Discussion regarding average mean error

presented to Pend Oreille
Watershed Advisory Group
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What's Real

Weather for Sandpoint, ID

54°F
Scattered Clouds
Wind: E at 7 mph
Humidity: 54%

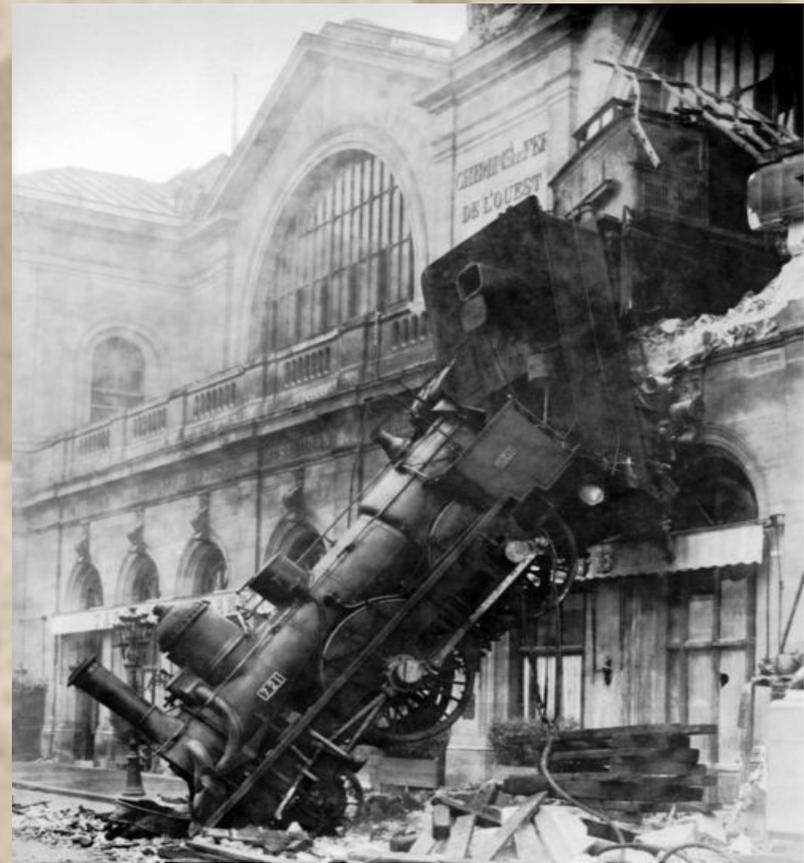| Mon	Tue	Wed	Thu
57° | 36°	46° | 28°	46° | 28°	49° | 33°

- What is the **absolutely accurate** (true) temperature in Sandpoint?

Defining Error

- The word error (ˈerə), has different meanings in different domains. The concrete meaning of the Latin word error means "wandering" or "straying", although the metaphorical meaning "mistake, misapprehension" is actually more common.
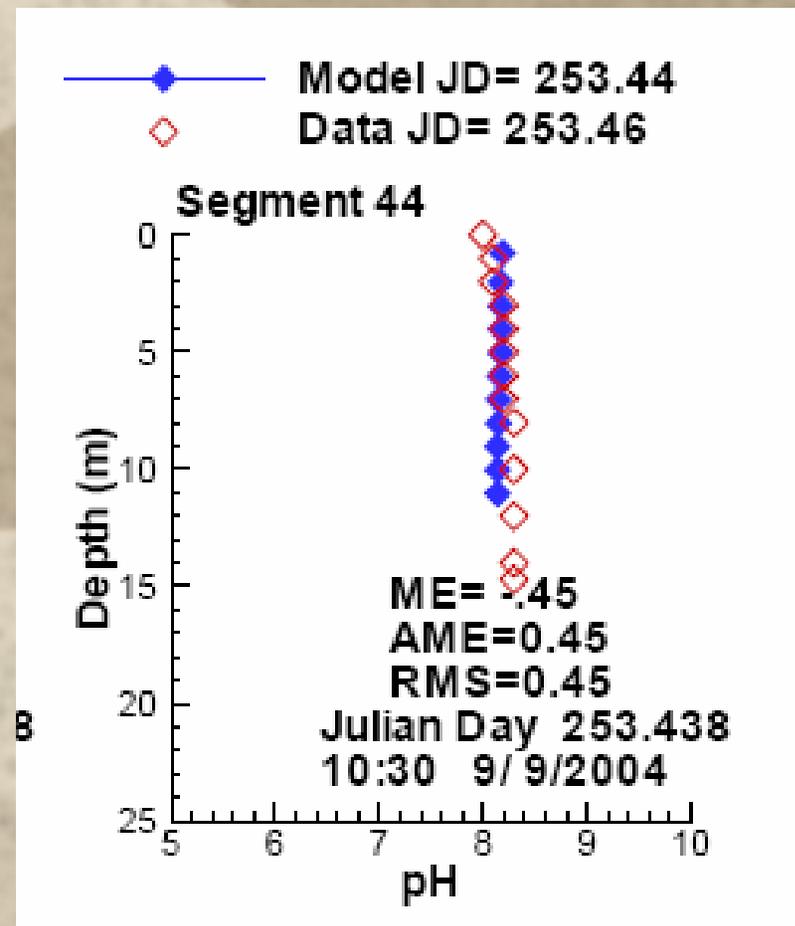
Our use of the term Error

- Error is the difference between a computed, value and a measured value. Neither of which are the theoretical true value.

Figure 74: Comparison between model predictions and temperature data at Albeni Falls Dam.
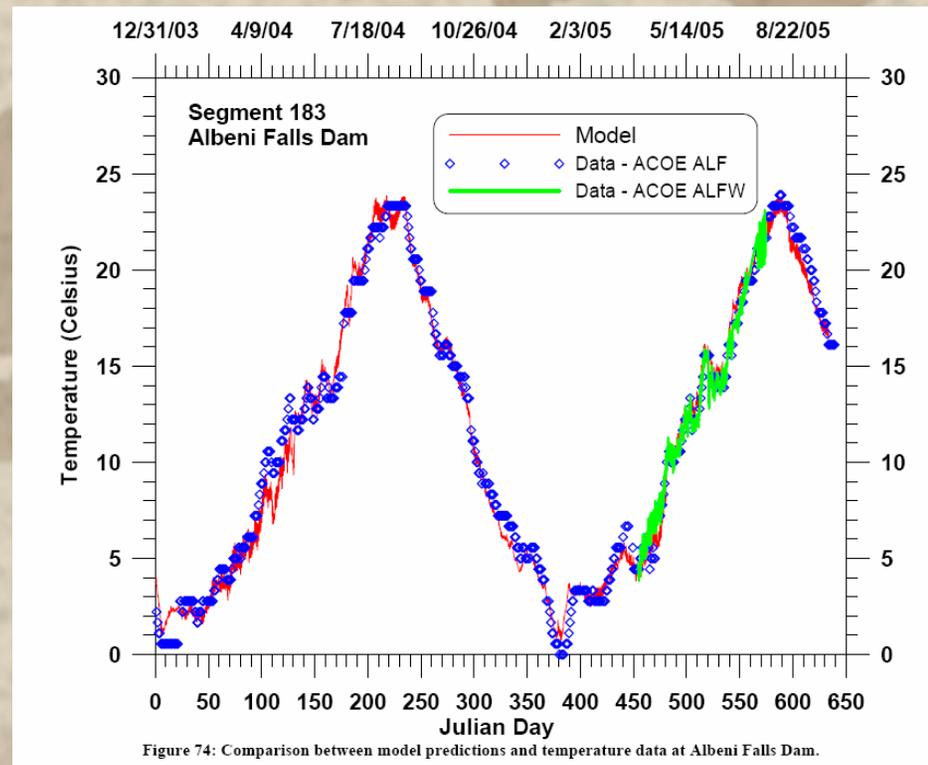
The Idaho Model

- In general the model reproduces the river responses to the known boundary conditions

- The Absolute Mean Error (AME) of the Idaho model predicted temperatures compared with vertical profile data was 0.37 degrees Centigrade

Model JD= 253.44
Data JD= 253.46

Segment 44

ME= -.45
AME=0.45
RMS=0.45
Julian Day 253.438
10:30 9/ 9/2004

Wait a second

- The AME is about the same size as the criteria against which we are evaluating impairment.

$$AME = 0.37$$

$$WQS = 0.3$$

The CE-QUAL-W2 model is a collection of equations

$$Tc = \frac{5}{9} \times \left(Tf - 32\right)$$

- Example Equation - converting Celsius to Fahrenheit

Calculation for converting Celsius to Fahrenheit with an Error

$$Tc = \frac{5}{9} \times \left(Tf - 32\right) + Error$$

Empirical Example

$$Tc = \frac{5}{9} \times \left(Tf - 32\right) + Error$$

Without Error	With Error
$Tc = \dfrac{5}{9} \times \left((57) - 32\right) = 13.89$	$Tc = \dfrac{5}{9} \times \left((57) - 32\right) + \left(0.37\right) = 14.26$
$Tc = \dfrac{5}{9} \times \left((50) - 32\right) = 10.0$	$Tc = \dfrac{5}{9} \times \left((50) - 32\right) + \left(0.37\right) = 10.37$

How IDEQ proposes addressing AME

- The use of the model to predict relative effects is consistent with standard modeling practices.

- The absolute accuracy of the parameters and the modeling coefficients used in the model is always subject to some uncertainty.

- The absolute accuracy (AME) of the model is not critically important when comparing scenarios, because any error in the model results would be similar between scenarios.

- Most modeling protocols acknowledge this approach as a valid use of models.

You do this all the time

- Do you expect it to be 75 on Saturday or do you expect it to be warmer than today?

Conclusions

- WAG members agree that error be accepted for purposes of reviewing and comparing modeling scenarios
- Error will be revisited and considered when discussing potential TMDL allocations