Identification and evaluation of impacts (CT12, EV2, EV3, EV6, RC4, RC15, RB2) – additional information will be provided to document model results. Additional data and model refinement may be needed to better understand the impact of Mystic Lake. Future work and lake modeling results for CL and LE would be needed to compare to current TMDL calculations
- Impacts from NO overflow of Mystic Lake (RC17, RB7, RB8) - Additional data and model refinement may be needed to better understand the impact of Mystic Lake. Currently re-evaluating 1998 loads and other overflow periods. Model results appear to be reasonable considering the rainfall results for 1998 and 2005. Limitations in the weather data coverage influences model accuracy. Note, subsidence is not explicitly represented

Comparison to 2003 Model/TMDL Report

- Significant variation from 2003 model (CT13, RC3) – significant updates were made to key model datasets (weather, landuse, Mystic Lake, etc.), which resulted in improvements in the model representation. A detailed calibration/validation was performed
- Comparison of results to 2003 TMDL report (RC1) - project scope included developing update to 2003 watershed model report. Lake model updates and results would be needed to compare to the 2003 TMDL report

Anthropogenic/Baseline Model

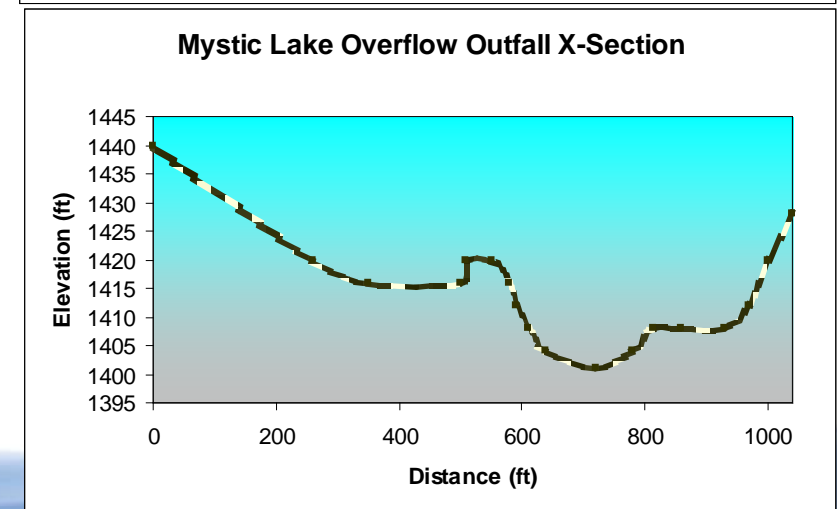
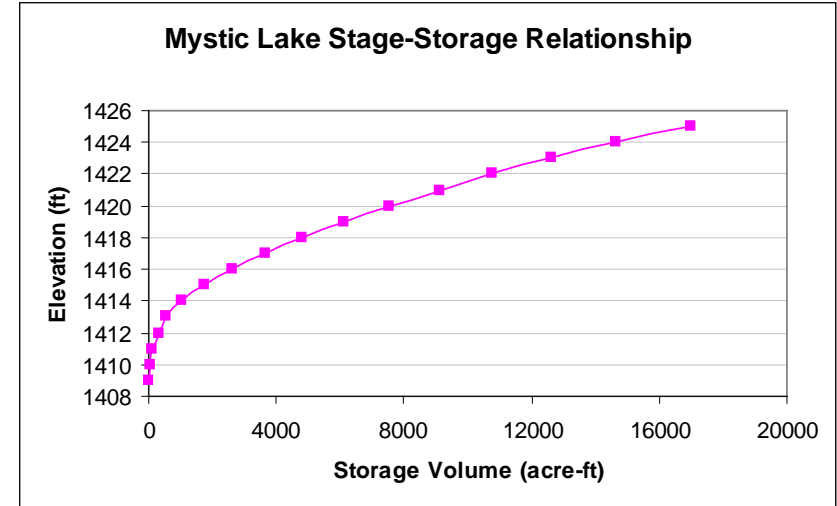
- 2010 results as compared to TMDL baseline results (CT13, CT14) - The baseline TMDL was based on a weighted average of simulations for water years 1994, 1998, and 2000 representing moderate, wet, and dry years respectively. As shown in the report, the average percent difference for simulated loads between the two models for shared simulation years is 5.3% (TN) and 18.1% (TP)
- Anthropogenic model run (RC 13) - The 2005 SCAG dataset does not differentiate between open space-forested and open space-scrub/shrub, therefore, hydrologic and loading characteristics of these areas are likely comparable. The 2003 model used an all-forest representation for the baseline run. This scenario can be updated to include a mix of forest and open space land.

TMDL calculations

- Appropriateness of WLA and LA (RC4) – based on the updated watershed model results, the TMDL calculations would likely include significant changes. Updated lake modeling results would be needed to quantify these changes
- Appropriateness of model to estimate TMDL load allocations (RC5) – There are inherent modeling uncertainties based on the complexity of the watershed, data gaps, and limitations in observed data. These limitations affect the accuracy of the TMDL calculations.

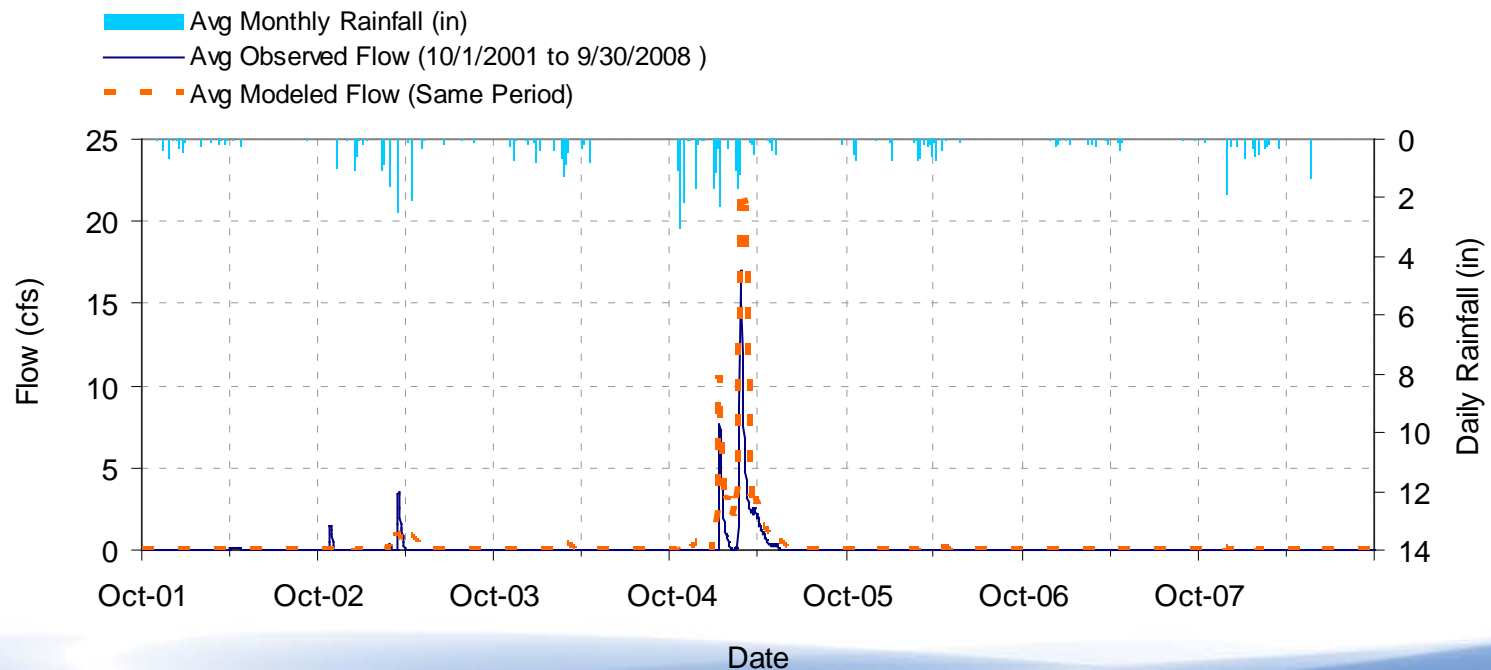
Mystic Lake Representation Updates

- Total storage increased from 5,010 acre-feet (2003 model) to 17,010 acre-feet (RCFC 2009)
- Adjustment of the lake overflow outfall dimensions based on HEC-RAS x-sections



Mystic Lake Calibration

- Calibration of Mystic Lake overflows was based on 2005 storm event recorded at USGS 11070210, ~4 mi. below Mystic Lake
- Hydrograph at USGS 11070210 was assumed to capture overflow event, as the data record generally shows no flow



Mystic Lake Overflows

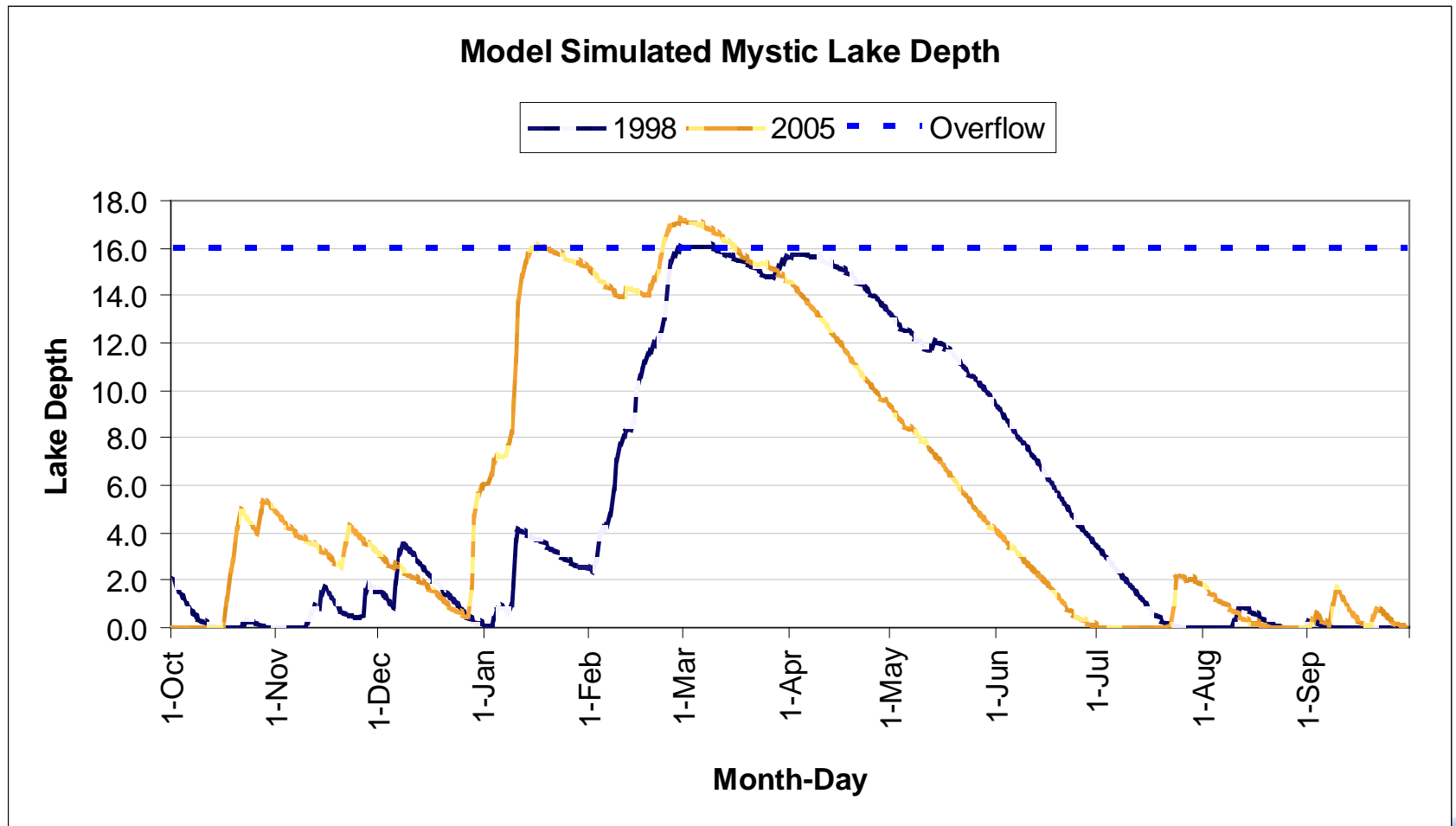
- Based on WY 2005 calibration, the model simulated Lake overflow events for 4 years

Month	Flow (af/month)
January-93	1,156
February-93	12,878
March-93	14,129
April-93	4,075
May-93	433
March-95	1,817
April-95	1,342
March-98	17
January-05	3
February-05	135
March-05	294

Mystic Lake Overflows

- Based on TAC and Regional Board comments, Mystic Lake did not overflow in 2005
- Model simulation of overflow in WY 2005 is the result of:
 - Wet fall season (12.5' in WY 2005 vs. 4.76' in WY 1998) causing high initial Lake depth
 - High rainfall total early in winter (6.6' in Jan. 2005 vs. 3.8' in Jan. 1998) causing early overflows, and depths close to breach point throughout winter
 - Generally wet WY (32.2' WY 2005 vs. 30.1' in WY 1998)

Modeled Mystic Lake Depths



Mystic Lake Data Gaps

- Additional data would be needed to refine watershed model
- Data gaps potentially causing simulation errors include:
 - No measurements / estimates of Mystic Lake overflows to calibrate to
 - No storage or design data for Lake Hemet Dam above Mystic Lake
 - No information on water withdrawals or basin to basin water transfers
 - Precipitation data record deficiencies