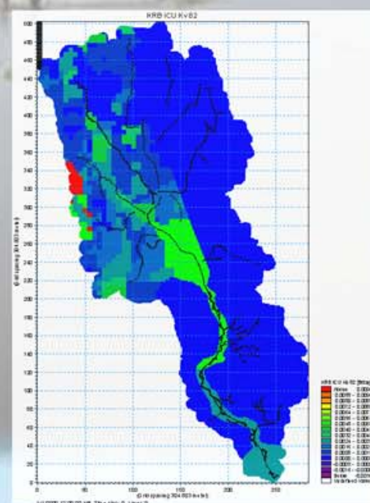
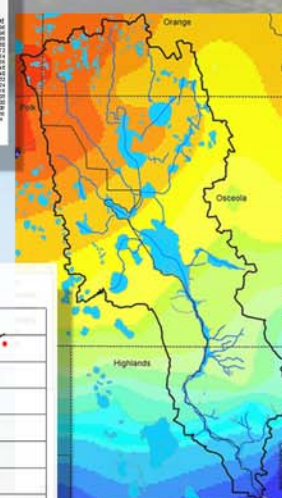
Analysis of Performance Measure Sensitivity to Changes in Model Parameters

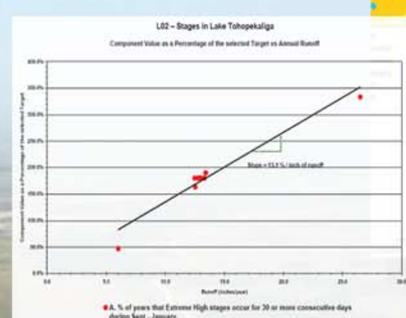
(Deliverable No. 2.1.3.2.5.3)

Kissimmee Basin Modeling and Operations Study

(Contract No. 4600000933-WO02)







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September, 2009

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1 INTRODUCTION AND TASK OBJECTIVES

Activities performed during Phase I of the Kissimmee Basin Modeling and Operations Study (KBMOS) [Earth Tech 2005] identified the need to use a suite of modeling tools to achieve the project objectives. Subsequently, the MIKE SHE/MIKE 11 model was selected as the Alternative Formulation / Evaluation Tool (AFET) for the KBMOS. A technical design document [Earth Tech 2006a] and the AFET Acceptance Test Plan [Earth Tech 2006b] were prepared to fit the objectives of the study. The AFET has been built and calibrated following the guidelines established in these documents, which are focused on obtaining an accurate representation of flow and stages of canals and lakes located within the extent of the Central and South Florida (C&SF) Flood Control Project within the Kissimmee Basin and their sensitivity to alternate structure operations [Earth Tech 2007].

An AFET Uncertainty Analysis was originally included as part of the KBMOS work plan. The intent of the uncertainty analysis was to provide a quantitative evaluation of the impact of uncertainty in the AFET modeling tool predictions of stage and flow in the surface water system that represent the components of the evaluation performance measures. The SFWMD has made efforts in the past to include a definition of uncertainty in the models that are being used to inform decision makers on specific issues, as stated in the RECOVER – CERP Model Uncertainty Workshop Report, May 2002 [Loucks et al 2002]. Based on the review of the modeling tool by the KBMOS Modeling Peer Review Panel, it was identified that the plan for completion of an uncertainty analysis was really a more robust sensitivity analysis, which is consistent with the findings of the previous investigation of similar planning efforts for the Comprehensive Everglades Restoration Plan (CERP) [Loucks et al 2008] Loucks et al [2002] describes the need for sensitivity analysis along with the difficulty of performing an uncertainty analysis:

> ***<u>Sensitivity vs. Uncertainty Analyses</u>***
>
> *An uncertainty analysis differs from a sensitivity analysis. An uncertainty analysis attempts to describe the entire set of possible outcomes, together with their associated probabilities of occurrence, given limited knowledge of the setting. A sensitivity analysis attempts to determine the relative change in model output values given possible changes in model input values. A sensitivity analysis thus measures the change in the model output in a localized region of the space of inputs.*
>
> *Performing sensitivity analyses is, or should be, standard procedure when modeling regions such as the Everglades. While one can often extend sensitivity analyses to a more comprehensive uncertainty analyses, it may not be practical.*

Since the available information is not sufficient to support an uncertainty analysis as described in the 2002 report, a thorough sensitivity analysis was performed to identify how changes in model input parameters affected evaluation performance measures component values. The sensitivity analysis described in this document goes beyond the definition of the sensitivity analysis provided above since it was not localized in a specific region of inputs. A set of inputs was defined by translating a range of inputs to a range of one output parameter (runoff) whose variation could be related to observations or realistic interpretations. Although, the accuracy of the Performance Measures cannot be established using a sensitivity analysis, the result of this analysis will identify which Performance Measures are more sensitive to the most critical model output parameters. It is important to emphasize that the set of Performance Measures used in the analysis corresponds to the 2007 version and the hydrologic-hydraulic, model is the AFET and not the most recent version AFET-W.

The sensitivity analysis followed some of the steps included in the uncertainty analysis as described in the 2002 report. Therefore the terminology used to describe the process refers to uncertainty characterization, uncertainty propagation and importance analysis. The word “uncertainty” is used in this document to refer to the range of results obtained when the model parameters are modified within their expected range of variation. The conclusions of this document should be considered as results of a robust sensitivity analysis and not as the results of an uncertainty analysis.

This analysis has been conducted to show how the AFET model uncertainty would be transferred to the predicted effectiveness of existing operating rules developed using the model and how this uncertainty gets translated into the evaluation of the components of each performance measure during the alternative evaluation.

Special interest was added to the uncertainty in the runoff quantities produced by the AFET. Runoff is a result of several model parameters and does not constitute a specific model input. Therefore, runoff depths were calculated and the propagation of the uncertainty in runoff was propagated to the values of each individual performance measure component. An evaluation of this propagation was performed by comparing the obtained component values with each one of their targets. Furthermore, a linear relationship was established between different values of potential runoff and the values of performance measure components.

2 SENSITIVITY ANALYSIS: BACKGROUND AND ASSUMPTIONS

The goal of the sensitivity analysis is to obtain enough information to verify if the AFET model will be able to identify when the operating rules in the preferred alternatives represent a substantial improvement over those in the base condition and over those alternatives that are not selected for final evaluation. This raises the question of what level of performance constitutes a “substantial improvement” of one alternative(s) over others. This question can be addressed by adopting a probabilistic approach, developed to provide a quantitative assessment of how the AFET model uncertainty is transferred to the predicted effectiveness of existing operating rules developed using the model and furthermore, how this uncertainty gets translated into the performance measures component values for each alternative.

It is important at this point to define uncertainty in general terms as a measure of the [un]reliability of the model predictions relative to reality, with reality being represented in practice by measurements/observations of the set of variables that the model is intended to predict. With these definitions in mind, the approach to analyze the sensitivity in the KBMOS model predictions begins with identifying the factors that contribute to the difference between model predictions and reality. In hydrologic modeling problems, these uncertainty sources can be grouped into several general categories, as explained in several references, such as Dettinger and Wilson [1981], Luis and McLaughlin [1992], Gelhar et al. [1993]:

- *Measurement uncertainty*: difference between measurements and true small scale (smaller than the numerical grid) values of the variable(s)
- *Spatial and temporal heterogeneity*: difference between the true small scale values of the variable(s) and their large scale (numerical grid and above) spatial and temporal trends
- *Model uncertainty*: difference between the large scale trend of the variable and the model predictions. Loucks et al [2002] also divides model uncertainty in two components: Model Structure uncertainty and Algorithmic (numerical) uncertainty.

This leads to a general form of uncertainty that can be summarized in the following equation [Luis and McLaughlin 1992]:

$$\varepsilon(x_i,t) = [u^*(x_i,t) - u(x_i,t)] + [u(x_i,t) - \bar{u}(x_i,t)] + [\bar{u}(x_i,t) - \hat{u}(x_i,t)] \tag{1}$$

where (x_i,t) are the spatial and temporal coordinates, $\varepsilon\,(x_i,t)$ is the overall uncertainty of the problem (difference between measurements and model predictions), $u^*(x_i,t)$ is the observed (measured) value of the variable $u(x_i,t)$, $\bar{u}(x_i,t)$ is the large scale trend of the variable and $\hat{u}(x_i,t)$ is the model prediction of the variable. The bracketed terms in equation (1) represent the measurement uncertainty, the spatial and temporal heterogeneity and the model uncertainty, respectively.

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The sensitivity analysis developed in this document for the KBMOS focuses on evaluating the ranges of model response to model uncertainty or the effect of the most uncertain parameter within the model on the performance measure component values. The measurement uncertainty is not addressed in this analysis given that it is not practicable to know the true value of the measured/modeled variables. Likewise, the small scale variability exhibited by natural hydrologic variables is not captured by a numerical model developed to address the spatial and temporal scales of the AFET, so the heterogeneity aspects of uncertainty are beyond the scope of this work.

There is a vast literature published on the subject of analyzing model uncertainty [e.g., Dettinger and Wilson 1981; Beven and Binley 1992; Konikow and Bredehoeft 1992; Vrugt et al. 2003; Beven 2007]. The various approaches that have been developed over time can be divided into two main groups, including full distribution analyses and moment analyses. Full distribution methods begin with a complete specification of the probabilistic structure of all model input parameters of the modeled system (e.g., rainfall) and an attempt to specify completely the probability distribution of the resulting model output (e.g., runoff and streamflow). The two most important full distribution techniques are the method of derived distributions and Monte Carlo simulation. The derived distribution approach is an analytical method to derive the probability distribution of a random function given the distributions of its independent variables [Benjamin and Cornell 1970]. The analysis becomes prohibitively complicated unless applied to simple systems with relatively simple functional forms linking input and output. More widely applicable is the Monte Carlo method, which employs numerous replications of flow system simulations, with the parameters and inputs of each simulation generated at random from their respective probability distributions. The results of the simulations are compiled to form estimates of the probability distribution of the model output variables. Unfortunately, Monte Carlo simulations are too computationally demanding to be practicable in problems of the size (space and time) of the KBMOS. Furthermore, exceedance probabilities of interest in performance assessment must be evaluated at the tail of the probability distributions, where Monte Carlo results are the least reliable.

Moment (first and second) methods use the first two statistical moments of a random variable or function (mean and variance) to quantify its probabilistic characteristics. The underlying assumption in these methods is that the important information about the random variables (or functions) of interest can be summarized with the mean representing the central or expected tendency of the variable (or function) and the variance-covariance representing the amount of scattering or variation around the mean. Unless the third moment (skewness) or higher moments of the variable are relatively large, they are generally of little interest in applications. An example of a variable/function fulfilling this assumption is one which is normally distributed. Such a function has zero skewness and other higher moments of odd order and all even order moments can be calculated from the variance [Benjamin and Cornell 1970].

In the absence of simple analytical models (derived distributions) and considering the impracticality of Monte Carlo methods and the computational burden that moment based approach to quantify model uncertainty will require. An analysis of performance measure sensitivity to changes in model parameters has been developed in this KBMOS task to capture the key statistics characterizing model uncertainty, under the general assumption that the AFET model predictions are uncertain as a result of the model being driven by uncertain inputs. This approach is explained in detail in Section 3.

3 METHODOLOGY

The sensitivity analysis developed in this task has been divided into three components, including uncertainty characterization, propagation and importance analysis.

3.1 Uncertainty Characterization

The uncertainty characterization in the KBMOS sensitivity analysis is based on a procedure to define reference boundaries of those parameters of the AFET model that are a source of uncertainty in the AFET model predictions. Five model input parameters were pre-selected from a list provided in Earth Tech [2007]. The proposed model input parameters analyzed are:

- Crop coefficients
- Horizontal hydraulic conductivity in the surficial aquifer system (SAS)
- Drainage time constants
- Intermediate confining unit (ICU) vertical hydraulic conductivity
- Drainage levels

Upper and lower boundaries for each of these parameters were defined based on capturing a reference range around the values of these parameters in the calibrated existing condition AFET. This was accomplished through a method that can be summarized in the following steps:

- The reference value (first moment) of the model input parameters (the five analyzed in this case) is assumed to be the calibrated AFET model values.
- The variance (second moment) of the model input parameters is calculated by assuming a coefficient of variation for each parameter.
- This variance is used to calculate a lower value and an upper value for each of the five parameters (reference +/- standard deviation).

It is important to note that in the absence of statistical data on the five model parameters being analyzed, this procedure is rather directed at quantifying how model outputs as well as KBMOS performance measures react to given (prescribed) levels of model parameters . For instance, the variation of each parameter (coefficient of variation and target confidence interval) produces a range of variation in the overall water budget (see Table 3.8 in Earth Tech, 2007, attached in Appendix A and the results discussed in Section 4).

3.2 Uncertainty Propagation / Sensitivity

The propagation or sensitivity translates the upper and lower bounds of each of the five varied parameters into an output range in the AFET model output using the KBMOS Performance Measure Evaluation (PME) Tool. This was achieved by running the AFET using the range of model input parameters defined in Section 3.1. The result of the sensitivity of the values of the performance measures components has been expressed by lower/upper limits in the quantitative components of the KBMOS performance measures.

3.3 Importance Analysis

The importance analysis provides a relative comparison of the results obtained for the performance measures, including confidence limits for each measure to determine the influence of the AFET model uncertainty on the performance of alternatives. The confidence limits, defined in Section 3.2, will be used during the subsequent alternative plan selection process to show how the alternatives compare over their corresponding ranges of uncertainty and particularly how the preferred alternatives are a substantial improvement over both the base condition and other alternatives that are not selected for final evaluation.

4 DISCUSSION OF RESULTS

A total of ten simulations were performed using the original AFET reviewed by the Peer Review Panel in 2007. Each simulation consisted of a lower boundary (LO) and an upper boundary (HI) for each of the five parameters used in this sensitivity analysis. These simulations are summarized in Table 4-1.

Table 4-1: List of AFET Simulations

Simulation	Variation
A1	Crop Coefficient Kc - LO
A2	Crop Coefficient Kc - HI
B1	Kh Surficial Aquifer System - LO
B2	Kh_Surficial Aquifer System- HI
C1	Drainage Constant, k - LO
C2	Drainage Constant, k - HI
D1	Drainage Level, h - LO
D2	Drainage Level, h - HI
E1	Kv Inter. Confining Unit - LO
E2	Kv Inter. Confining Unit - HI

These parameters, one at a time, were varied in each of the simulations, while the rest of the parameters were kept at their reference (existing condition AFET) values. The values used for the LO/HI limits and the results of these simulations are discussed in the following section.

4.1 Uncertainty Characterization

The procedure summarized in Section 3.1 was implemented as follows:

- Reference values for the five model parameters being analyzed were taken from the existing calibrated AFET.
- A coefficient of variation of 50 percent was assumed for each of these parameters. This assumption was necessary due to the lack of information on statistical distribution of model parameters and it was defined focusing in obtaining a broad enough range in model results.
- Using the reference values and the assumed coefficient of variation, the variance of each parameter was computed and the standard deviation is computed as the square root of this variance.
- A LO limit for each parameter is computed by subtracting the standard deviation from the reference value. A HI limit for each parameter is computed by adding the standard deviation to the reference value.
- The LO and HI limits for each parameter were adjusted if they became physically unfeasible or unrealistic values.

It is important to note that the combination of the assumed coefficient of variation and the subtraction/addition of the standard deviation to obtain the LOW/HIGH limits of the uncertain model parameters is flexible in accommodating scenarios of uncertainty. For instance, assuming a coefficient of variation of 50 percent and subtracting/adding 1 standard deviation to obtain the LOW/HIGH value of a parameter is equivalent to assuming a coefficient of variation of 25 percent and then subtracting/adding 2 standard deviations to obtain the LOW/HIGH values of the parameter. This flexibility is important in light of the lack of detailed statistical data on these parameters and this methodology offers the flexibility to cover the myriad of uncertainty scenarios that can be feasible.

Simulations A1 and A2: Crop Coefficient Uncertainty

For the crop coefficient (Kc), the reference values in the calibrated AFET are distributed temporally (monthly) and with vegetation types [Earth Tech 2007]. Using the procedure described above, the LO and HI values are obtained as 50 percent and 150 percent of their reference values. These values are presented in Table 4-2 (LO) and Table 4-3 (HI). When selecting the LO and HI values of the Kc, special emphasis was placed on the ability to obtain a wide enough range to identify any trend in a runoff vs. component value analysis.

Simulations B1 and B2: SAS Horizontal Hydraulic Conductivity

For the SAS horizontal hydraulic conductivity (Kh), the reference values in the calibrated AFET are distributed spatially [Earth Tech 2007]. Using the procedure described above, the LO and HI values are obtained as 50 percent and 150 percent of their reference values. These values are presented in Figure 4-1 (LO) and Figure 4-2 (HI).

Simulations C1 and C2: SAS Drainage Time Constant

For the drainage time constant (tc), the reference values in the calibrated AFET are distributed spatially [Earth Tech 2007]. Using the procedure described above, the LO and HI values are obtained as 50 percent and 150 percent of their reference values. These values are presented in Figure 4-3 (LO) and Figure 4-4 (HI).

Simulations D1 and D2: SAS Drainage Level

For the drainage level (h), the reference values in the calibrated AFET are distributed spatially [Earth Tech 2007]. Using the procedure described above, the LO and HI values are obtained as 50 percent and 150 percent of their reference values. These values are presented in Figure 4-5 (LO) and Figure 4-6 (HI).

Simulations E1 and E2: ICU Vertical Hydraulic Conductivity

For the ICU vertical hydraulic conductivity (Kv), the reference values in the calibrated AFET are distributed spatially [Earth Tech 2007]. Using the procedure described above, the LO and HI values are obtained as 50 percent and 150 percent of their reference values. These values are presented in Figure 4-7 (LO) and Figure 4-8 (HI).

Table 4-2: Crop Coefficients used in Simulation A1

Stage Name	End day	Citrus	Pasture	Urban	Truck Crops	Hydric	Wet Prairie/ Marsh	Cypress	Swamp Forest
Initial	0	0.26	0.3445	0.31	0.315	0.32	0.32	0.38	0.375
Jan	31	0.26	0.3445	0.31	0.4	0.32	0.32	0.38	0.375
Feb	59	0.27	0.3445	0.31	0.49	0.32	0.37	0.415	0.395
Mar	90	0.275	0.3445	0.31	0.315	0.32	0.42	0.415	0.415
Apr	120	0.285	0.3445	0.31	0.4	0.32	0.42	0.415	0.415
May	151	0.285	0.3445	0.31	0.49	0.32	0.42	0.415	0.415
Jun	181	0.285	0.3445	0.31	0.315	0.32	0.42	0.415	0.415
Jul	212	0.285	0.3445	0.31	0.315	0.32	0.42	0.415	0.415
Aug	243	0.285	0.3445	0.31	0.315	0.32	0.42	0.415	0.415
Sep	273	0.285	0.3445	0.31	0.315	0.32	0.42	0.415	0.415
Oct	304	0.275	0.3445	0.31	0.315	0.32	0.42	0.415	0.415
Nov	334	0.27	0.3445	0.31	0.4	0.32	0.37	0.415	0.395
Dec	365	0.26	0.3445	0.31	0.49	0.32	0.32	0.38	0.375

Table 4-3: Crop Coefficients used in Simulation A2

Stage Name	End day	Citrus	Pasture	Urban	Truck Crops	Hydric	Wet Prairie/ Marsh	Cypress	Swamp Forest
Initial	0	0.78	1.0335	0.93	0.945	0.96	0.96	1.14	1.125
Jan	31	0.78	1.0335	0.93	1.2	0.96	0.96	1.14	1.125
Feb	59	0.81	1.0335	0.93	1.47	0.96	1.11	1.245	1.185
Mar	90	0.825	1.0335	0.93	0.945	0.96	1.26	1.245	1.245
Apr	120	0.855	1.0335	0.93	1.2	0.96	1.26	1.245	1.245
May	151	0.855	1.0335	0.93	1.47	0.96	1.26	1.245	1.245
Jun	181	0.855	1.0335	0.93	0.945	0.96	1.26	1.245	1.245
Jul	212	0.855	1.0335	0.93	0.945	0.96	1.26	1.245	1.245
Aug	243	0.855	1.0335	0.93	0.945	0.96	1.26	1.245	1.245
Sep	273	0.855	1.0335	0.93	0.945	0.96	1.26	1.245	1.245
Oct	304	0.825	1.0335	0.93	0.945	0.96	1.26	1.245	1.245
Nov	334	0.81	1.0335	0.93	1.2	0.96	1.11	1.245	1.185
Dec	365	0.78	1.0335	0.93	1.47	0.96	0.96	1.14	1.125

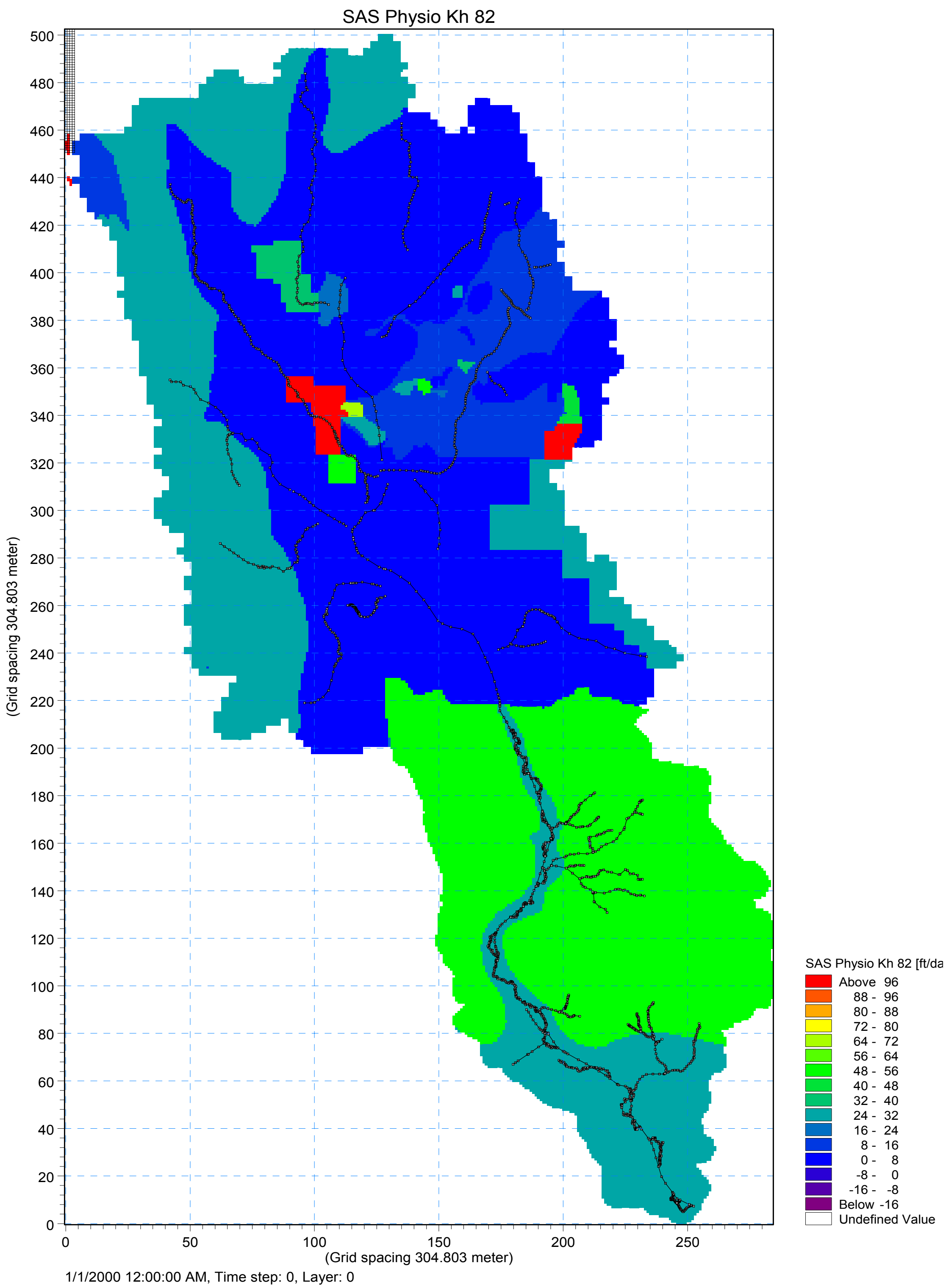

Figure 4-1: Distribution of SAS Horizontal Hydraulic Conductivity in Simulation B1

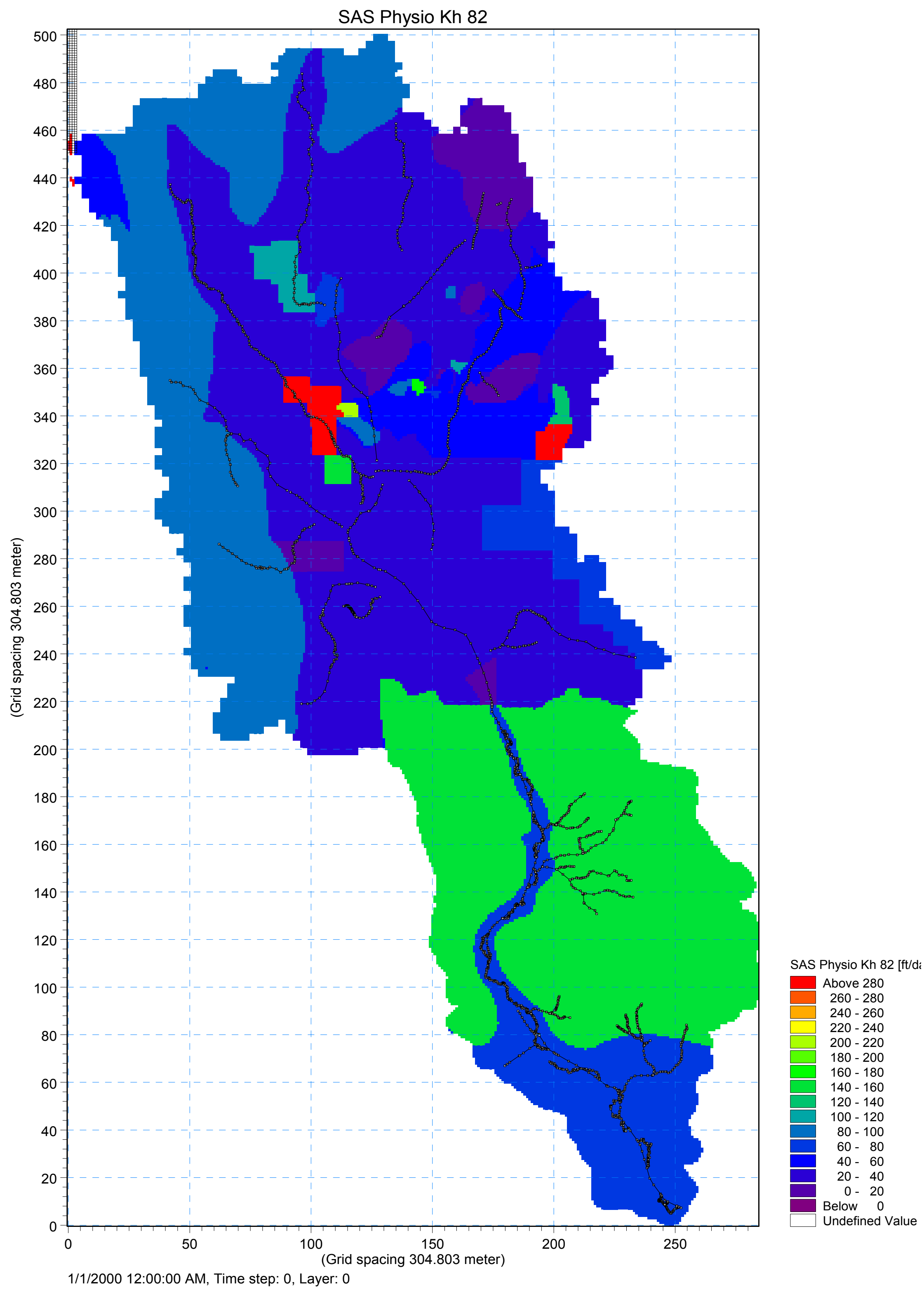

Figure 4-2: Distribution of SAS Horizontal Hydraulic Conductivity in Simulation B2

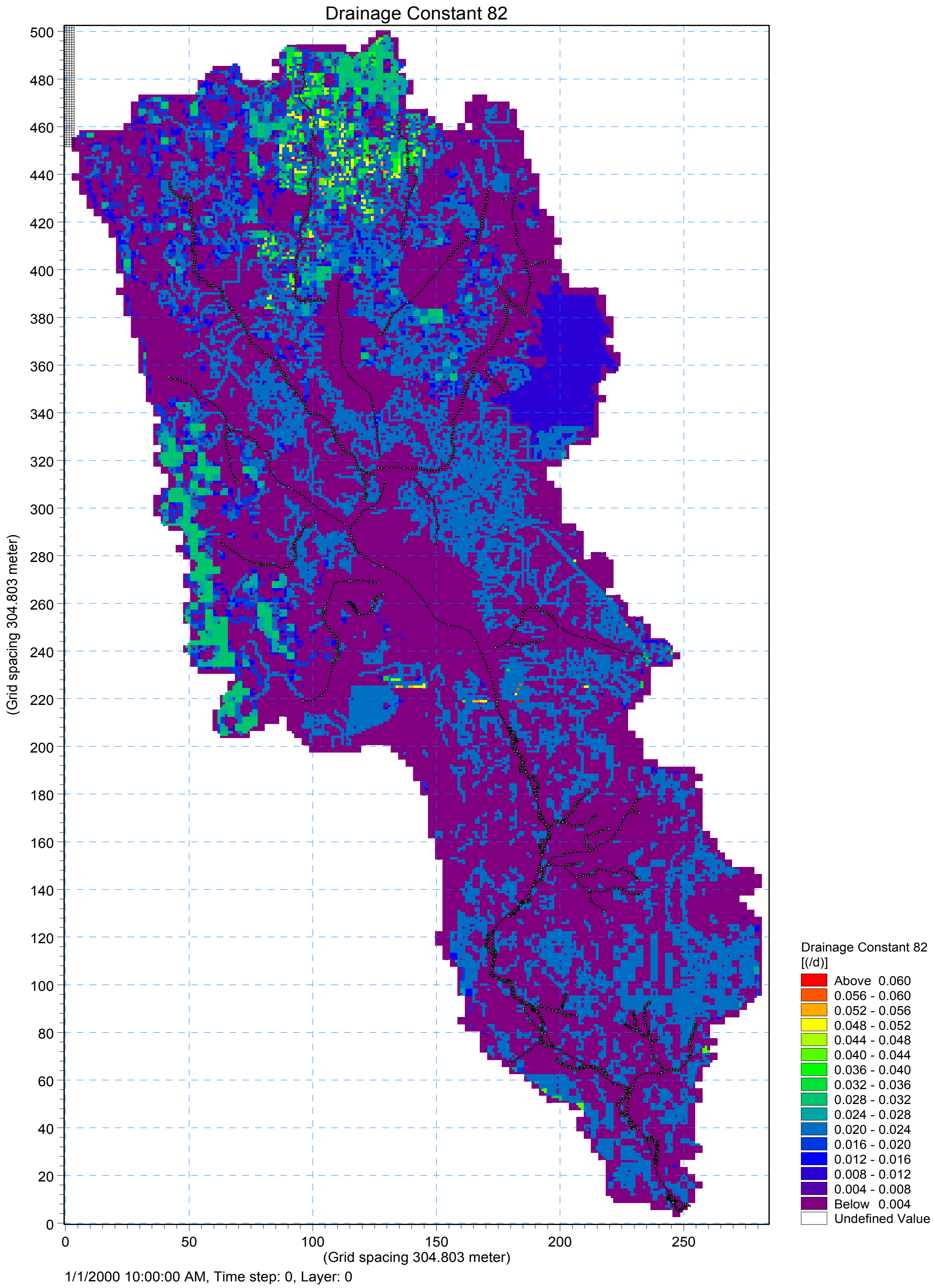

Figure 4-3: Distribution of Drainage Time Constant in Simulation C1

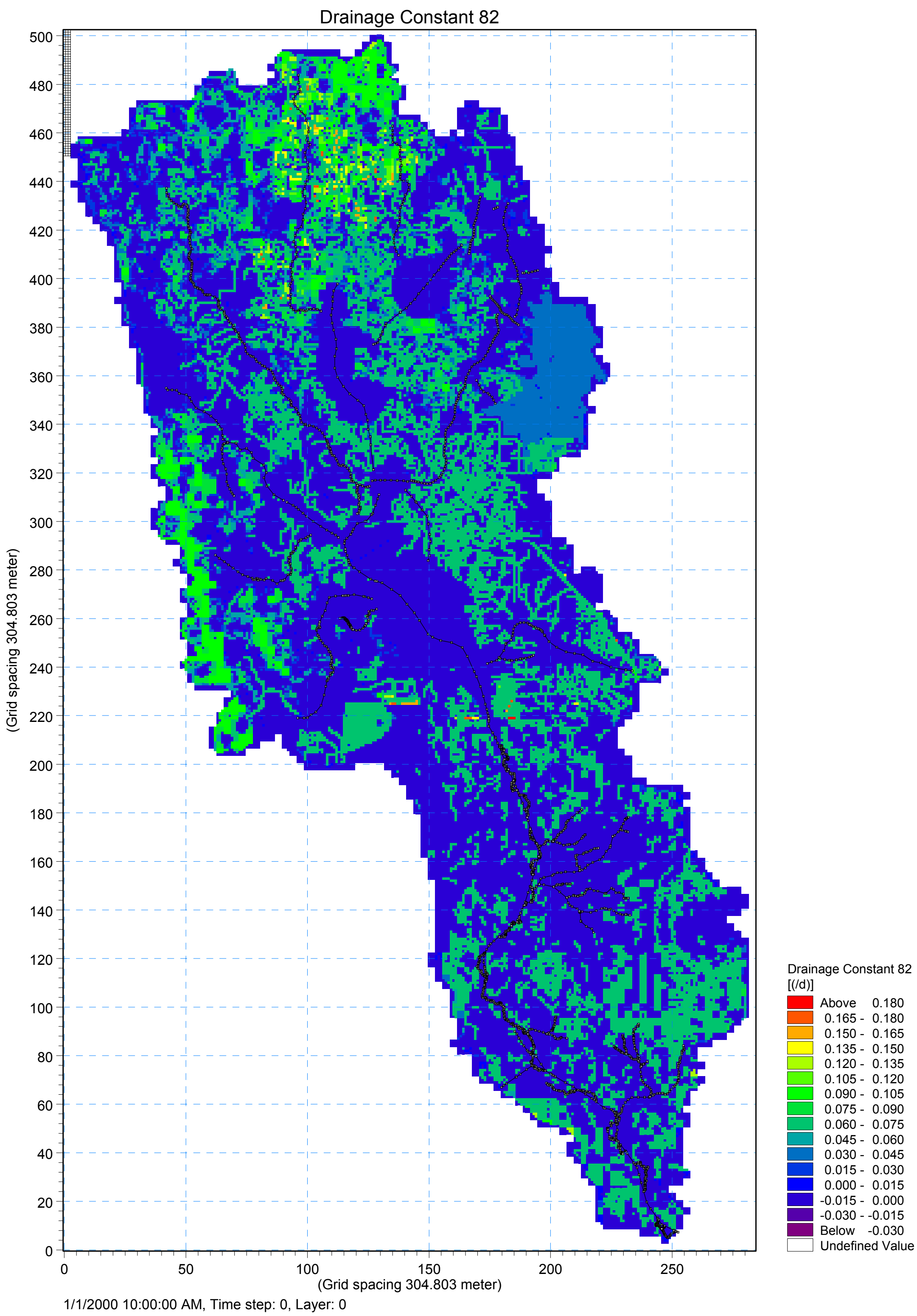

Figure 4-4: Distribution of Drainage Time Constant in Simulation C2

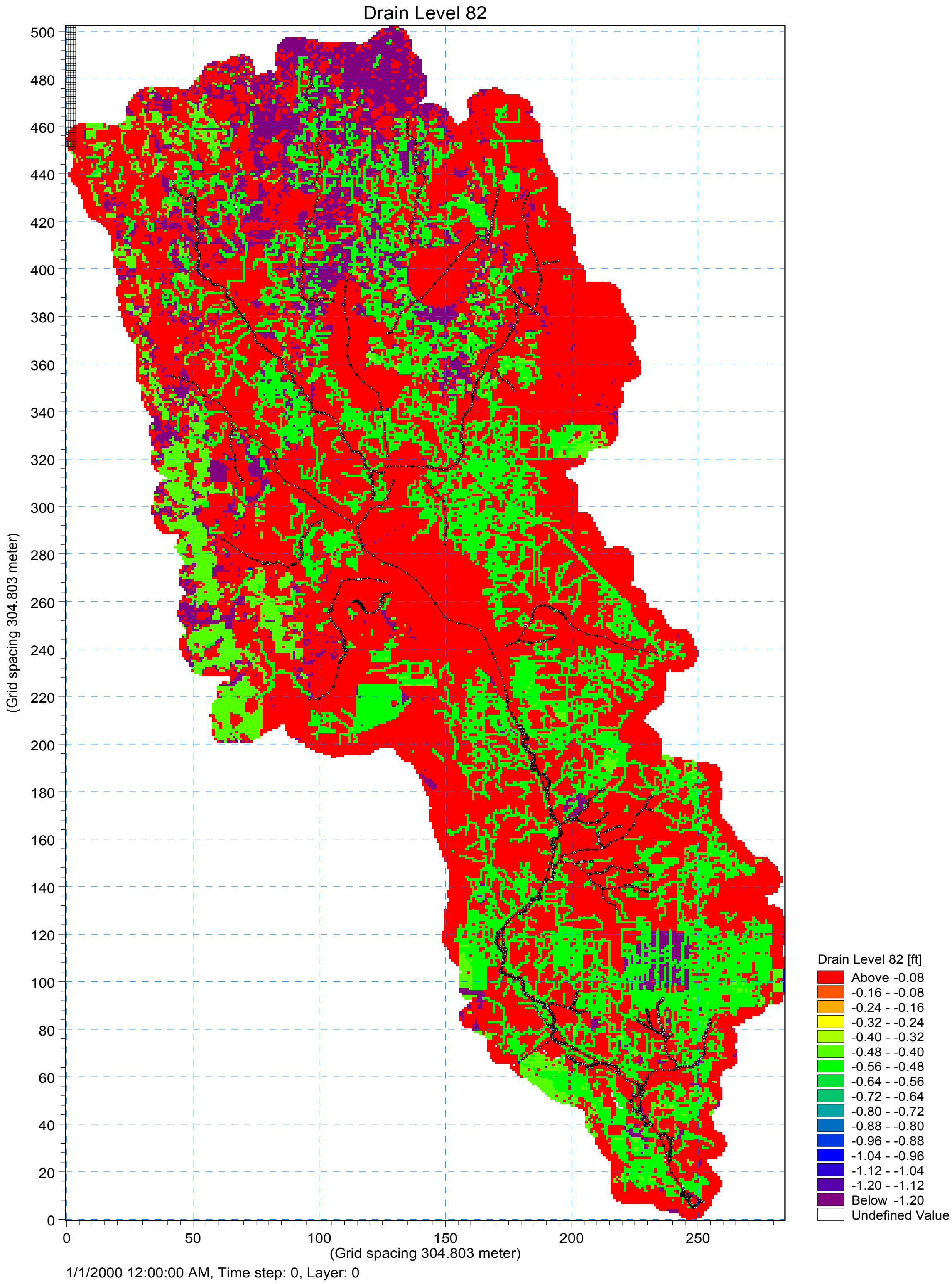

Figure 4-5: Distribution of Drainage Level in Simulation D1

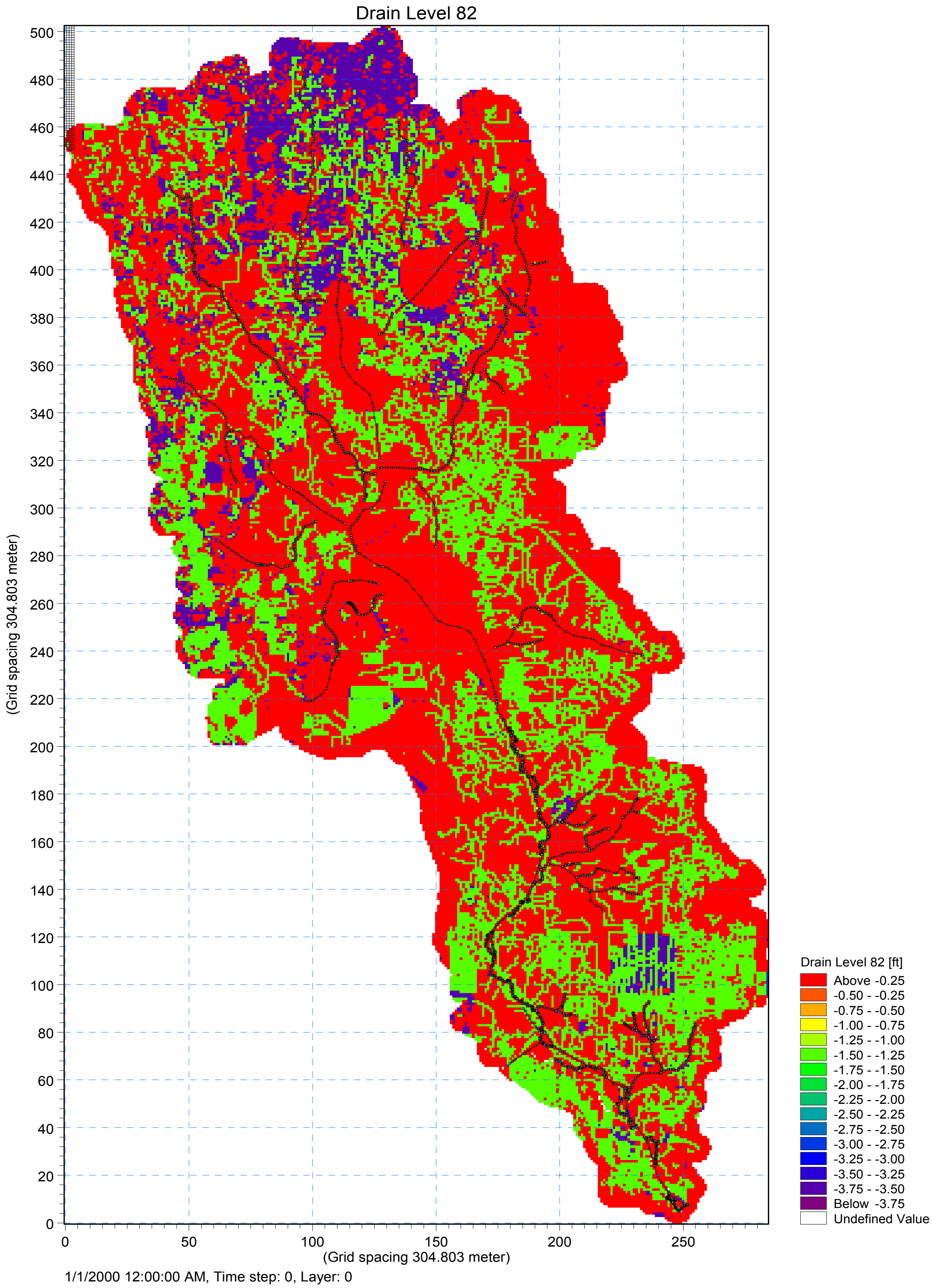

Figure 4-6: Distribution of Drainage Level in Simulation D2

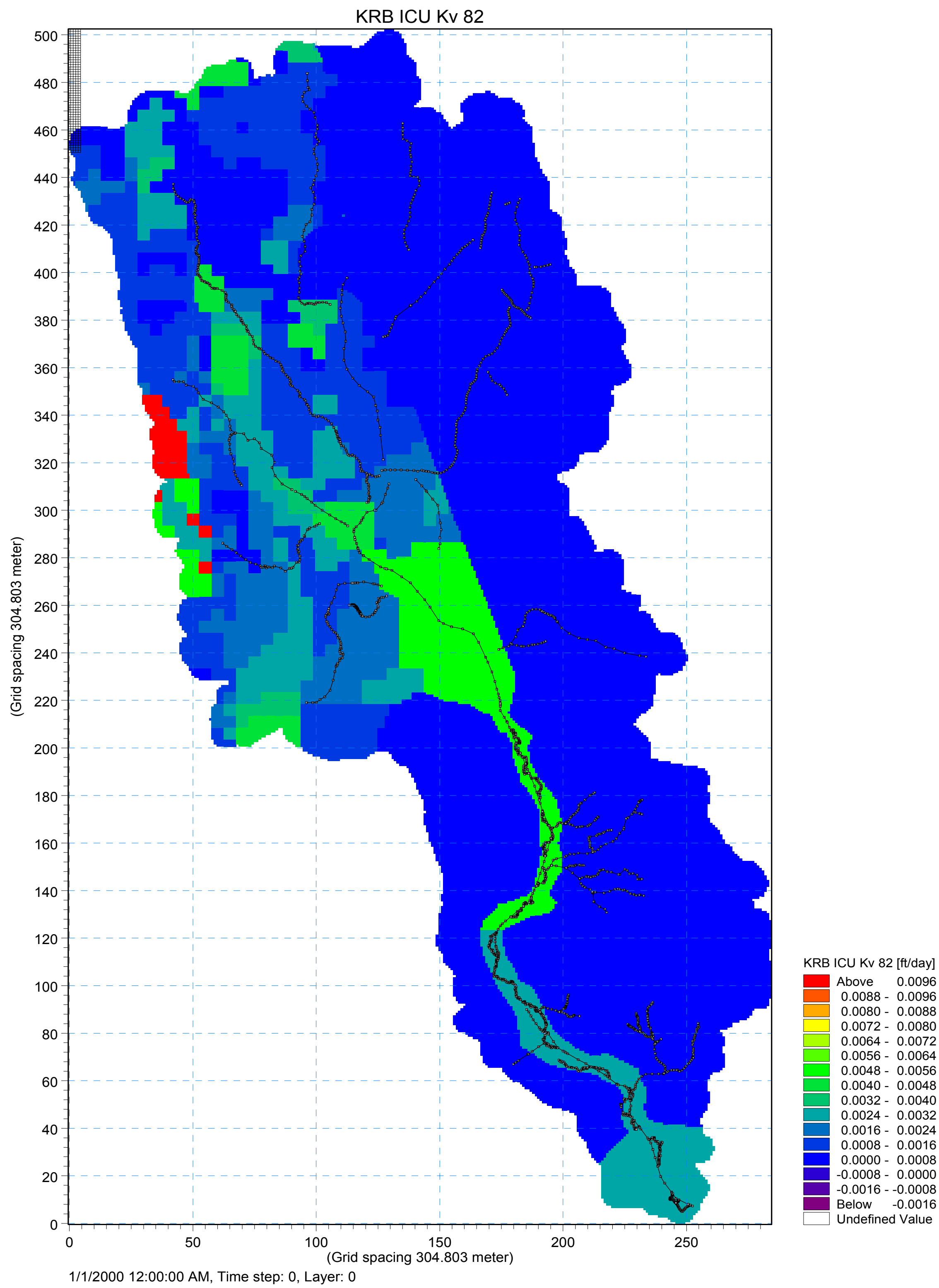

Figure 4-7: Distribution of ICU Vertical Hydraulic Conductivity in Simulation E1

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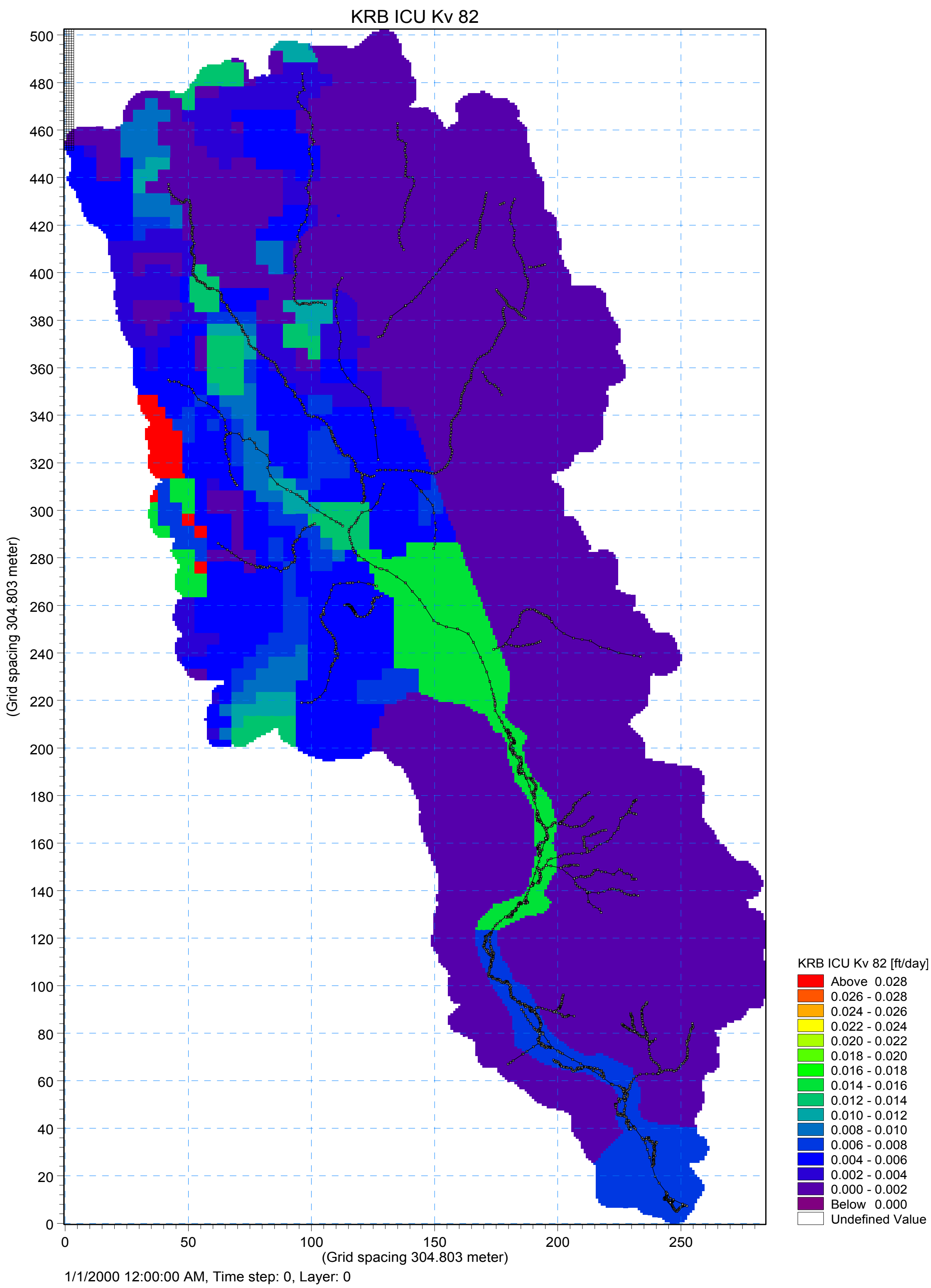

Figure 4-8: Distribution of ICU Vertical Hydraulic Conductivity in Simulation E2

4.2 Uncertainty Propagation

The AFET results obtained for the 10 simulations were used in the KBMOS PME Tool to obtain the impact of variations in model parameters on the PME quantitative indicators for each of the AFET simulations performed. For the uncertainty propagation, the set of performance measures and their components defined within KBMOS were used to illustrate the quantitative impact of the LO/HI values on the PME Tool results corresponding to each simulation:

- L-01: Stages in Lakes Kissimmee, Hatchineha, Cypress and Tiger
- L-02: Stages in Lake Tohopekaliga
- L-03: Stages in Lake Gentry
- L-04: Stages in Lakes Joel, Myrtle and Preston
- L-05: Stages in East Lake Toho, Fell's Cove and Lake Ajay
- L-06: Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout
- L-07: Stages in Lake Hart and Mary Jane
- R-01: Kissimmee River Flow
- R-02: Kissimmee River Stage Hydrograph / Floodplain Hydroperiod
- R-03: Kissimmee River Stage Recession / Ascension

The results of this analysis are summarized in Table 4-4 to Table 4-13, which shows a comparison of the quantitative performance of each of the simulations with the base case (existing condition calibrated AFET).

The detailed PME Tool reports for each of the ten simulations are attached in Appendix B.

Table 4-4: Evaluation Performance Measure Score for L01 (S-65)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

			Simulations									
Evaluation Component	Target	Current Base Conditions	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
A. % of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B. % of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
C. % of years that Spring High stages occur for 150 or more consecutive days during January - June.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E. % of years that Wet Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. % of years that Normal Low stages occur for 60 or more consecutive days during March - May.	40.0	80.0	100.0	40.0	83.0	86.0	86.0	83.0	83.0	89.0	86.0	86.0
G. % of years that Extreme Low stages occur for 90 or more consecutive days during February - May.	10.0	6.0	0.0	57.0	23.0	11.0	14.0	20.0	20.0	11.0	17.0	20.0
H. % of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.0 ft/30 days.	60.0	65.7	68.6	68.6	71.4	71.4	68.6	77.1	62.9	65.7	71.4	68.6
I. % of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	11.4	20.0	14.3	17.1	11.4	17.1	20.0	14.3	17.1	14.3
J. % of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days (%).	31.0	77.1	97.1	74.3	88.6	91.4	88.6	80.0	80.0	88.6	88.6	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	3.2	3.1	3.4	3.3	3.2	3.3	3.3	3.3	3.3	3.3
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	4.3	6.3	6.0	6.1	6.0	6.2	6.2	6.1	5.6	5.6

Table 4-5: Evaluation Performance Measure Score for L02 (S-61)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
L02 – Stages in Lake Tohopekaliga

			Simulations									
Evaluation Component	Target	Current Base Conditions	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
A. % of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	100.0	14.0	49.0	57.0	54.0	54.0	54.0	57.0	54.0	54.0
B. % of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
C. % of years that Spring High stages occur for 150 or more consecutive days during January - June.	10.0	0.0	71.0	0.0	29.0	34.0	31.0	11.0	9.0	31.0	37.0	34.0
E. % of years that Wet Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. % of years that Normal Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	37.0	91.0	63.0	66.0	66.0	71.0	74.0	66.0	63.0	60.0
G. % of years that Extreme Low stages occur for 90 or more consecutive days during February - May.	10.0	0.0	0.0	9.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0
H. % of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.0 ft/30 days.	70.5	40.0	25.7	54.3	42.9	40.0	37.1	42.9	40.0	37.1	42.9	42.9
I. % of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	17.1	2.9	5.7	8.6	5.7	5.7	5.7	8.6	8.6	5.7
J. % of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	71.4	85.7	80.0	85.7	77.1	85.7	80.0	85.7	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.4	2.8	3.1	3.2	3.1	3.3	3.2	3.2	3.1	3.1
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.9	7.2	5.9	5.8	5.6	6.2	6.0	5.7	5.6	5.7

Table 4-6: Evaluation Performance Measure Score for L03 (S-63)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
L03 – Stages in Lake Gentry

			Simulations									
Evaluation Component	**Target**	**Current Base Condition**	**A1**	**A2**	**B1**	**B2**	**C1**	**C2**	**D1**	**D2**	**E1**	**E2**
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	11.0	54.0	54.0	54.0	57.0	54.0	60.0	54.0	51.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 150 or more consecutive days during January - June.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 60 or more consecutive days during March - May.	40.0	97.0	100.0	86.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
G. Percent of years that Extreme Low stages occur for 90 or more consecutive days during February - May.	10.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	51.4	62.9	65.7	62.9	62.9	65.7	68.6	68.6	65.7	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	25.7	11.4	34.3	11.4	11.4	14.3	8.6	11.4	25.7	22.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	82.9	54.3	74.3	74.3	80.0	71.4	74.3	74.3	71.4	68.6
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.7	2.5	2.8	2.6	2.5	2.7	2.5	2.6	2.7	2.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.5	5.8	5.7	5.5	5.2	5.7	5.6	5.6	5.8	5.6

Table 4-7: Evaluation Performance Measure Score for L04 (S-57)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
L04 – Stages in Lakes Joel, Myrtle, and Preston

			Simulations									
Evaluation Component	Target	Current Base Condition	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	74.0	100.0	94.0	97.0	97.0	94.0	94.0	94.0	91.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 150 or more consecutive days during January - June.	10.0	0.0	69.0	3.0	20.0	23.0	29.0	20.0	20.0	20.0	23.0	23.0
E. Percent of years that Wet Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 60 or more consecutive days during March - May.	40.0	6.0	3.0	63.0	51.0	63.0	54.0	51.0	57.0	63.0	57.0	54.0
G. Percent of years that Extreme Low stages occur for 90 or more consecutive days during February - May.	10.0	0.0	0.0	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	37.1	54.3	60.0	62.9	54.3	60.0	65.7	62.9	65.7	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	57.1	17.1	22.9	17.1	17.1	28.6	25.7	22.9	22.9	22.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	82.9	60.0	77.1	77.1	80.0	82.9	80.0	80.0	74.3	74.3
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	2.8	2.2	2.5	2.4	2.4	2.4	2.3	2.4	2.5	2.5
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	4.2	7.9	5.7	5.3	5.3	5.4	5.3	5.2	5.6	5.5

Table 4-8: Evaluation Performance Measure Score for L05 (S-59)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
L05 – Stages in East Lake Tohopekaliga, Fells Cove, and Lake Ajay

			Simulations									
Evaluation Component	Target	Current Base Conditions	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	100.0	11.0	51.0	66.0	69.0	54.0	57.0	60.0	60.0	57.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 150 or more consecutive days during January - June.	10.0	0.0	91.0	17.0	57.0	66.0	66.0	51.0	51.0	69.0	60.0	63.0
E. Percent of years that Wet Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	11.0	91.0	63.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0
G. Percent of years that Extreme Low stages occur for 90 or more consecutive days during February - May.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	37.1	42.9	31.4	28.6	20.0	28.6	31.4	20.0	25.7	22.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	0.0	2.9	2.9	2.9	2.9	0.0	2.9	2.9	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	94.3	80.0	91.4	91.4	97.1	91.4	94.3	97.1	91.4	91.4
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.2	2.6	3.0	3.0	3.0	3.1	3.0	3.0	3.0	3.0
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	4.5	6.5	4.4	4.4	4.3	4.6	4.4	4.4	4.4	4.4

Table 4-9: Evaluation Performance Measure Score for L06 (S-60)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

			Simulations									
Evaluation Component	Target	Current Base Condition	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	100.0	9.0	51.0	51.0	77.0	46.0	51.0	54.0	54.0	51.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 150 or more consecutive days during January - June.	10.0	0.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0
E. Percent of years that Wet Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 60 or more consecutive days during March - May.	40.0	14.0	94.0	71.0	97.0	100.0	100.0	97.0	97.0	100.0	97.0	97.0
G. Percent of years that Extreme Low stages occur for 90 or more consecutive days during February - May.	10.0	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	40.0	62.9	62.9	62.9	57.1	68.6	62.9	60.0	65.7	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	8.6	0.0	0.0	2.9	0.0	5.7	2.9	2.9	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	100.0	57.1	91.4	85.7	85.7	88.6	85.7	94.3	88.6	88.6
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.4	2.8	2.6	2.5	2.5	2.6	2.5	2.6	2.6	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.2	7.8	6.4	6.2	6.2	6.5	6.3	6.2	6.3	6.2

Table 4-10: Evaluation Performance Measure Score for L07 (S-62)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
L07 – Stages in Lake Hart and Mary Jane

			Simulations									
Evaluation Component	Target	Current Base Condition	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	100.0	11.0	71.0	74.0	71.0	74.0	71.0	71.0	69.0	69.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 150 or more consecutive days during January - June.	10.0	0.0	100.0	14.0	71.0	71.0	74.0	71.0	71.0	71.0	71.0	71.0
E. Percent of years that Wet Low stages occur for 60 or more consecutive days during March - May.	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 60 or more consecutive days during March - May.	40.0	3.0	0.0	63.0	49.0	43.0	46.0	46.0	46.0	40.0	46.0	46.0
G. Percent of years that Extreme Low stages occur for 90 or more consecutive days during February - May.	10.0	0.0	0.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	34.3	45.7	28.6	25.7	20.0	20.0	17.1	20.0	25.7	25.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	2.9	2.9	2.9	5.7	2.9	5.7	2.9	5.7	2.9	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	97.1	51.4	82.9	82.9	82.9	82.9	82.9	82.9	82.9	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.1	6.2	3.5	3.4	3.3	3.6	3.6	3.6	3.5	3.4
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	100.0	9.0	60.0	66.0	66.0	60.0	60.0	66.0	63.0	63.0

Table 4-11: Evaluation Performance Measure Score for R01 (S-65 and S-65E)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
R01. Kissimmee River Flow

Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Simulations																			
							A1		A2		B1		B2		C1		C2		D1		D2		E1		E2	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	25.7	31.4	37.1	54.3	25.7	40.0	28.6	40.0	31.4	34.3	31.4	37.1	31.4	45.7	31.4	42.9	25.7	40.0	25.7	40.0
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	68.6	65.7	31.4	37.1	57.1	54.3	62.9	54.3	48.6	54.3	51.4	54.3	48.6	45.7	51.4	51.4	57.1	54.3	54.3	54.3
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	60.0	60.0	88.6	82.9	88.6	80.0	88.6	80.0	88.6	85.7	88.6	82.9	85.7	85.7	85.7	82.9	88.6	85.7	88.6	82.9
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	25.7	22.9	5.7	14.3	5.7	11.4	5.7	11.4	5.7	8.6	5.7	5.7	8.6	5.7	8.6	5.7	5.7	5.7	5.7	8.6
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	309.0	386.0	94.0	127.0	200.0	260.0	200.0	260.0	188.0	236.0	210.0	271.0	193.0	243.0	206.0	268.0	200.0	262.0	200.0	262.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	536.0	717.0	312.0	419.0	429.0	558.0	417.0	557.0	401.0	526.0	436.0	570.0	420.0	545.0	431.0	547.0	428.0	572.0	426.0	559.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	33.4	0.0	1.2	1.3	2.1	3.0	3.2	8.1	2.8	5.2	2.3	6.4	2.3	13.3	3.1	5.5	2.6	4.2	2.7	4.2
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

AECOM

Table 4-12: Evaluation Performance Measure Score for R02 (PC52)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
R02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

				Simulations									
Evaluation Component	Target	Current Base Condition	Future Base Conditions	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
A. Number of days per water year that river channel depth is greater than average floodplain ground elevation. (average)	252.0	250.0	203.0	365.0	183.0	291.0	314.0	314.0	315.0	316.0	311.0	299.0	300.0
B. Number of days per water year that river channel depth is greater than zero. (standard deviation)	106.0	86.0	86.0	2.0	106.0	67.0	55.0	56.0	54.0	55.0	56.0	64.0	63.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	4.9	3.8	5.6	5.1	4.9	4.8	4.6	5.1	5.6	5.5
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	6.1	6.4	8.6	9.1	9.0	7.1	6.8	9.4	9.1	8.8

Table 4-13: Evaluation Performance Measure Score for R03 (PC52)
Alternative Description: Sensitivity Analysis – Summary of the PME Tool Results
R03. Kissimmee River Stage Recession / Ascension

				Simulations									
Evaluation Component	Target	Current Base Condition	Future Base Conditions	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	14.3	57.1	45.7	42.9	48.6	51.4	48.6	48.6	45.7	42.9
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	100.0	54.3	77.1	88.6	85.7	68.6	65.7	82.9	88.6	88.6
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	28.6	40.0	28.6	37.1	25.7	34.3	37.1	31.4	22.9	25.7

AECOM

4.3 Importance Analysis

The results of the model uncertainty translate into uncertainty in quantitative components of the performance measures listed in Section 4.2. The relative importance of uncertainty in each of the five model parameters analyzed in this report is presented here in terms of the predicted variations of three key particularly important representative model outputs with respect to the existing conditions (base) case:

- Annual runoff at S-65 Structure
- Floodplain stage
- Lake Kissimmee stage

The average and root-mean-squared (RMS) deviation with respect to the base case (C-BC: Current Base Conditions AFET) of these three model outputs generated over the period 1965 – 2000 by the AFET model simulations is summarized in Table 4-14.

Table 4-14: First and Second Moments of Selected AFET Output (1965 – 2000)

Simulation	C-BC	A1*	A2*	B1	B2	C1	C2	D1	D2	E1	E2
Average Annual Runoff S-65(in)	12	25	5	12	13	12	13	12	13	12	12
RMS Annual Runoff S-65E (in)	-	13 (3.9)	7.7 (2.3)	0.4	0.3	0.3	0.1	0.4	0.3	0.1	0.2
Average Floodplain Stage (ft, PC52)	37.6	39.1	36.5	37.5	37.7	37.6	37.7	37.6	37.7	37.6	37.6
RMS Floodplain Stage (ft, PC52)	-	1.7 (0.5)	1.6 (0.5)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Average Lake Kissimmee Stage (ft)	50.7	51.4	49.5	50.5	50.6	50.6	50.5	50.5	50.6	50.5	50.5
RMS Lake Kissimmee Stage (ft)	-	0.9 (0.3)	1.5 (0.5)	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.4

* A1 and A2 values were adjusted to a 15 % change assuming a linear relationship. (i.e 3.9 = 13/0.5 *0.15)

These values illustrate the range of uncertainty in quantitative components of KBMOS performance measures under the different scenarios for model parameter variability. The RMS values are essentially confidence limits in the base case simulation for each of these three outputs. These confidence limits allow to determine the influence of the AFET model uncertainty on the performance of each of the 10 simulated cases.

RMS deviations for simulations A1 and A2 were adjusted to a more expected range of Kc variation, those values were transformed from a 50 percent change to a 15 percent change. 15 percent change represents a change in runoff in the basin of approximately 2 inches (2.3" inches for A2).After applying this normalization, it is clear that A1 and A2, as expected, are the simulations with a higher effect on the Total Runoff and in a lesser degree on the Lake Kissimmee Stage

Simulations B1, B2, C1, C2, D1, D2, E1, and E2 had a minor impact in the Floodplain stage. This indicates that the uncertainty in runoff is unlikely to affect the results of the River performance measures that deal with stages in the river (R02 and R03).

In view of this, the annual runoff rate was taken as a surrogate variable to illustrate the relative importance of model uncertainty on the KBMOS performance measures in Section 4.2. This is presented graphically as scatter plots in Appendix C, and summarized in Table 4-15 and Table 4-16. In these scatter plots, the lower and higher bounds in the horizontal axis correspond to the low/high values of runoff that result from HI/LO values in the crop coefficient (Kc). The remaining uncertain parameters (Kh, Kv, tc, h) generate runoff values in between the low/high values. The latter are shown as the intermediate points in the plots.

Table 4-15 and Table 4-16 present the slope obtained from the scatter plots in Appendix C for the Lake and River performance measures respectively. Each slope value quantifies the change in the corresponding performance measure component, expressed as a percentage of its target that would be caused by a deviation in the AFET model results equivalent to one inch of runoff at S-65 Structure. The shaded cells correspond to those components with more than 10% change per inch of runoff. From the evaluation of Table 4-15 it is clear that components A and C in most of the lakes are the components that will carry most of the uncertainty associated with runoff values. Similarly, from the evaluation of Table 4-16, it can be concluded that the uncertainty in runoff, as aforementioned, is not significantly transferred to the results on the performance measures components. The scatter plots in Appendix C show that uncertainty in the remaining four parameters (and not the Kc), are most likely to be transferred to the performance measure component evaluation.

Table 4-15: Relative Change in Performance Measure Component Value per Unit of Runoff (%/inch-of-runoff*) Observed for the Lake Performance Measures**

	L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger	L02 – Stages in Lake Tohopekaliga	L03 – Stages in Lake Gentry	L04 – Stages in Lakes Joel, Myrtle, and Preston	L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay	L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout	L07 – Stages in Lake Hart and Mary Jane
A. % of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	0.0	13.1	13.2	3.1	13.2	13.2	12.0
B. % of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C. % of years that Spring High stages occur for 150 or more consecutive days during January - June.	0.0	35.2	0.0	33.8	34.8	7.8	38.5
E. % of years that Wet Low stages occur for 60 or more consecutive days during March - May.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. % of years that Normal Low stages occur for 60 or more consecutive days during March - May.	6.8	5.4	1.2	7.4	9.0	2.7	7.4
G. % of years that Extreme Low stages occur for 90 or more consecutive days during February - May.	25.4	3.5	2.3	7.6	0.0	9.6	8.6
H. % of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.0 ft/30 days.	0.0	1.8	1.2	2.0	0.0	2.2	0.3
I. % of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	1.6	3.4	3.5	11.1	1.4	1.7	0.1
J. % of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days (%).	2.9	1.6	3.5	2.8	1.6	5.4	5.9
K. Mean Intra-annual Lake Stage Variation (ft)	0.1	0.6	0.4	0.9	0.5	0.4	0.1
L. Maximum Inter-annual Lake stage Amplitude (ft)	0.6	1.0	1.6	2.1	0.6	3.0	2.1
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	N/A	N/A	N/A	N/A	N/A	N/A	4.5

*: Obtained from Charts in Appendix C. Values represent the change in component value in terms of % points of the Target per inch of additional runoff (absolute value is reported)
**: Shaded Cells indicate those components that are most likely to carry the uncertainty of the modeled basin runoff

Table 4-16: Relative Change in Performance Measure Component Value per Unit of Runoff (%/inch-of-runoff*) Observed for the River Performance Measures**

	R-01. Kissimmee River Flow - S65	R-01. Kissimmee River Flow - S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	0.7	1.4
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	6.3	8.5
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	2.2	1.6
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	5.9	3.9
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	8.0	4.9
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	2.3	1.9
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	36.7	2.0

	R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod
A. Number of days per water year that river channel depth is greater than average floodplain ground elelvation. (average)	3.0
B. Number of days per water year that river channel depth is greater than zero. (standard deviation)	4.6
C. Mean intra-annual river channel stage fluctuation per water year (ft).	0.6
D. Maximum inter-annual river channel stage fluctuation (ft).	0.5

	R-03. Kissimmee River Stage Recession / Ascension
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	3.4
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	4.7
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	1.0

*: Obtained from Charts in Appendix C. Values represent the change in component value in terms of % points of the Target per inch of additional runoff (absolute value is reported)
**: Shaded Cells indicate those components that are most likely to carry the uncertainty of the modeled basin runoff

5 CONCLUSIONS

This sensitivity analysis is limited in its scope and focus is placed on providing a quantitative assessment of the impact of model uncertainty in the AFET modeling tool predictions on KBMOS performance measure component values. The word "uncertainty" is used in this document to refer to the range of results obtained when the model parameters are modified within their expected range of variation.

The uncertainty characterization in the KBMOS sensitivity analysis is based on a procedure to define reasonable boundaries of those parameters of the AFET model that are a source of uncertainty in the AFET model predictions. Five model input parameters were pre-selected from a list provided in Earth Tech [2007]. These input parameters are:

- Crop coefficients
- Horizontal hydraulic conductivity in the SAS
- Drainage time constants
- ICU vertical hydraulic conductivity
- Drainage levels

Upper and lower boundaries for each of these parameters were defined using a statistical moment procedure based on capturing a reasonable range around the values of these parameters in the calibrated existing condition AFET.

The uncertainty propagation translates the upper and lower bounds of each of the five varied parameters into uncertainty in the AFET model output, followed by quantitative components in the performance measures process using the KBMOS PME Tool. The result of the uncertainty propagation into uncertainty in the alternative scores has been expressed by uncertainty limits (higher/lower) in these quantitative components. These values are essentially confidence limits in the base case simulation for each of the model parameters that are varied. These confidence limits quantitatively determine the influence of the AFET model uncertainty on the performance of each of the 10 simulated cases.

The results suggest that the annual runoff rate at S-65 Structure and the stage of Lake Kissimmee respond most strongly to uncertainty in the crop coefficient (simulations A1, A2); other parameters show relatively more important influence into the Floodplain stages. Although the influence in the Lake Kissimmee stages and in the floodplain stages were much lower than those obtained for the Runoff.

For lake performance measures, the results obtained in this work suggest that components A and C in most of the lakes will carry most of the uncertainty associated with the model parameters. For river performance measures, it can be concluded that the uncertainty in runoff is not significantly transferred to the results on the performance measures components; rather, these are driven by uncertainty in the remaining four parameters (not Kc).

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APPENDIX A

Table 3.8 of the AFET Model Documentation and Calibration Report

Table 3.8 Average, minimum and maximum water budget changes resulting from parameter perturbations. (values expressed as percentages of average annual rainfall)

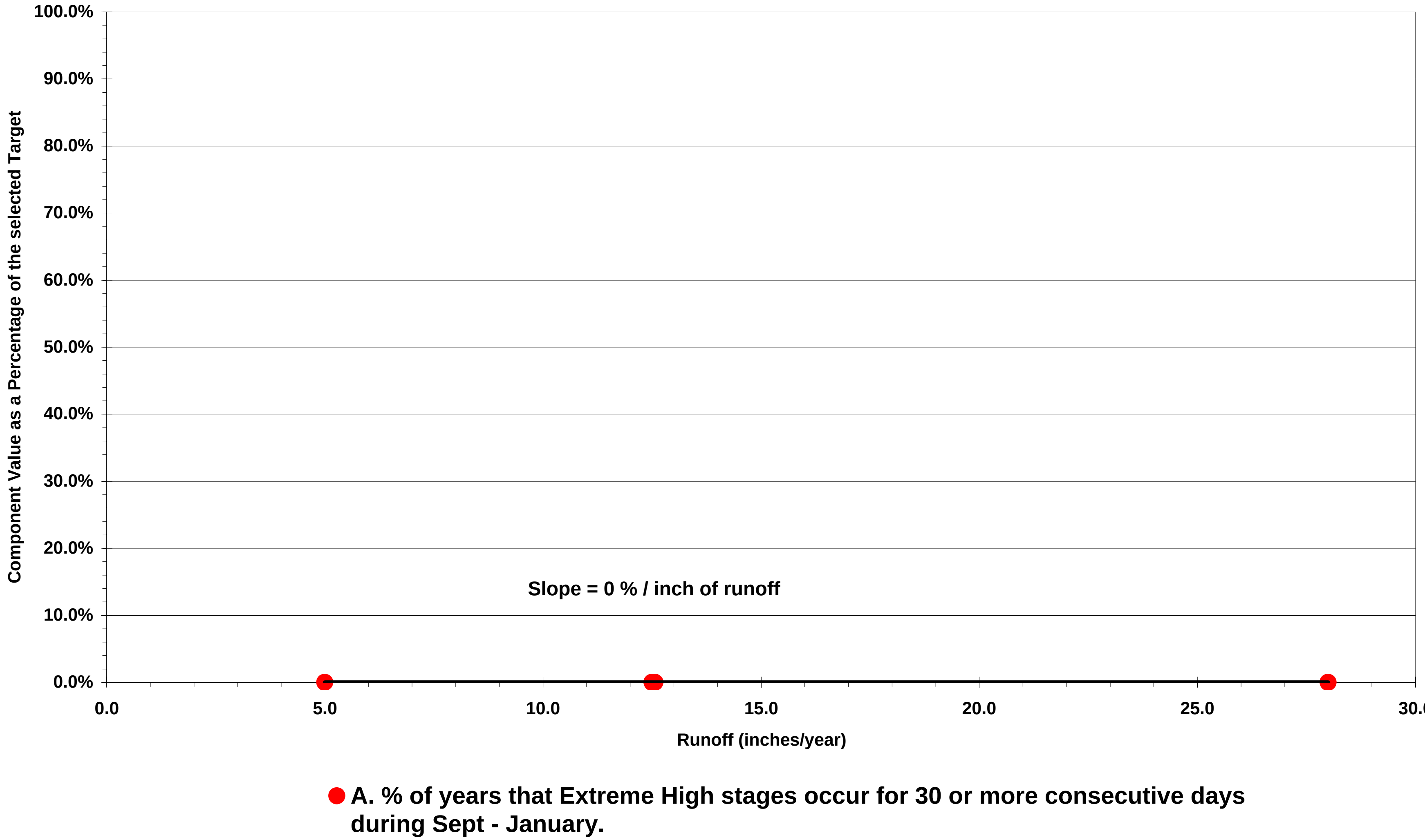
Simulation	Simulation Number	Average	Minimum	Maximum
Base Sensitivity Model		0.0	0.0	0.0
Surficial AQ (Decrease)	1	0.1	-0.5	0.5
Surficial AQ (Increase)	2	-0.1	-0.5	0.0
Confining Unit (Decrease)	3	0.0	-0.3	0.3
Confining Unit (Increase)	4	0.1	-0.1	0.5
Floridan AQ (Decrease)	5	-0.5	-4.6	0.5
Floridan AQ (Increase)	6	0.5	-0.5	4.0
Kc (Decrease)	7	-1.6	-57.2	23.0
Kc (Increase)	8	1.8	-19.8	52.4
OL Manning (Decrease)	9	0.0	-0.5	1.0
OL Manning (Increase)	10	0.0	-0.7	0.5
River Manning (Decrease)	11	0.0	-0.5	0.6
River Manning (Increase)	12	0.0	-0.6	0.4
UZ inf. (Decrease)	13	0.0	-0.1	0.1
UZ inf. (Increase)	14	0.0	-0.5	0.4
Soil Moisture Content$_{sat}$ (Decrease)	15	0.4	-5.5	4.4
Soil Moisture Content$_{sat}$ (Increase)	16	-0.2	-2.4	3.5
Soil Moisture Content$_{Fc}$ (Decrease)	17	-0.3	-1.0	0.1
Soil Moisture Content$_{Fc}$ (Increase)	18	0.5	-0.6	2.1
Drain constant (Decrease)	19	-0.2	-5.5	3.1
Drain constant (Increase)	20	0.2	-1.3	4.4

APPENDIX C

Charts of Component Values vs. Annual Runoff

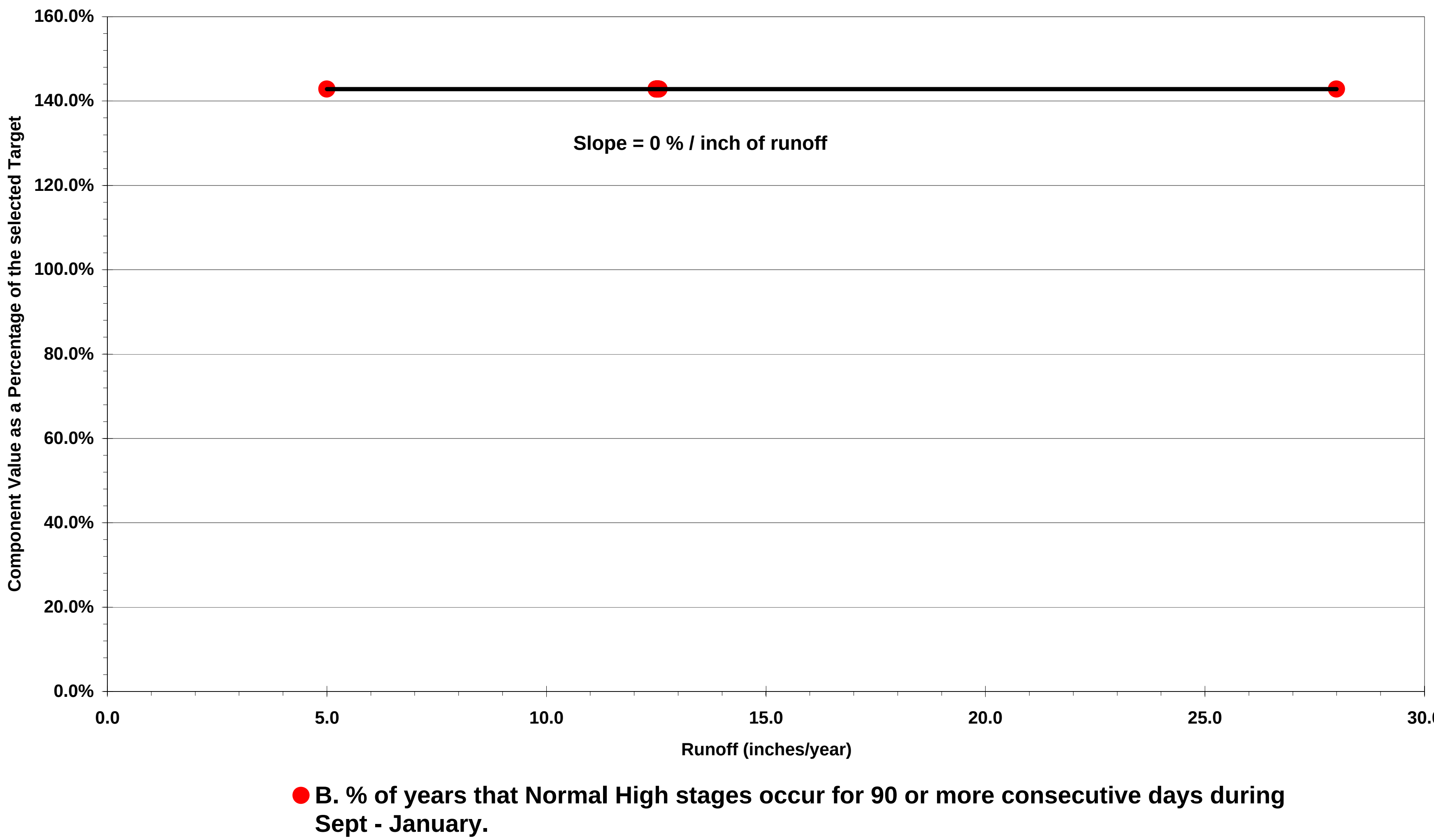
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Component Value as a Percentage of the selected Target vs Annual Runoff



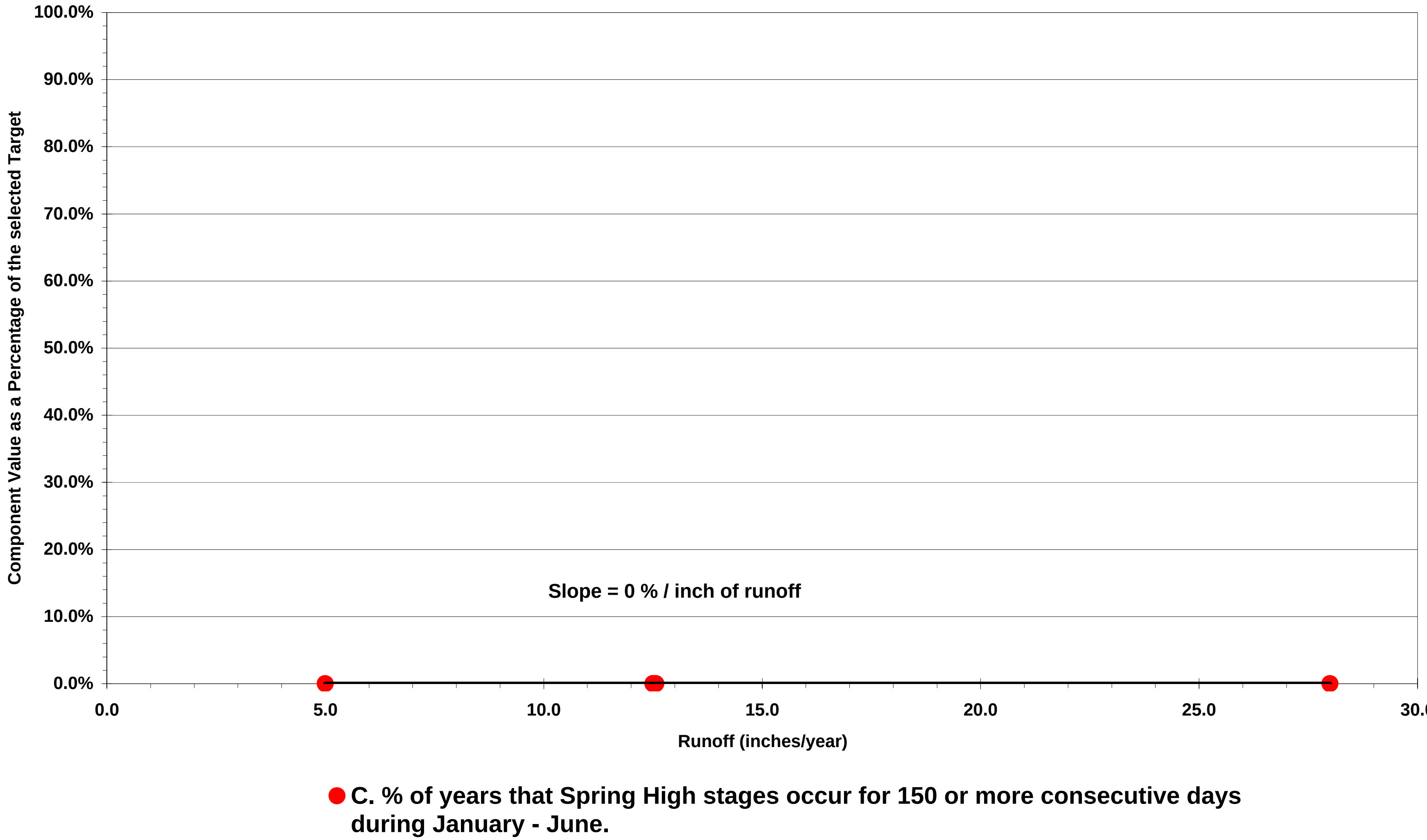
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Component Value as a Percentage of the selected Target vs Annual Runoff



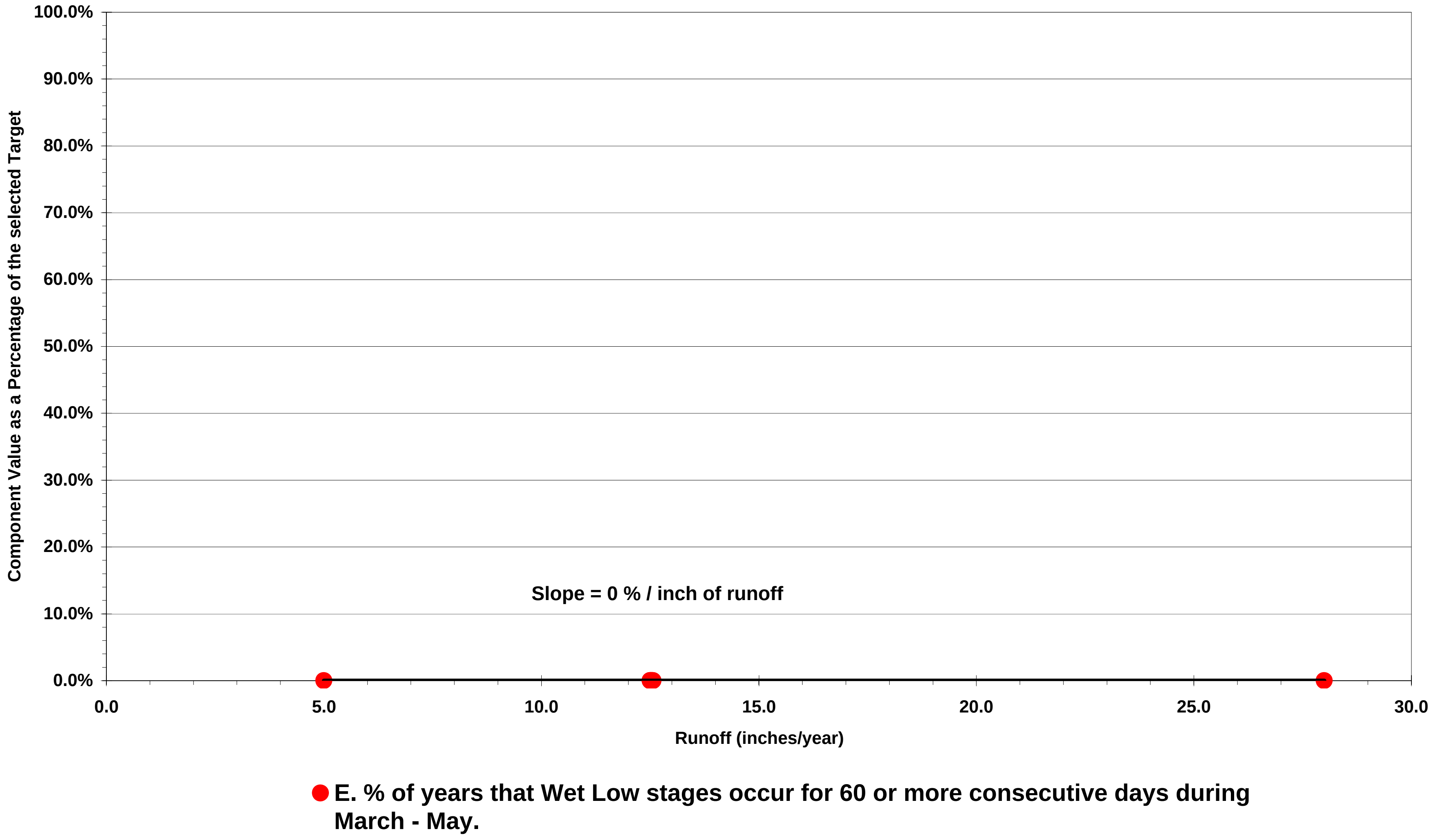
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Component Value as a Percentage of the selected Target vs Annual Runoff



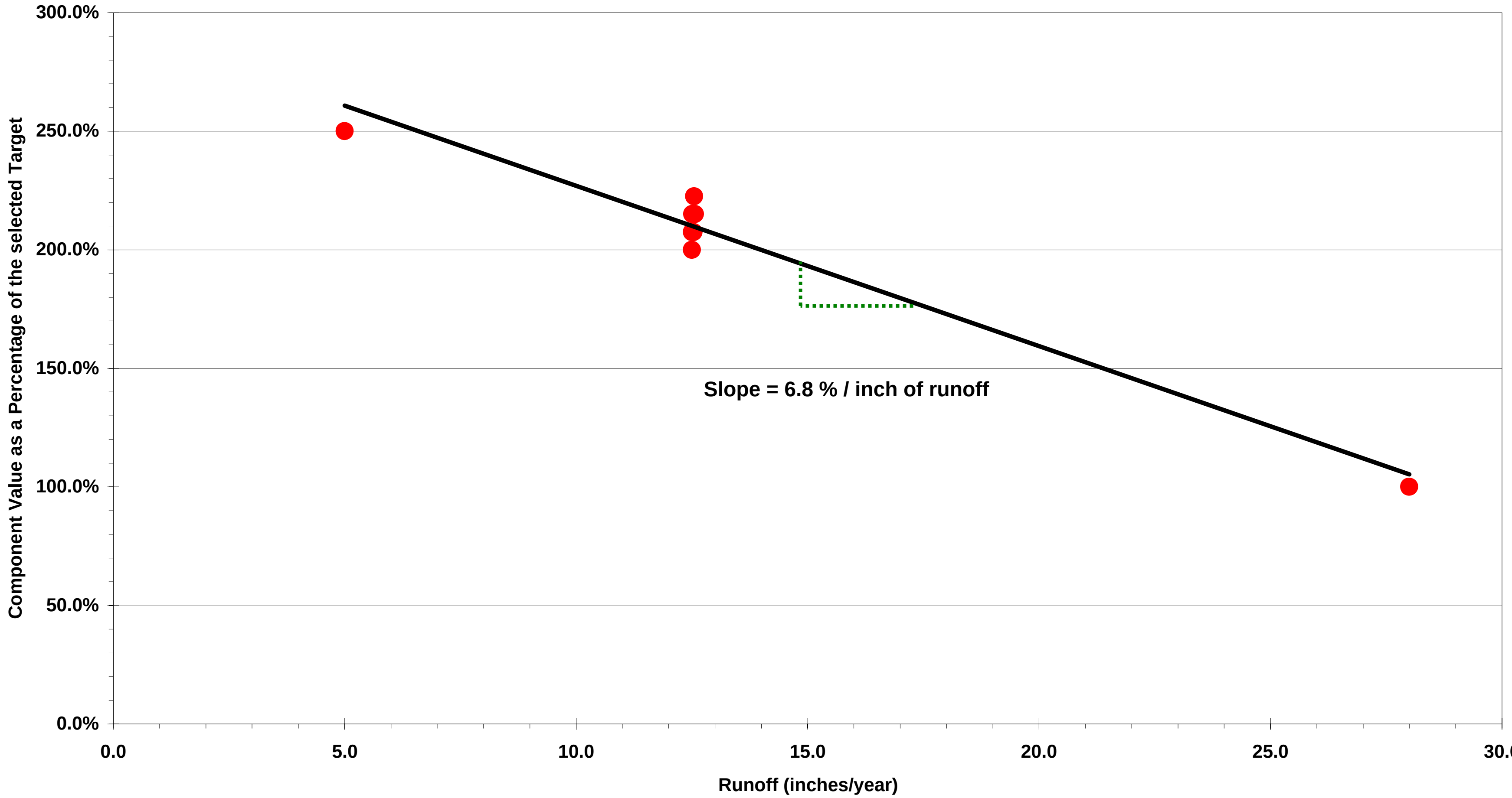
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Component Value as a Percentage of the selected Target vs Annual Runoff



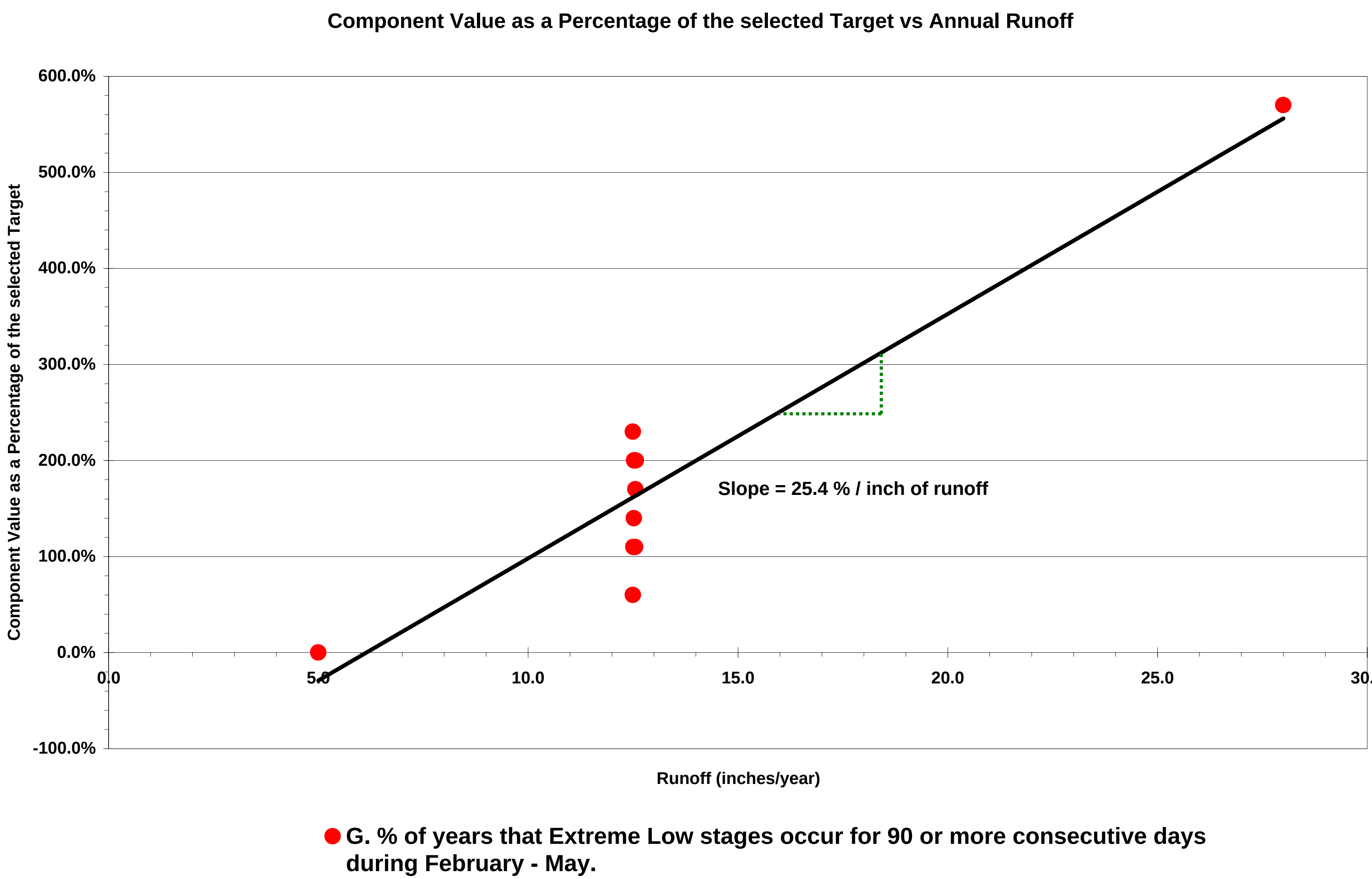
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Component Value as a Percentage of the selected Target vs Annual Runoff



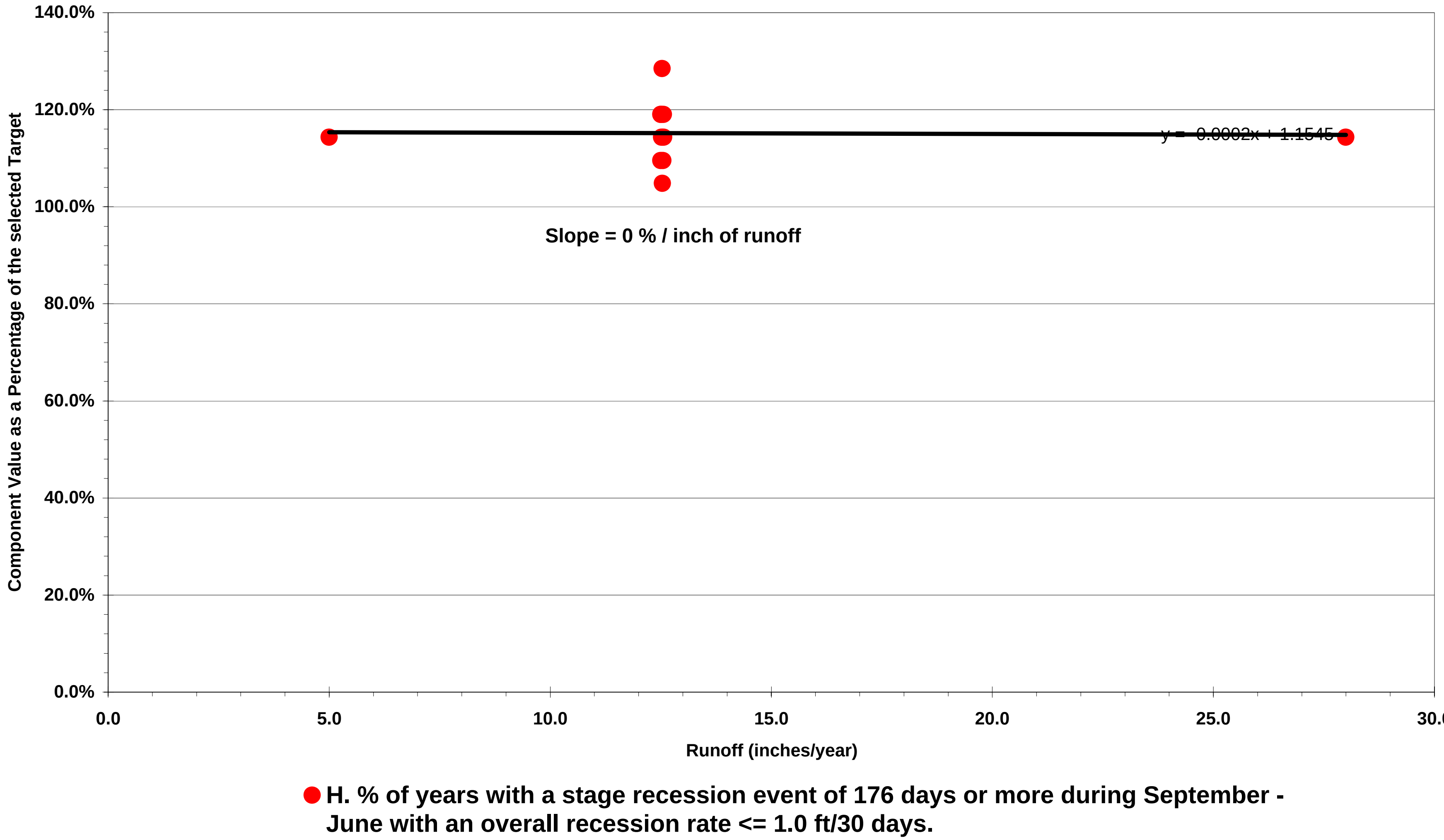
● F. % of years that Normal Low stages occur for 60 or more consecutive days during March - May.

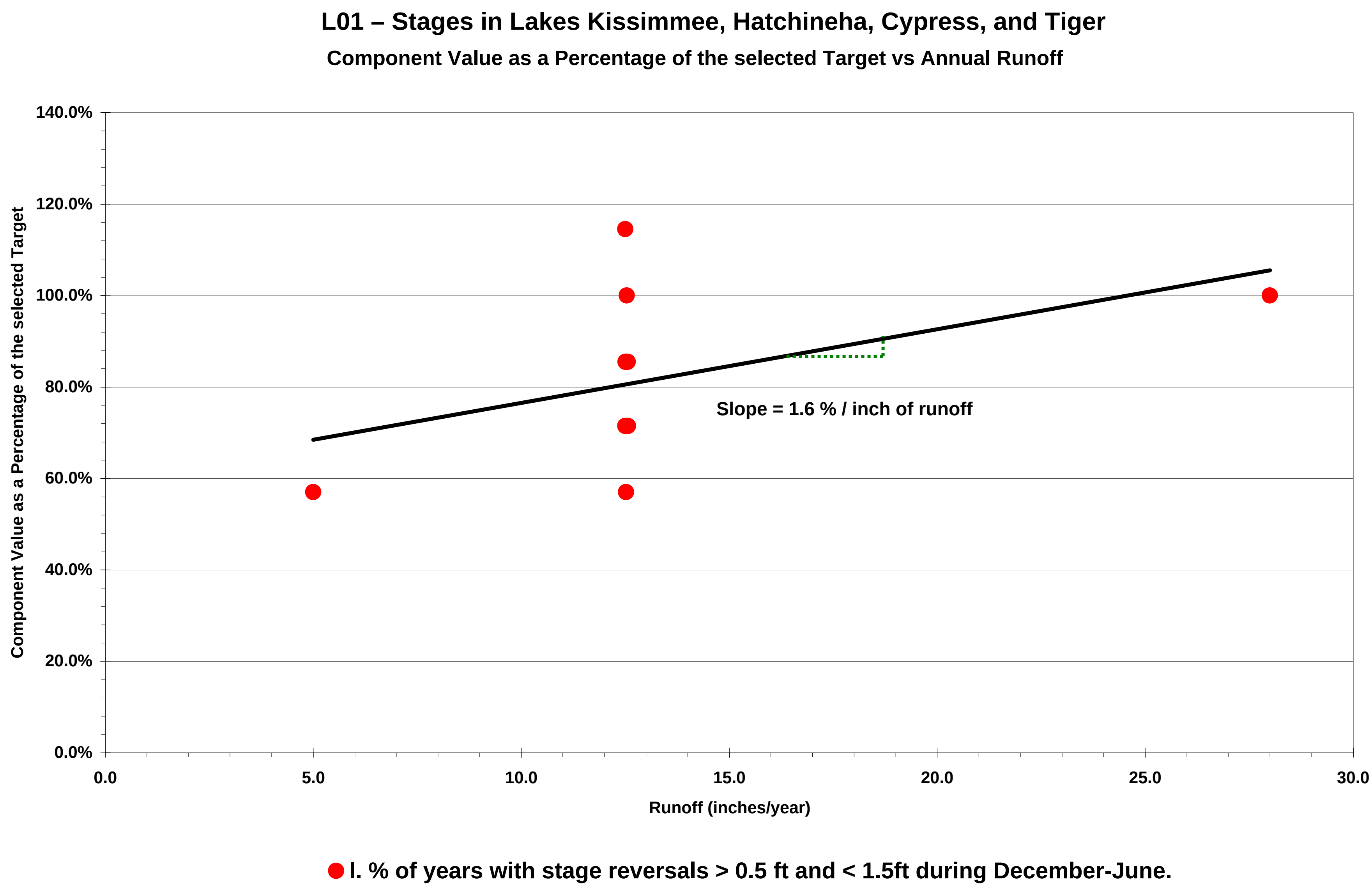
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger



L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Component Value as a Percentage of the selected Target vs Annual Runoff

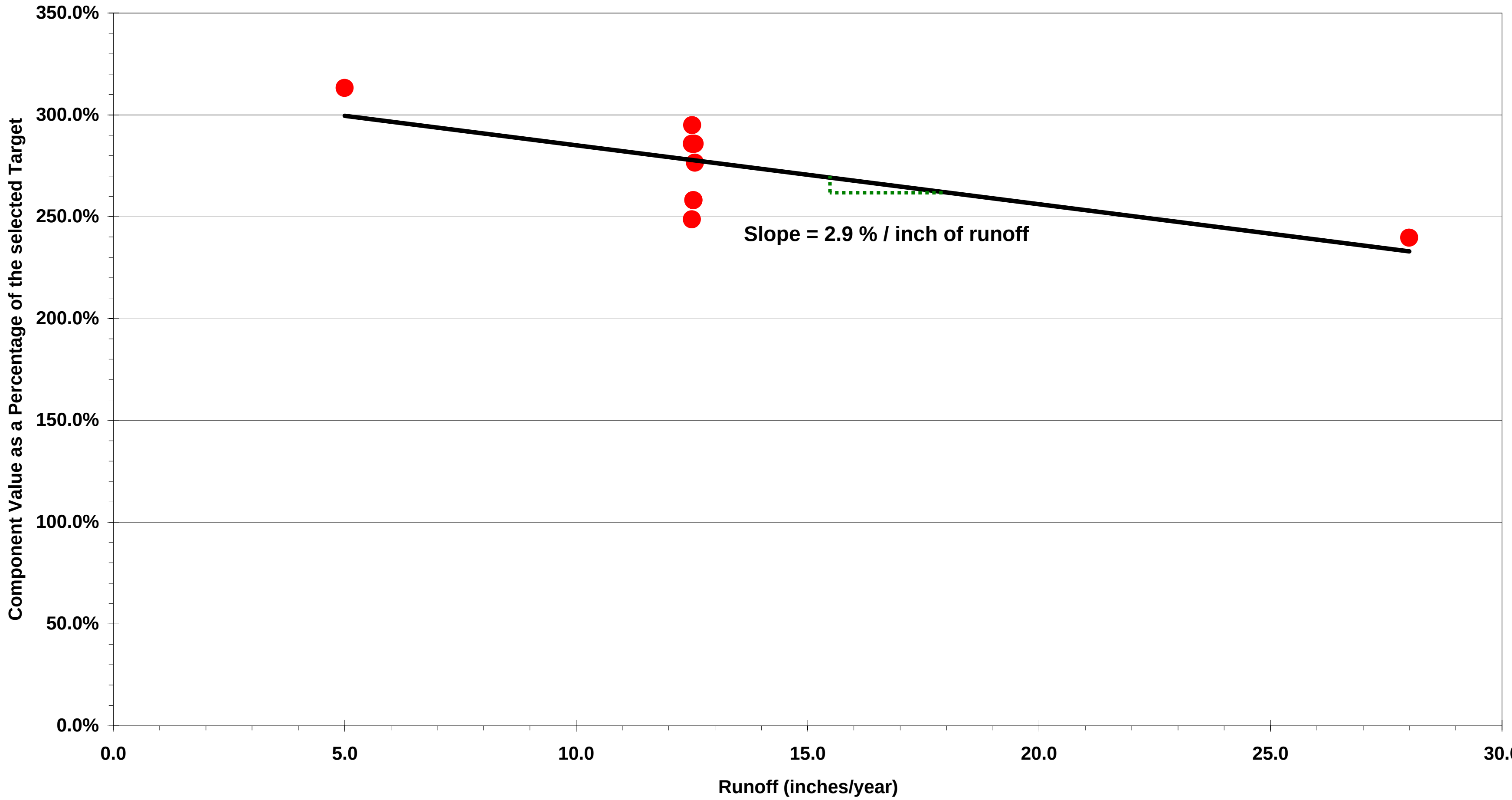




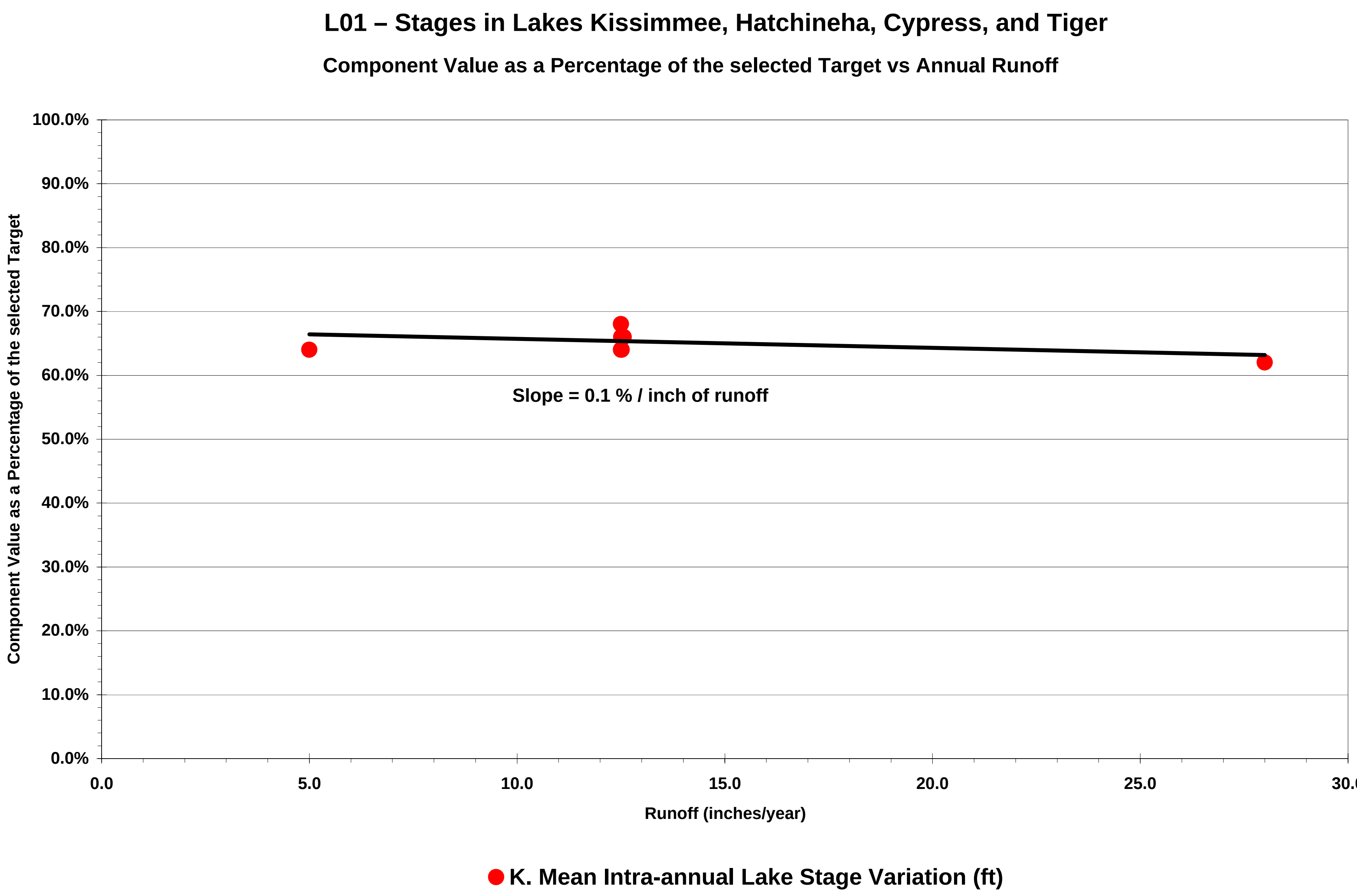
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Slope = 1.6 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
I. % of years with stage reversals > 0.5 ft and < 1.5ft during December-June.

L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

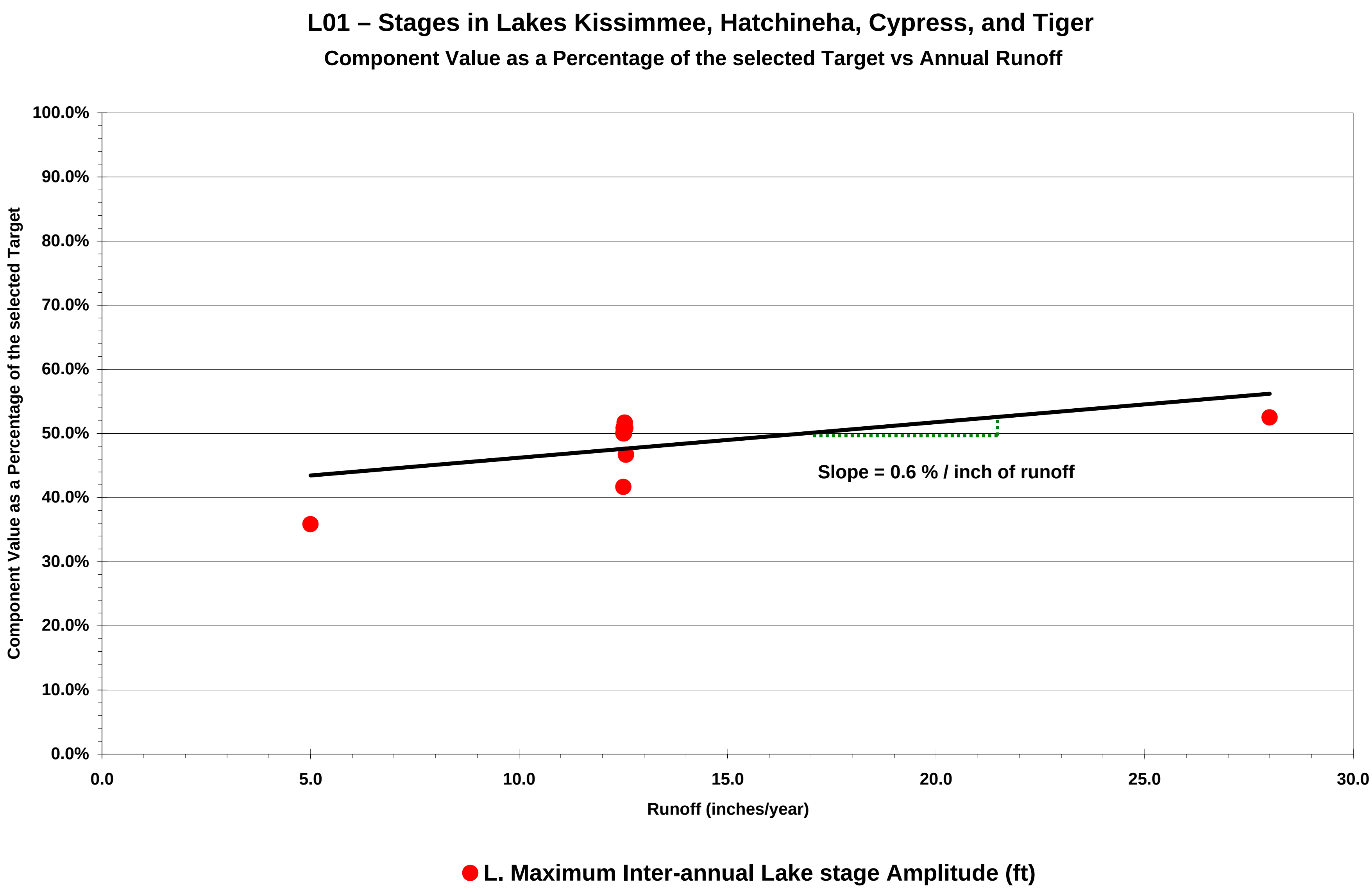
Component Value as a Percentage of the selected Target vs Annual Runoff

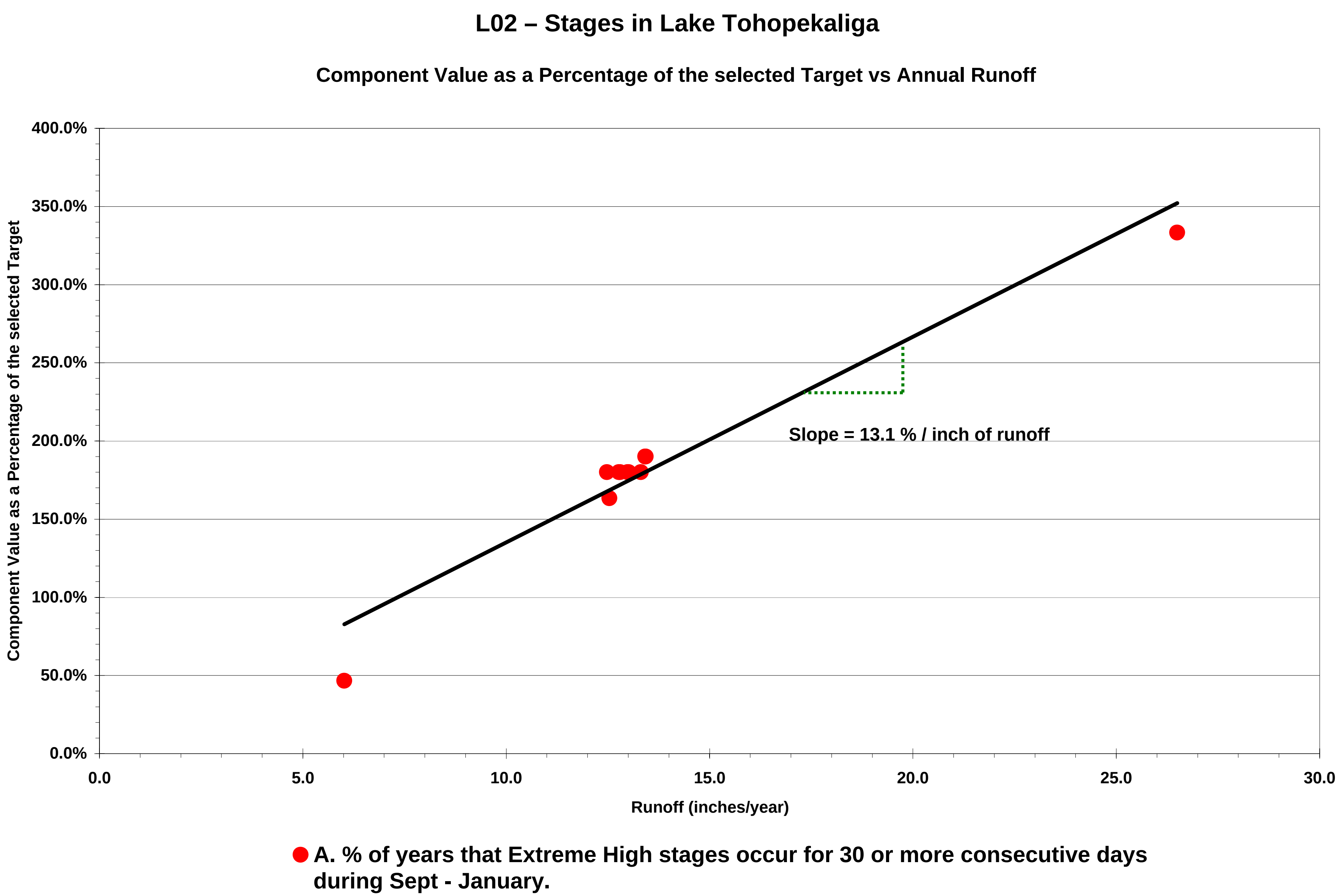


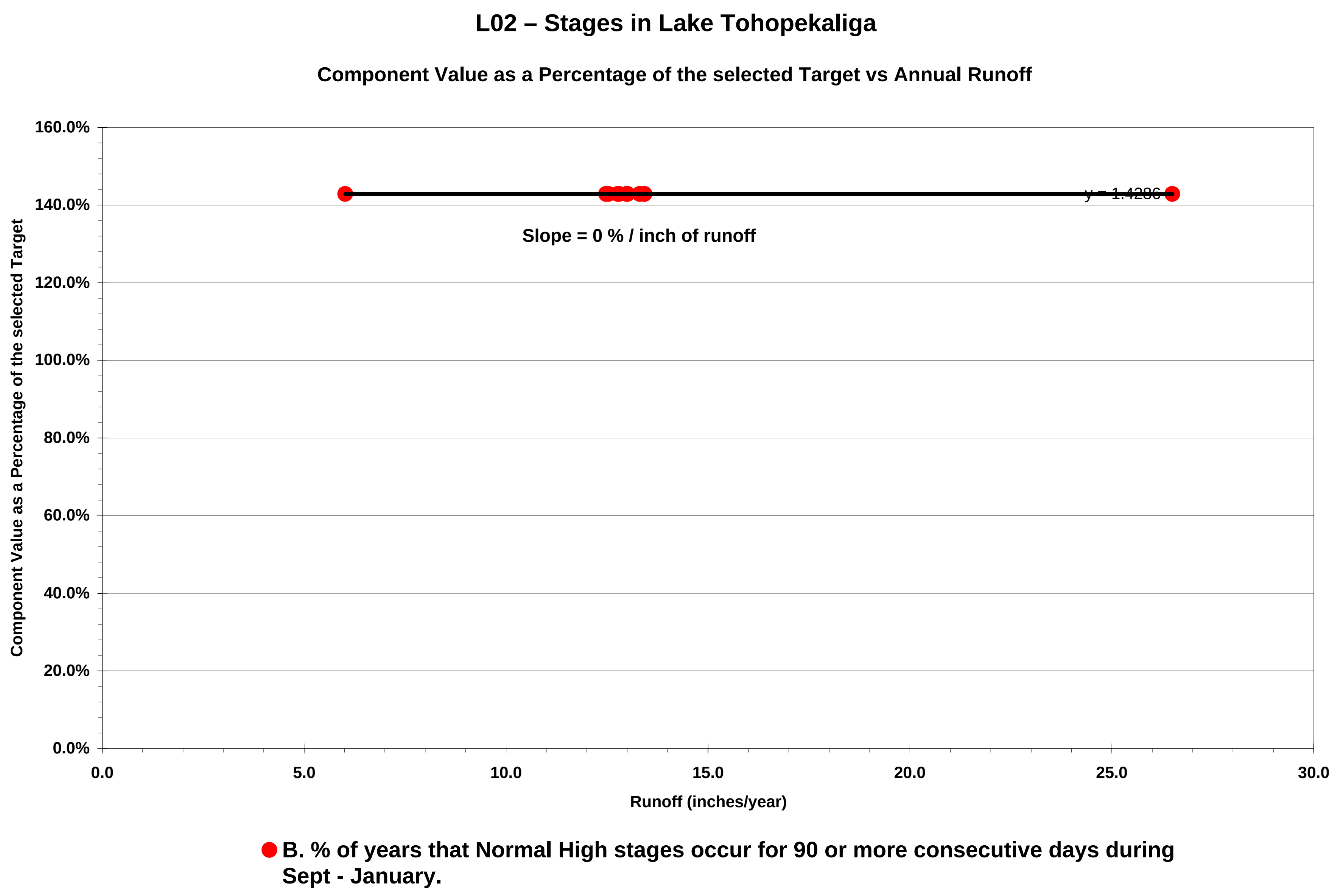
J. % of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days (%).



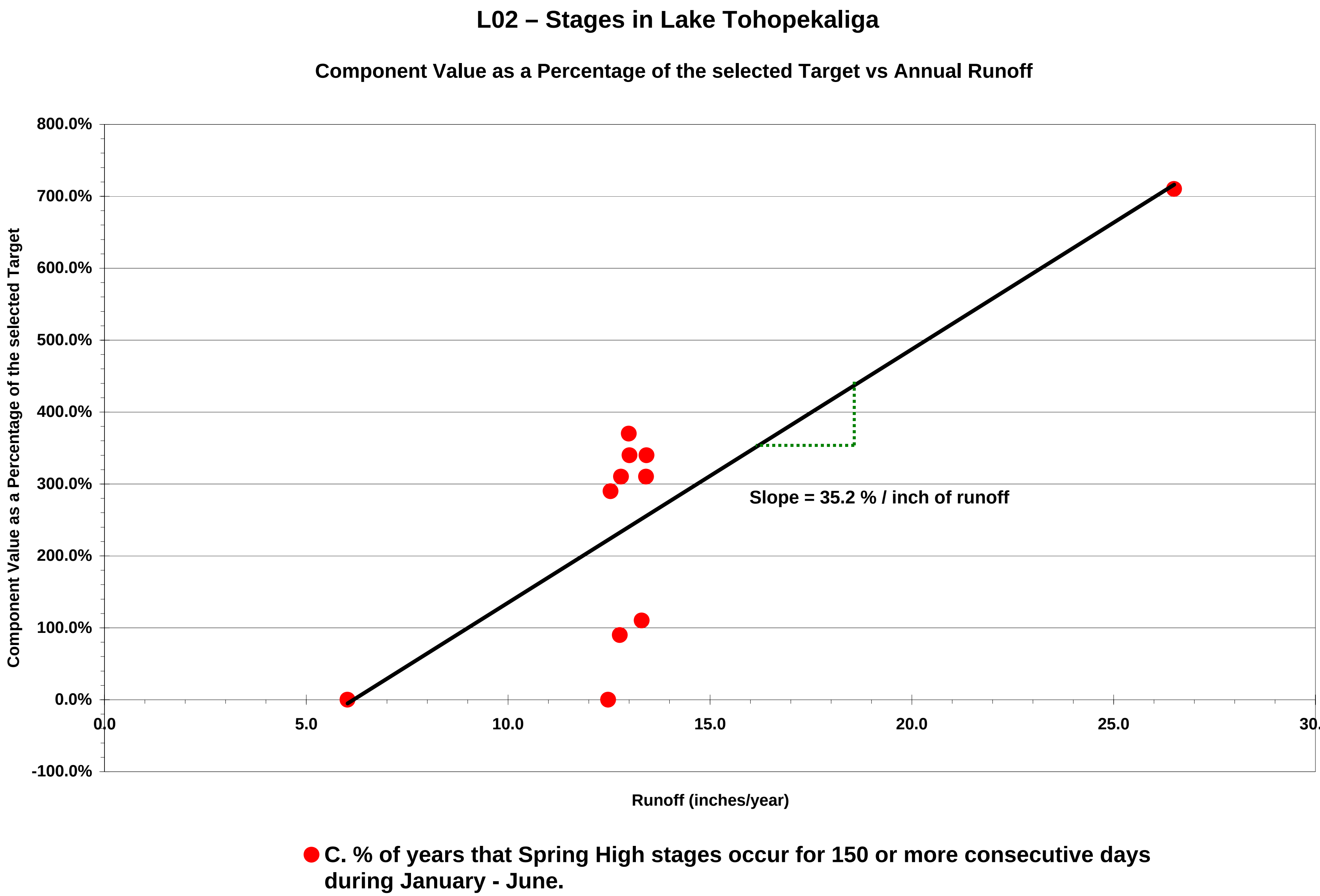
L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger
Component Value as a Percentage of the selected Target vs Annual Runoff
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Component Value as a Percentage of the selected Target
Slope = 0.1 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
K. Mean Intra-annual Lake Stage Variation (ft)


L01 – Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 0.6 % / inch of runoff
L. Maximum Inter-annual Lake stage Amplitude (ft)

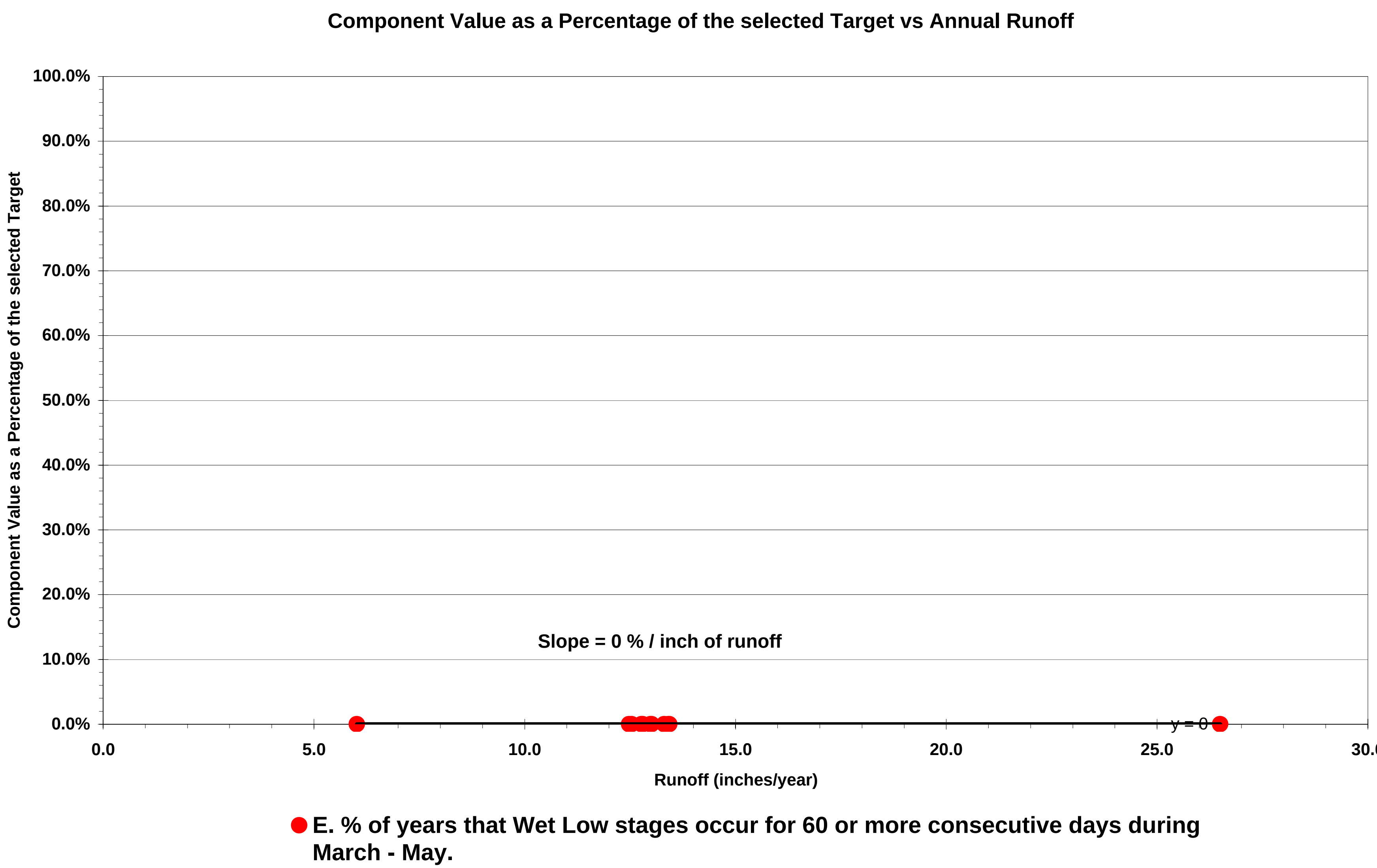

L02 – Stages in Lake Tohopekaliga
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
400.0%
350.0%
300.0%
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 13.1 % / inch of runoff
A. % of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.



L02 – Stages in Lake Tohopekaliga
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
160.0%
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
y = 1.4286
Slope = 0 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
B. % of years that Normal High stages occur for 90 or more consecutive days during Sept - January.

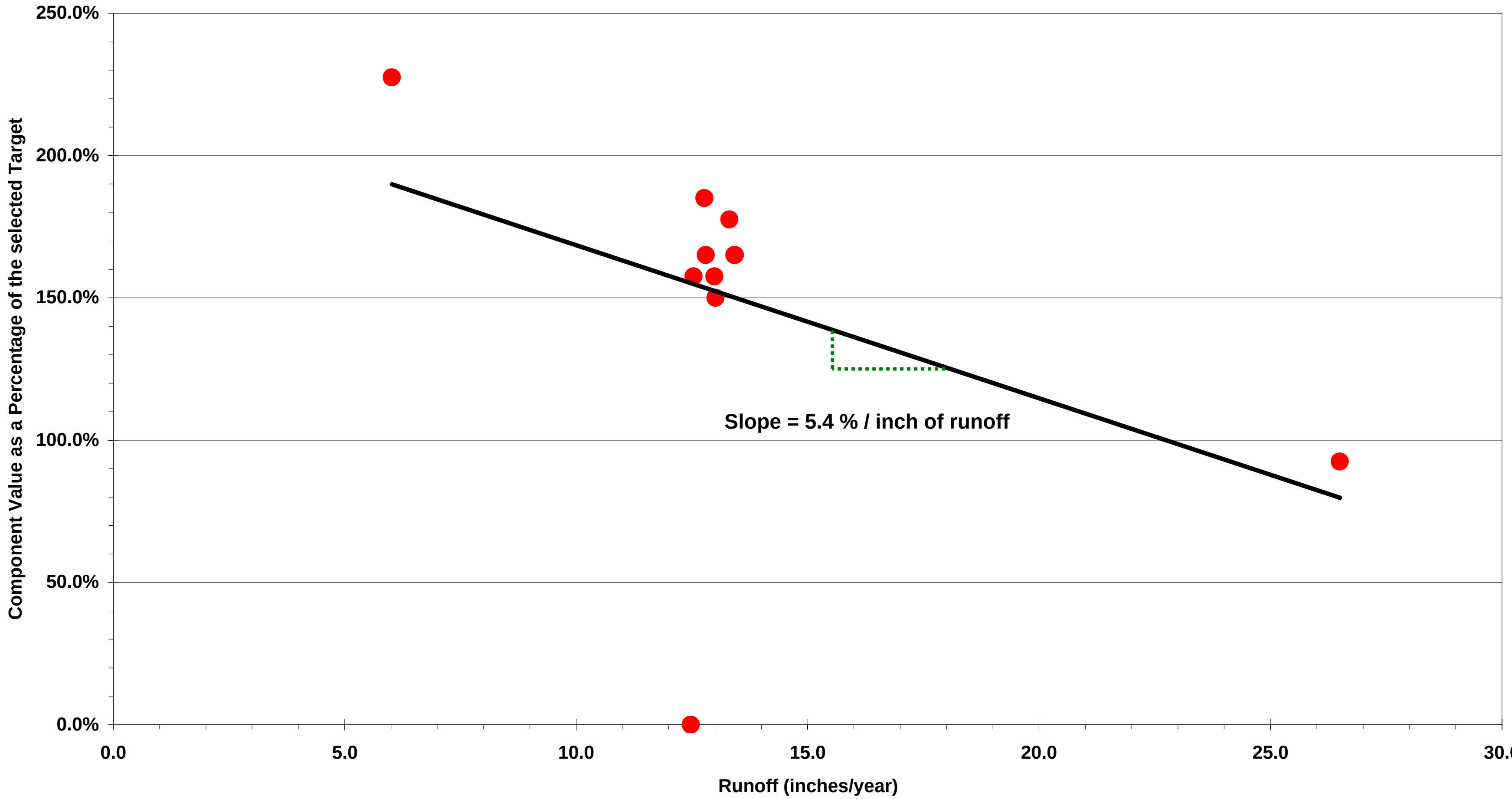

L02 – Stages in Lake Tohopekaliga
Component Value as a Percentage of the selected Target vs Annual Runoff
800.0%
700.0%
600.0%
500.0%
400.0%
300.0%
200.0%
100.0%
0.0%
-100.0%
Component Value as a Percentage of the selected Target
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Slope = 35.2 % / inch of runoff
Runoff (inches/year)
C. % of years that Spring High stages occur for 150 or more consecutive days during January - June.

L02 – Stages in Lake Tohopekaliga



L02 – Stages in Lake Tohopekaliga

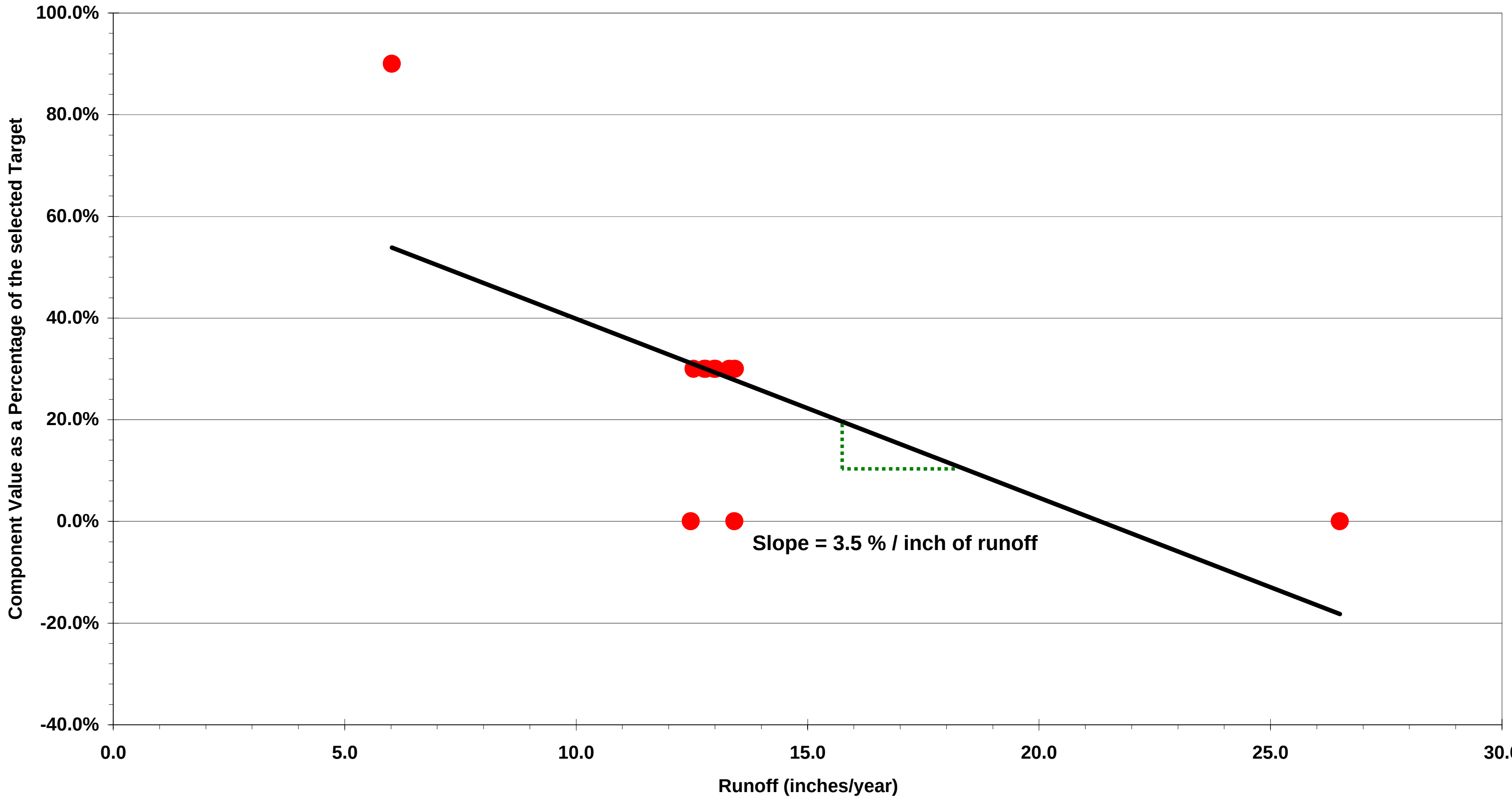
Component Value as a Percentage of the selected Target vs Annual Runoff



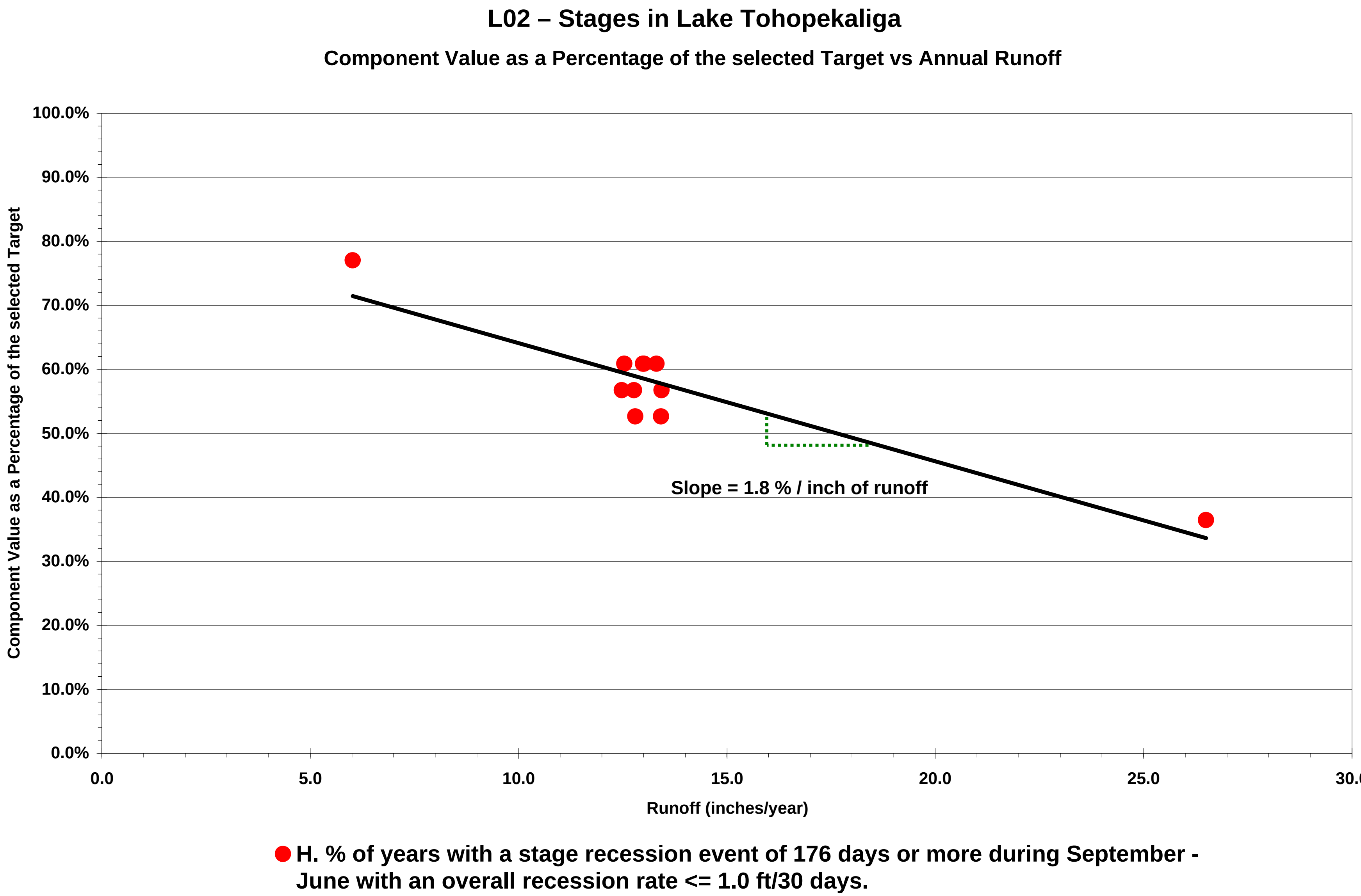
● F. % of years that Normal Low stages occur for 60 or more consecutive days during March - May.

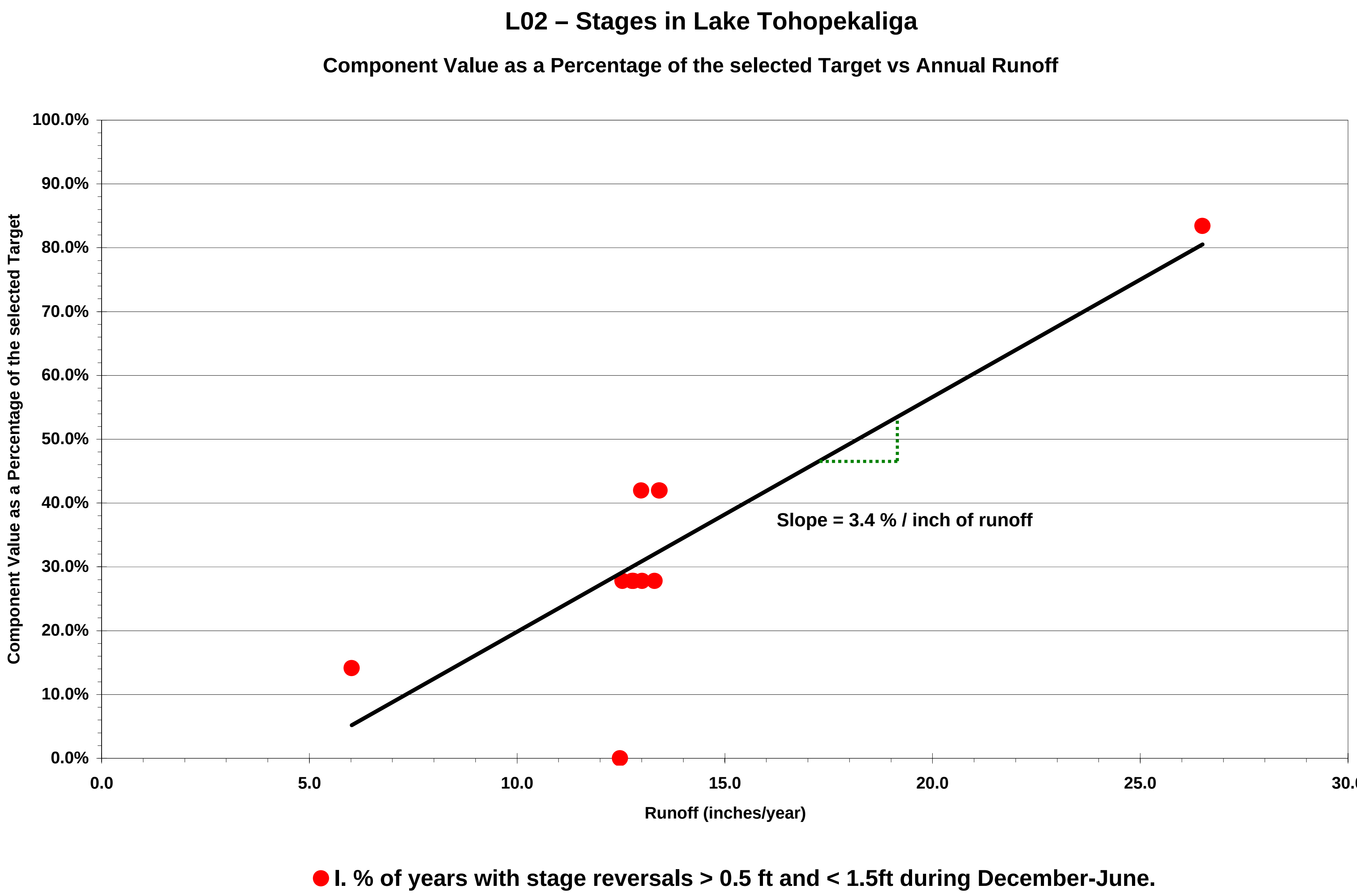
L02 – Stages in Lake Tohopekaliga

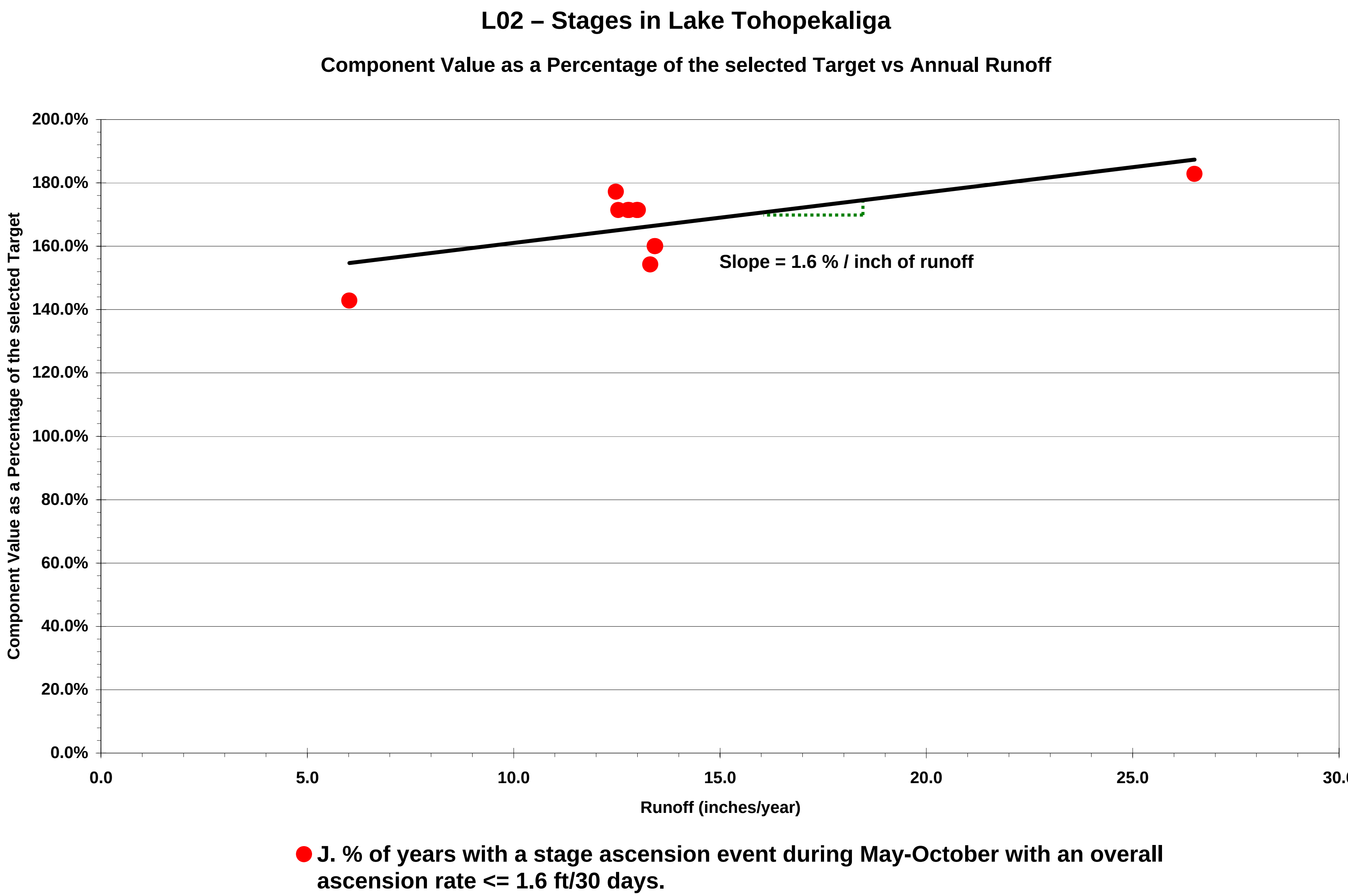
Component Value as a Percentage of the selected Target vs Annual Runoff



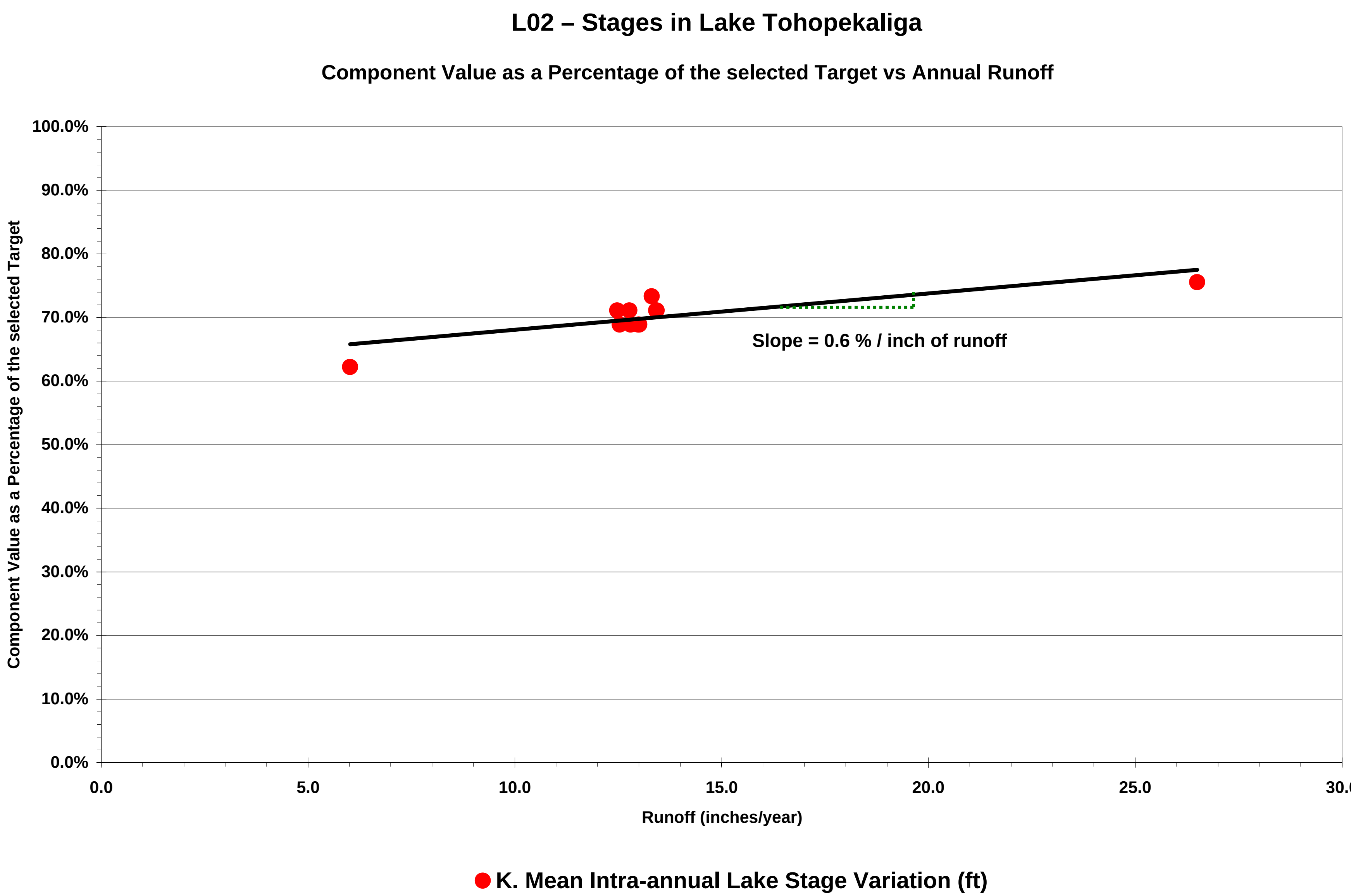
● G. % of years that Extreme Low stages occur for 90 or more consecutive days during February - May.



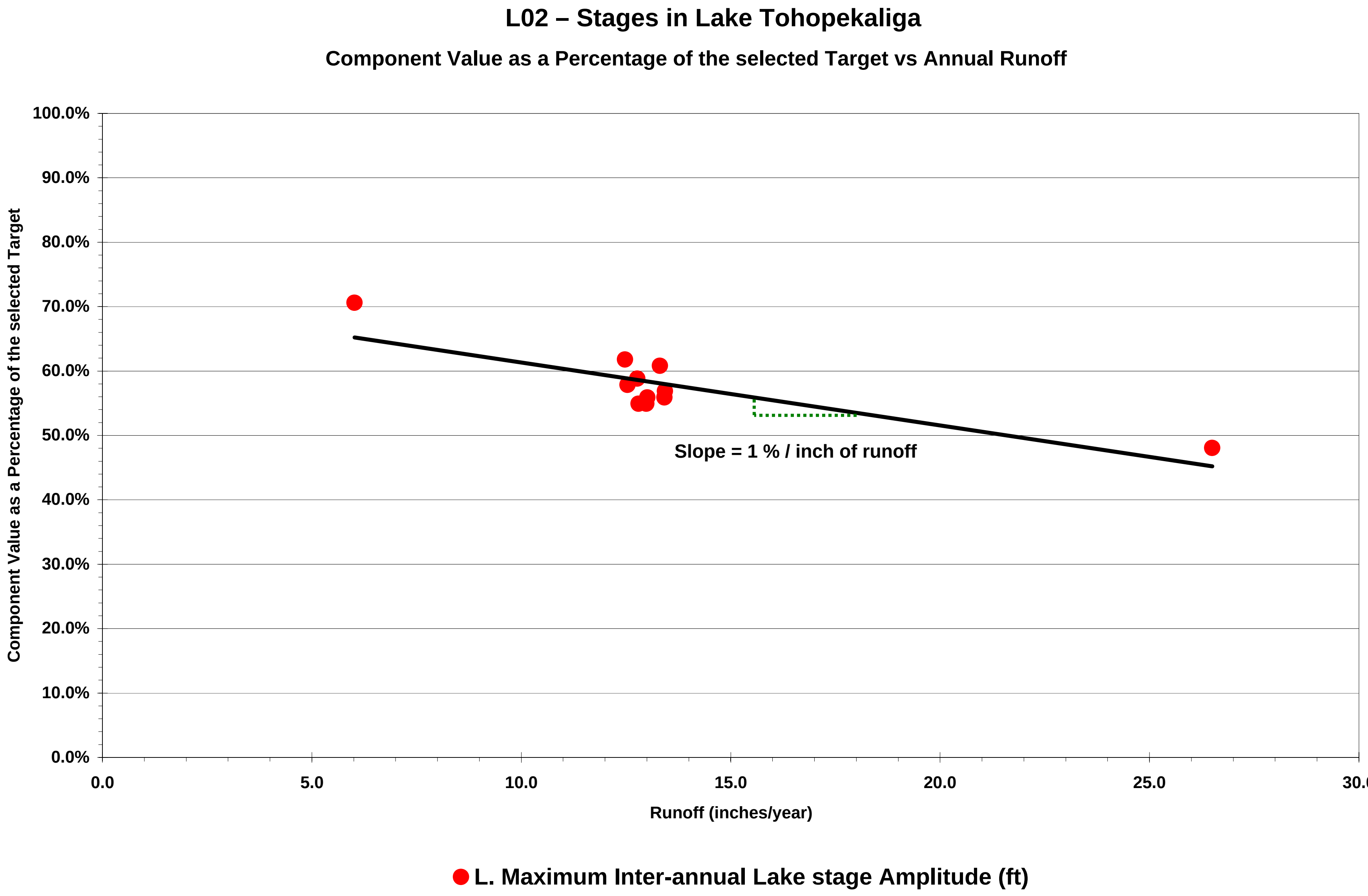

L02 – Stages in Lake Tohopekaliga
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 3.4 % / inch of runoff
I. % of years with stage reversals > 0.5 ft and < 1.5ft during December-June.



L02 – Stages in Lake Tohopekaliga
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
200.0%
180.0%
160.0%
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 1.6 % / inch of runoff
J. % of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.

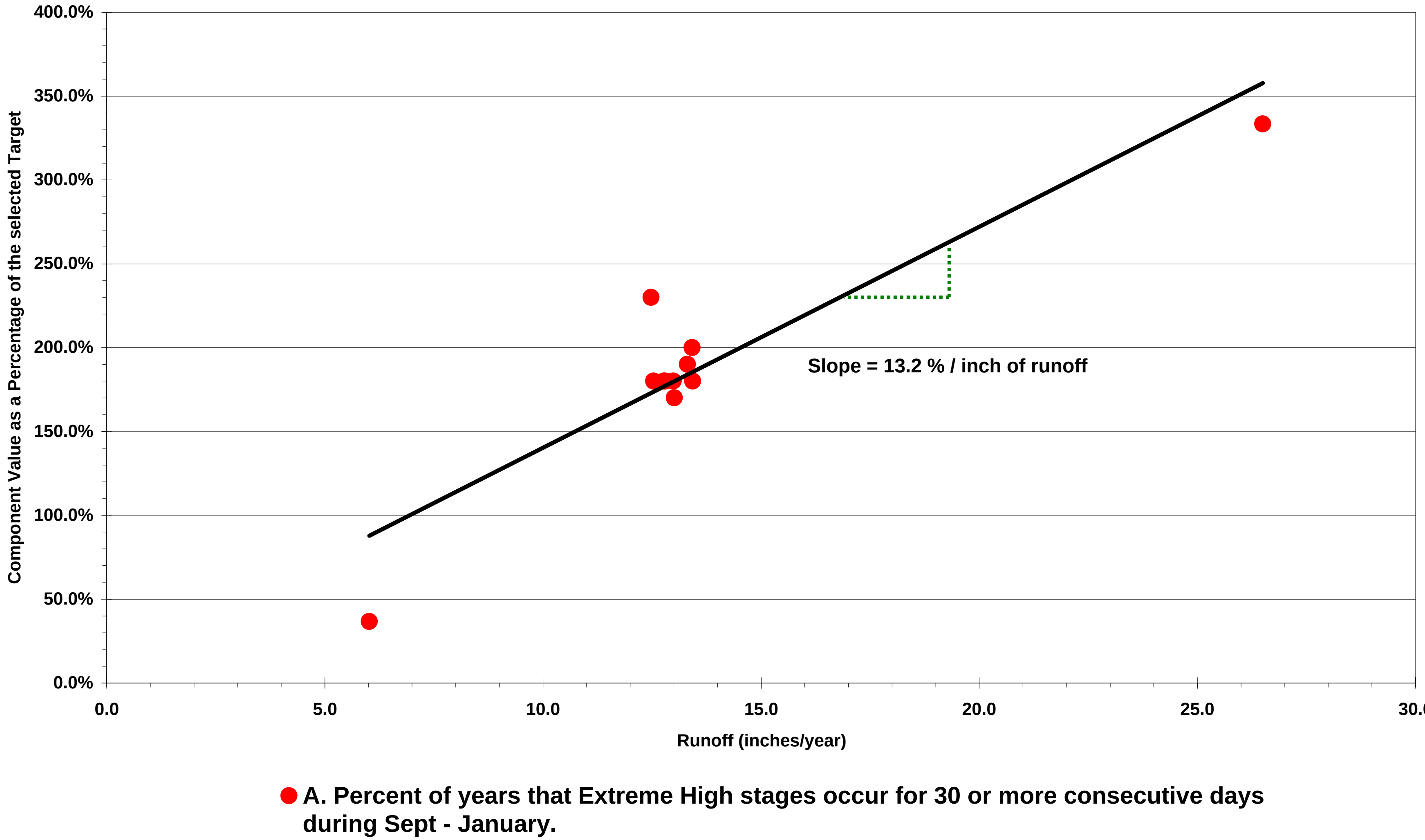


L02 – Stages in Lake Tohopekaliga
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 0.6 % / inch of runoff
K. Mean Intra-annual Lake Stage Variation (ft)


L02 – Stages in Lake Tohopekaliga
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 1 % / inch of runoff
L. Maximum Inter-annual Lake stage Amplitude (ft)

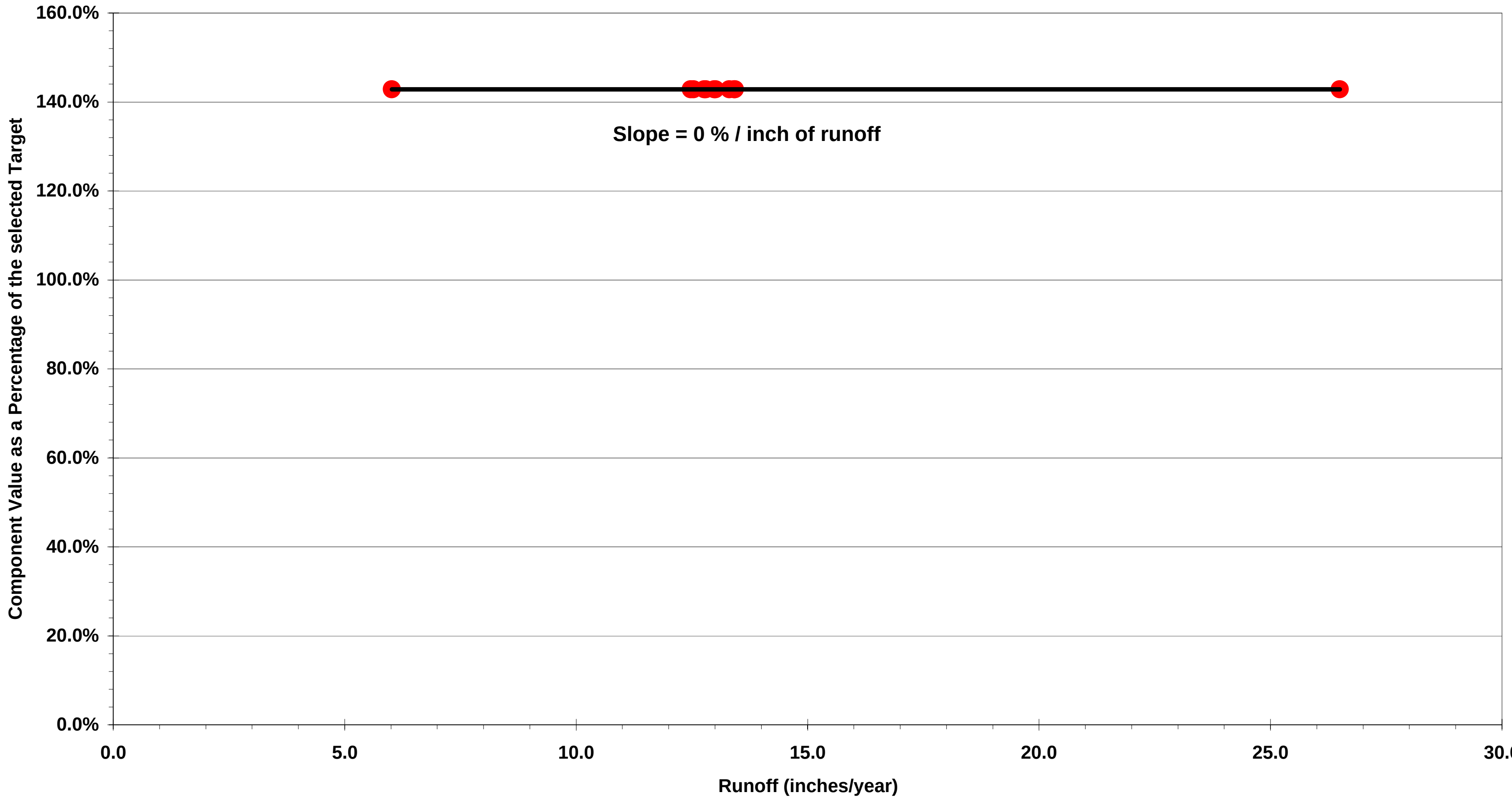
L03 – Stages in Lake Gentry

Component Value as a Percentage of the selected Target vs Annual Runoff

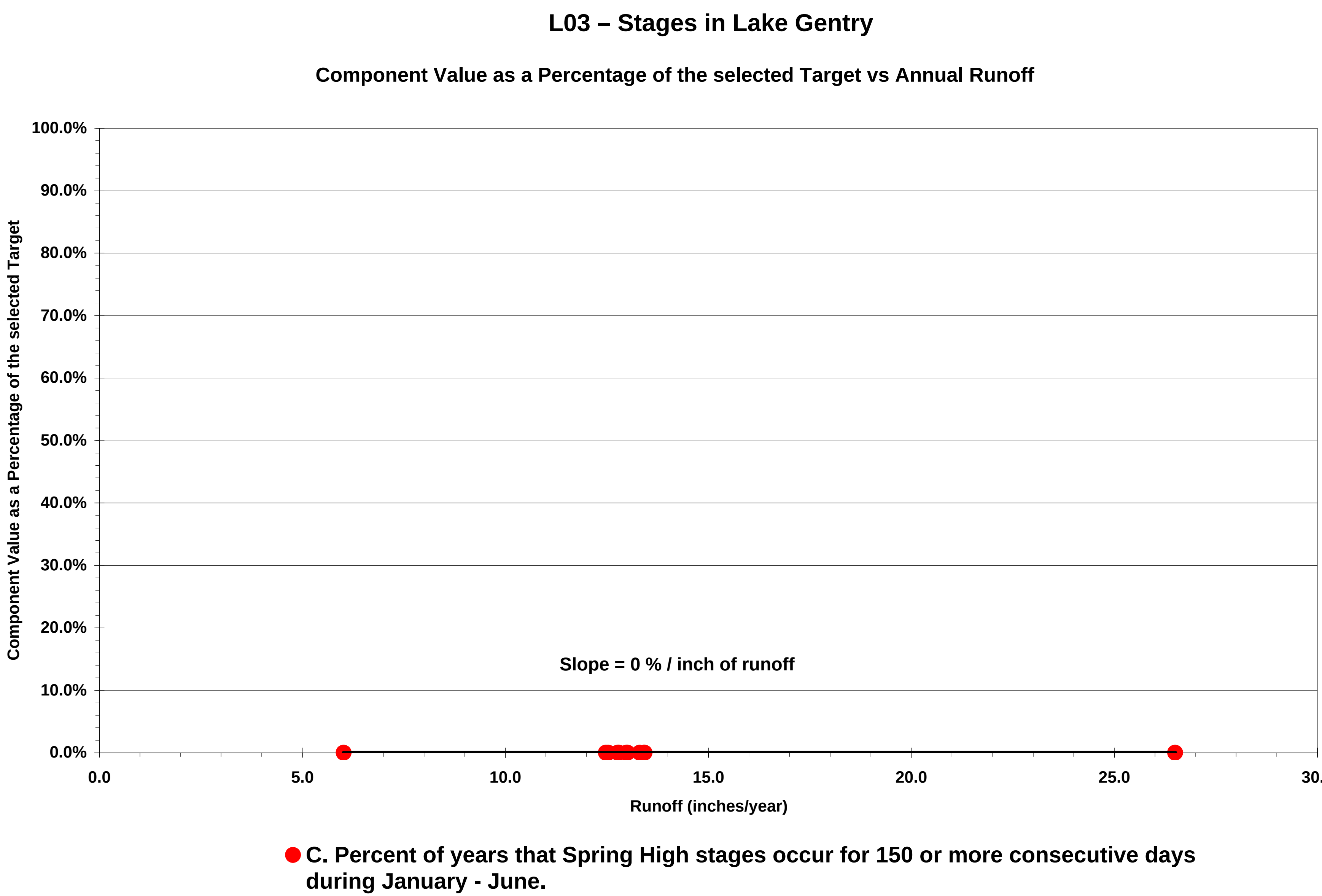


L03 – Stages in Lake Gentry

Component Value as a Percentage of the selected Target vs Annual Runoff

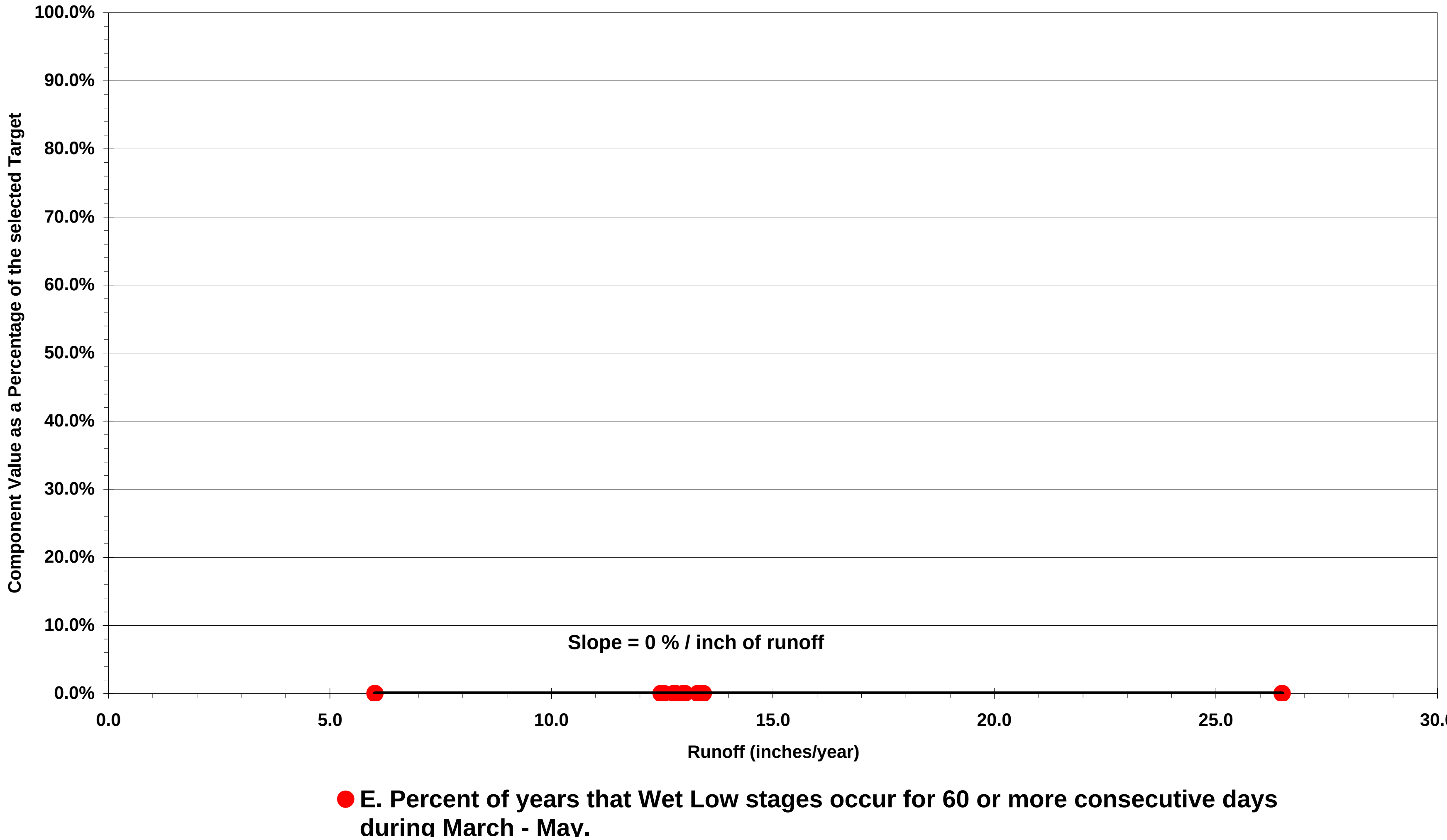


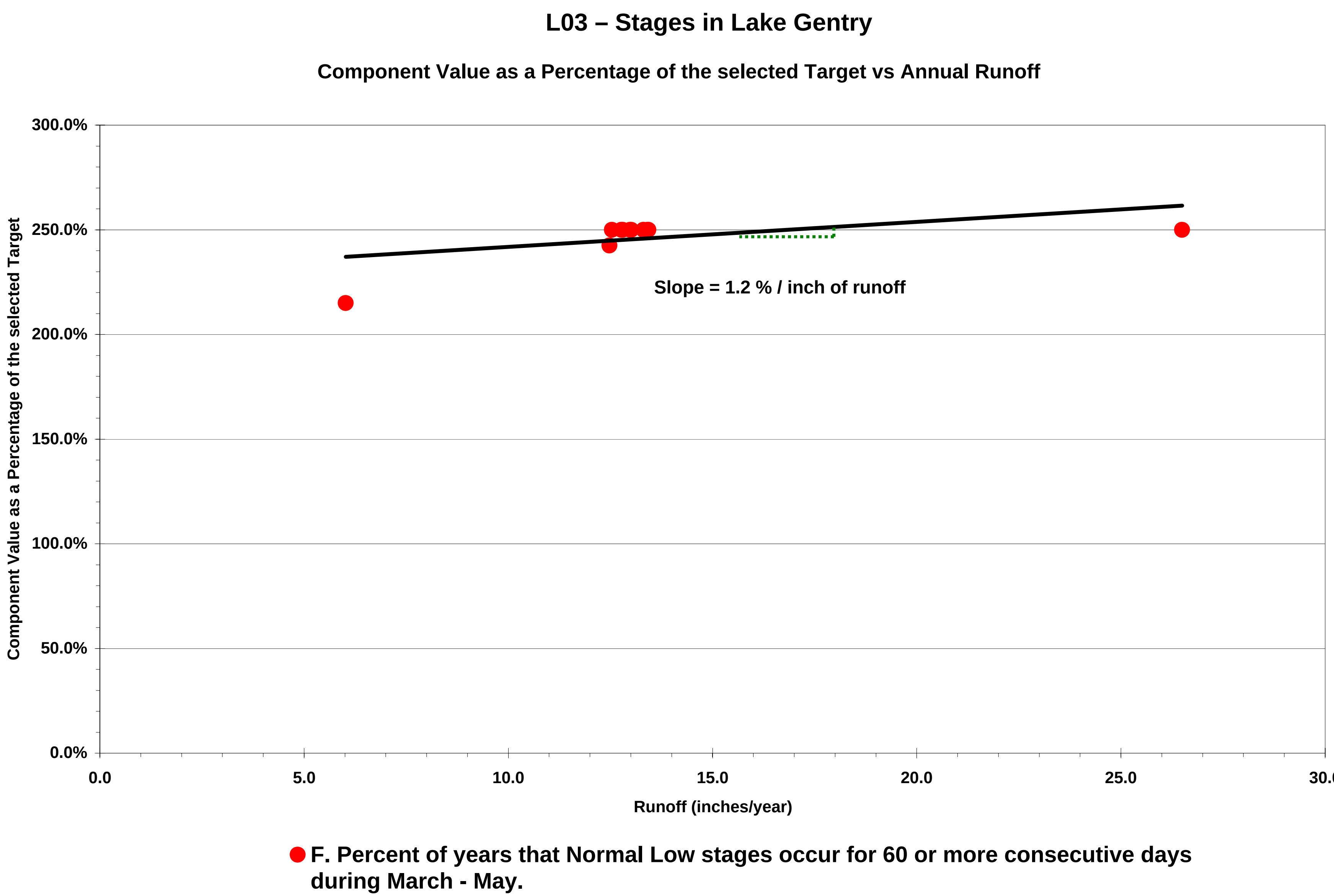
● B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.


L03 – Stages in Lake Gentry
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Slope = 0 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
C. Percent of years that Spring High stages occur for 150 or more consecutive days during January - June.

L03 – Stages in Lake Gentry

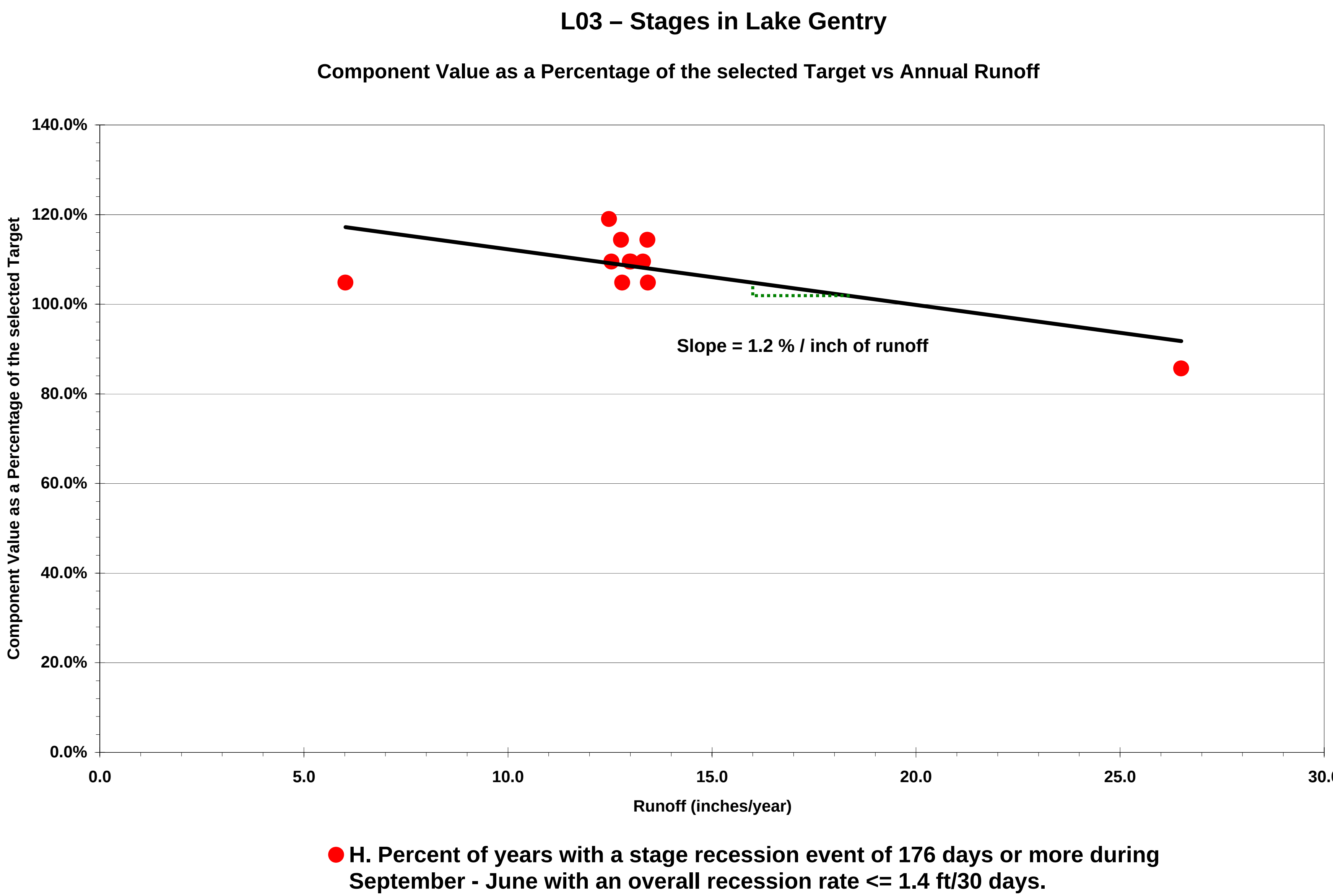
Component Value as a Percentage of the selected Target vs Annual Runoff



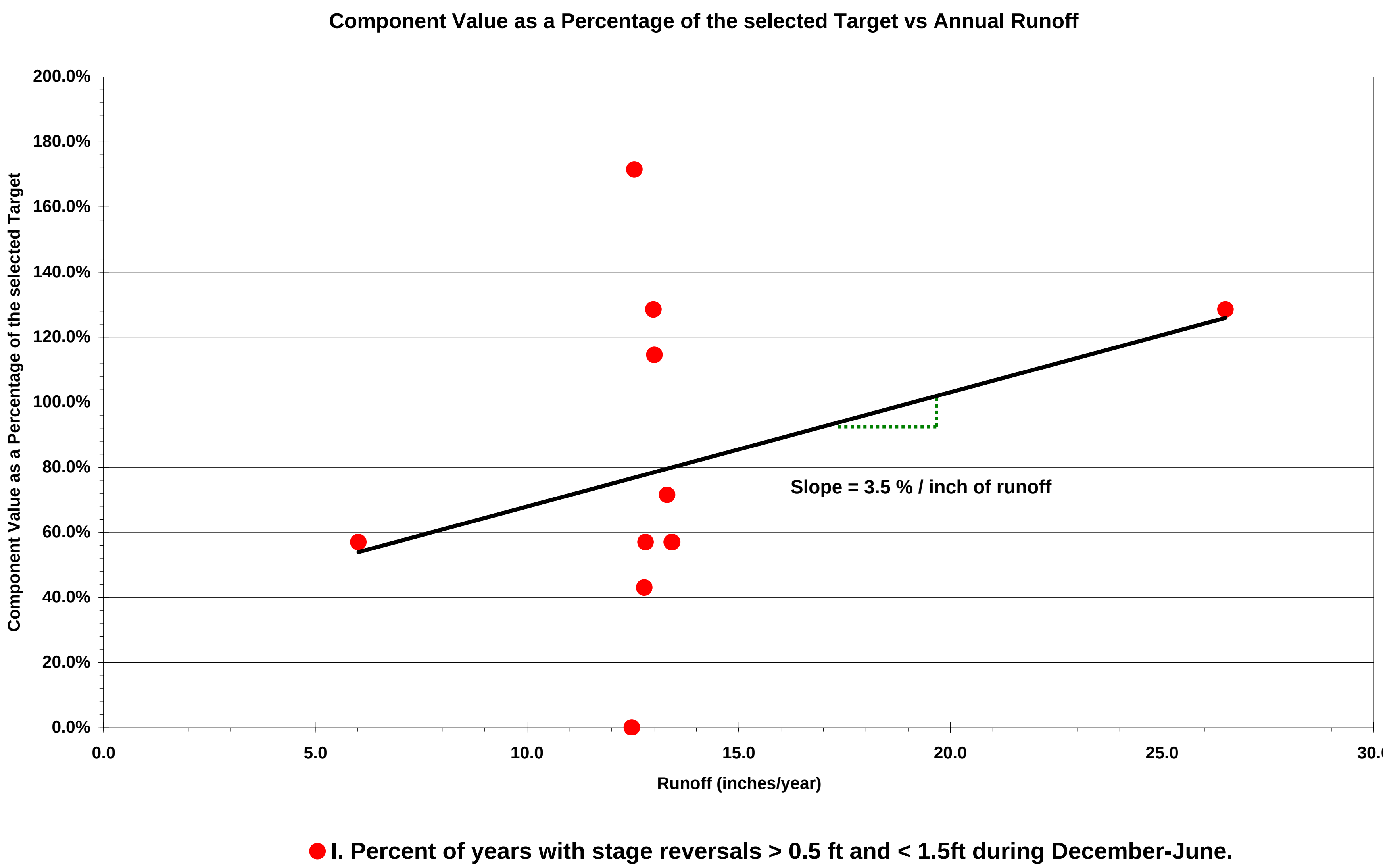


L03 – Stages in Lake Gentry
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
300.0%
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
Slope = 1.2 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
F. Percent of years that Normal Low stages occur for 60 or more consecutive days during March - May.

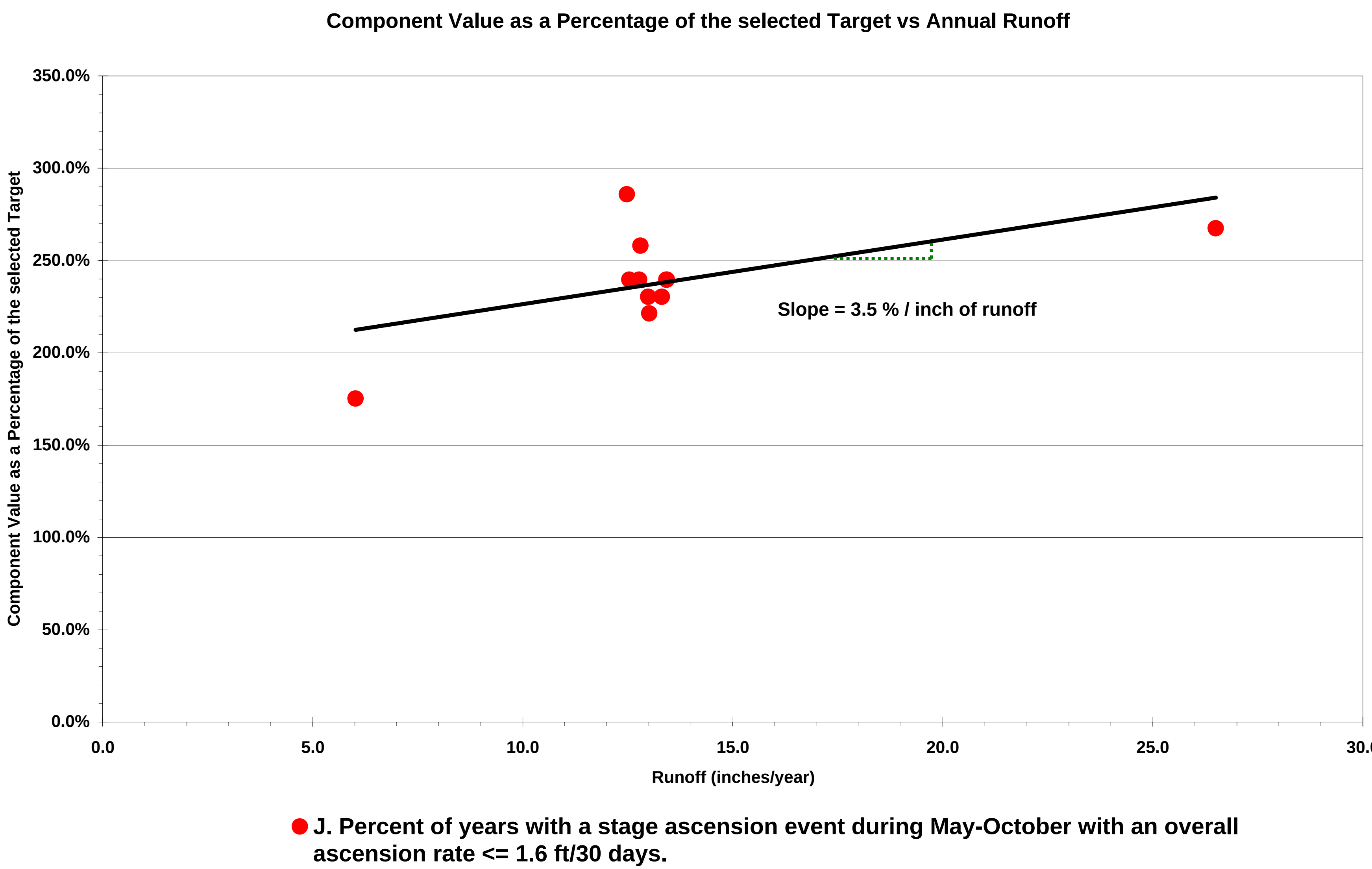

L03 – Stages in Lake Gentry
Component Value as a Percentage of the selected Target vs Annual Runoff
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
-40.0%
Component Value as a Percentage of the selected Target
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 2.3 % / inch of runoff
G. Percent of years that Extreme Low stages occur for 90 or more consecutive days during February - May.


L03 – Stages in Lake Gentry
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Slope = 1.2 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.

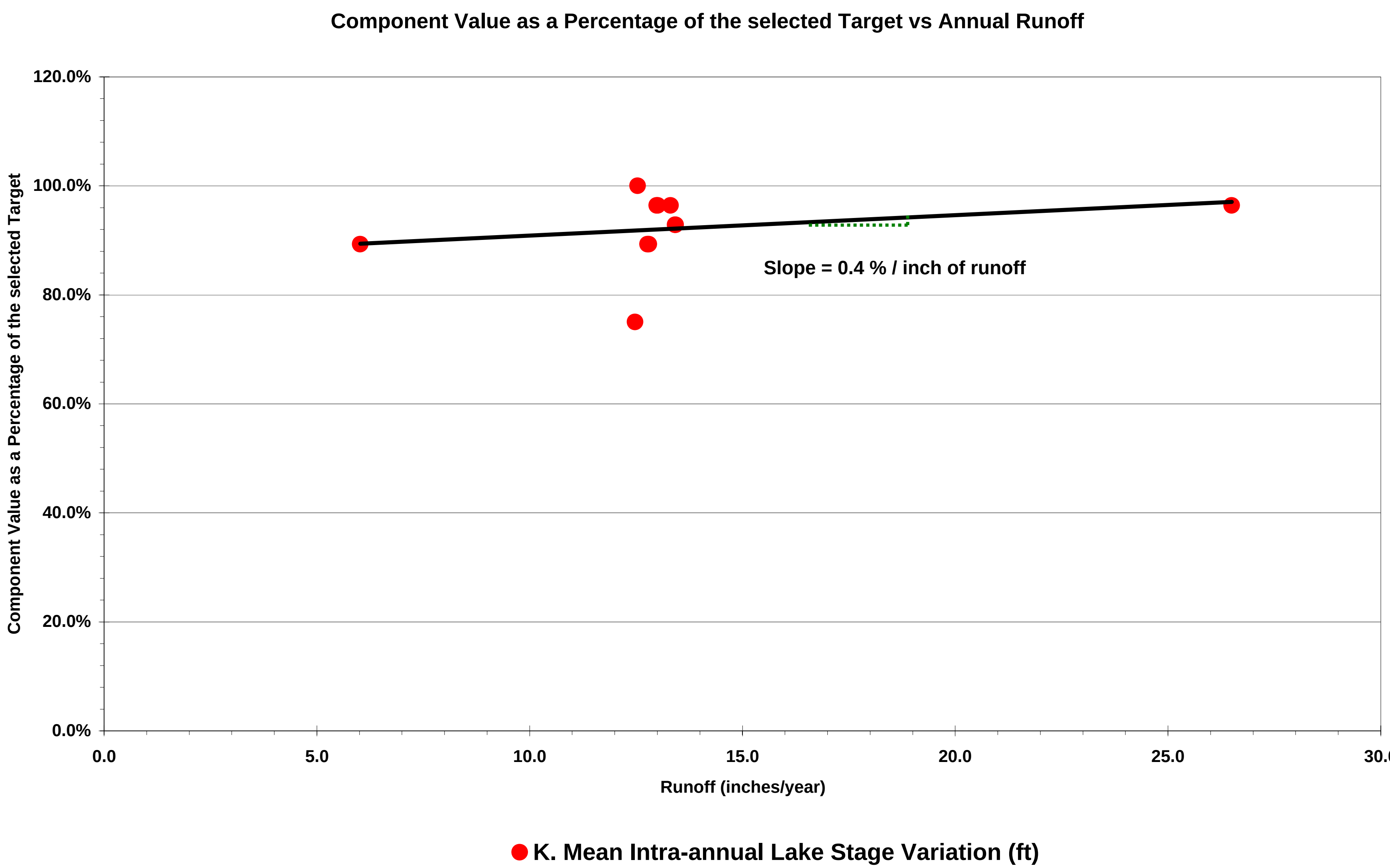
L03 – Stages in Lake Gentry

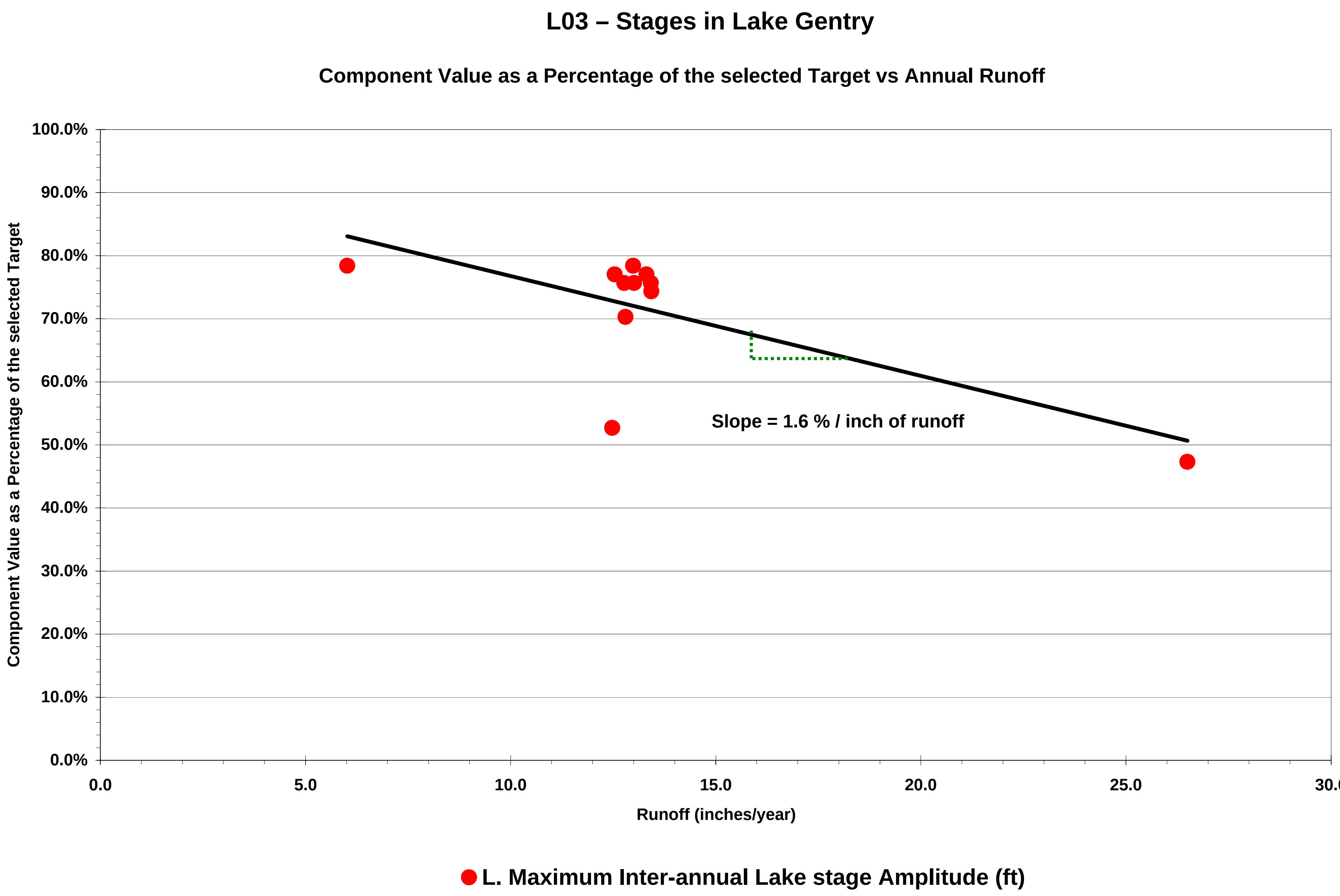


L03 – Stages in Lake Gentry



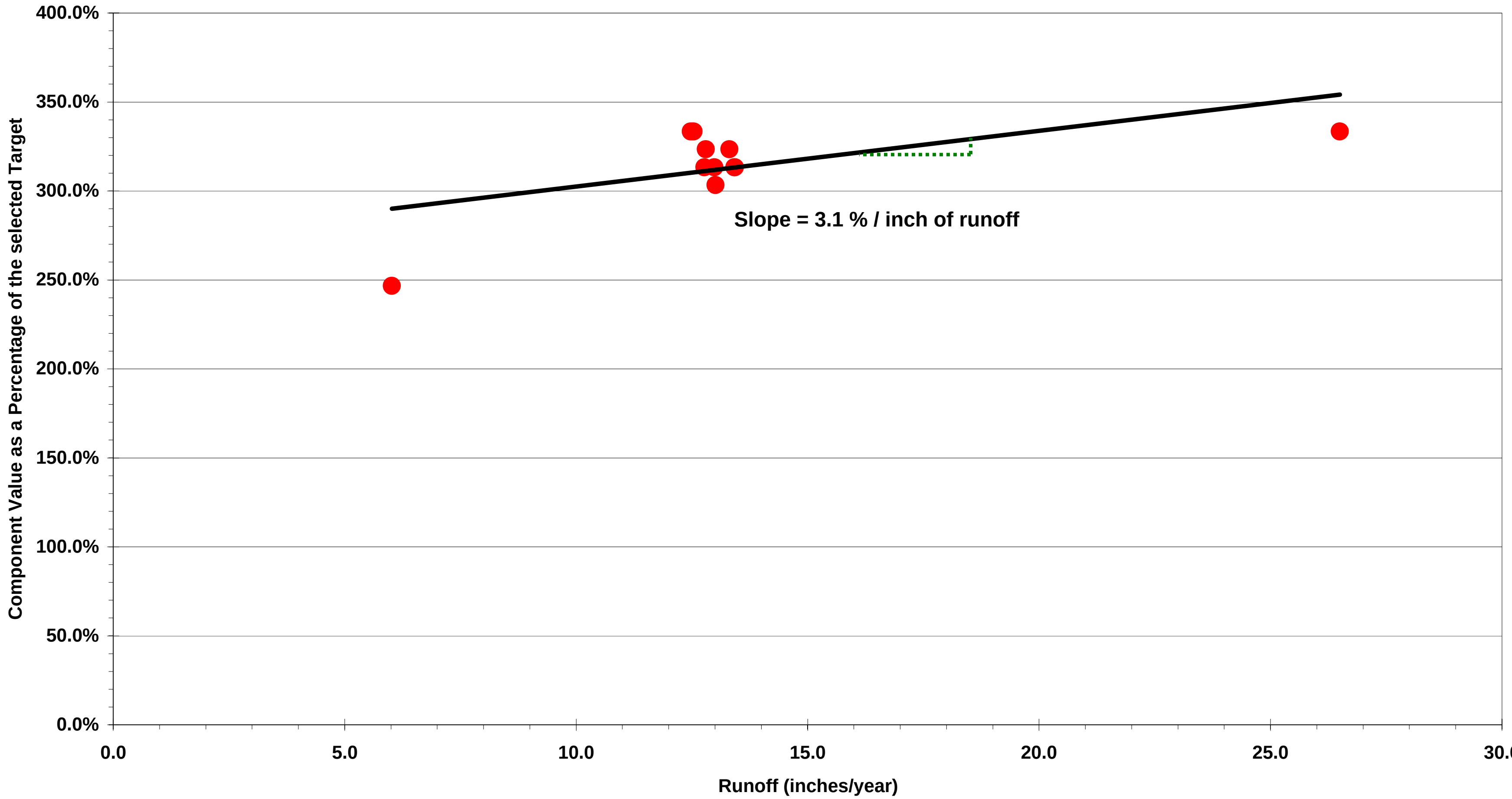
L03 – Stages in Lake Gentry




L03 – Stages in Lake Gentry
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 1.6 % / inch of runoff
L. Maximum Inter-annual Lake stage Amplitude (ft)

L04 – Stages in Lakes Joel, Myrtle, and Preston

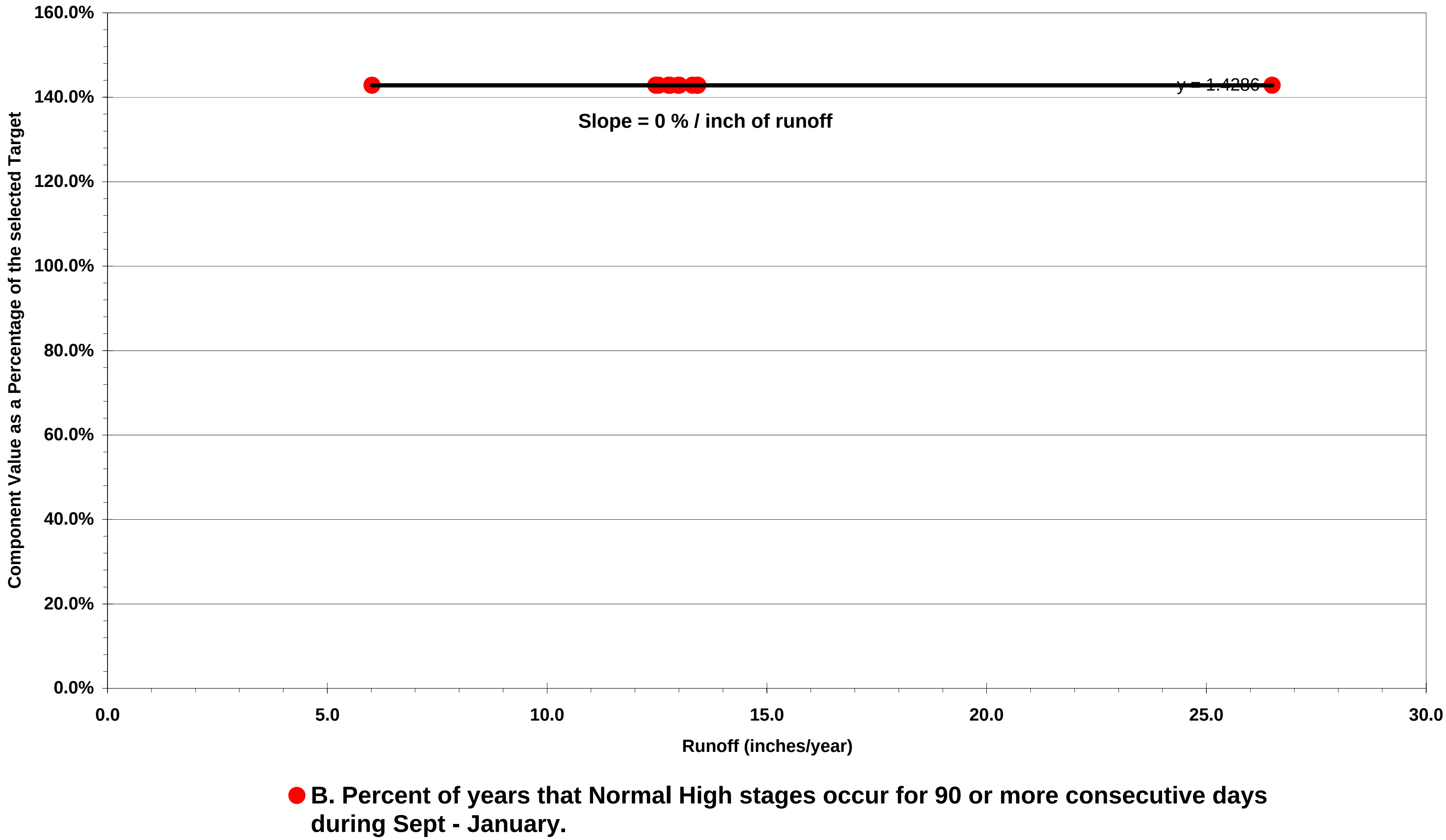
Component Value as a Percentage of the selected Target vs Annual Runoff



A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.

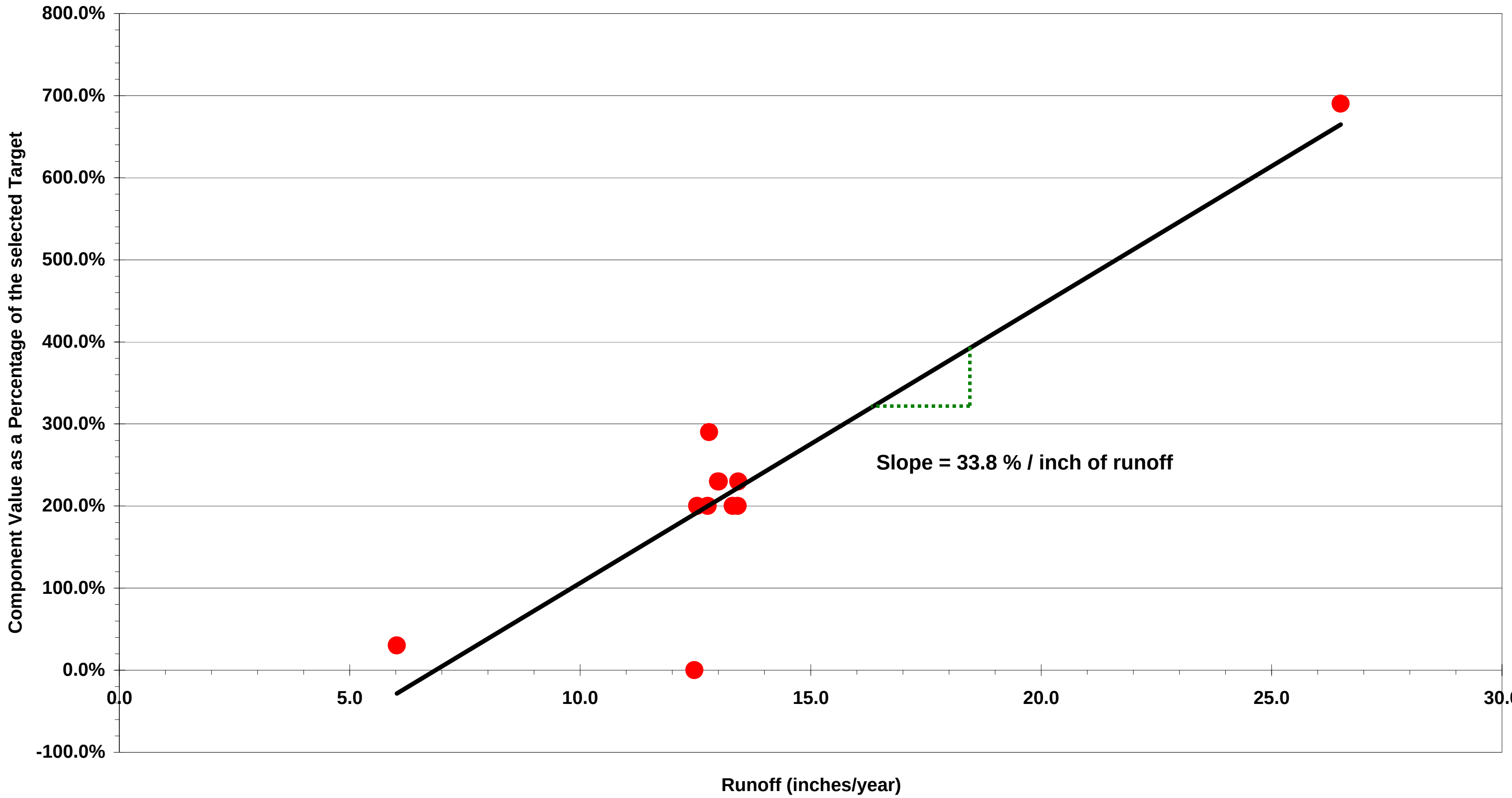
L04 – Stages in Lakes Joel, Myrtle, and Preston

Component Value as a Percentage of the selected Target vs Annual Runoff

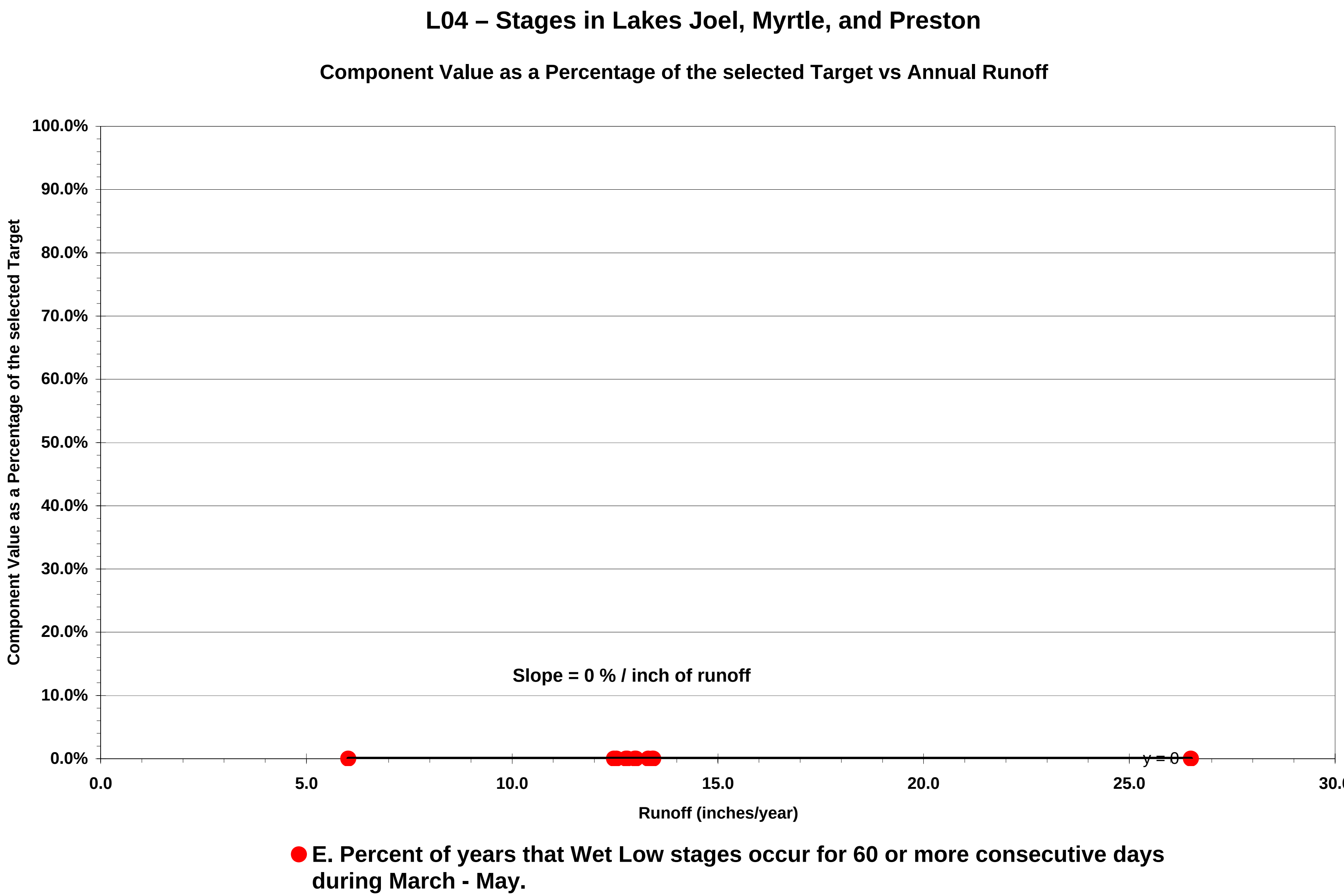


L04 – Stages in Lakes Joel, Myrtle, and Preston

Component Value as a Percentage of the selected Target vs Annual Runoff

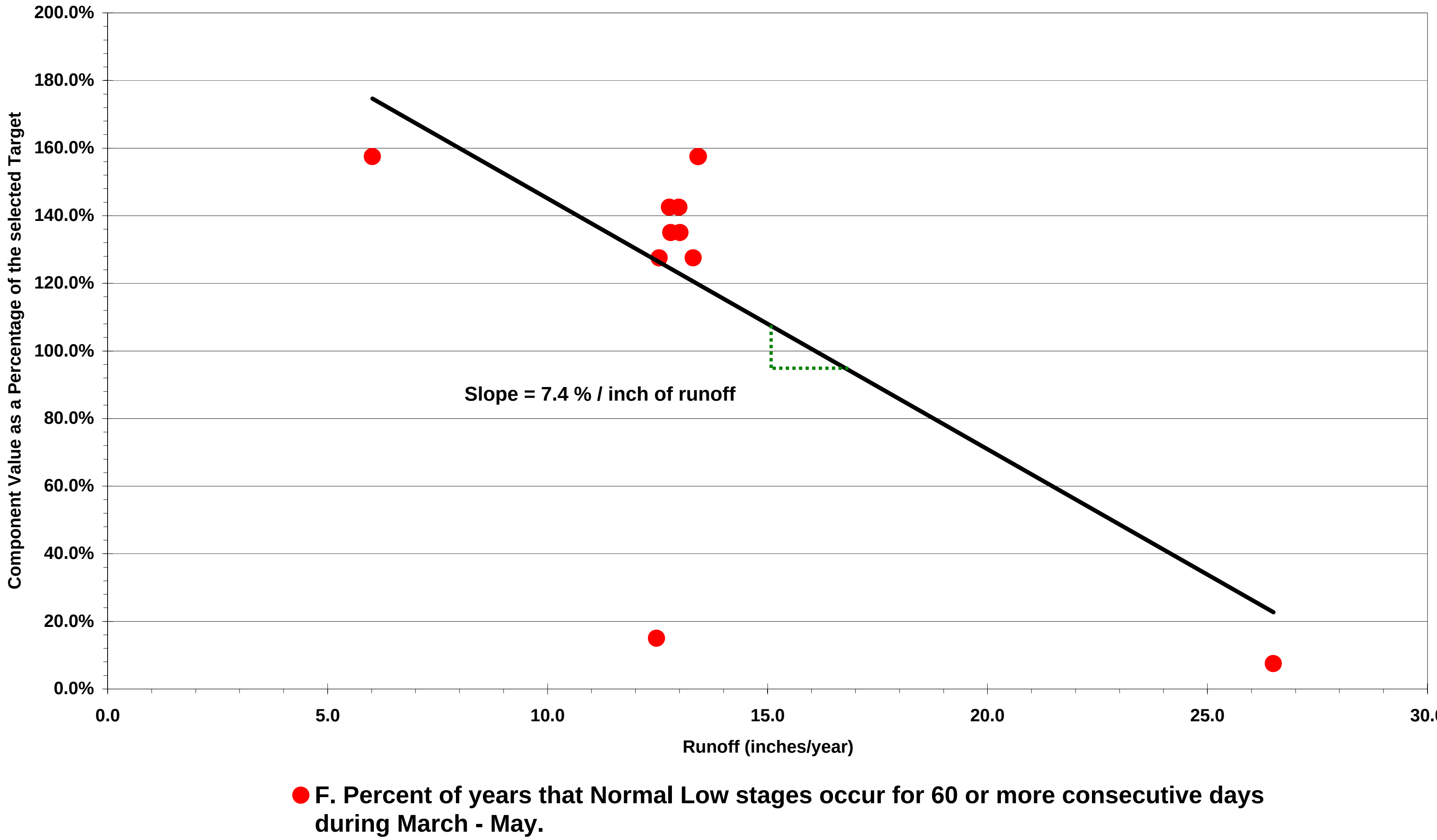


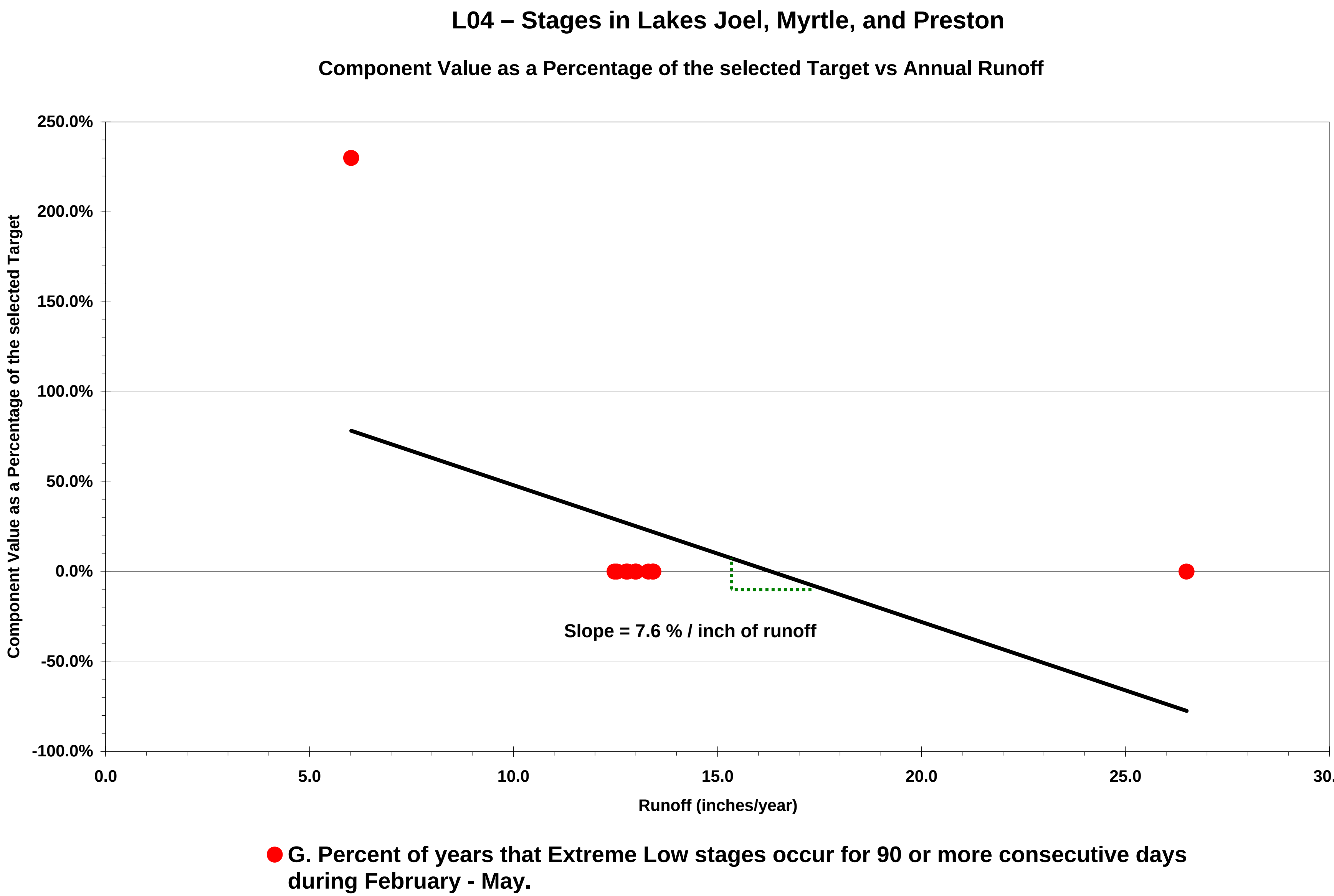
● C. Percent of years that Spring High stages occur for 150 or more consecutive days during January - June.


L04 – Stages in Lakes Joel, Myrtle, and Preston
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Slope = 0 % / inch of runoff
y = 0
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
E. Percent of years that Wet Low stages occur for 60 or more consecutive days during March - May.

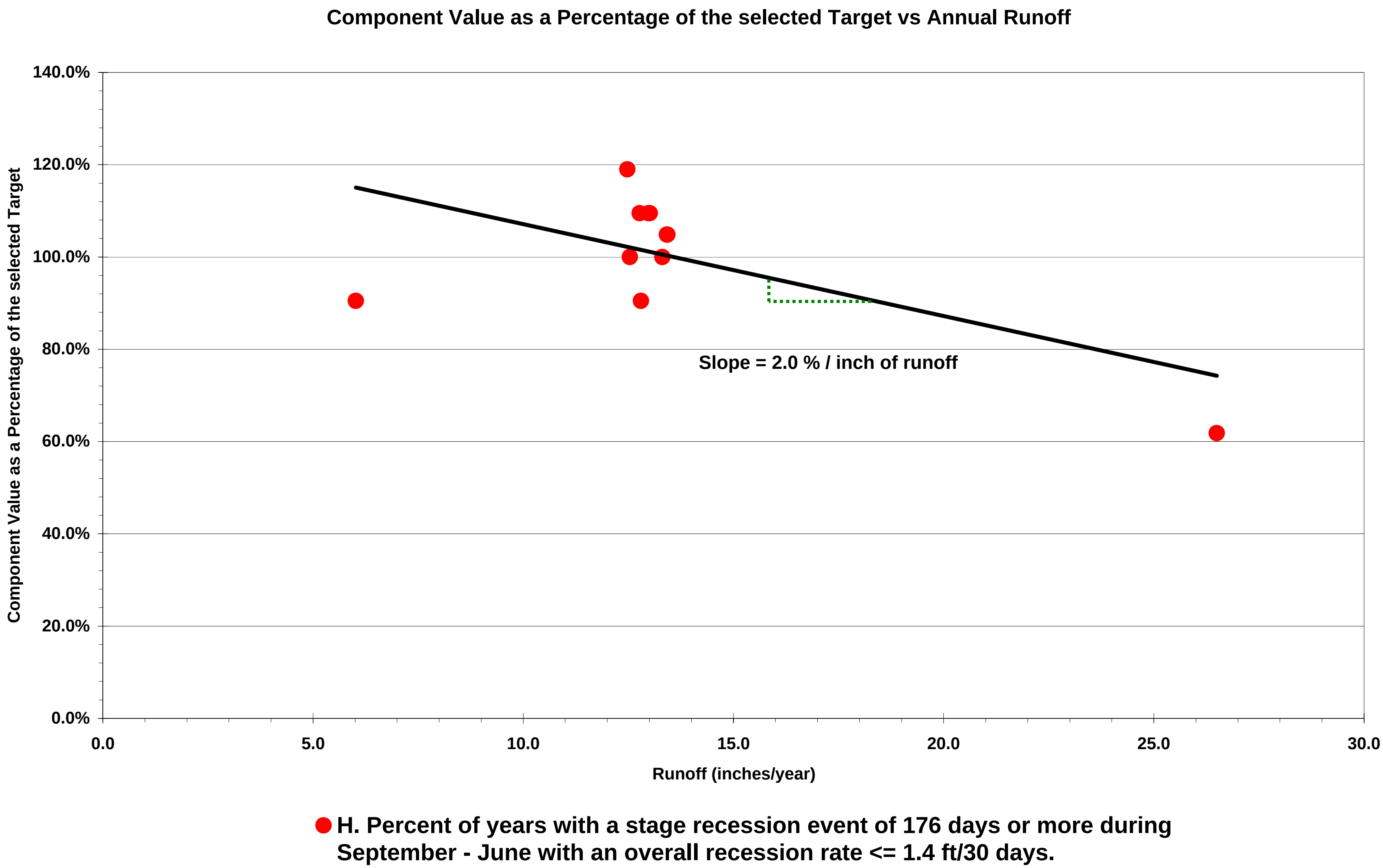
L04 – Stages in Lakes Joel, Myrtle, and Preston

Component Value as a Percentage of the selected Target vs Annual Runoff



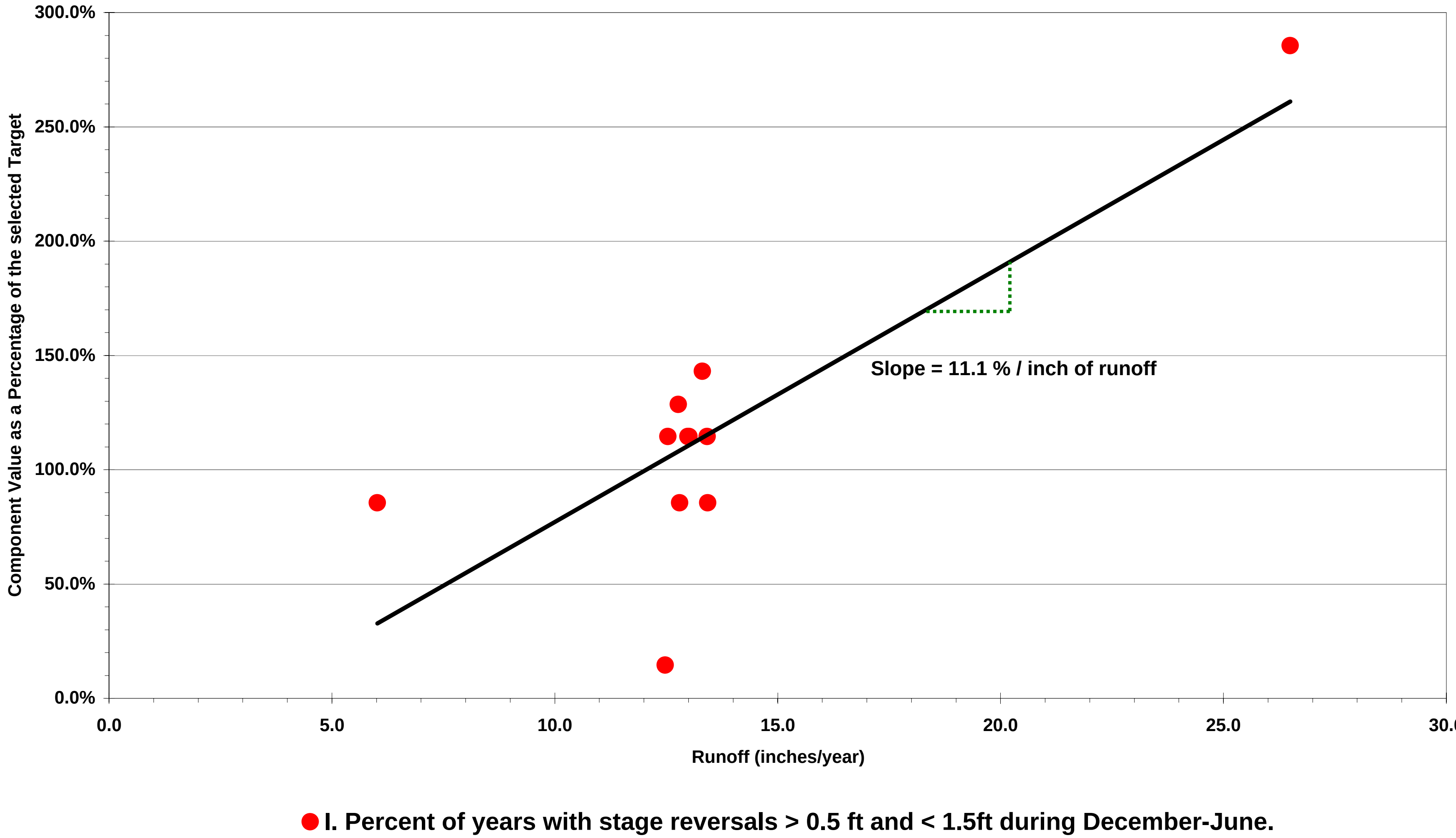

L04 – Stages in Lakes Joel, Myrtle, and Preston
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
-50.0%
-100.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 7.6 % / inch of runoff
G. Percent of years that Extreme Low stages occur for 90 or more consecutive days during February - May.

L04 – Stages in Lakes Joel, Myrtle, and Preston



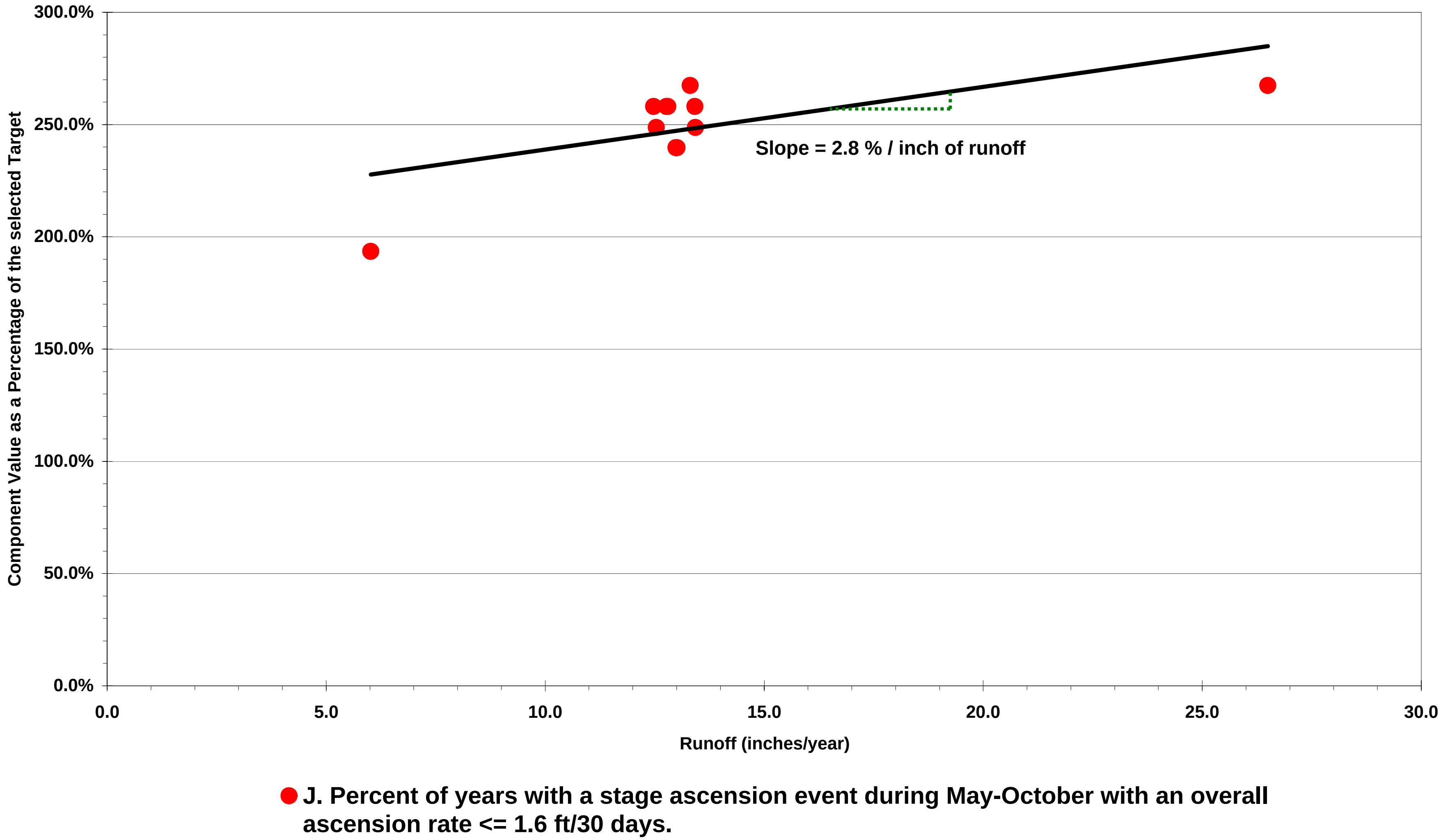
L04 – Stages in Lakes Joel, Myrtle, and Preston

Component Value as a Percentage of the selected Target vs Annual Runoff

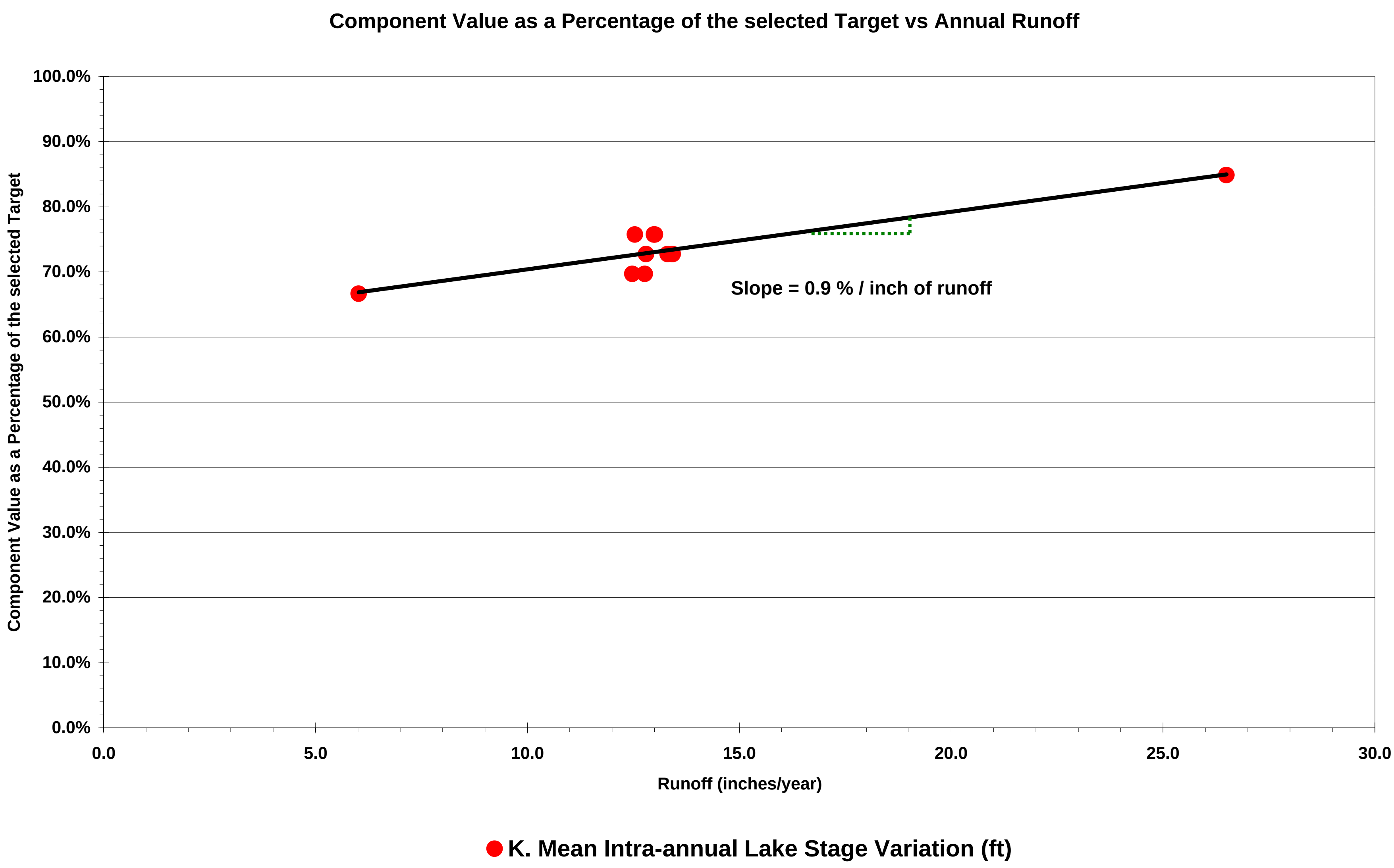


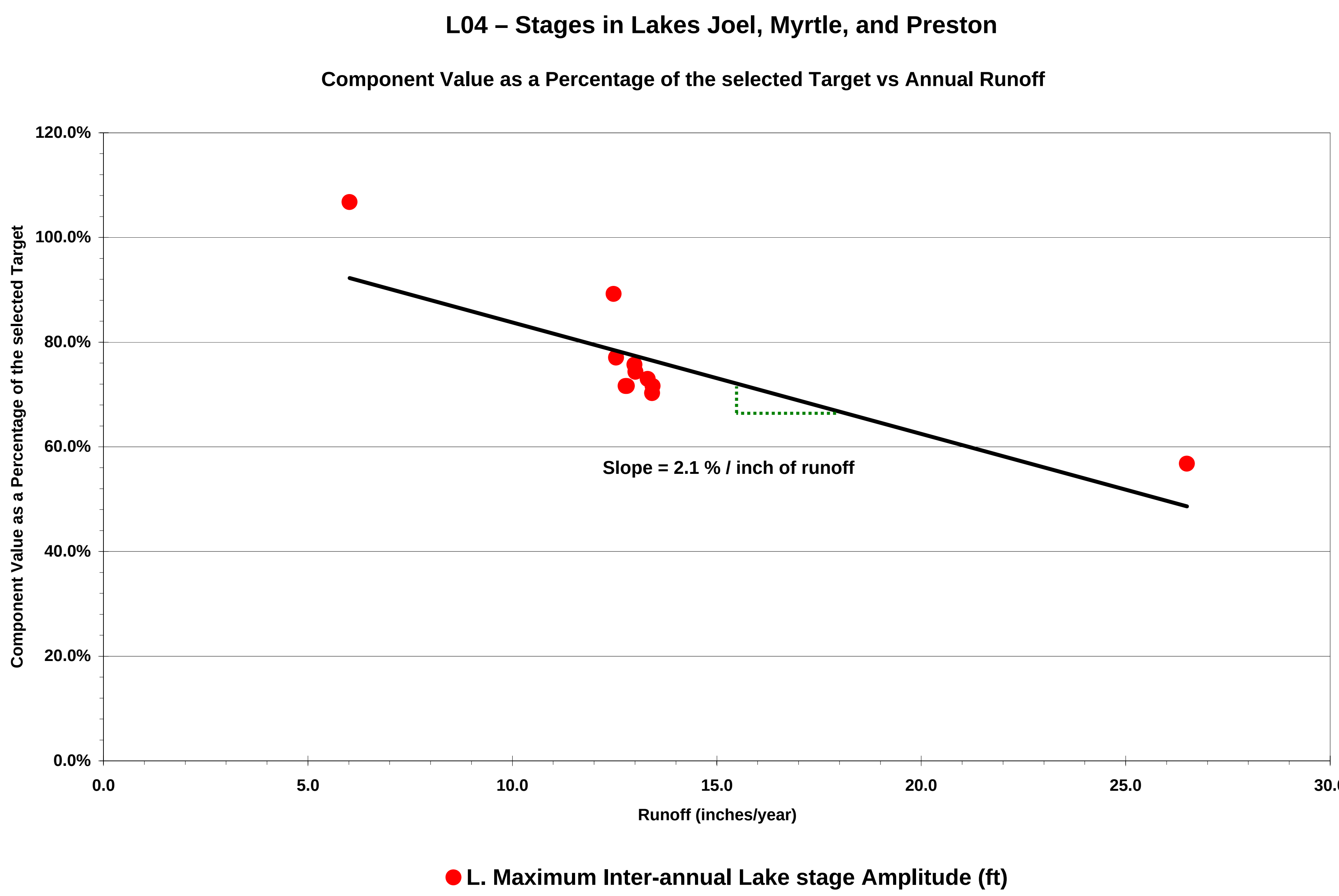
L04 – Stages in Lakes Joel, Myrtle, and Preston

Component Value as a Percentage of the selected Target vs Annual Runoff



L04 – Stages in Lakes Joel, Myrtle, and Preston

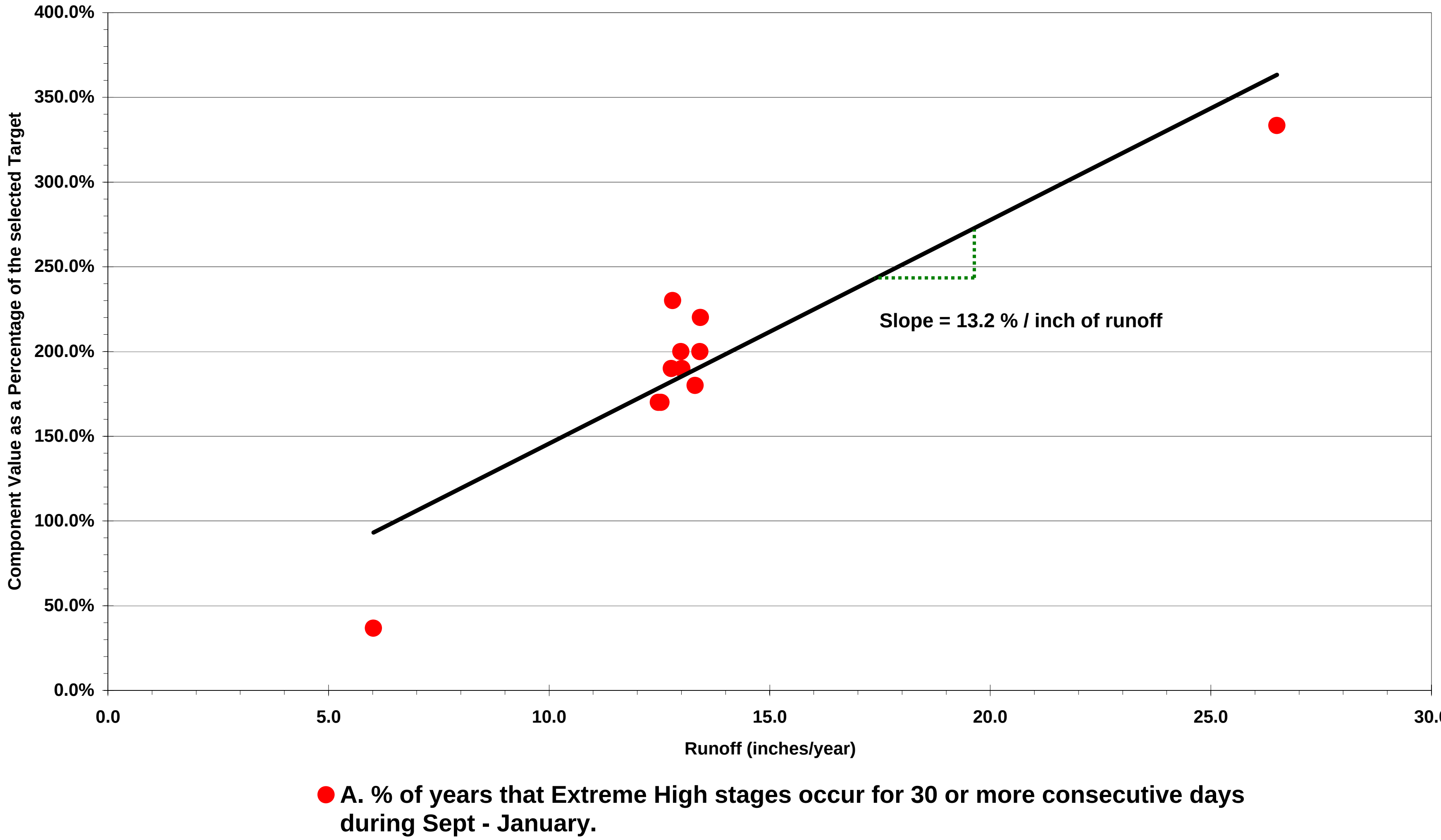




L04 – Stages in Lakes Joel, Myrtle, and Preston
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Slope = 2.1 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
L. Maximum Inter-annual Lake stage Amplitude (ft)

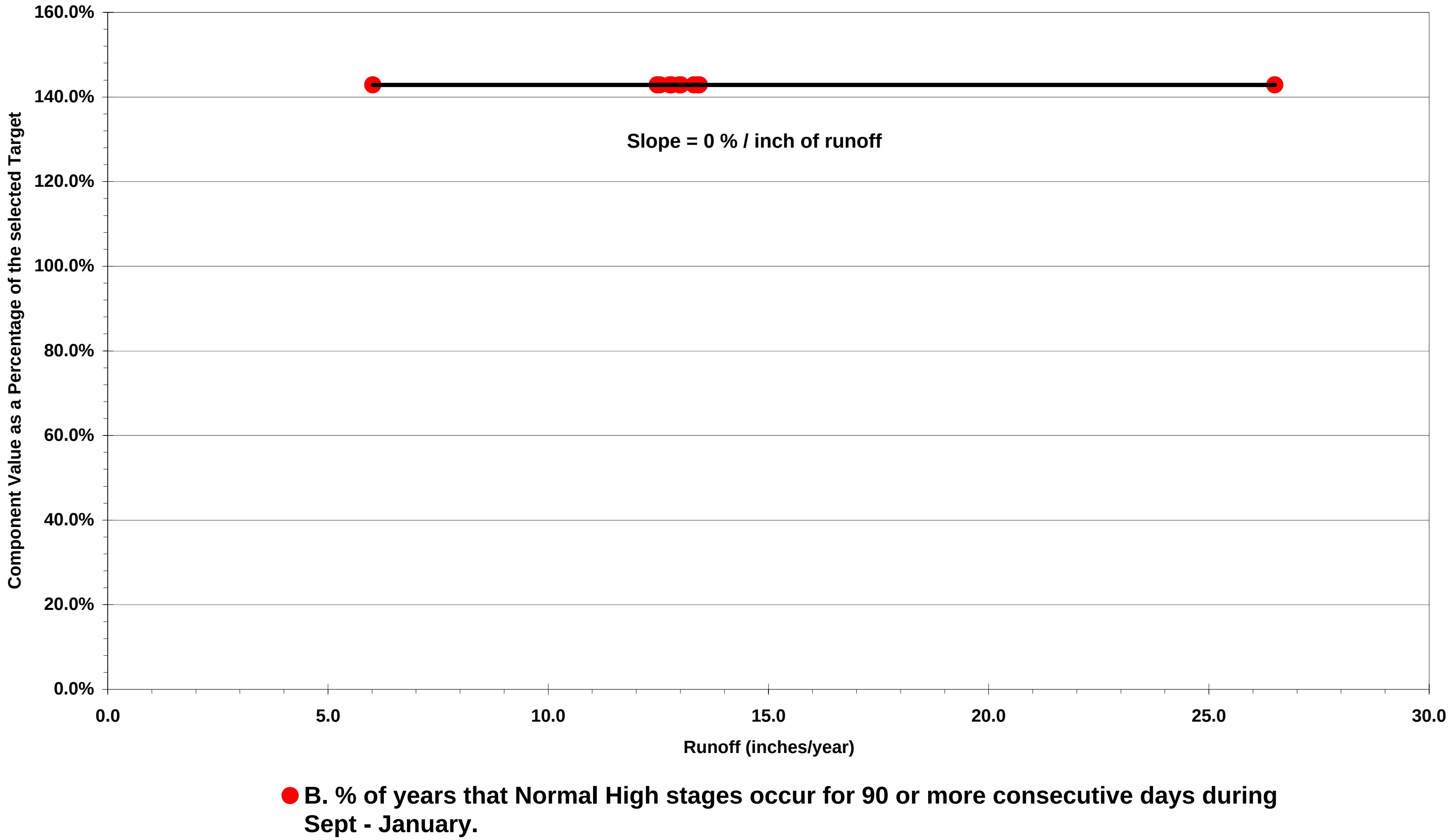
L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay

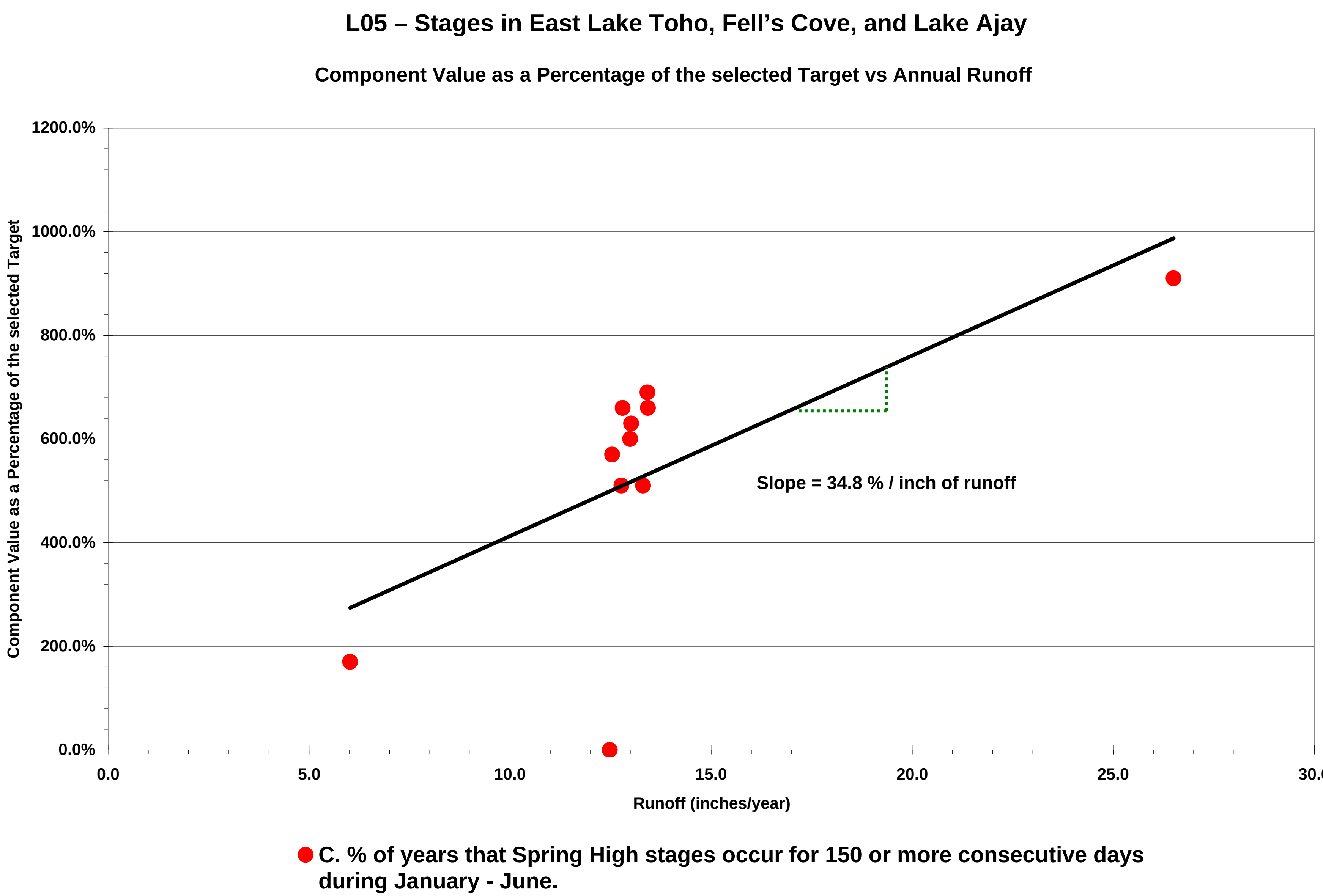
Component Value as a Percentage of the selected Target vs Annual Runoff



L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay

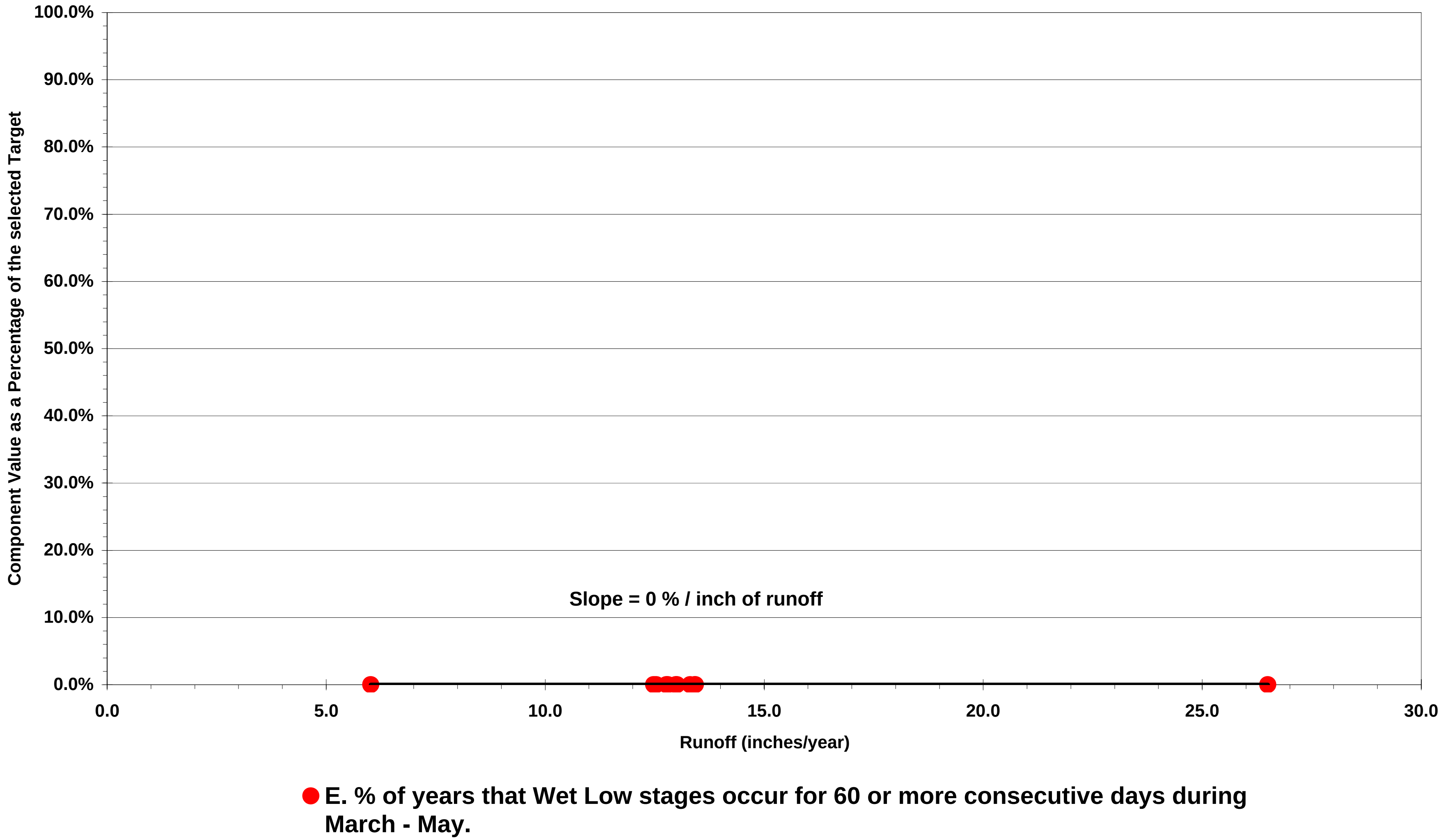
Component Value as a Percentage of the selected Target vs Annual Runoff




L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
1200.0%
1000.0%
800.0%
600.0%
400.0%
200.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 34.8 % / inch of runoff
C. % of years that Spring High stages occur for 150 or more consecutive days during January - June.

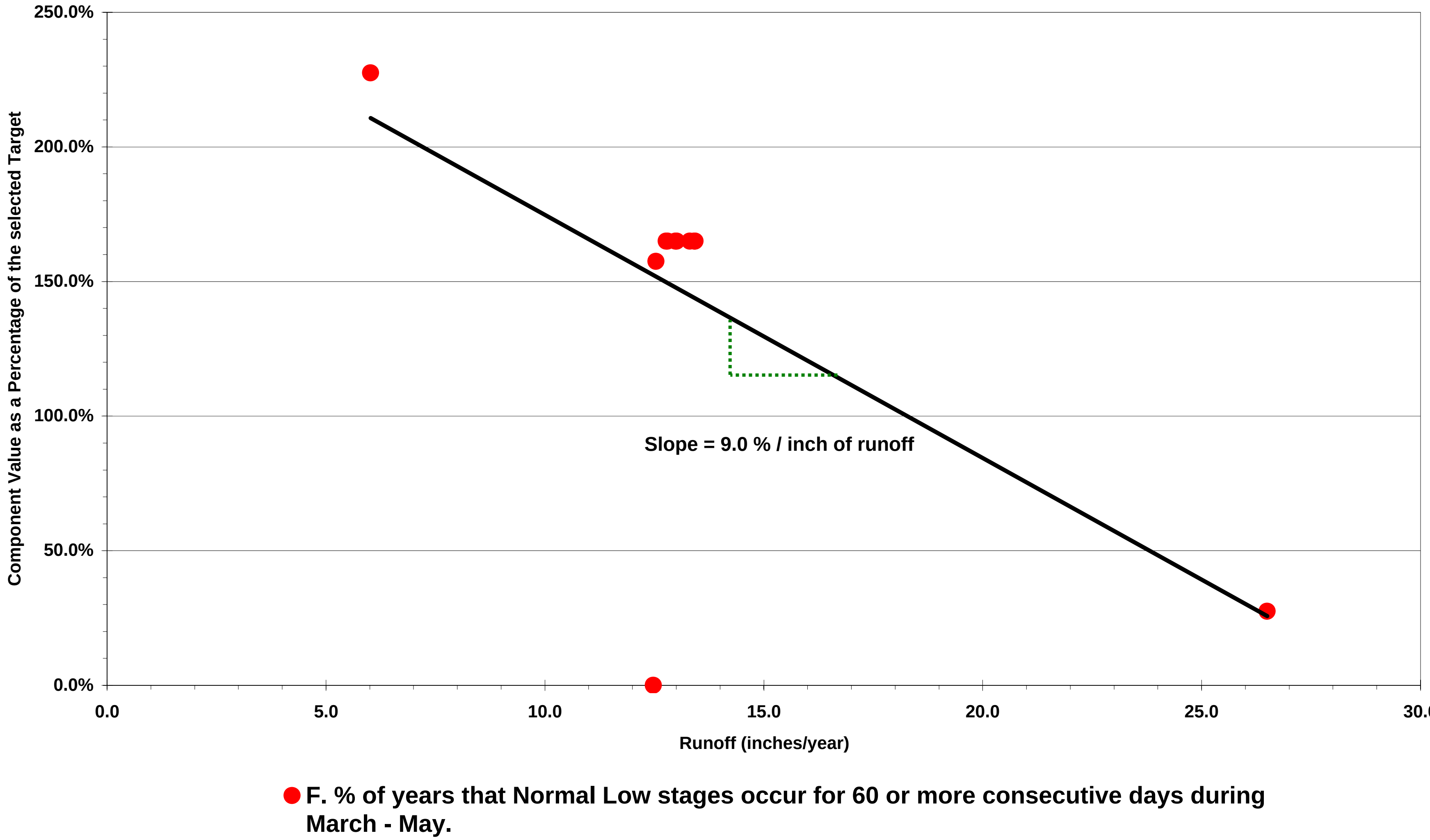
L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Component Value as a Percentage of the selected Target vs Annual Runoff



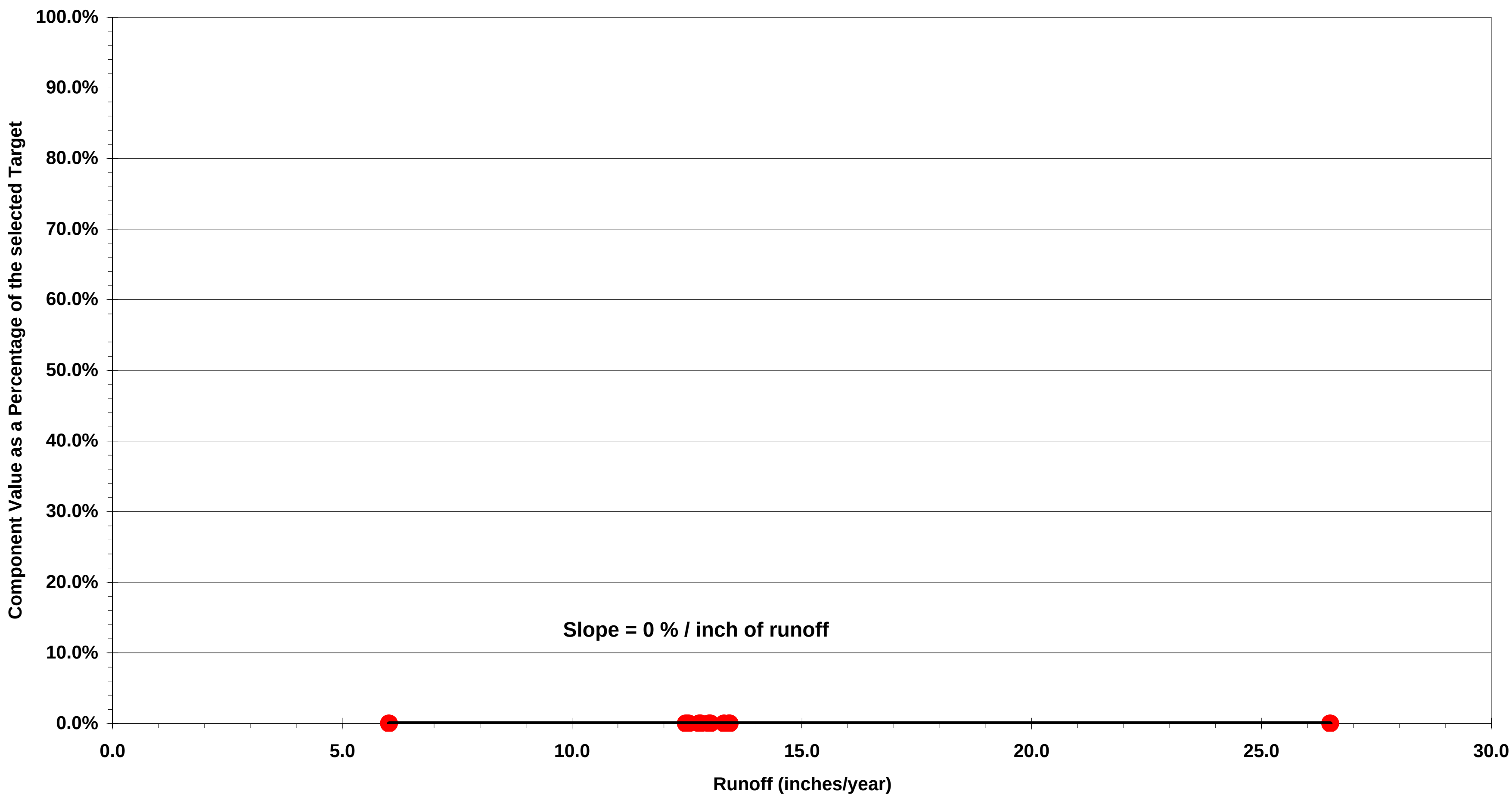
L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Component Value as a Percentage of the selected Target vs Annual Runoff



L05 – Stages in East Lake Toho, Fell’s Cove, and Lake Ajay

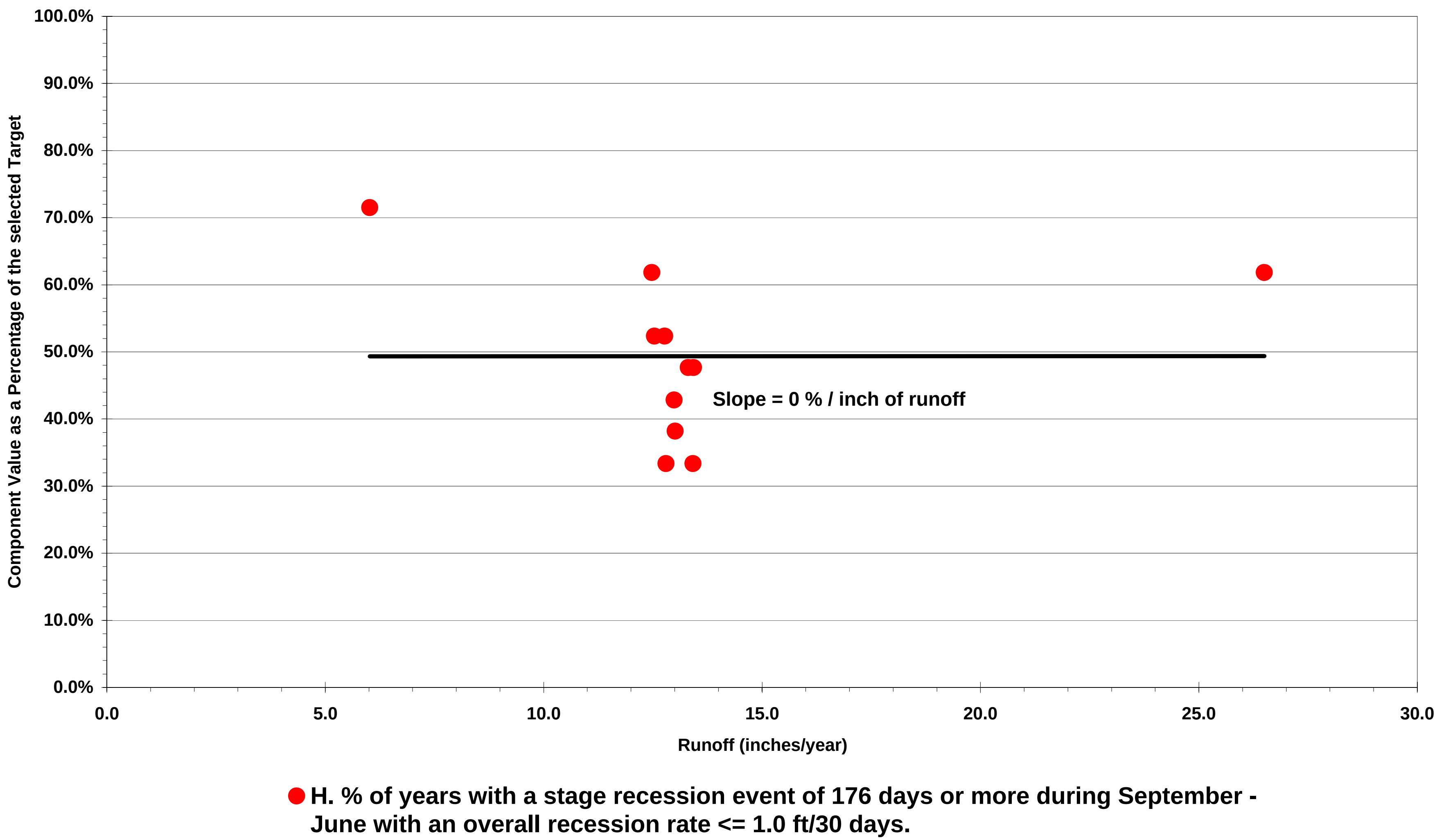
Component Value as a Percentage of the selected Target vs Annual Runoff



G. % of years that Extreme Low stages occur for 90 or more consecutive days during February - May.

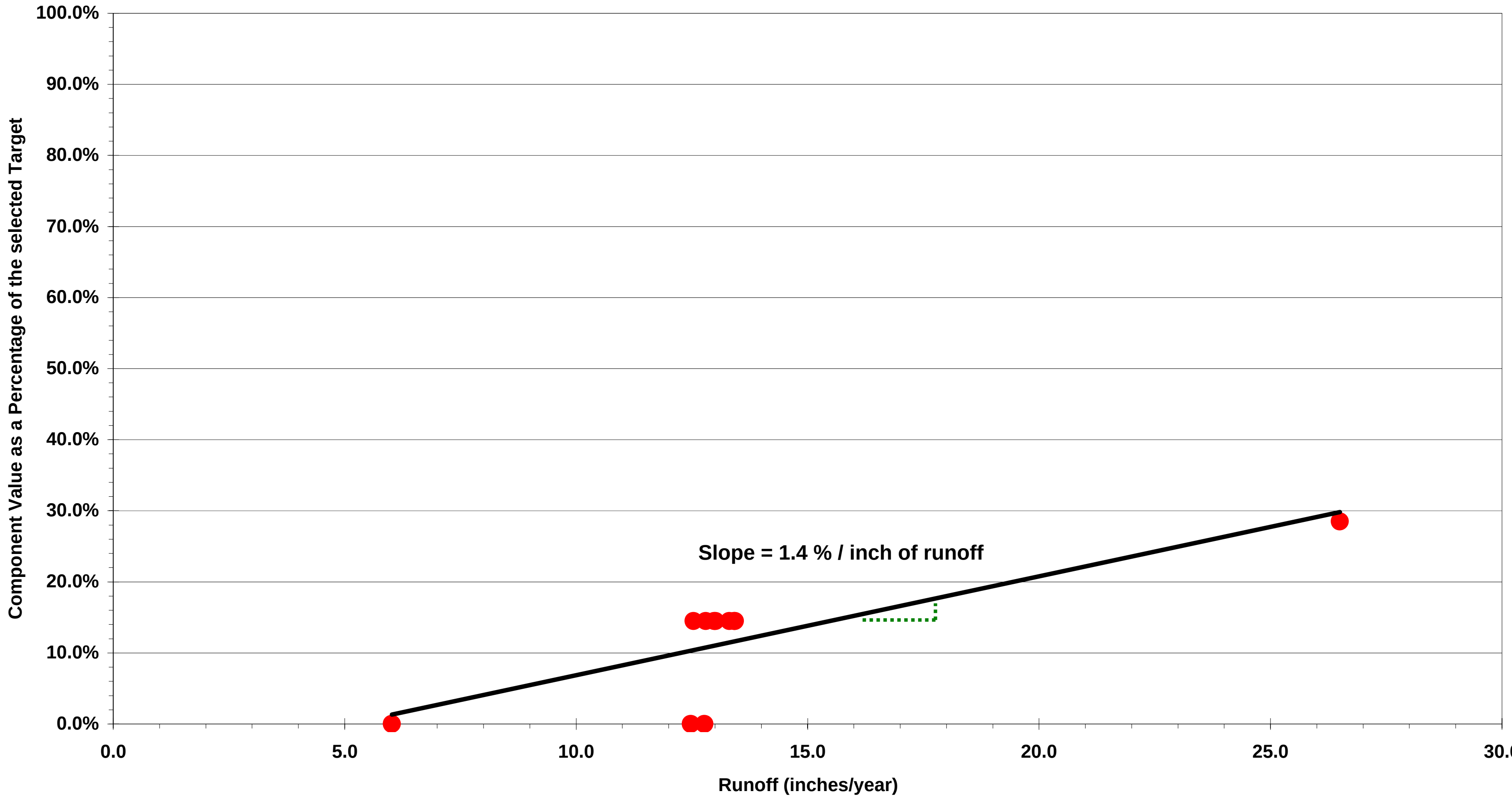
L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Component Value as a Percentage of the selected Target vs Annual Runoff

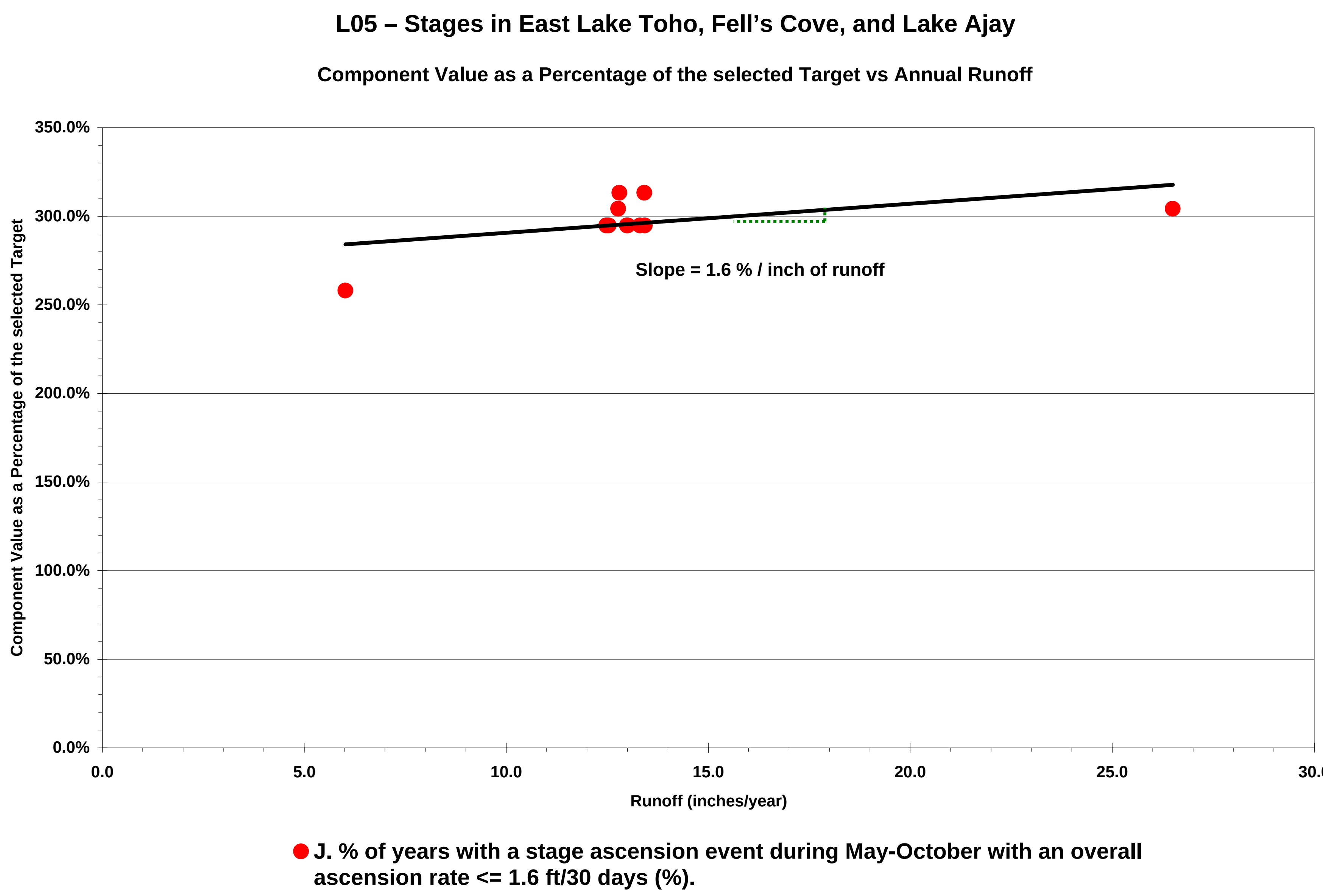


L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Component Value as a Percentage of the selected Target vs Annual Runoff

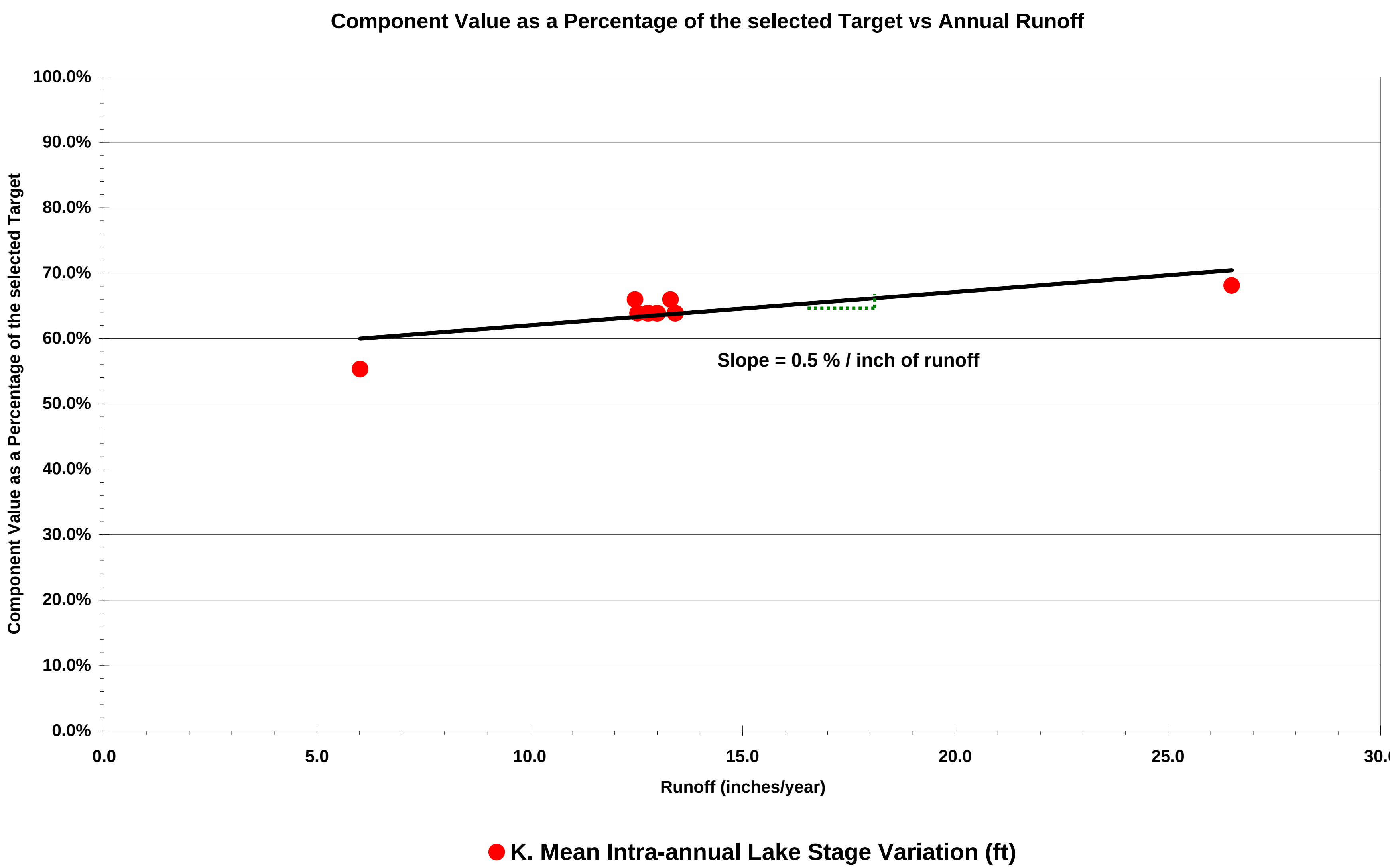


● I. % of years with stage reversals > 0.5 ft and < 1.5ft during December-June.



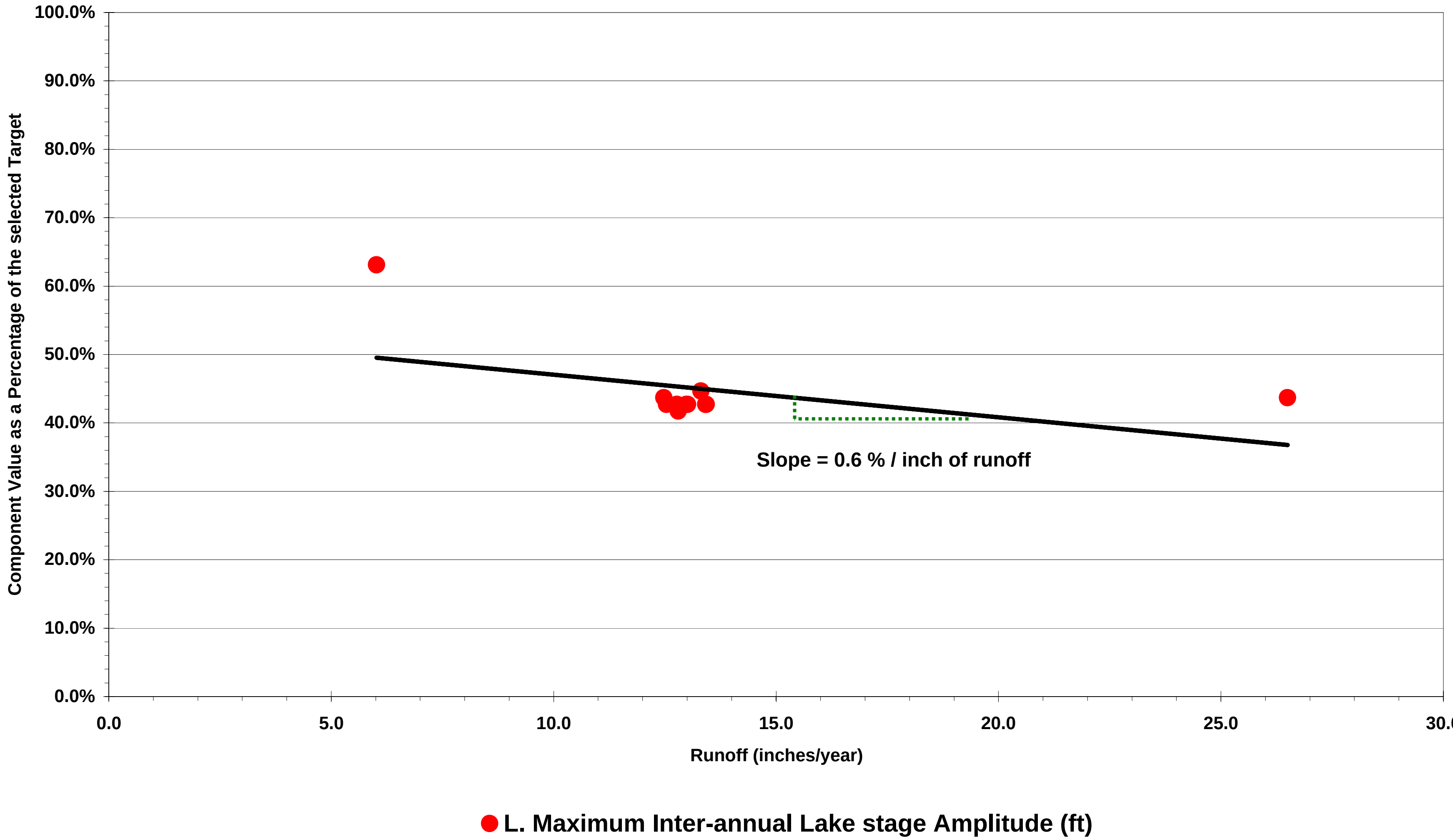
L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay
Component Value as a Percentage of the selected Target vs Annual Runoff
350.0%
300.0%
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
Component Value as a Percentage of the selected Target
Slope = 1.6 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
J. % of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days (%).

L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay



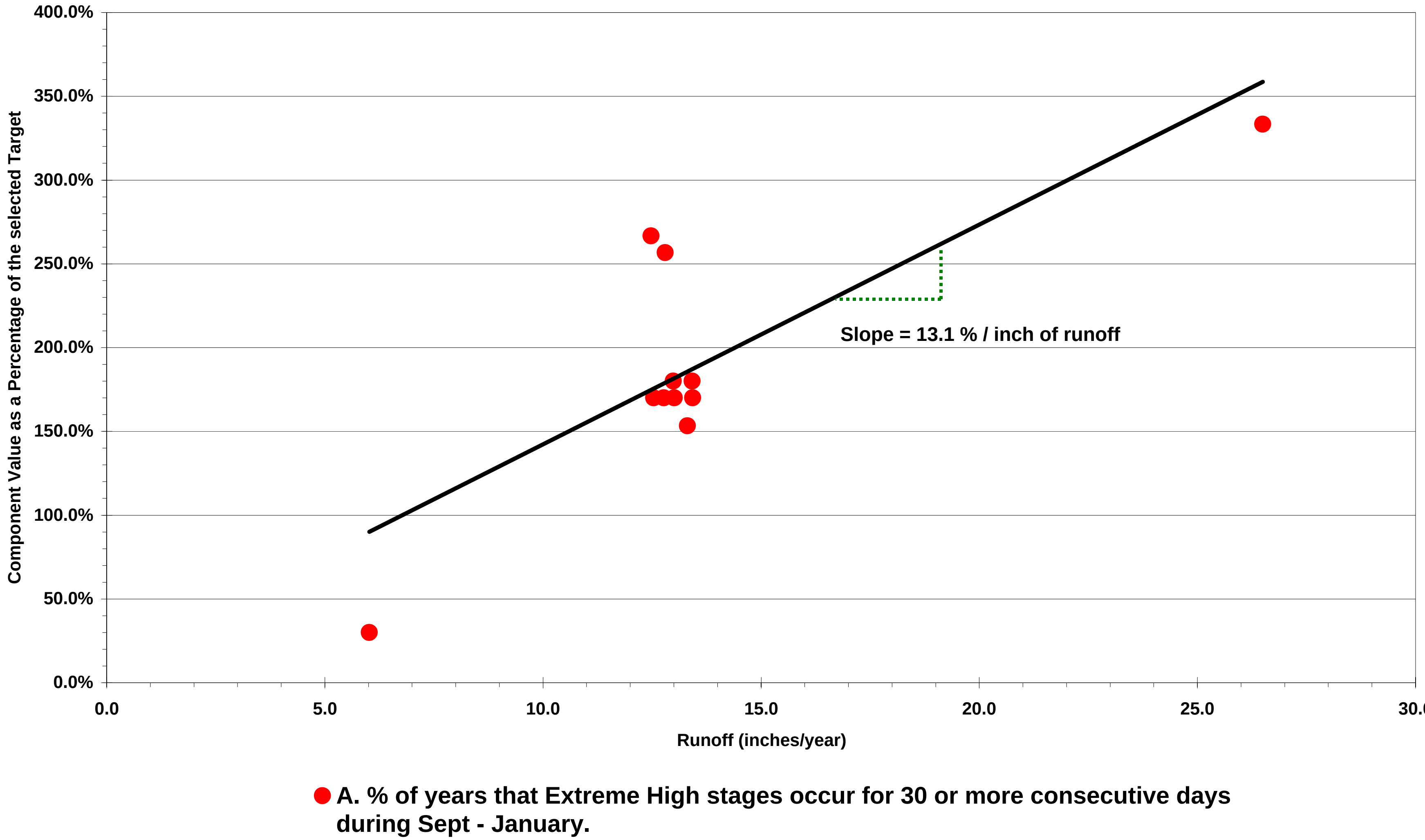
L05 – Stages in East Lake Toho, Fell's Cove, and Lake Ajay

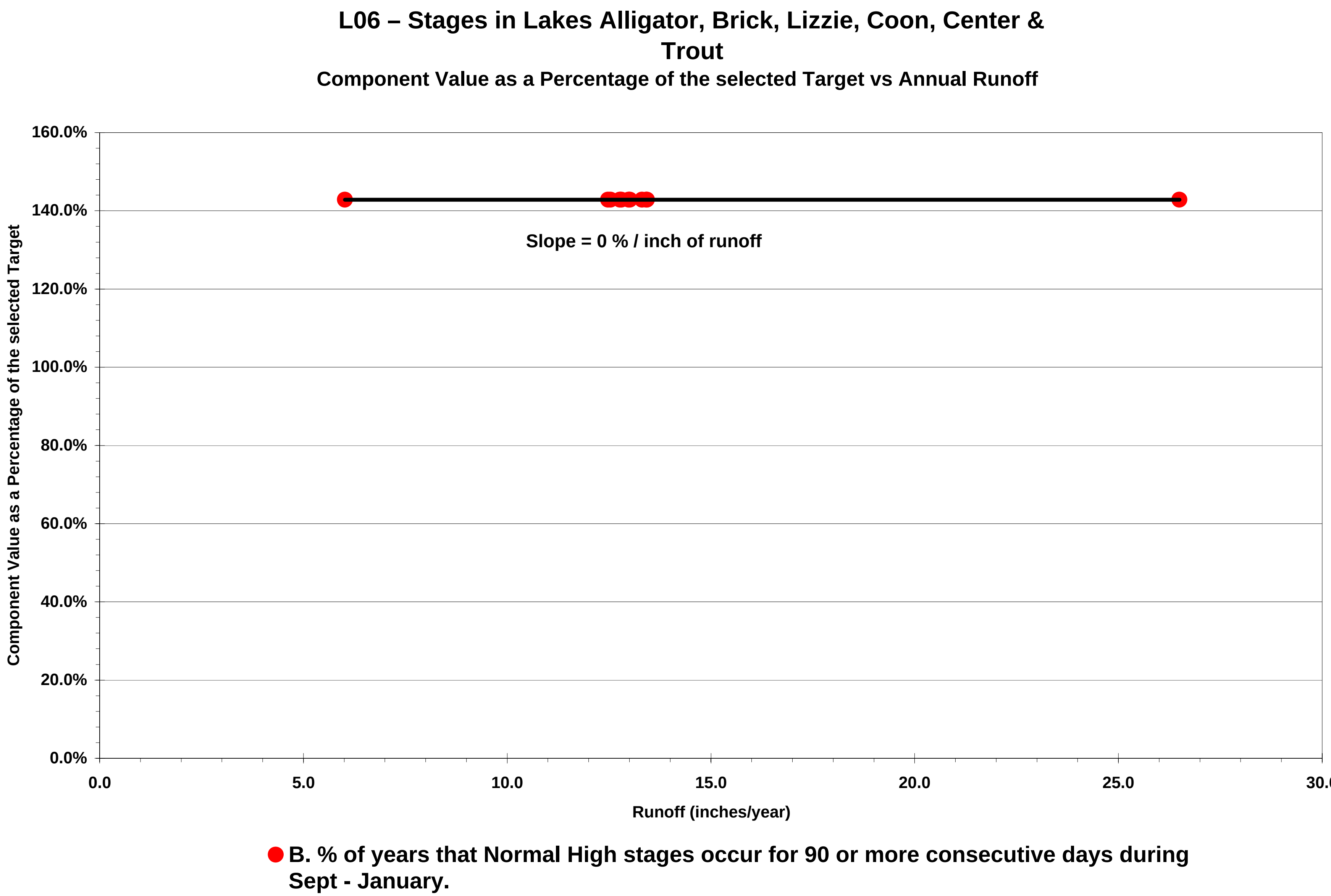
Component Value as a Percentage of the selected Target vs Annual Runoff



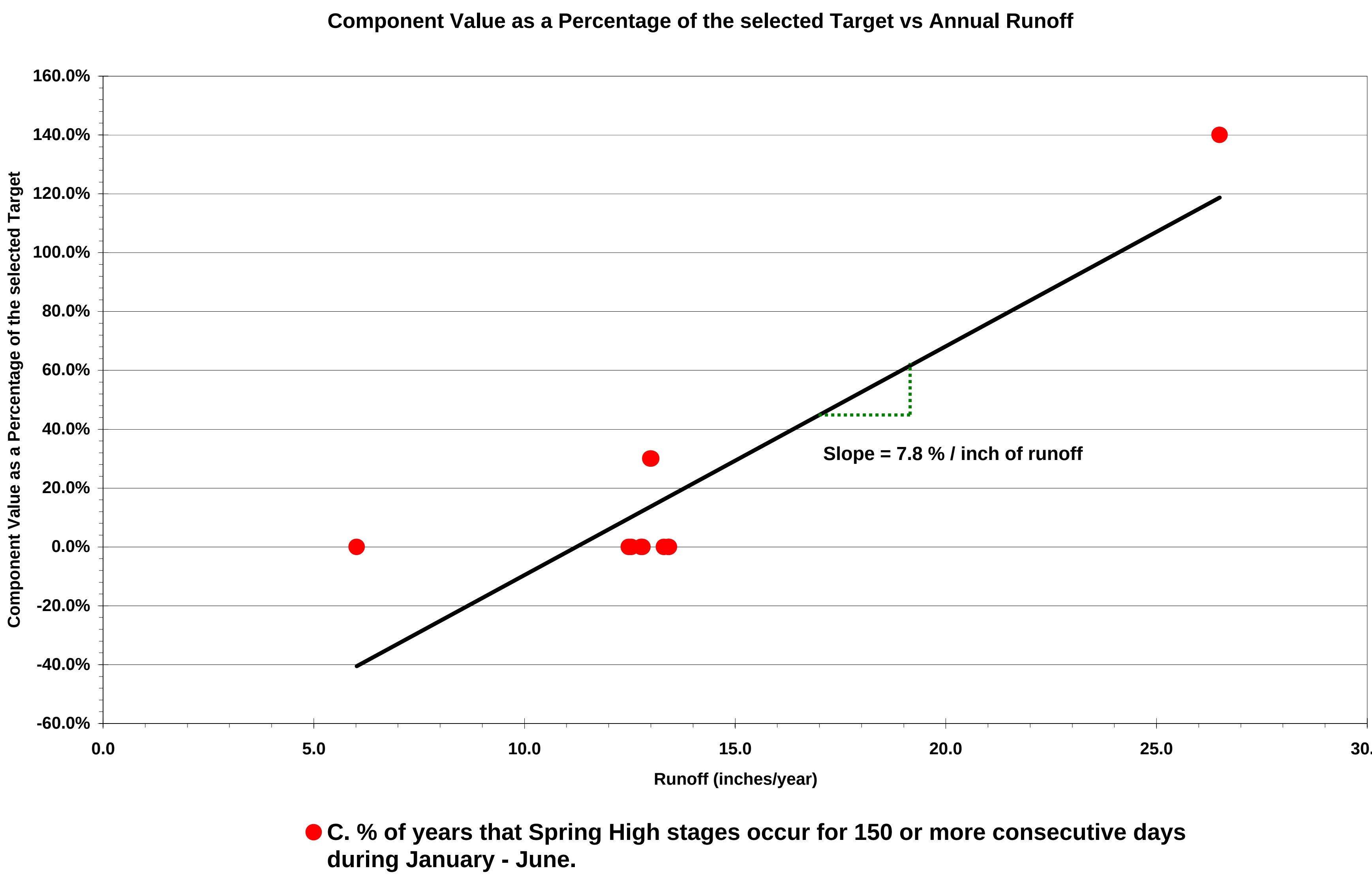
L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Component Value as a Percentage of the selected Target vs Annual Runoff



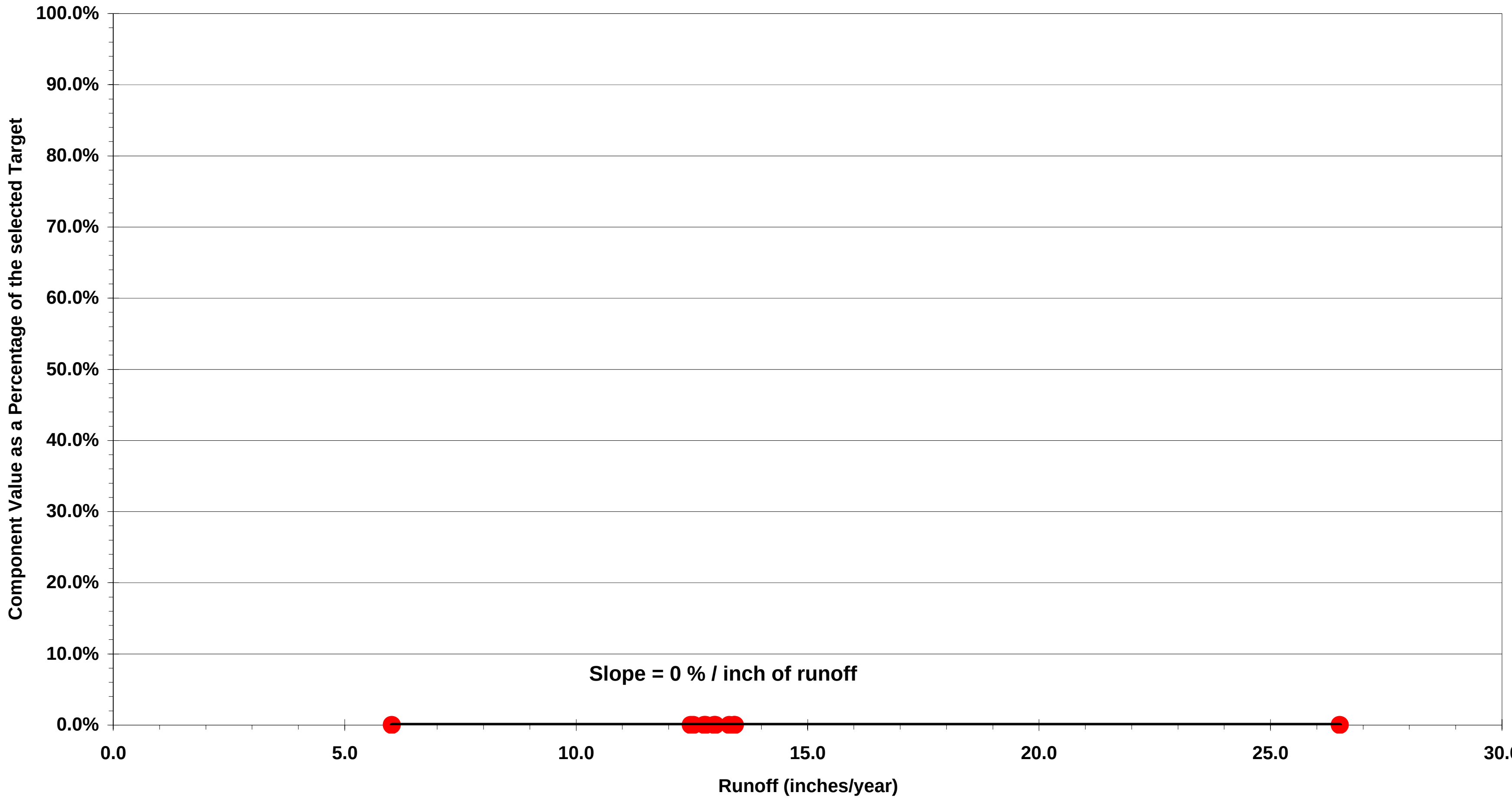

L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
160.0%
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Slope = 0 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
B. % of years that Normal High stages occur for 90 or more consecutive days during Sept - January.

L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout



L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

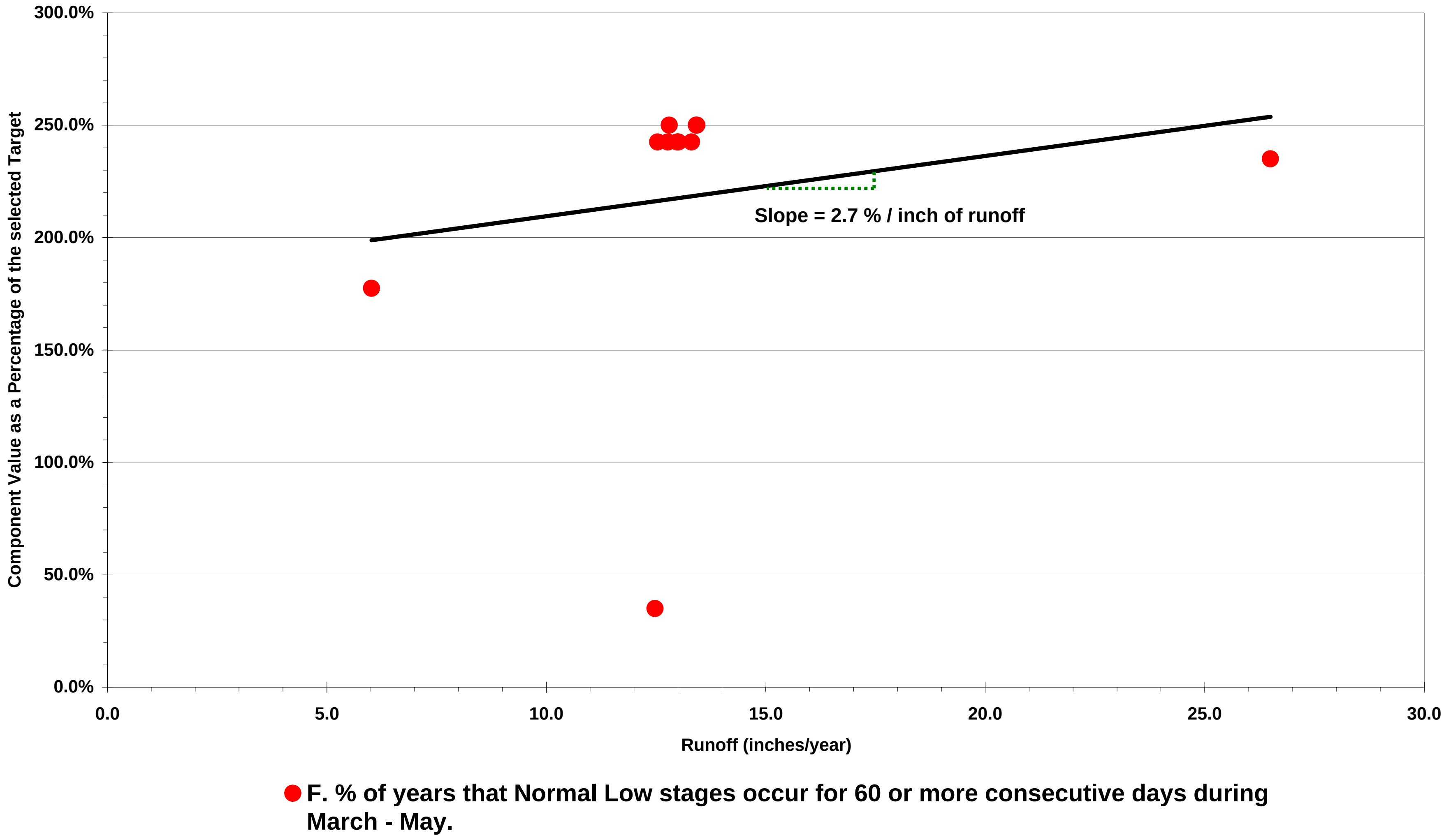
Component Value as a Percentage of the selected Target vs Annual Runoff



● E. % of years that Wet Low stages occur for 60 or more consecutive days during March - May.

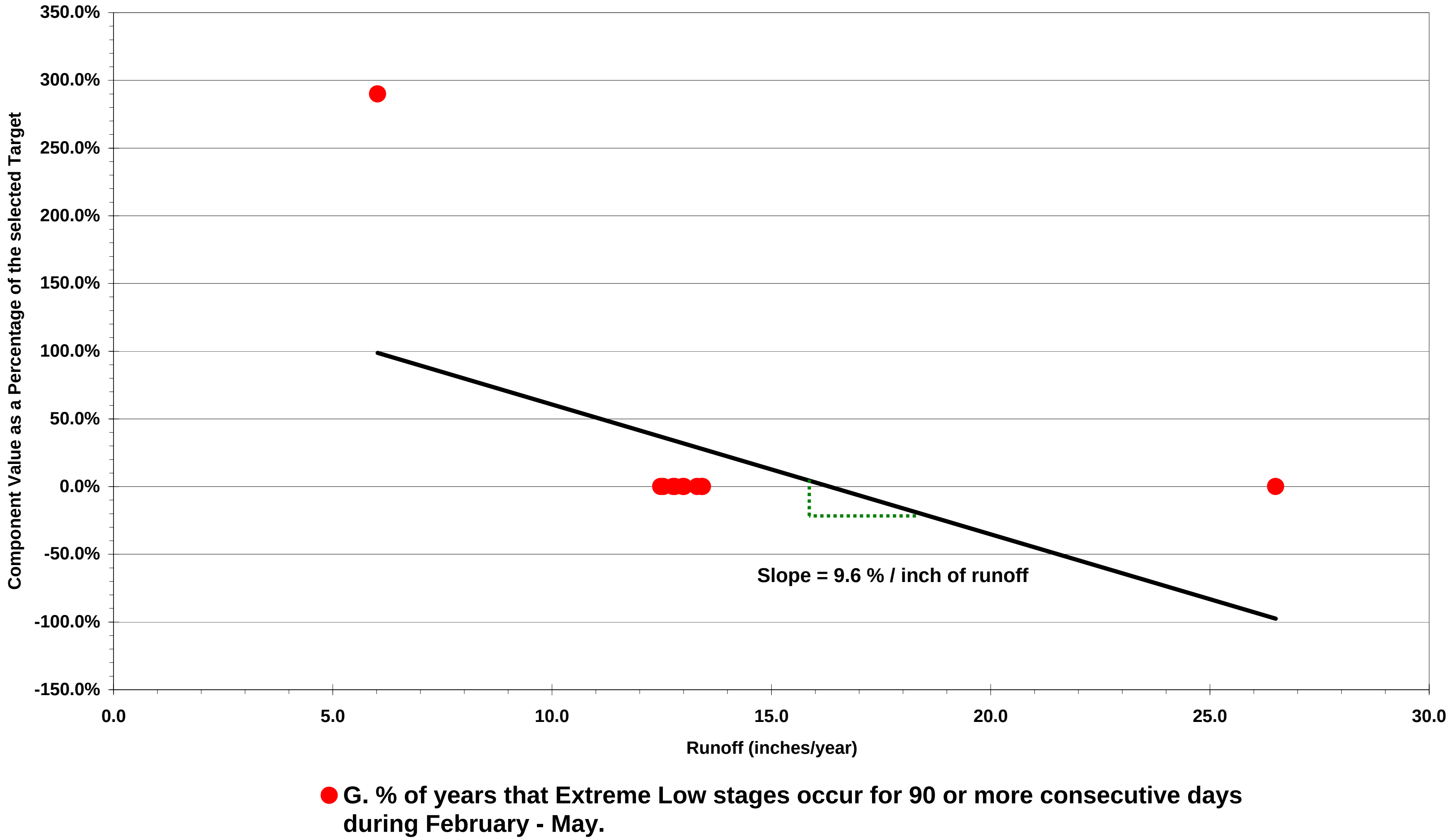
L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

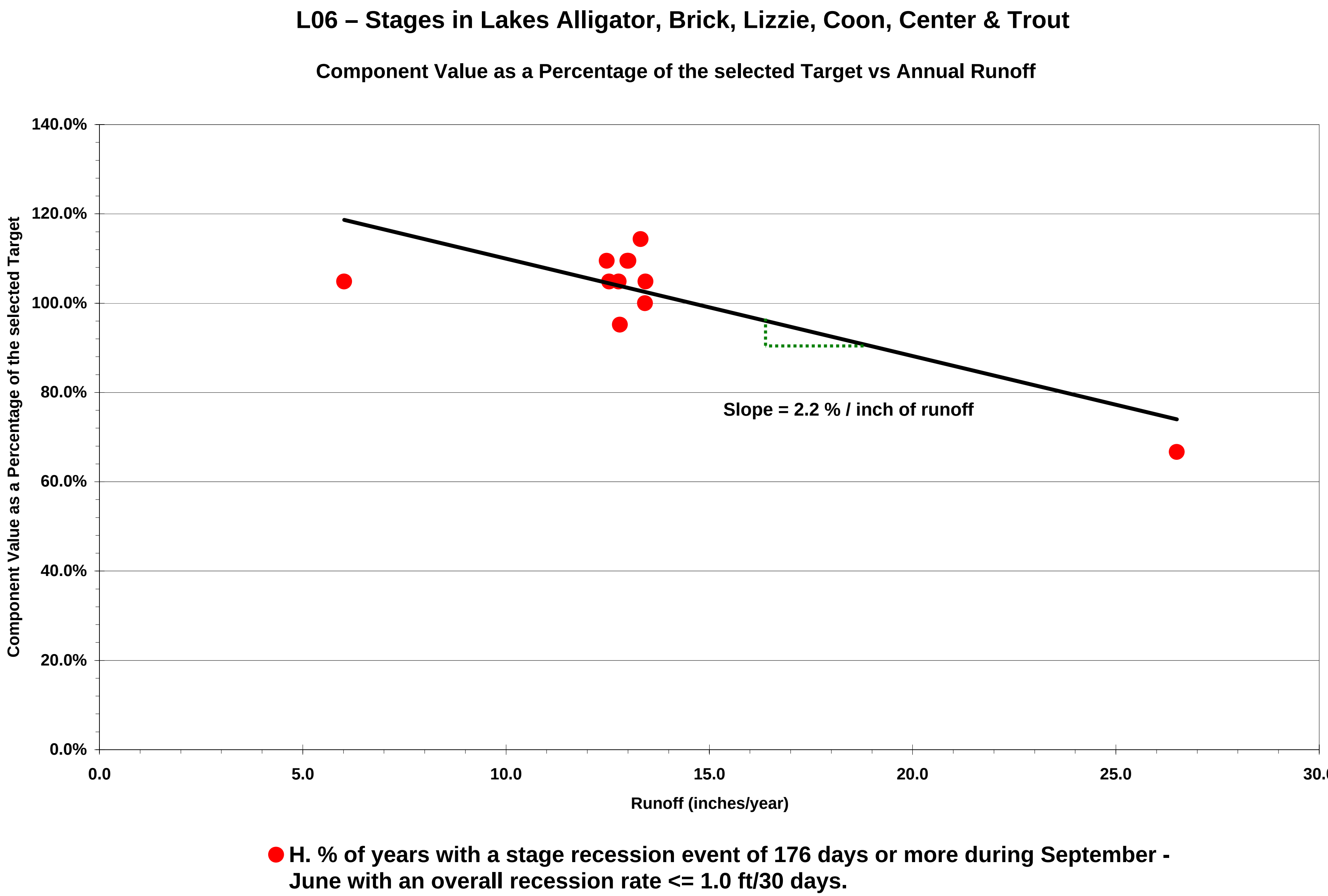
Component Value as a Percentage of the selected Target vs Annual Runoff

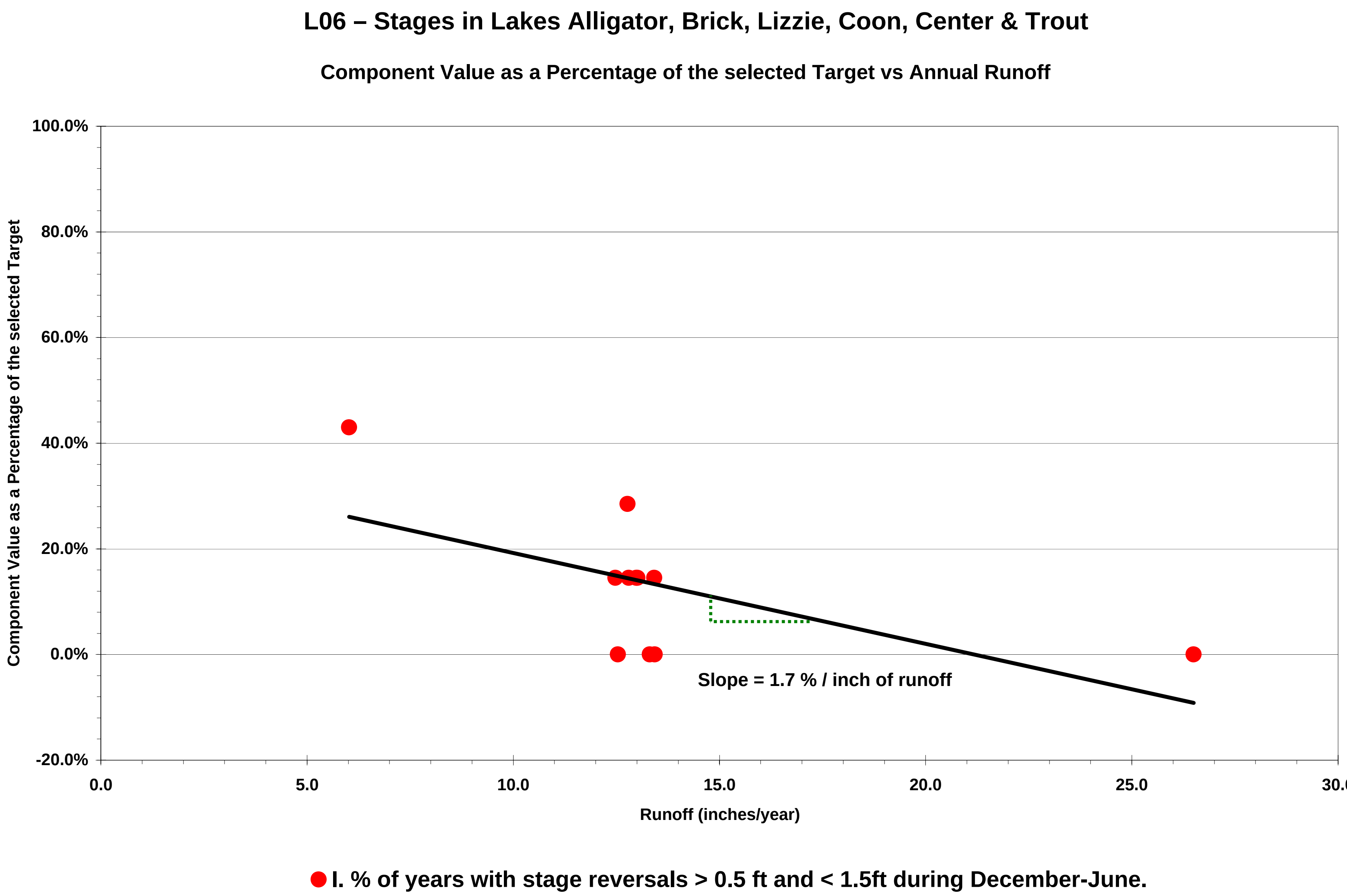


L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Component Value as a Percentage of the selected Target vs Annual Runoff



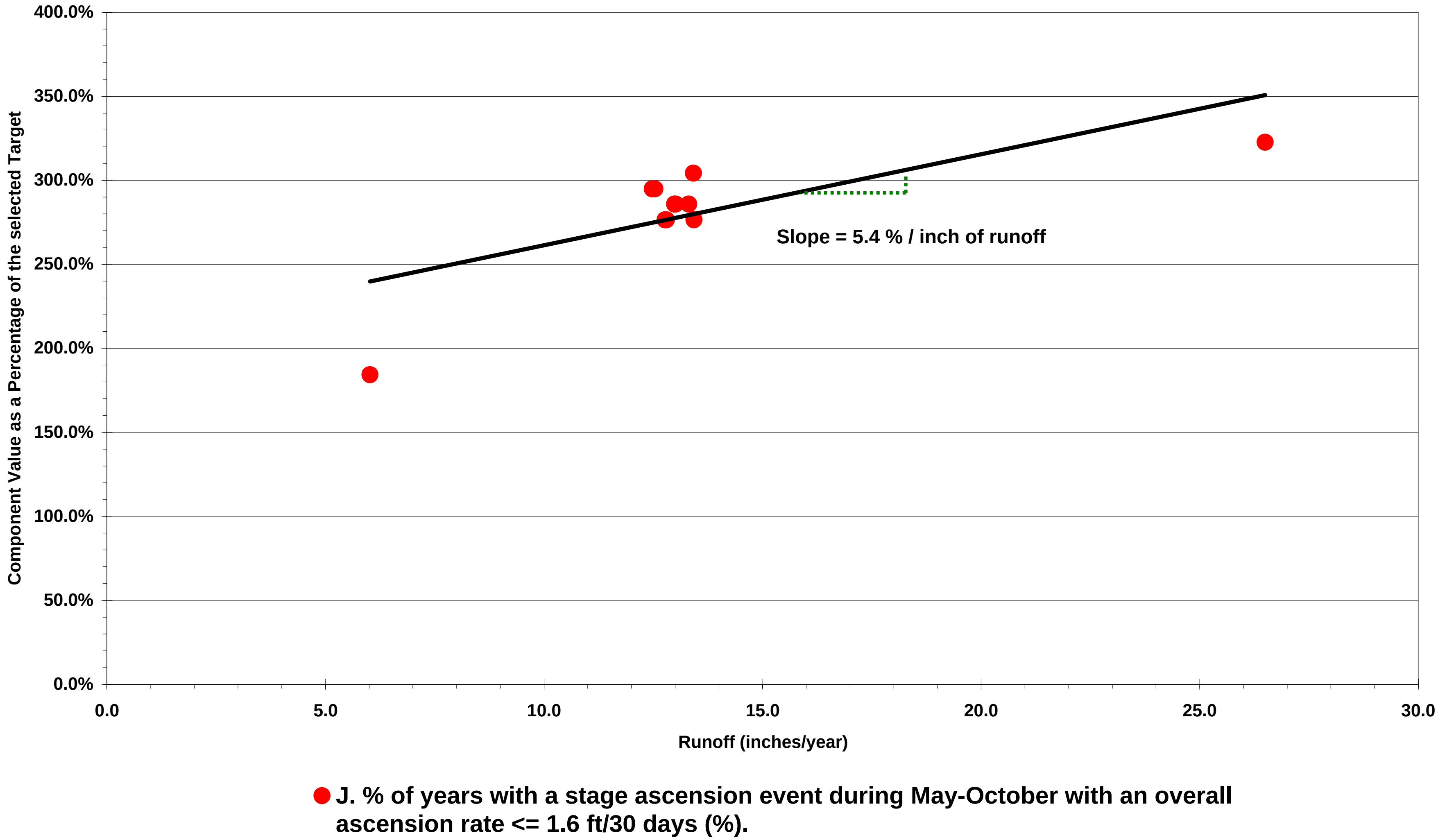

L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout
Component Value as a Percentage of the selected Target vs Annual Runoff
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Component Value as a Percentage of the selected Target
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 2.2 % / inch of runoff
H. % of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.0 ft/30 days.



L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout
Component Value as a Percentage of the selected Target vs Annual Runoff
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
Component Value as a Percentage of the selected Target
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 1.7 % / inch of runoff
I. % of years with stage reversals > 0.5 ft and < 1.5ft during December-June.

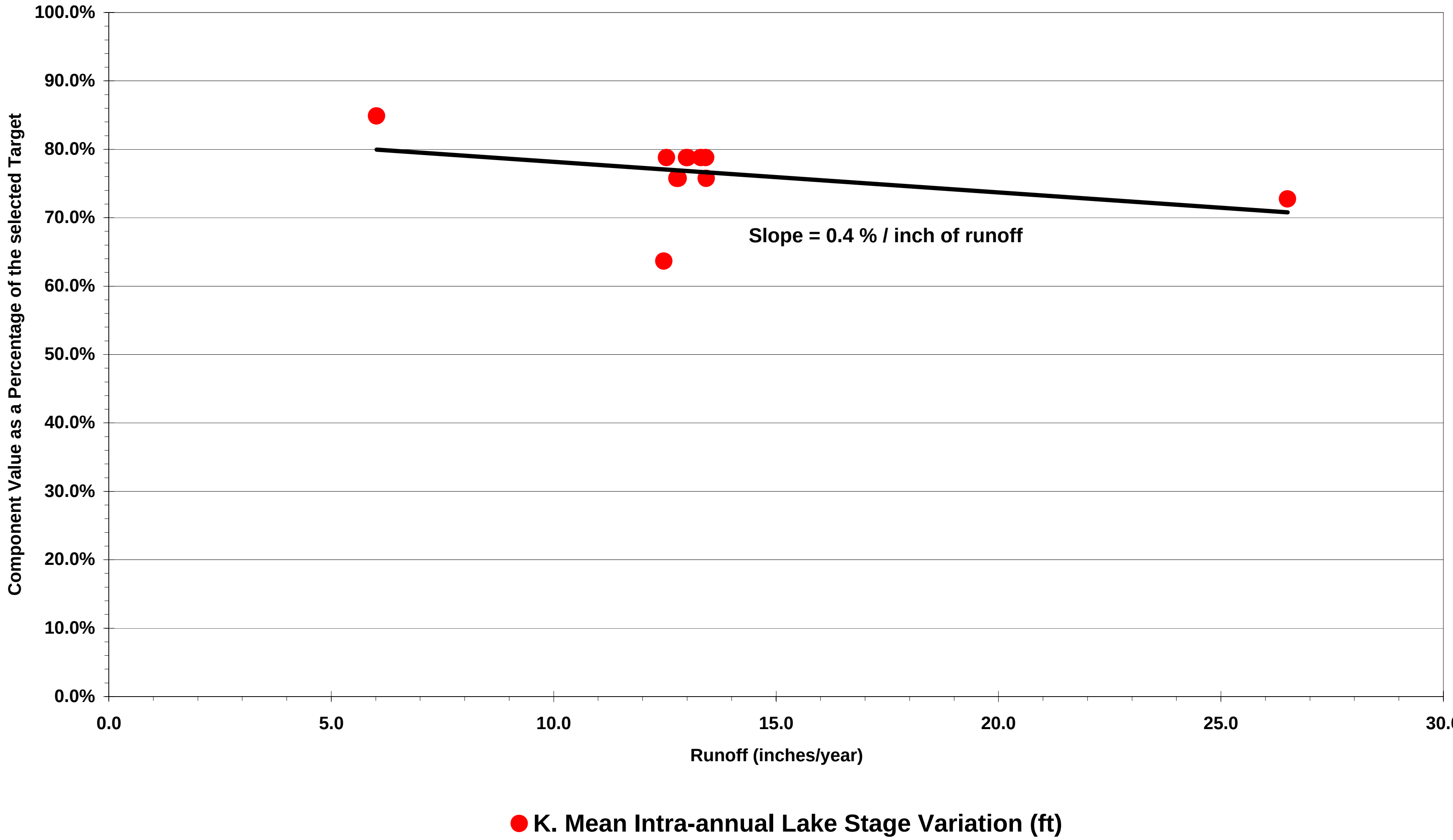
L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

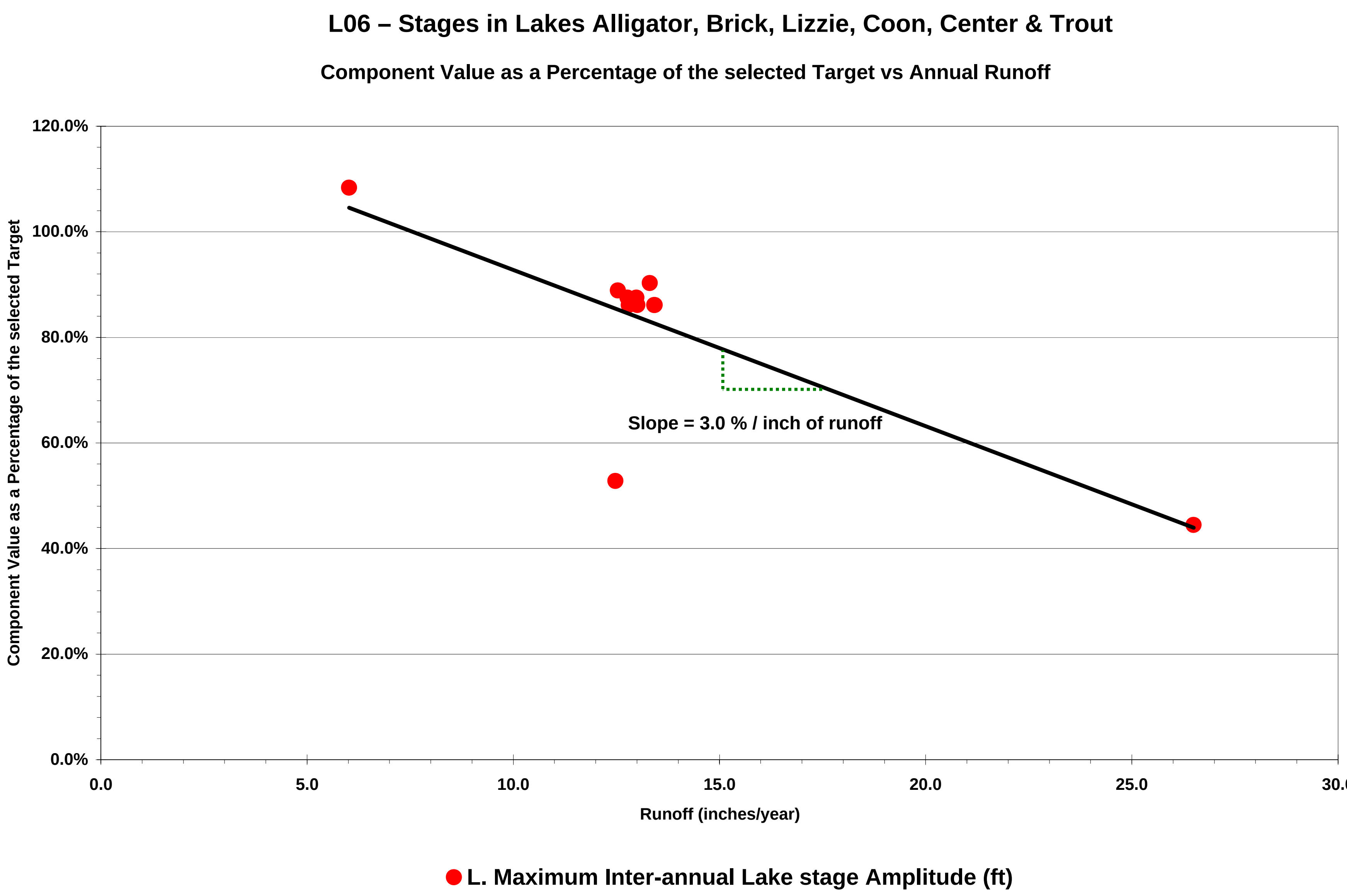
Component Value as a Percentage of the selected Target vs Annual Runoff



L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Component Value as a Percentage of the selected Target vs Annual Runoff

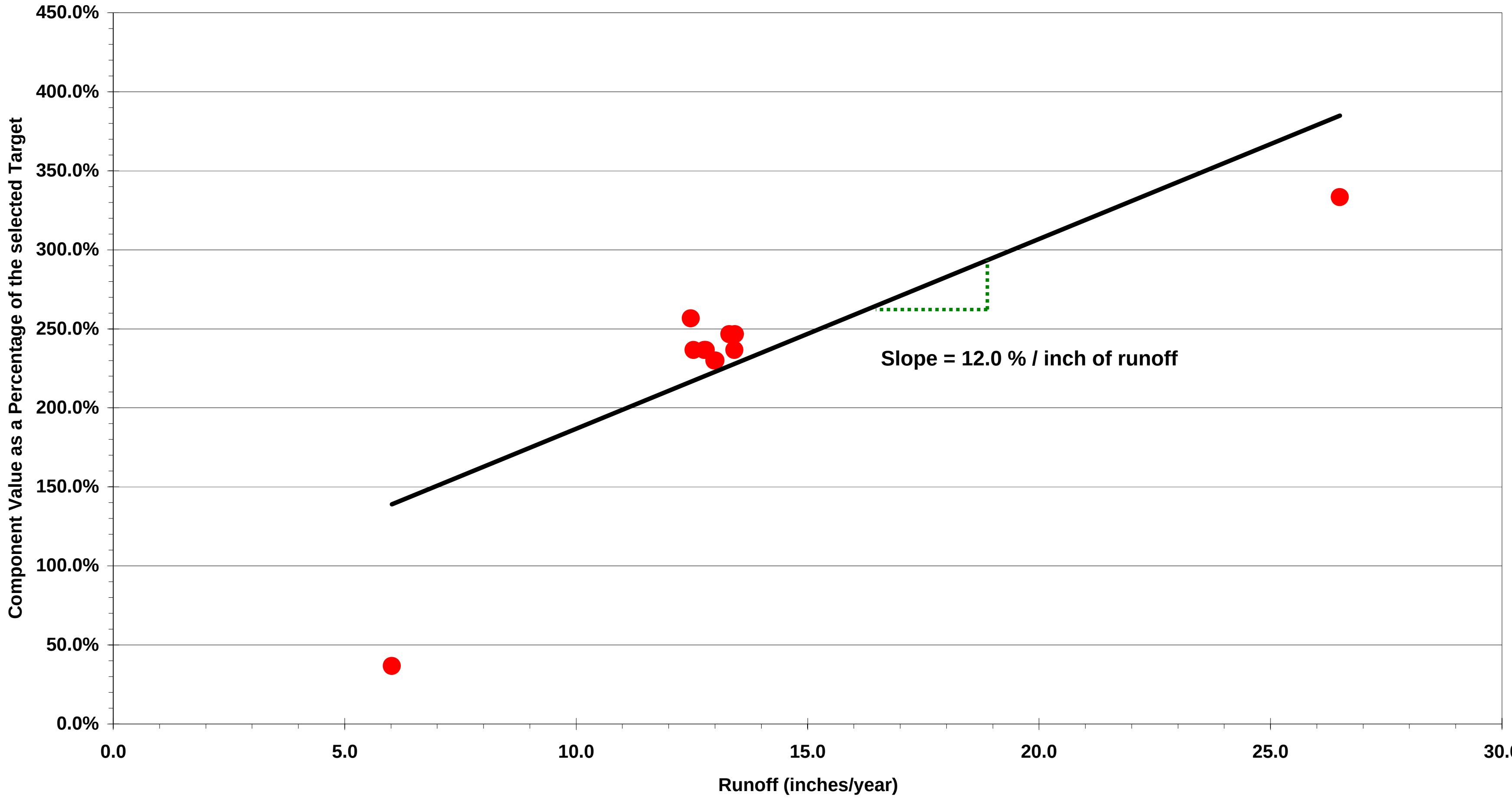




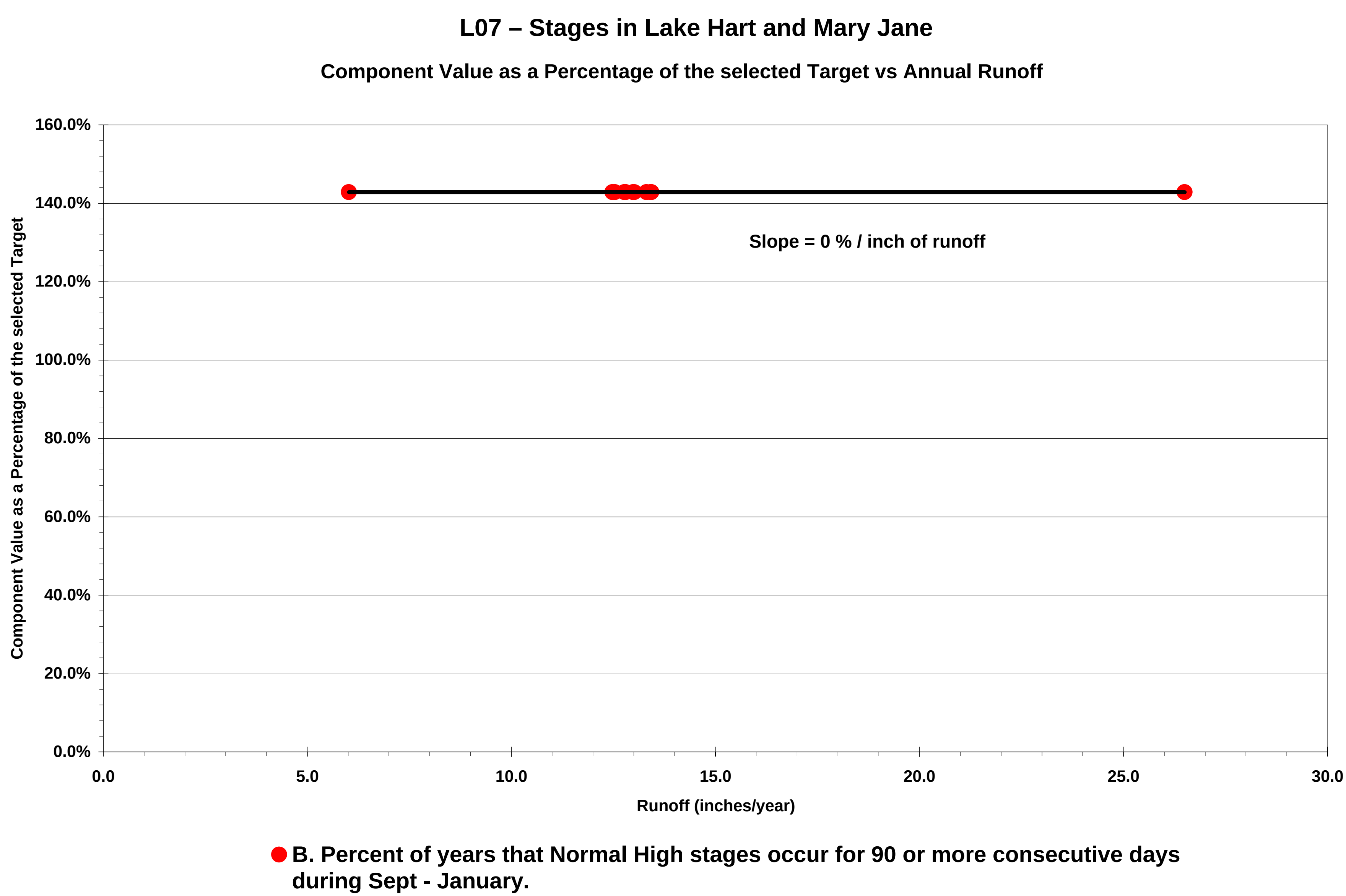
L06 – Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 3.0 % / inch of runoff
L. Maximum Inter-annual Lake stage Amplitude (ft)

L07 – Stages in Lake Hart and Mary Jane

Component Value as a Percentage of the selected Target vs Annual Runoff



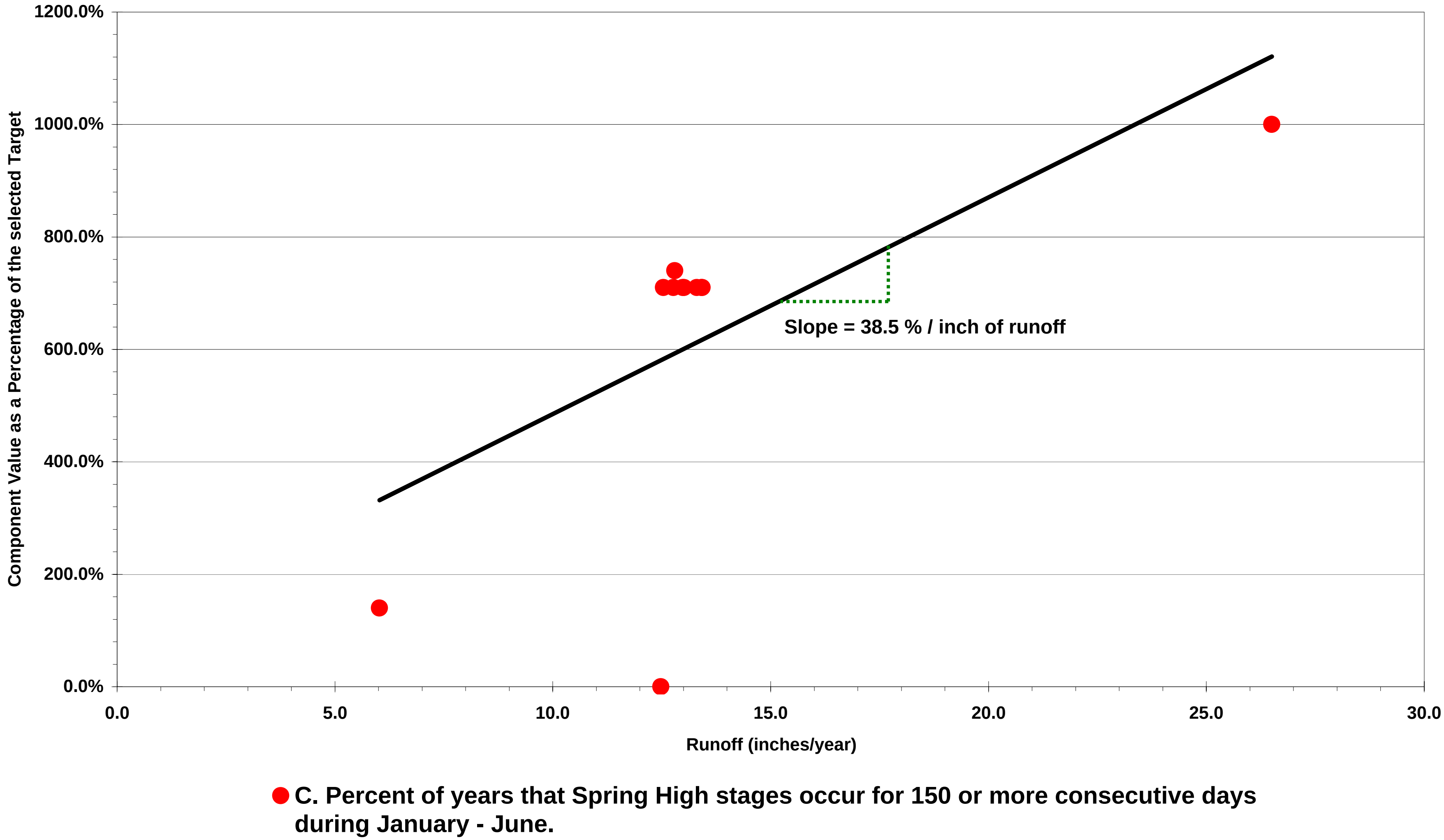
● A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.



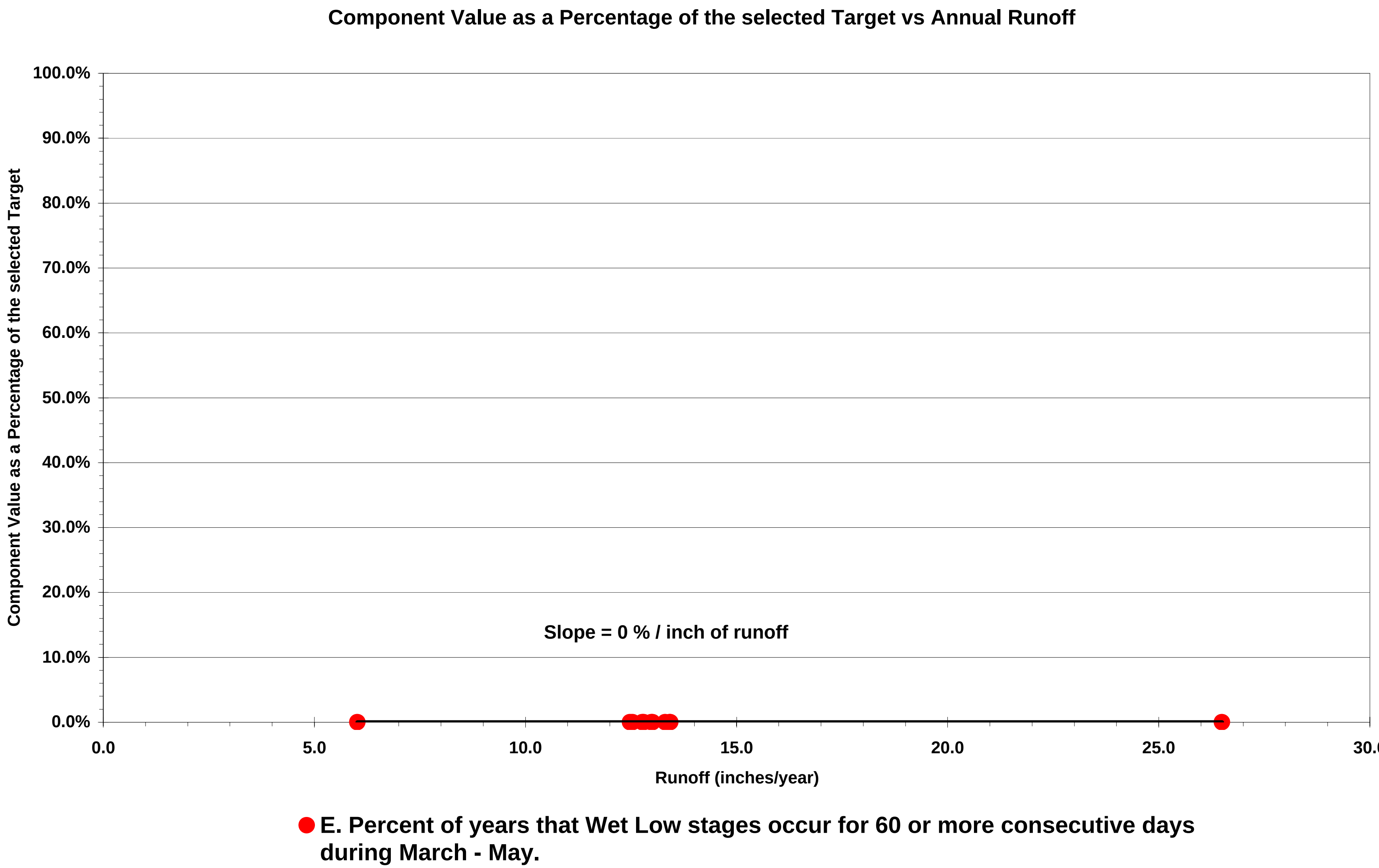
L07 – Stages in Lake Hart and Mary Jane
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
160.0%
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 0 % / inch of runoff
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.

L07 – Stages in Lake Hart and Mary Jane

Component Value as a Percentage of the selected Target vs Annual Runoff

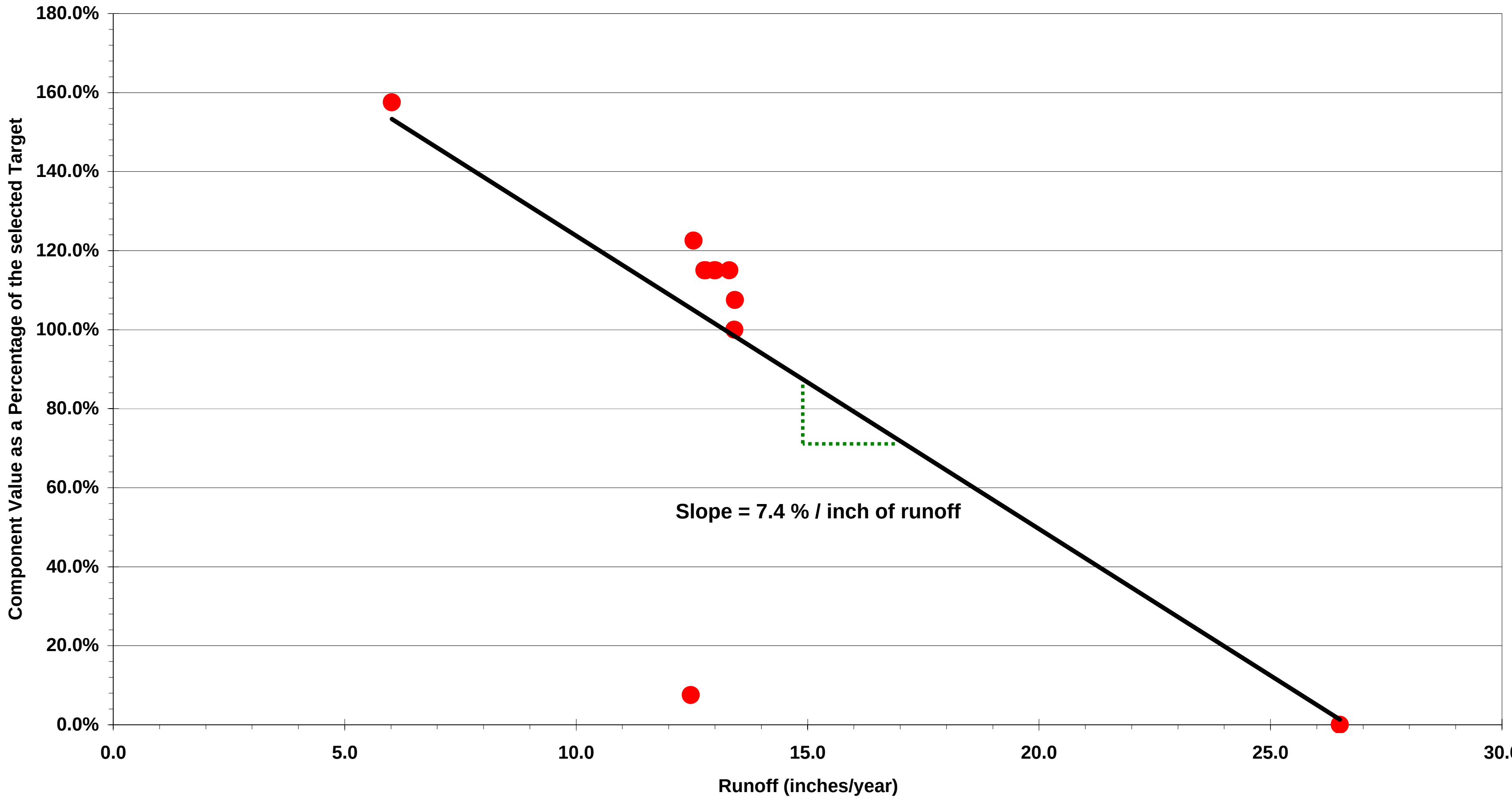


L07 – Stages in Lake Hart and Mary Jane

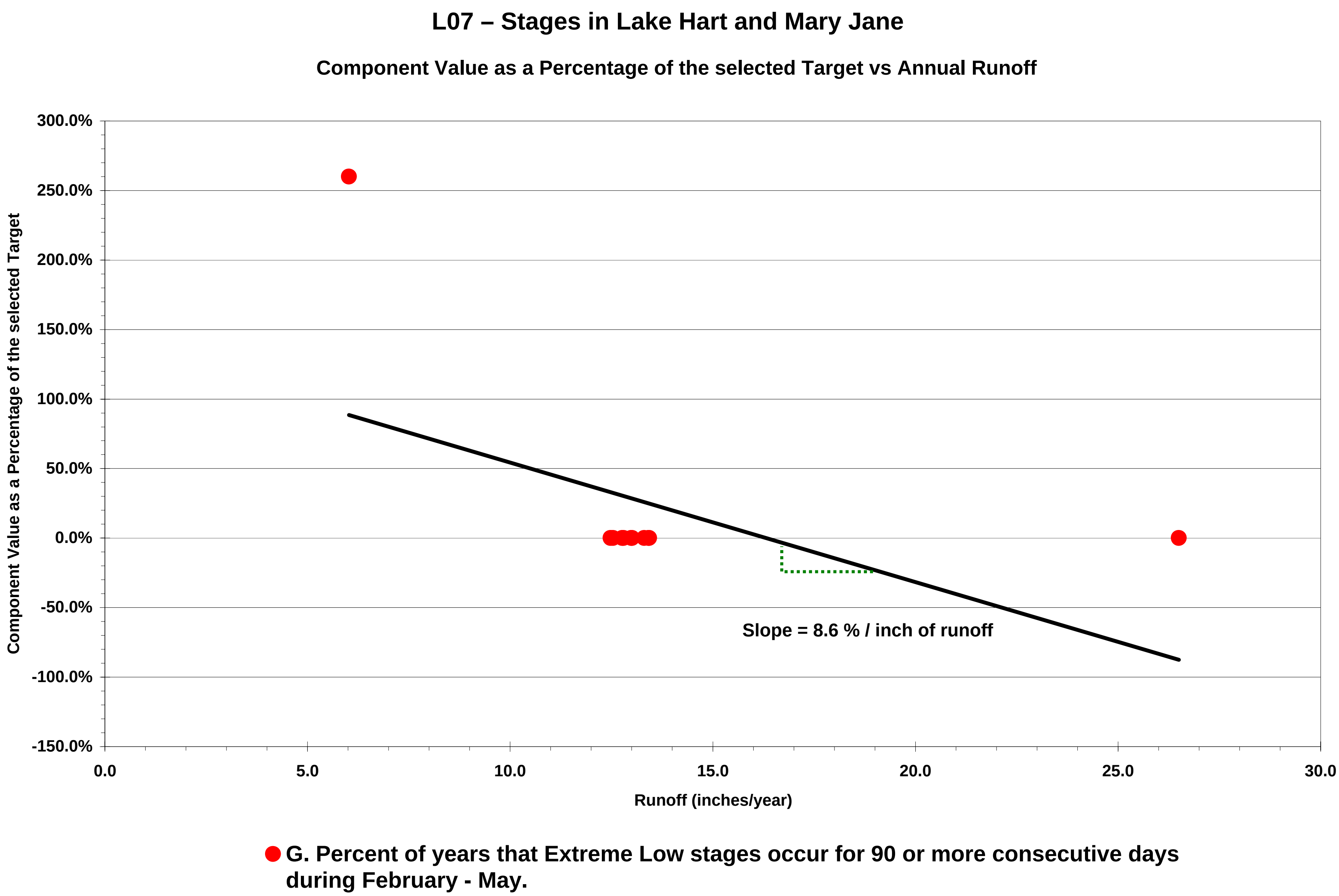


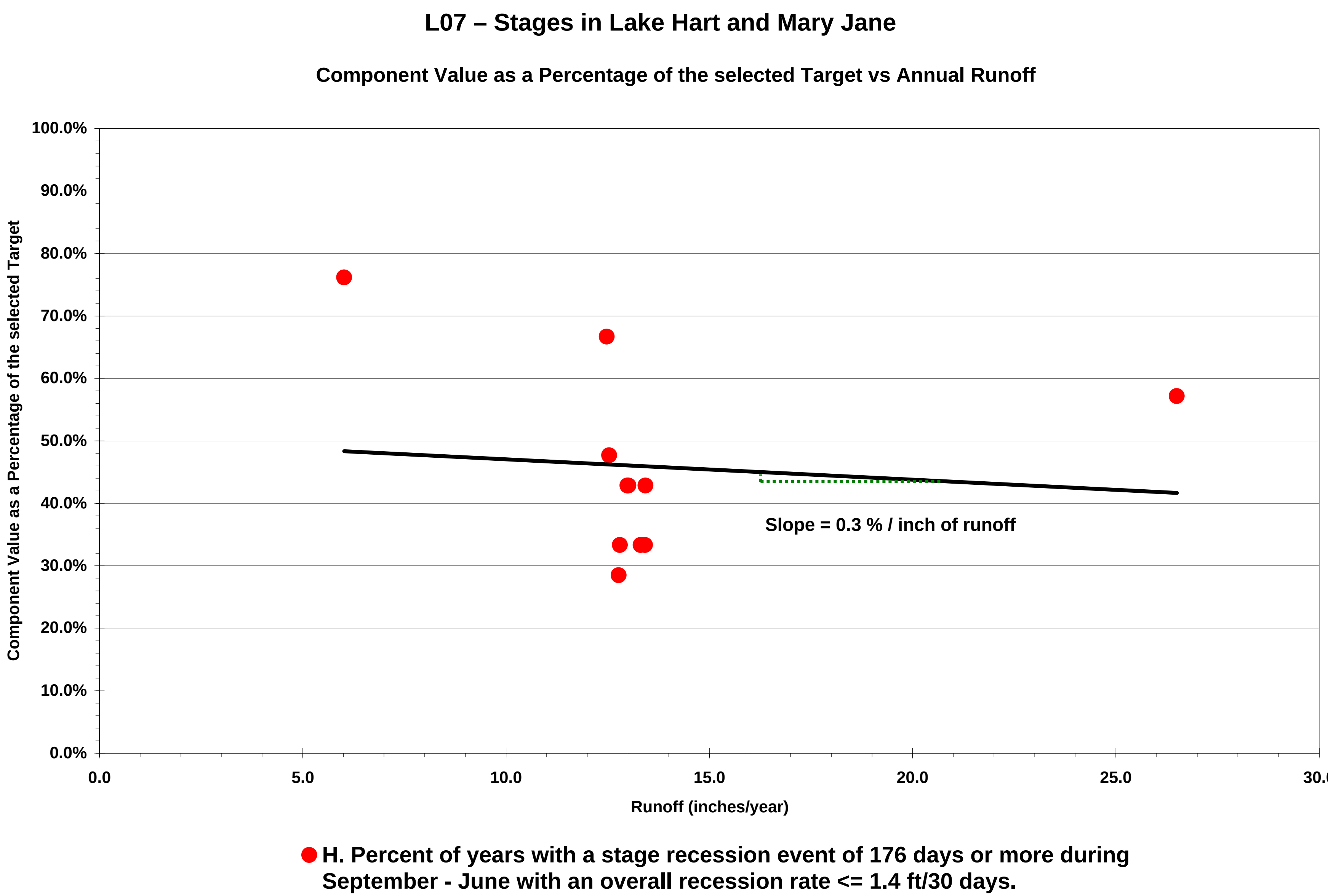
L07 – Stages in Lake Hart and Mary Jane

Component Value as a Percentage of the selected Target vs Annual Runoff



F. Percent of years that Normal Low stages occur for 60 or more consecutive days during March - May.

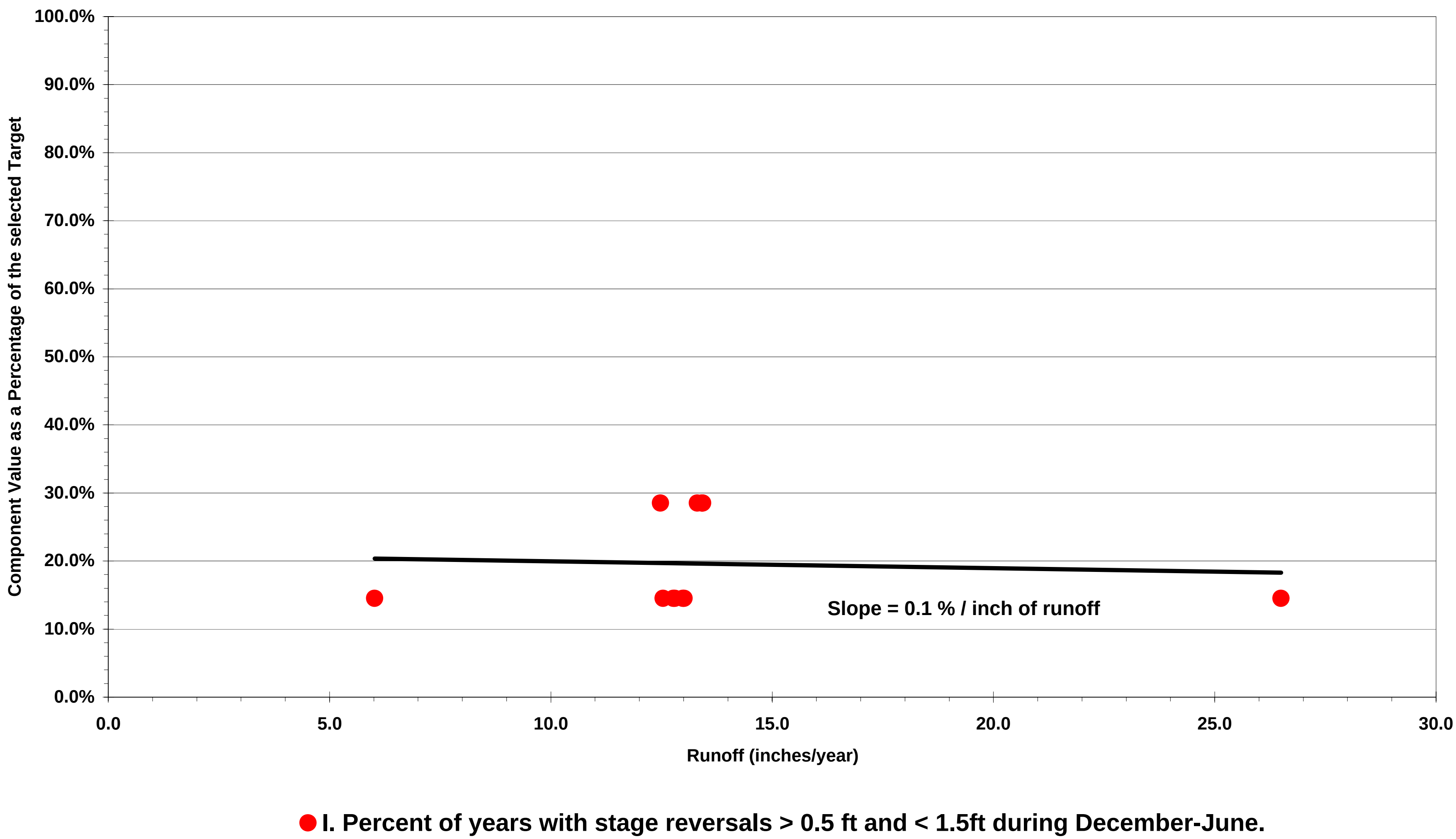

L07 – Stages in Lake Hart and Mary Jane
Component Value as a Percentage of the selected Target vs Annual Runoff
300.0%
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
-50.0%
-100.0%
-150.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Component Value as a Percentage of the selected Target
Runoff (inches/year)
Slope = 8.6 % / inch of runoff
G. Percent of years that Extreme Low stages occur for 90 or more consecutive days during February - May.

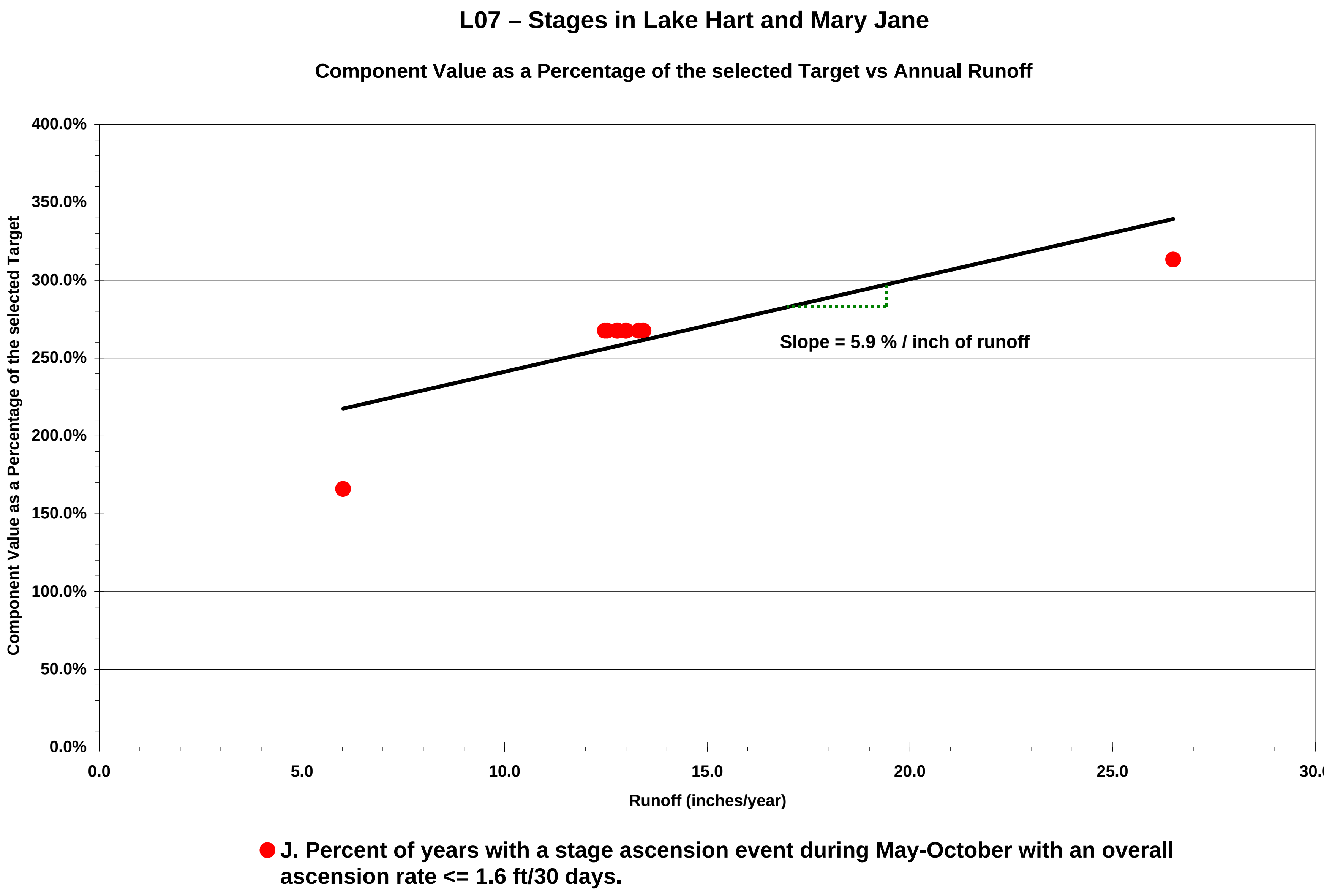


L07 – Stages in Lake Hart and Mary Jane
Component Value as a Percentage of the selected Target vs Annual Runoff
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Component Value as a Percentage of the selected Target
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 0.3 % / inch of runoff
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.

L07 – Stages in Lake Hart and Mary Jane

Component Value as a Percentage of the selected Target vs Annual Runoff

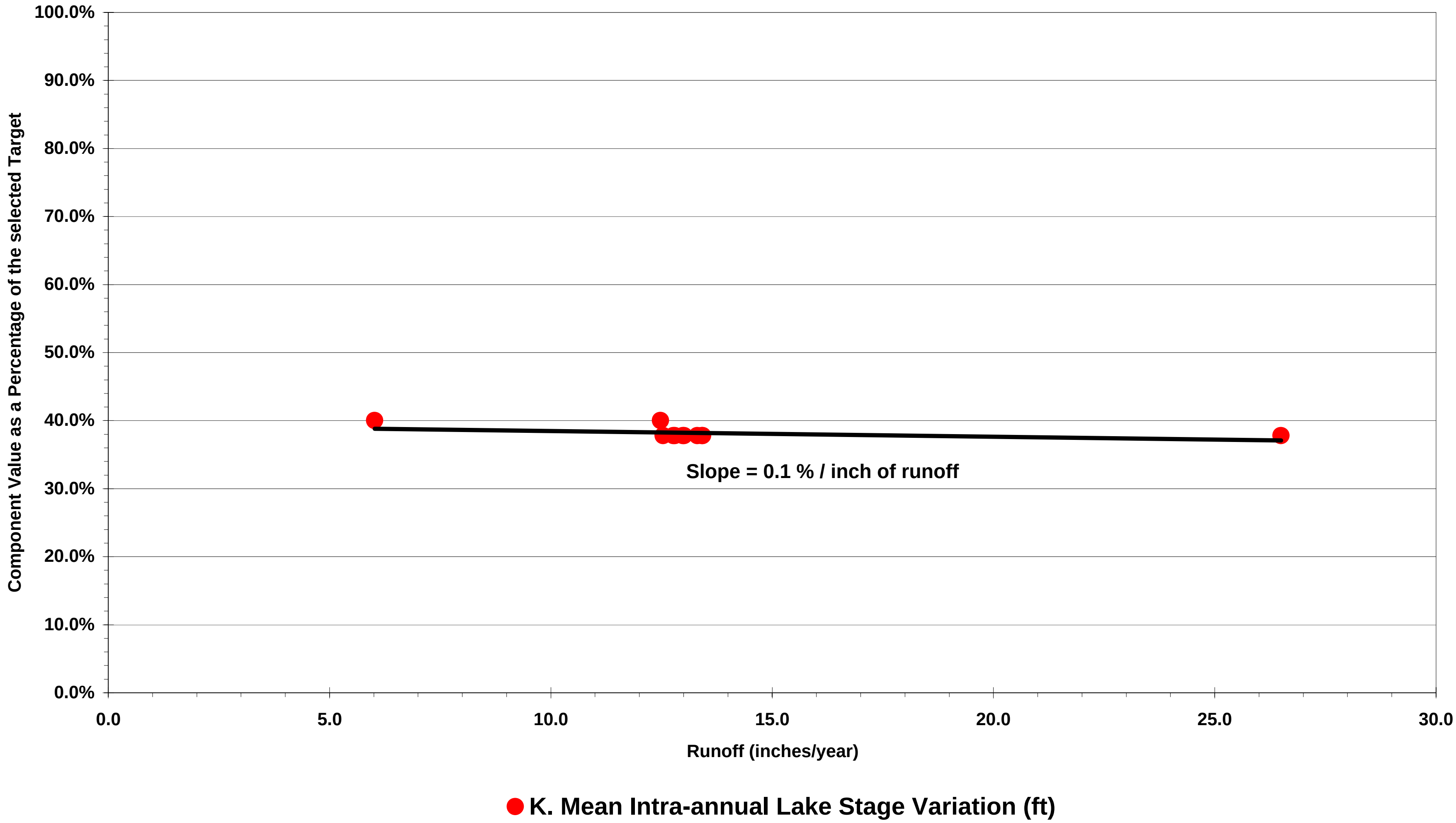




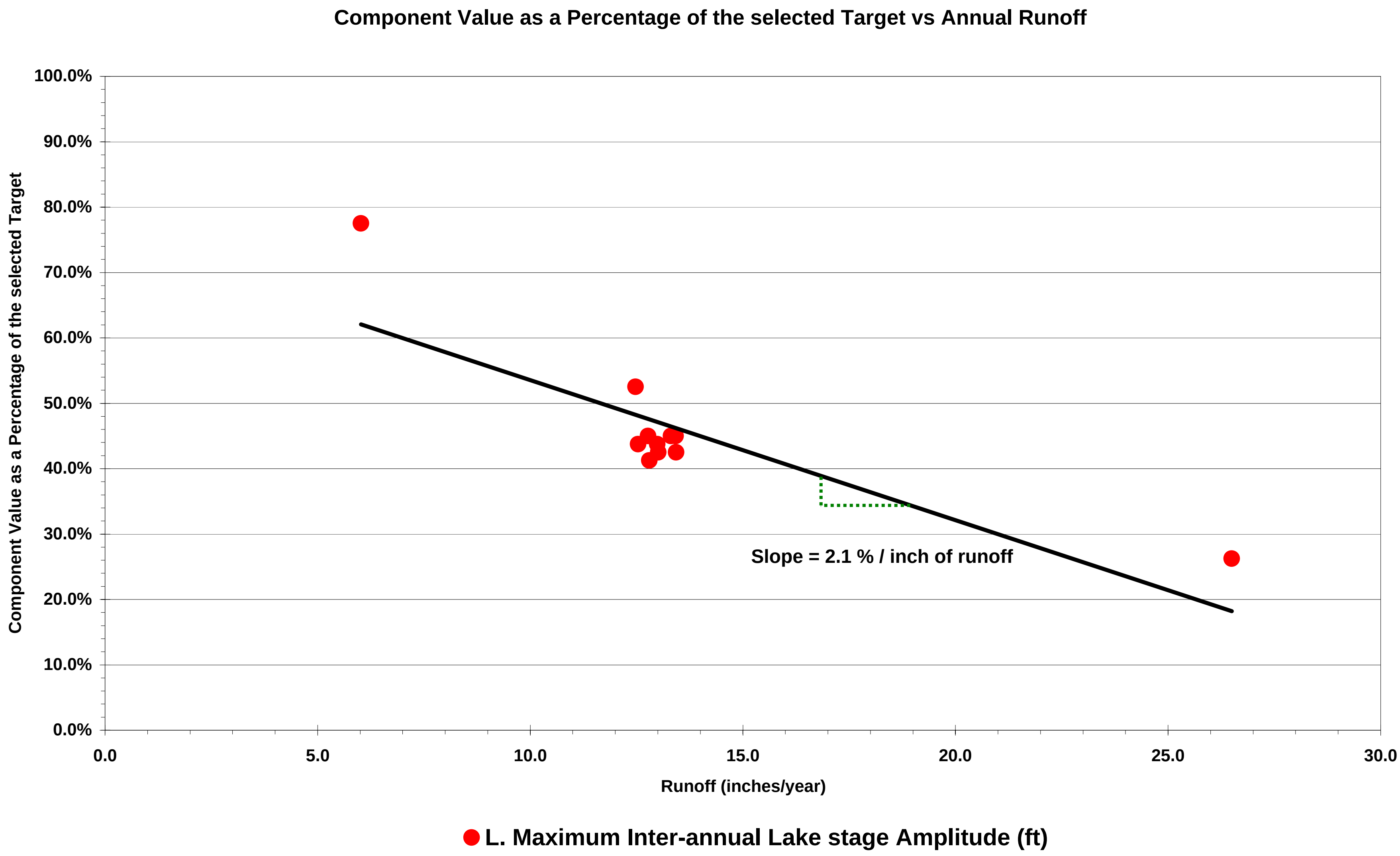
L07 – Stages in Lake Hart and Mary Jane
Component Value as a Percentage of the selected Target vs Annual Runoff
400.0%
350.0%
300.0%
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
Component Value as a Percentage of the selected Target
Slope = 5.9 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.

L07 – Stages in Lake Hart and Mary Jane

Component Value as a Percentage of the selected Target vs Annual Runoff

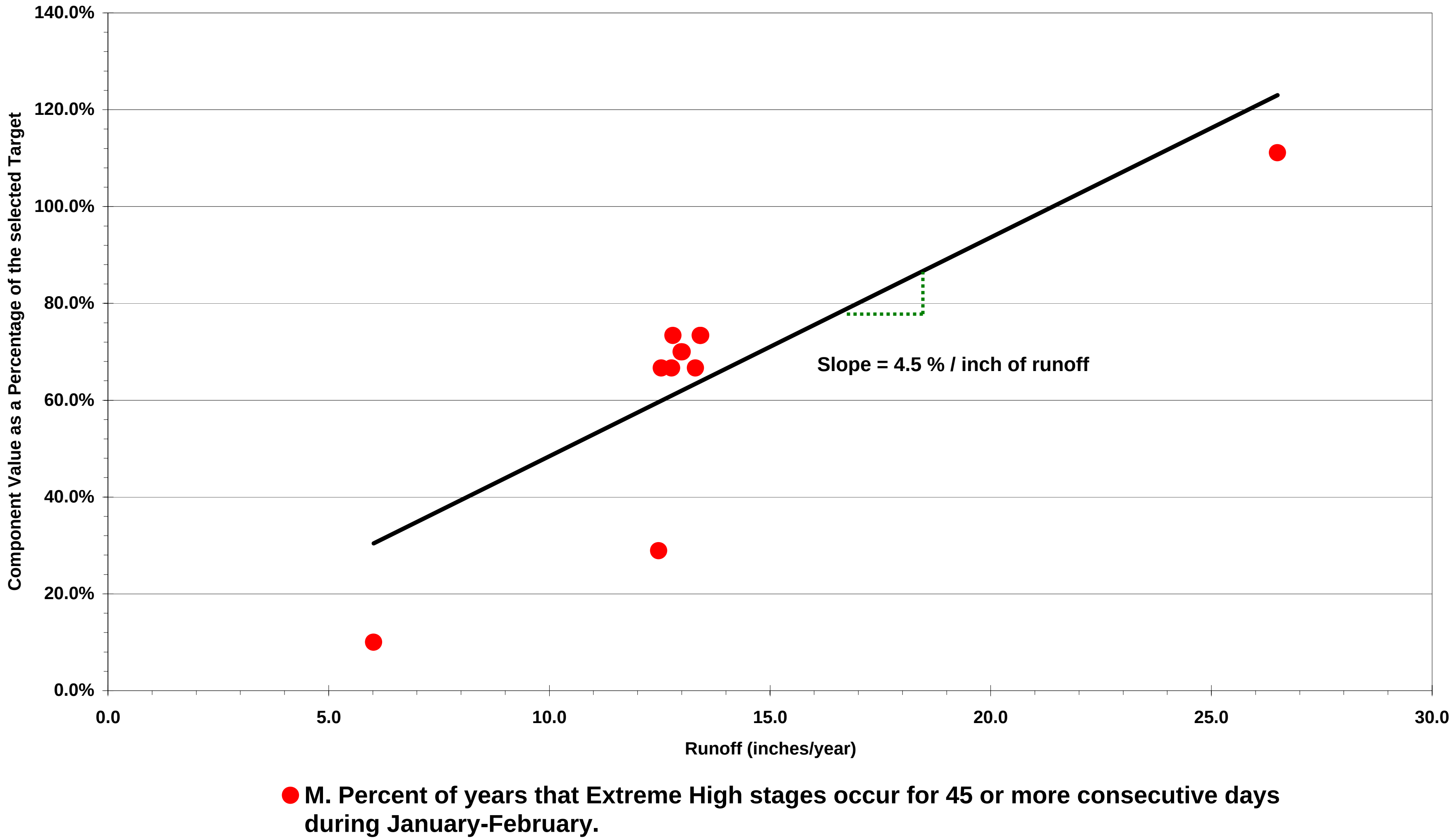


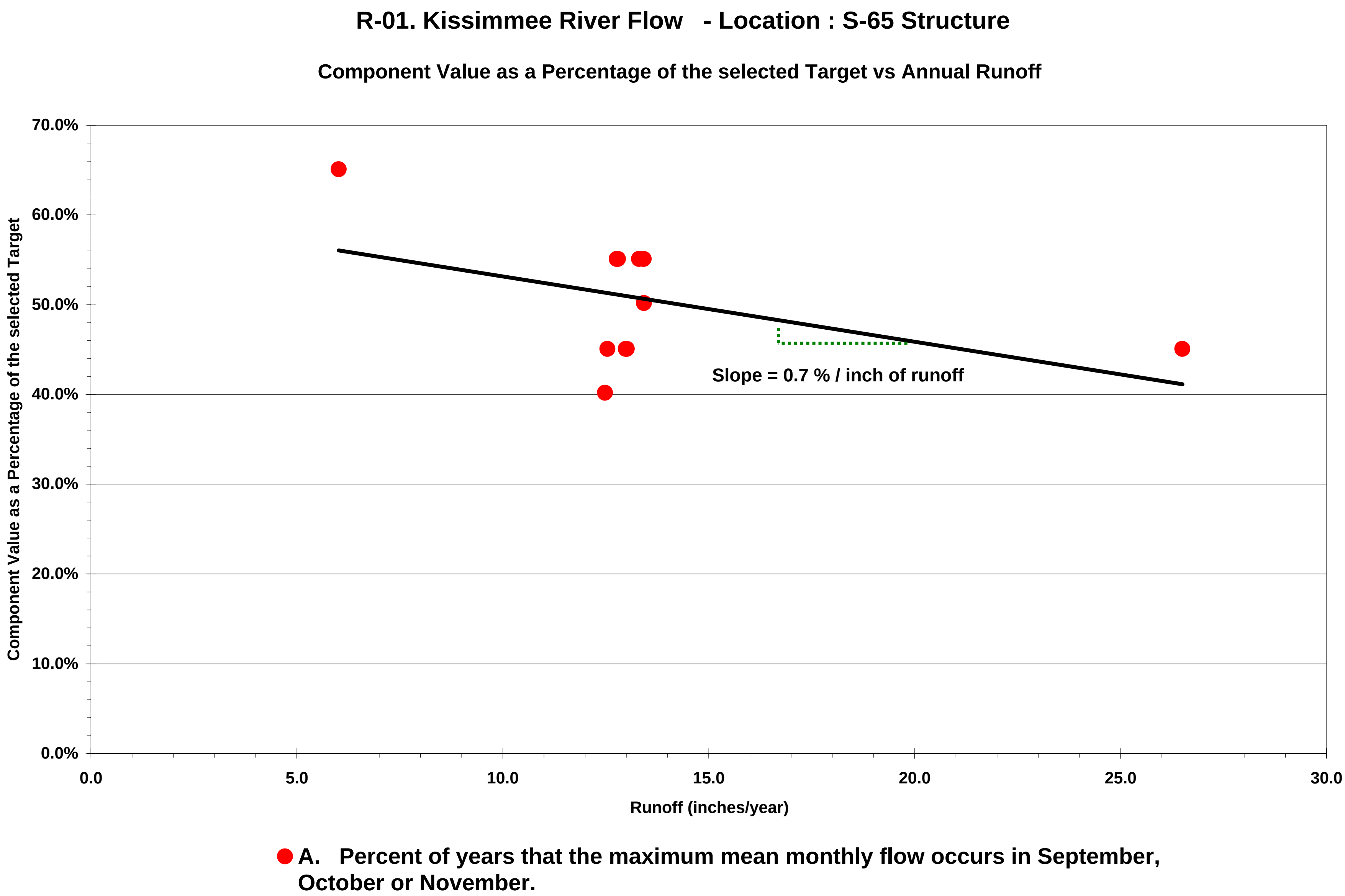
L07 – Stages in Lake Hart and Mary Jane



L07 – Stages in Lake Hart and Mary Jane

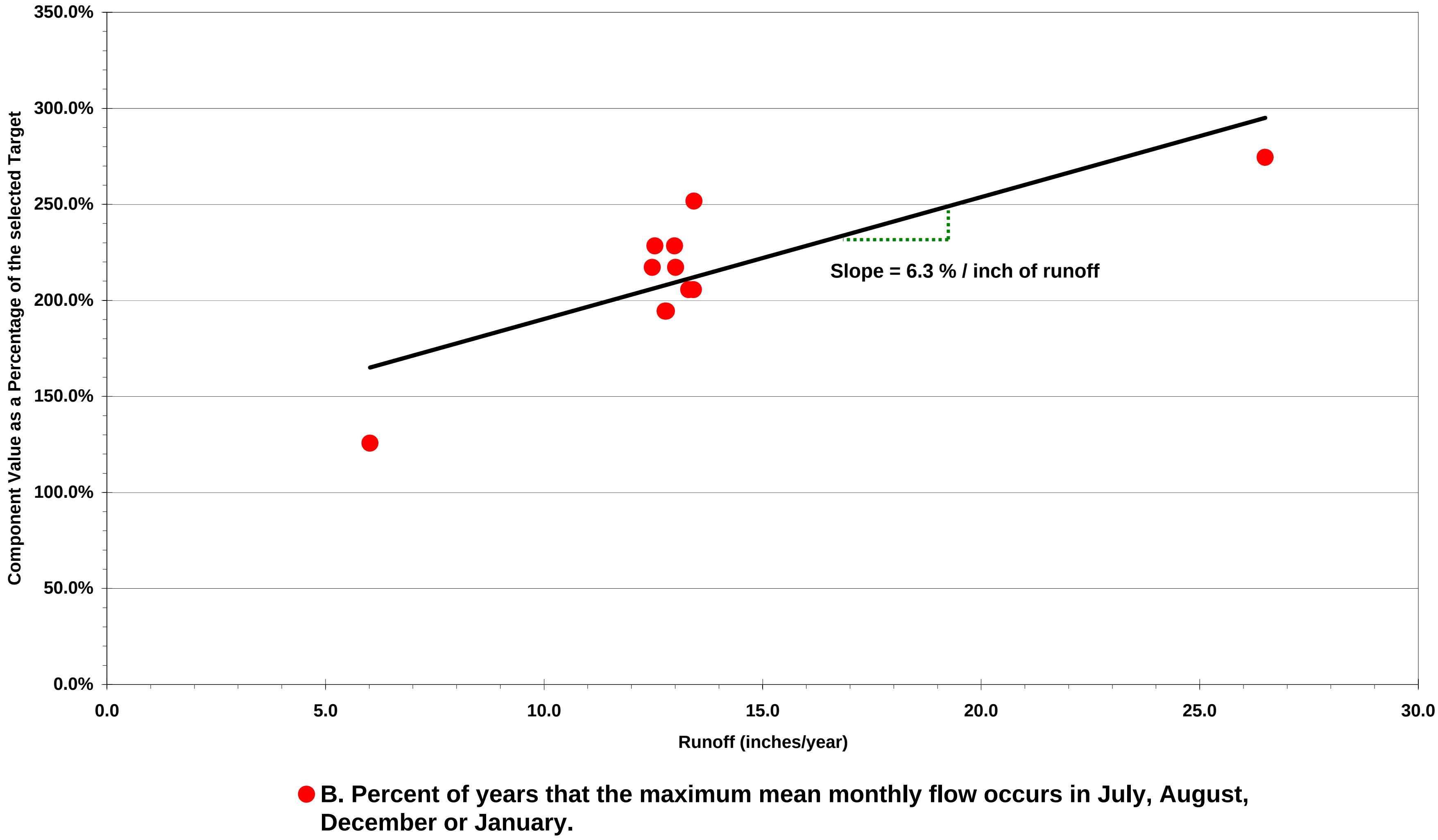
Component Value as a Percentage of the selected Target vs Annual Runoff




R-01. Kissimmee River Flow - Location : S-65 Structure
Component Value as a Percentage of the selected Target vs Annual Runoff
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Component Value as a Percentage of the selected Target
Slope = 0.7 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.

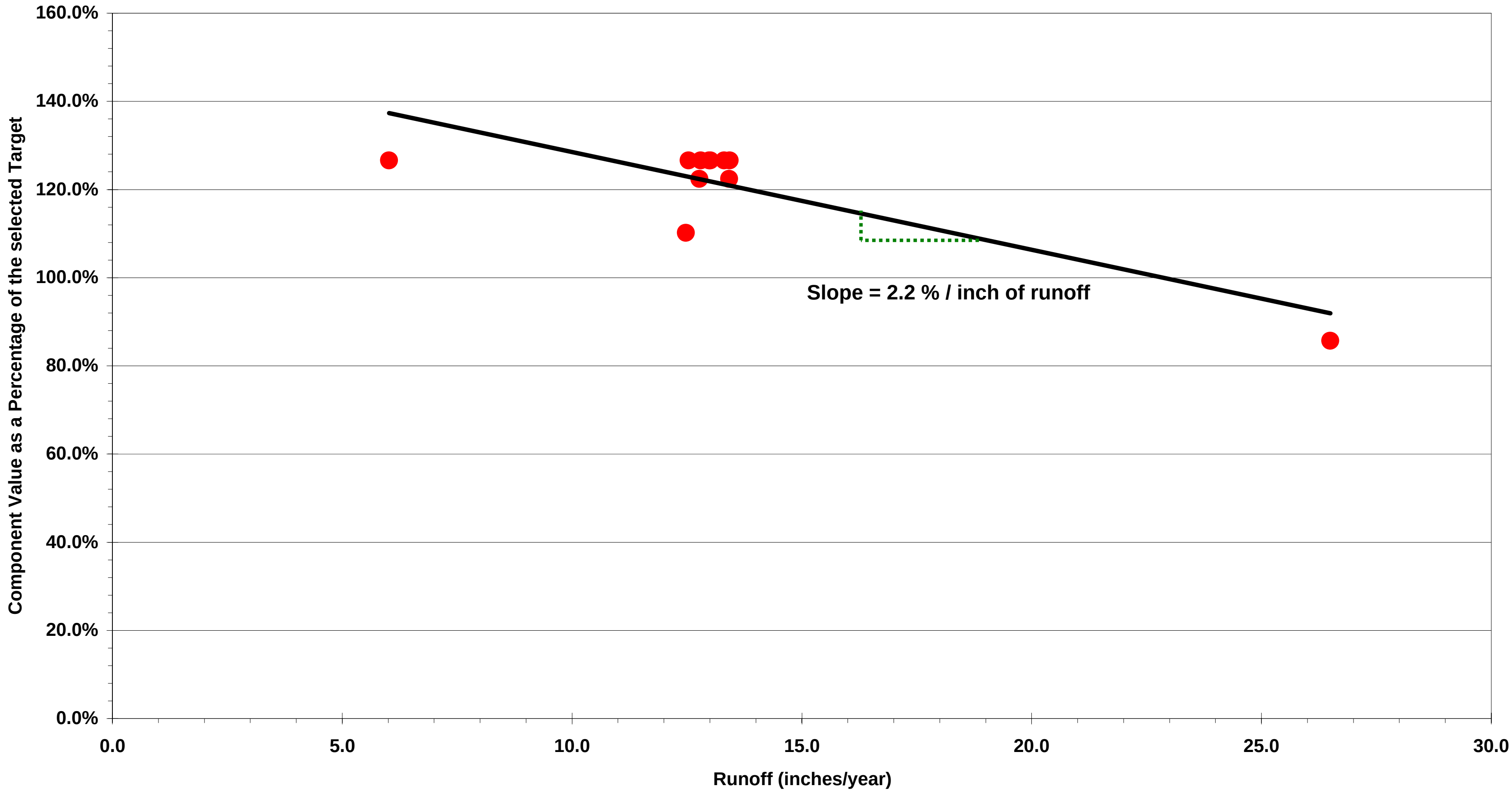
R-01. Kissimmee River Flow - Location : S-65 Structure

Component Value as a Percentage of the selected Target vs Annual Runoff

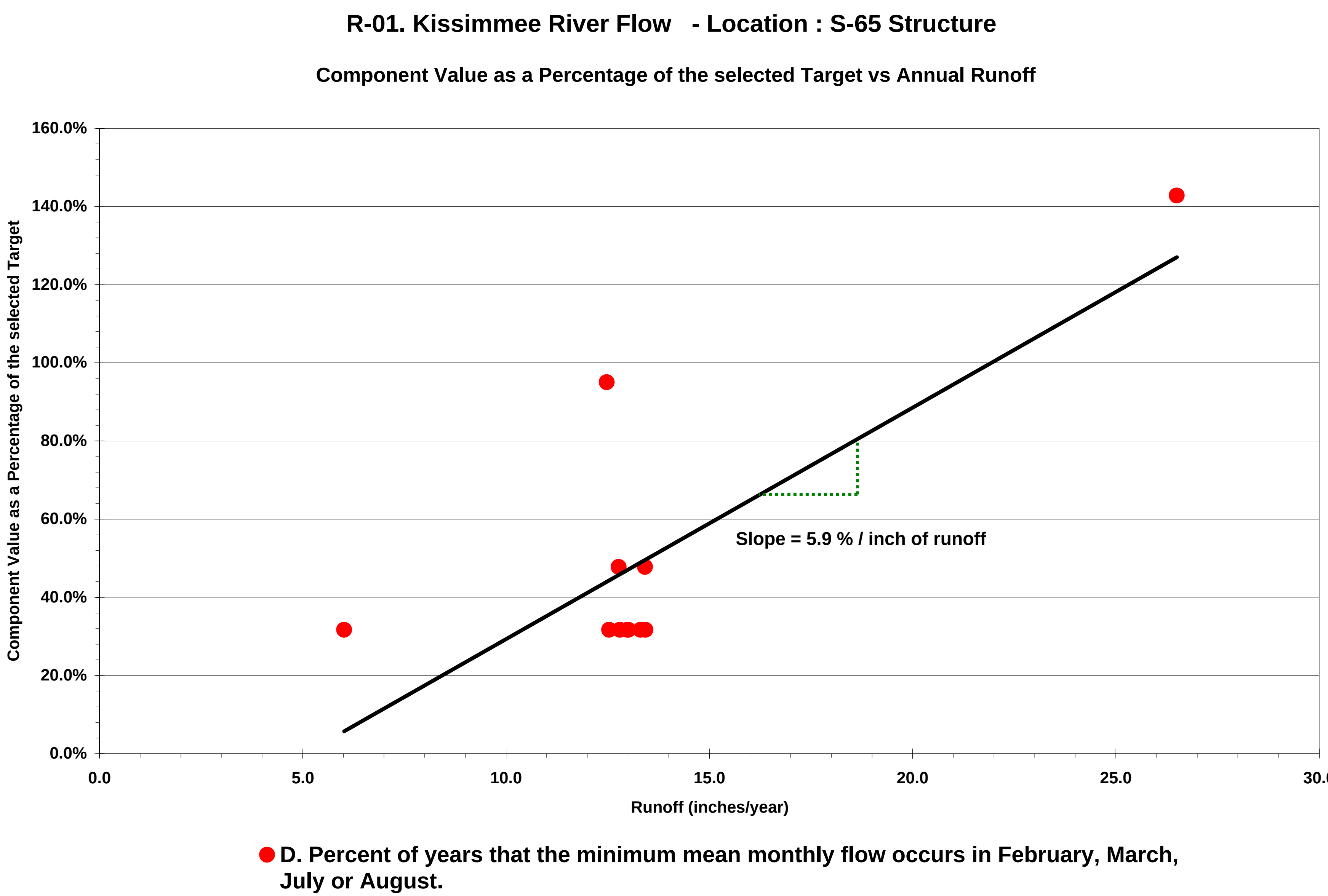


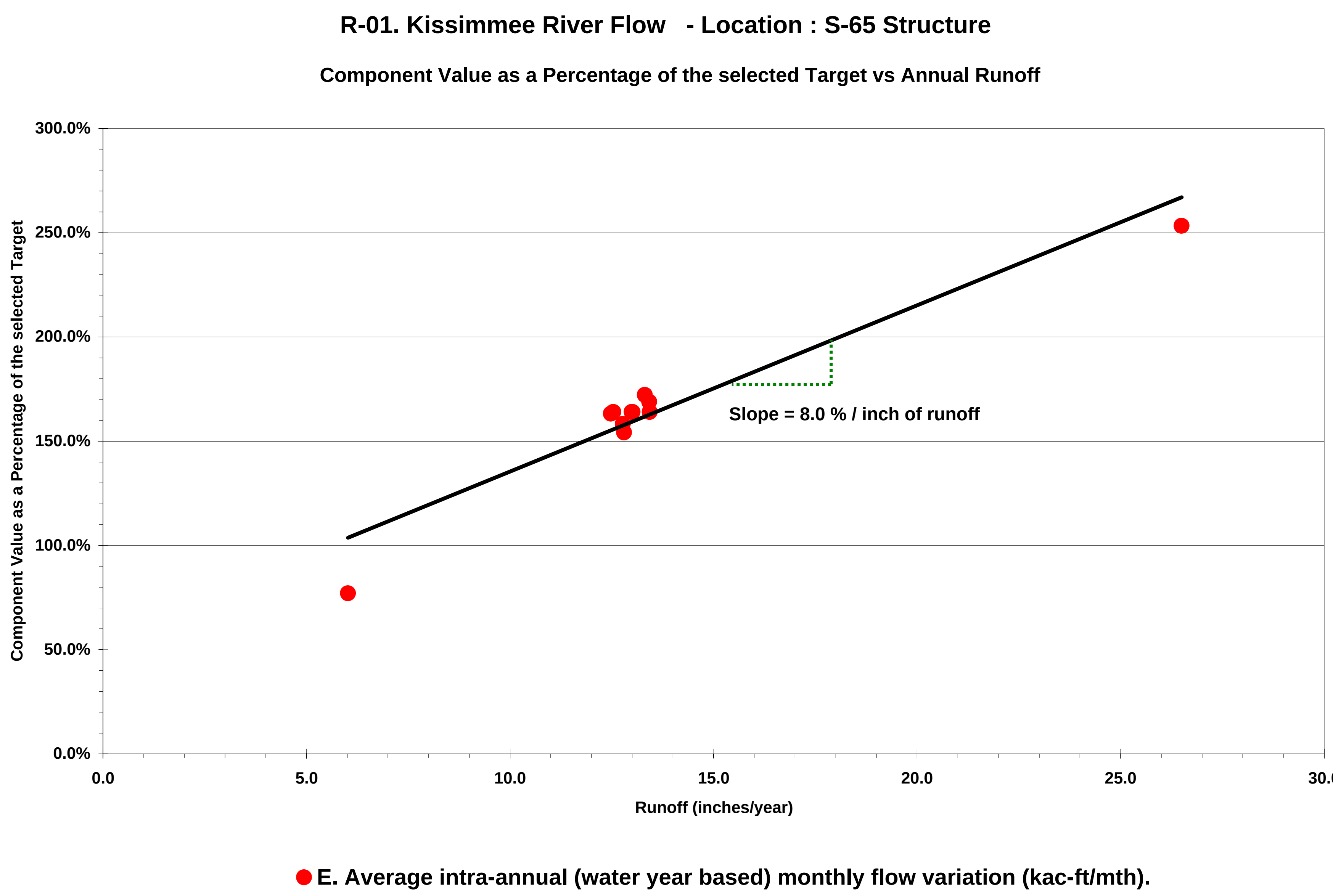
R-01. Kissimmee River Flow - Location : S-65 Structure

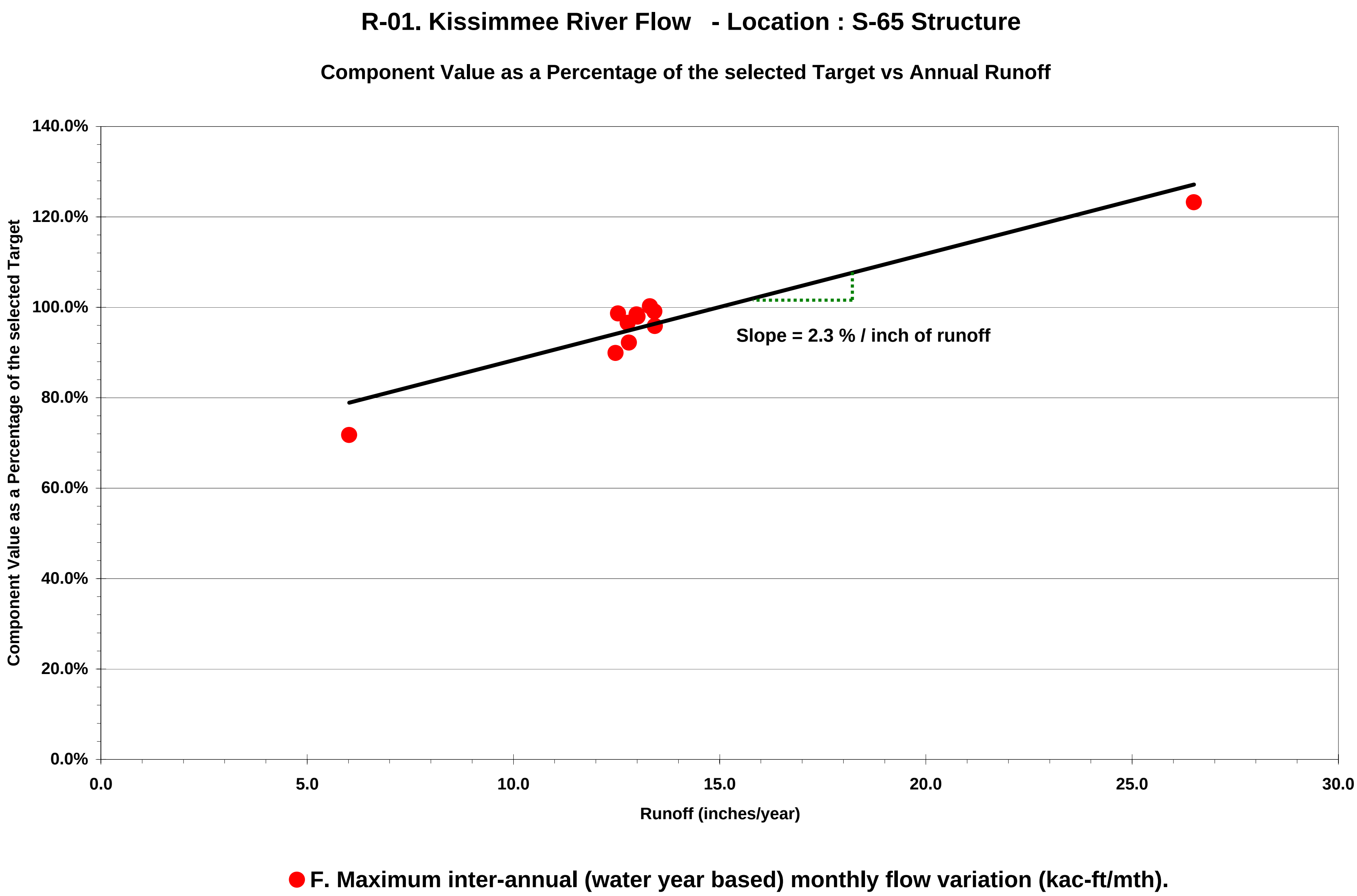
Component Value as a Percentage of the selected Target vs Annual Runoff



● **C. Percent of years that the minimum mean monthly flow occurs in April, May or June.**


R-01. Kissimmee River Flow - Location : S-65 Structure
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
160.0%
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 5.9 % / inch of runoff
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.

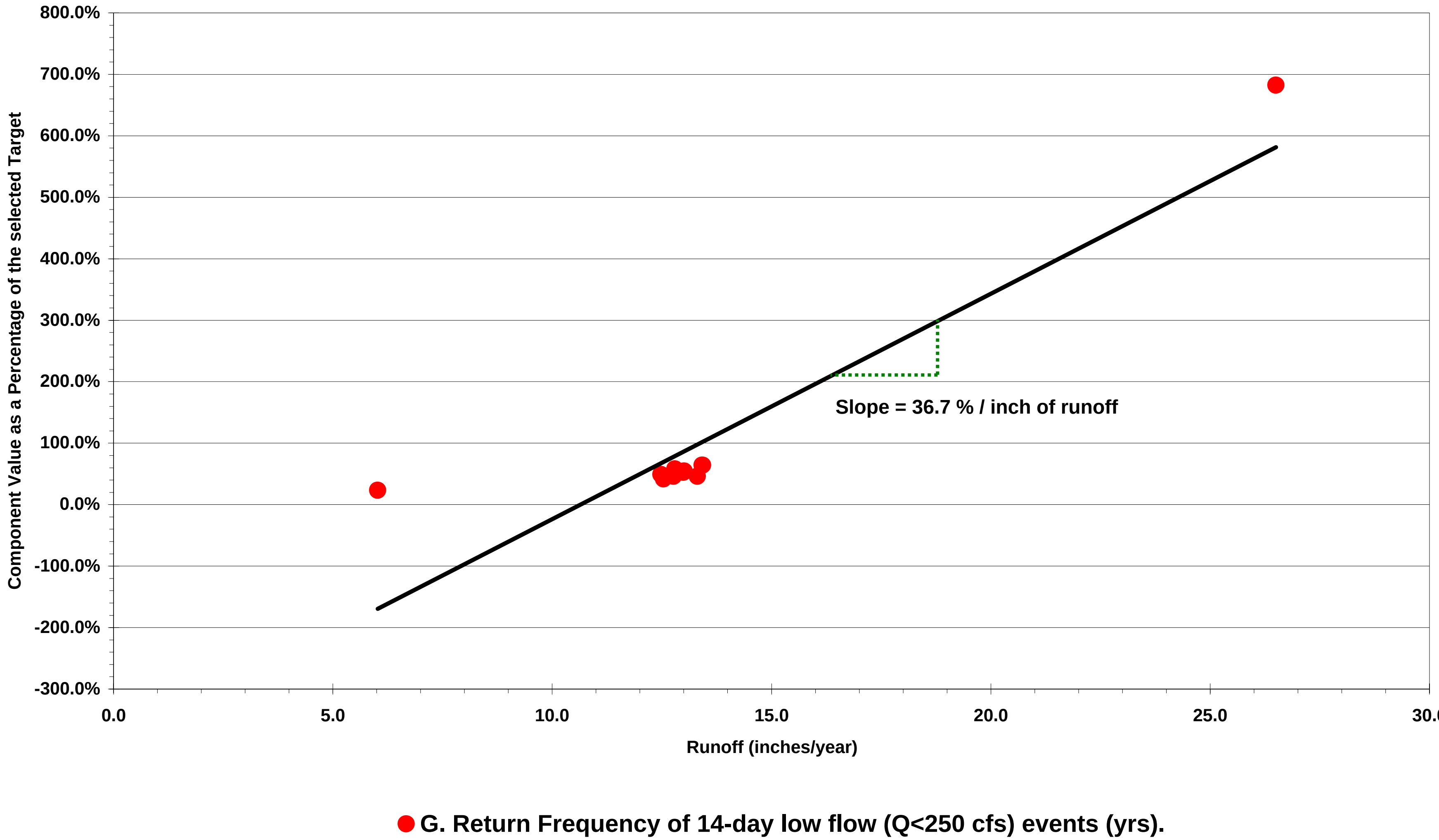

R-01. Kissimmee River Flow - Location : S-65 Structure
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
300.0%
250.0%
200.0%
150.0%
100.0%
50.0%
0.0%
Slope = 8.0 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).



R-01. Kissimmee River Flow - Location : S-65 Structure
Component Value as a Percentage of the selected Target vs Annual Runoff
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Component Value as a Percentage of the selected Target
Slope = 2.3 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).

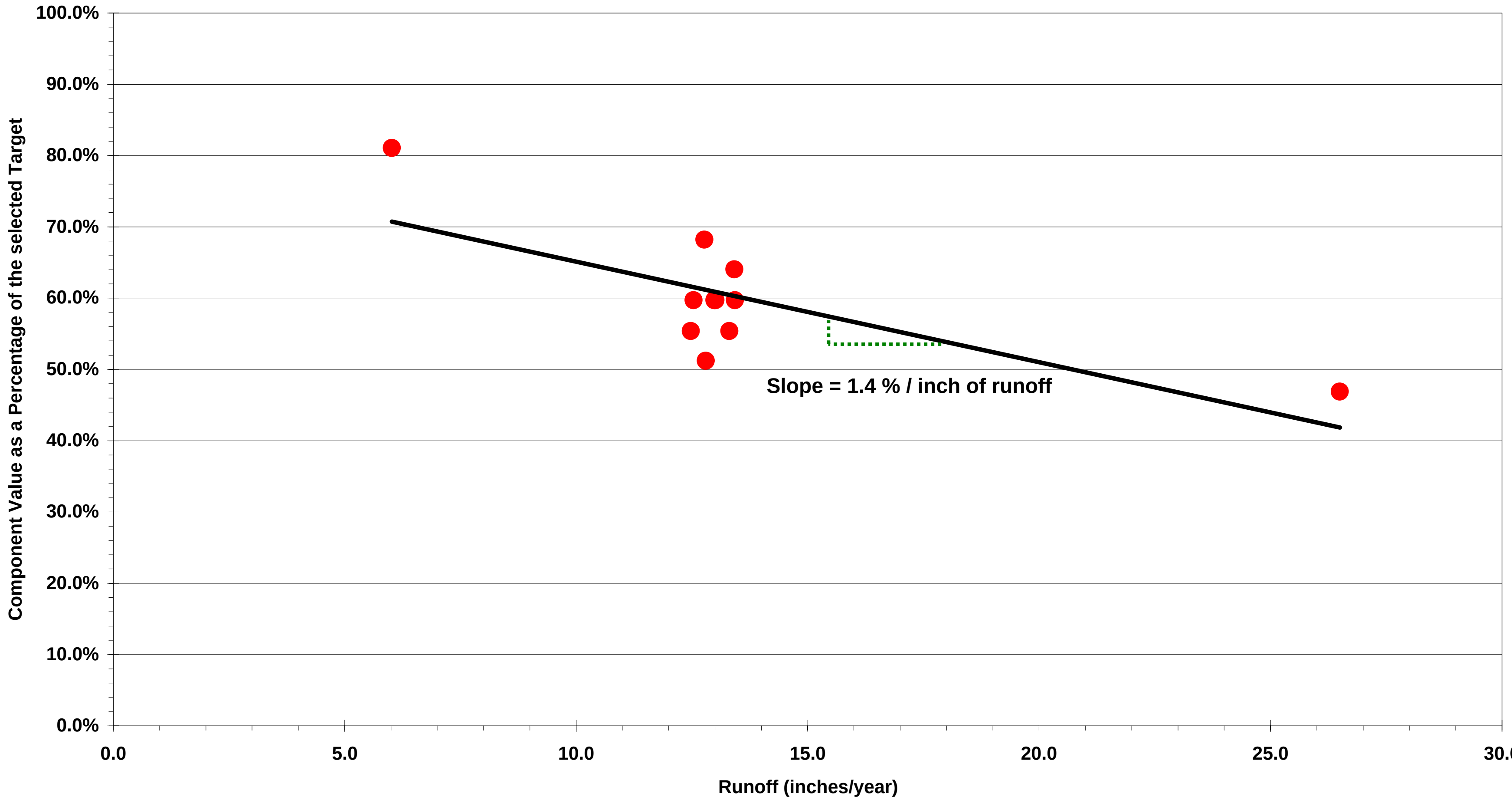
R-01. Kissimmee River Flow - Location : S-65 Structure

Component Value as a Percentage of the selected Target vs Annual Runoff



R-01. Kissimmee River Flow - Location : S-65E Structure

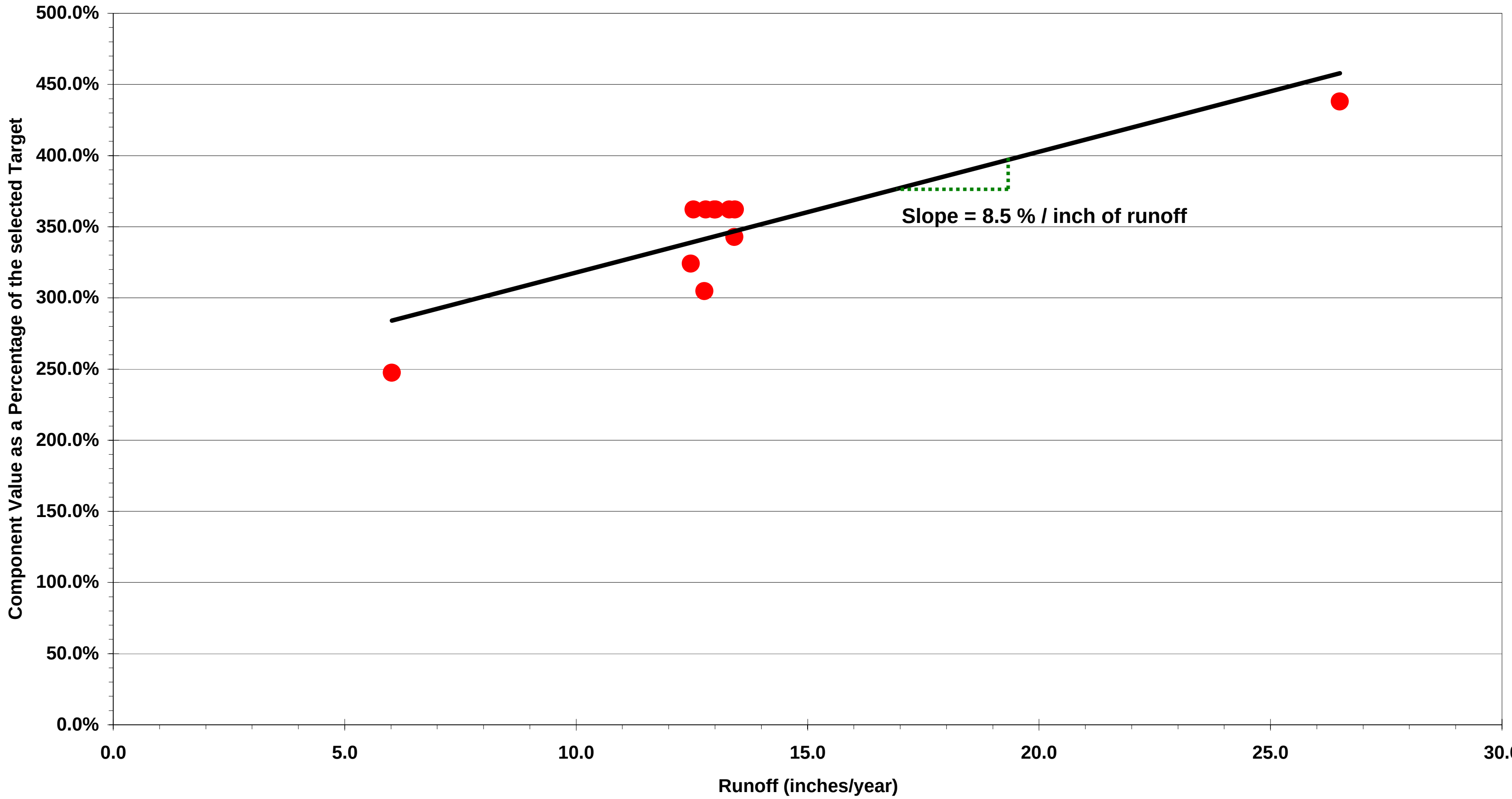
Component Value as a Percentage of the selected Target vs Annual Runoff



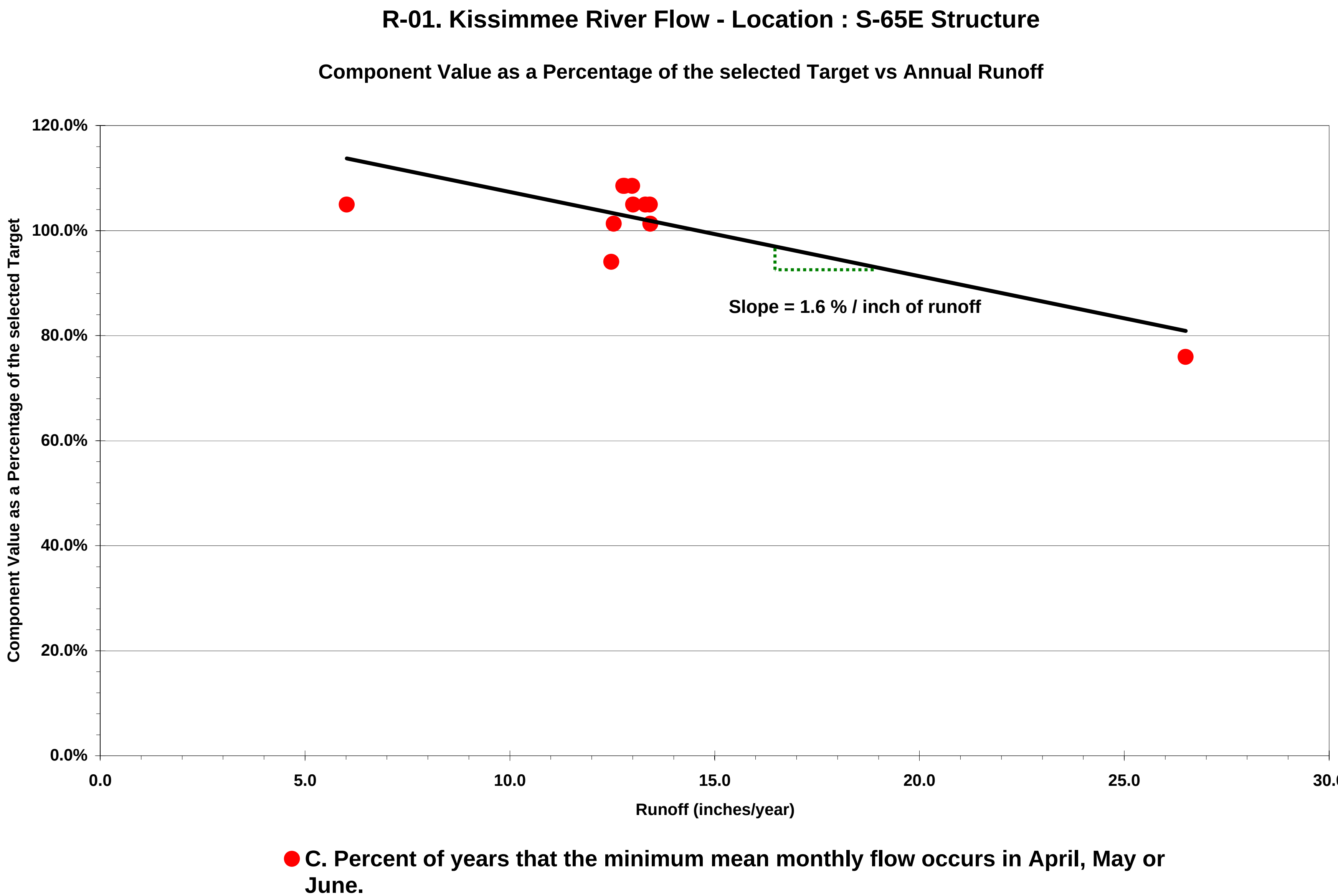
● **A. Percent of years that the maximum mean monthly flow occurs in September, October or November.**

R-01. Kissimmee River Flow - Location : S-65E Structure

Component Value as a Percentage of the selected Target vs Annual Runoff

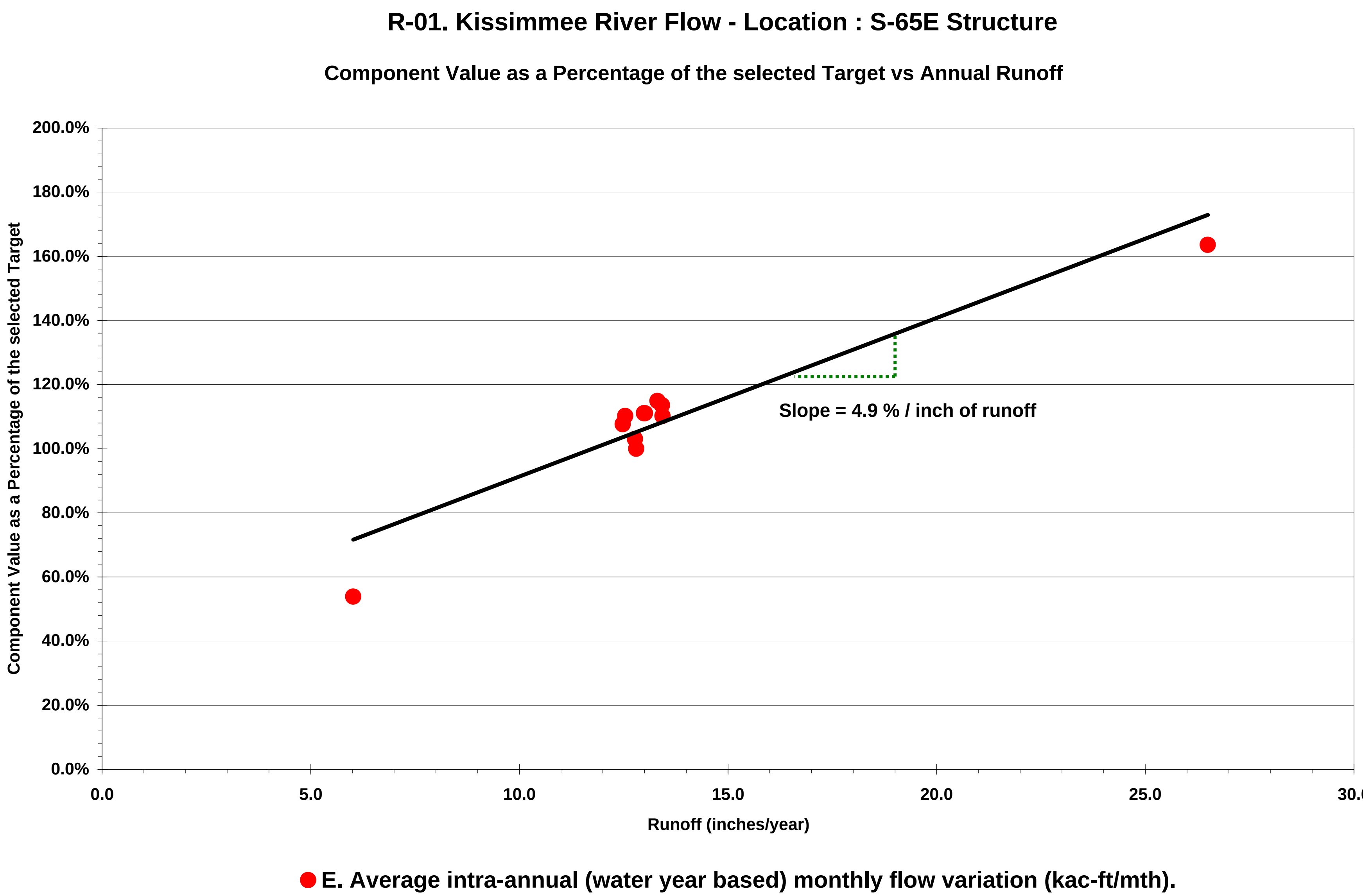


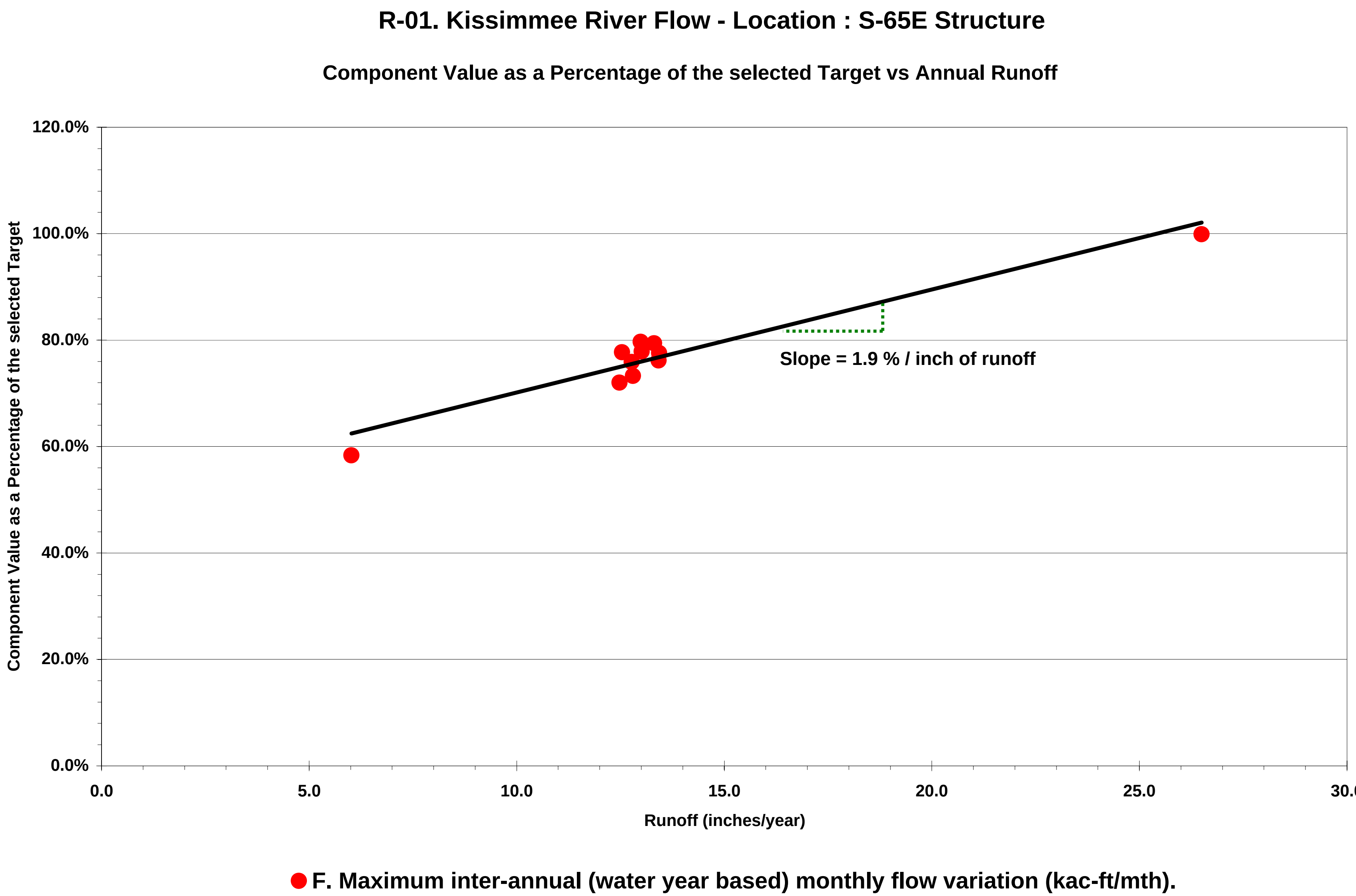
● B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.



R-01. Kissimmee River Flow - Location : S-65E Structure
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 1.6 % / inch of runoff
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.

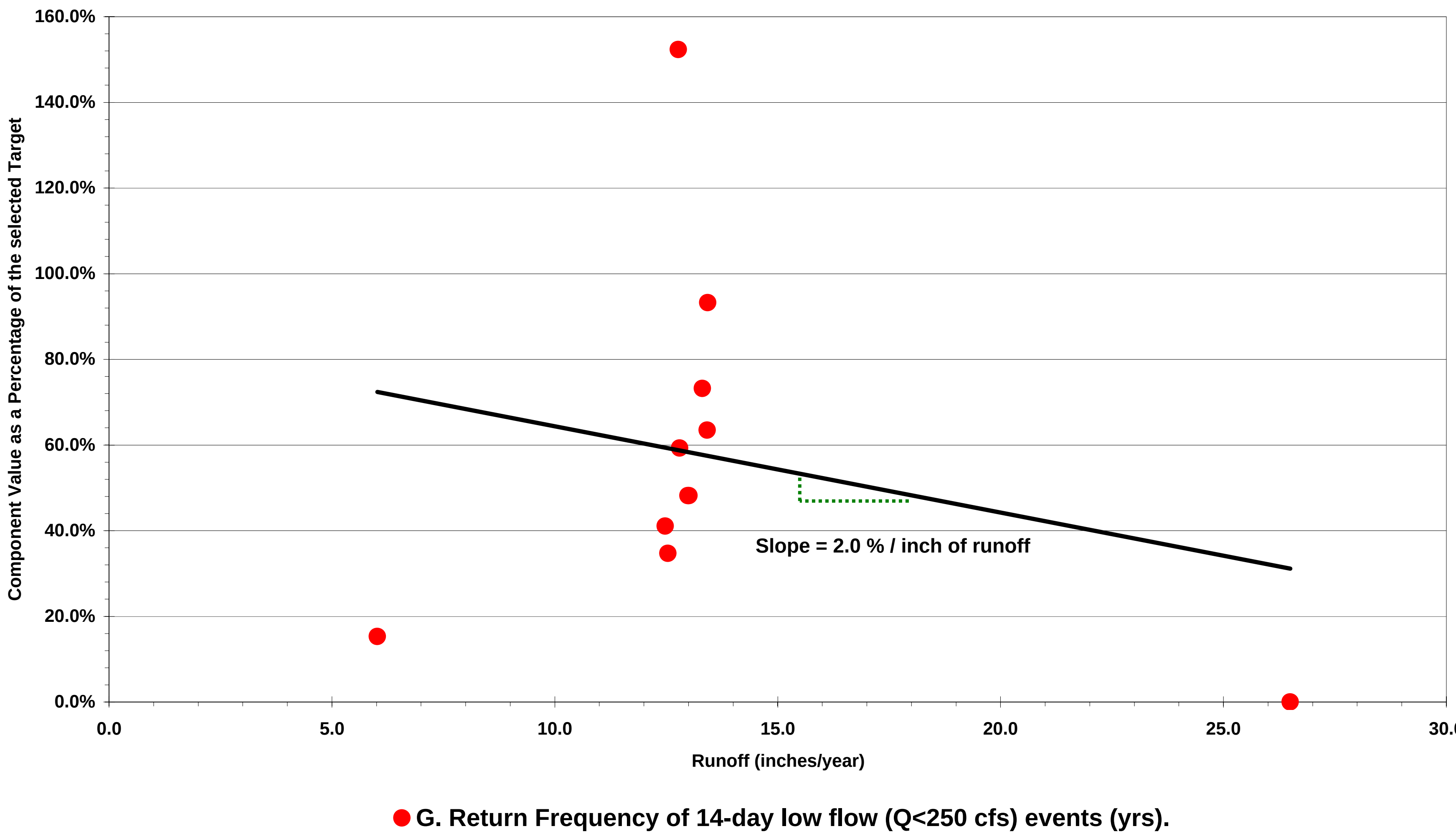
R-01. Kissimmee River Flow - Location : S-65E Structure


R-01. Kissimmee River Flow - Location : S-65E Structure
Component Value as a Percentage of the selected Target vs Annual Runoff
Component Value as a Percentage of the selected Target
200.0%
180.0%
160.0%
140.0%
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Slope = 4.9 % / inch of runoff
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).


R-01. Kissimmee River Flow - Location : S-65E Structure
Component Value as a Percentage of the selected Target vs Annual Runoff
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Component Value as a Percentage of the selected Target
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 1.9 % / inch of runoff
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).

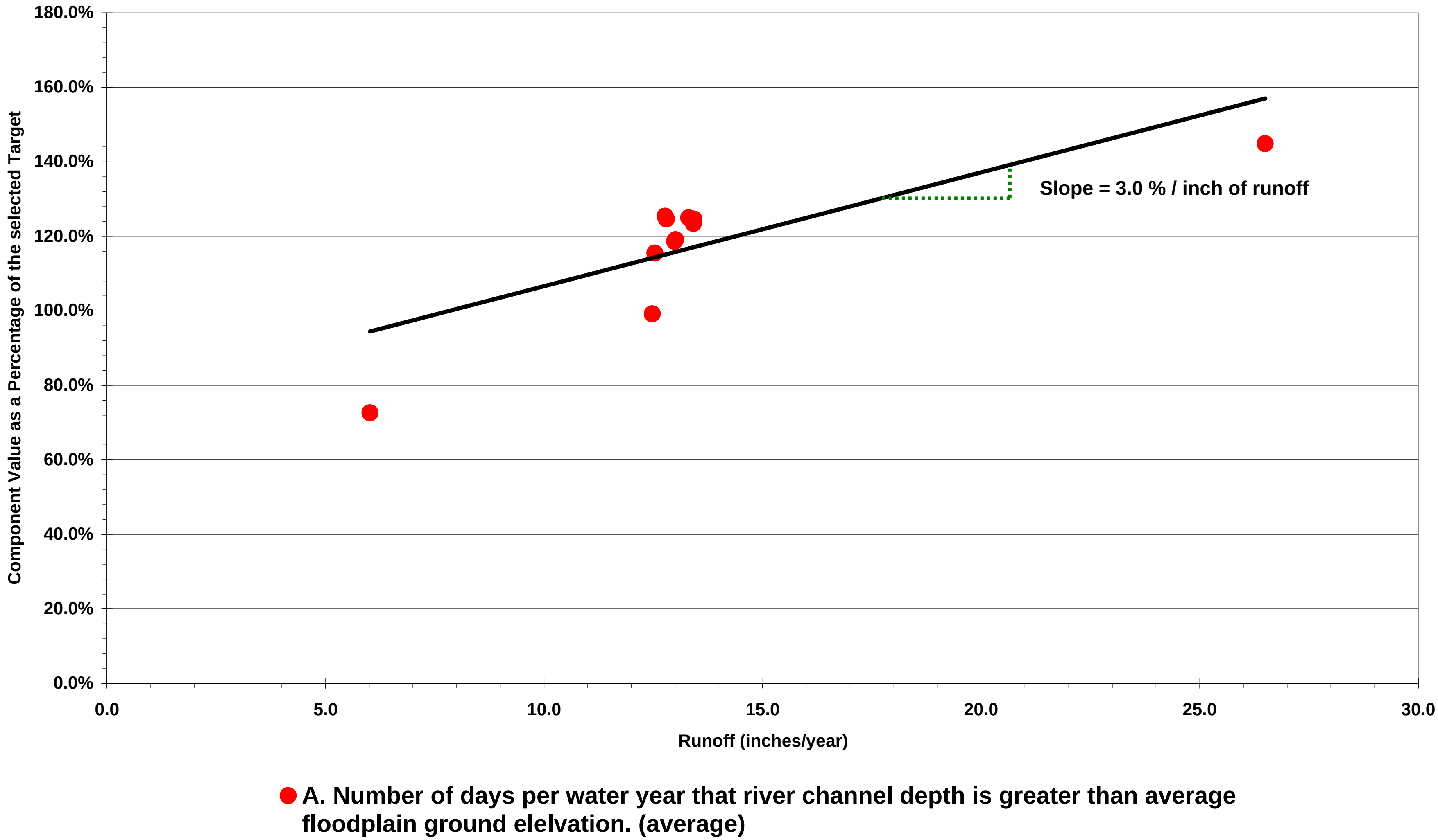
R-01. Kissimmee River Flow - Location : S-65E Structure

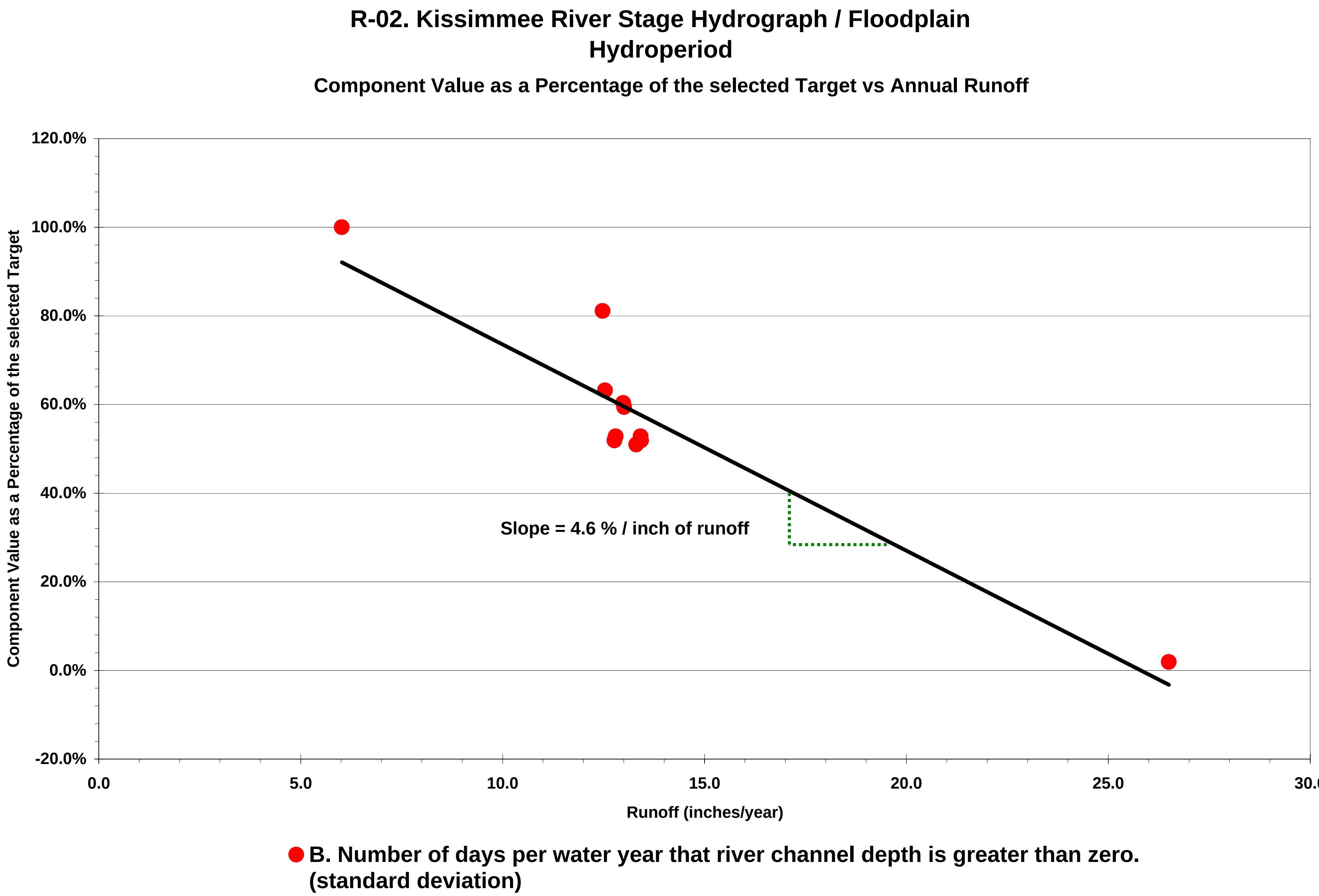
Component Value as a Percentage of the selected Target vs Annual Runoff



R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

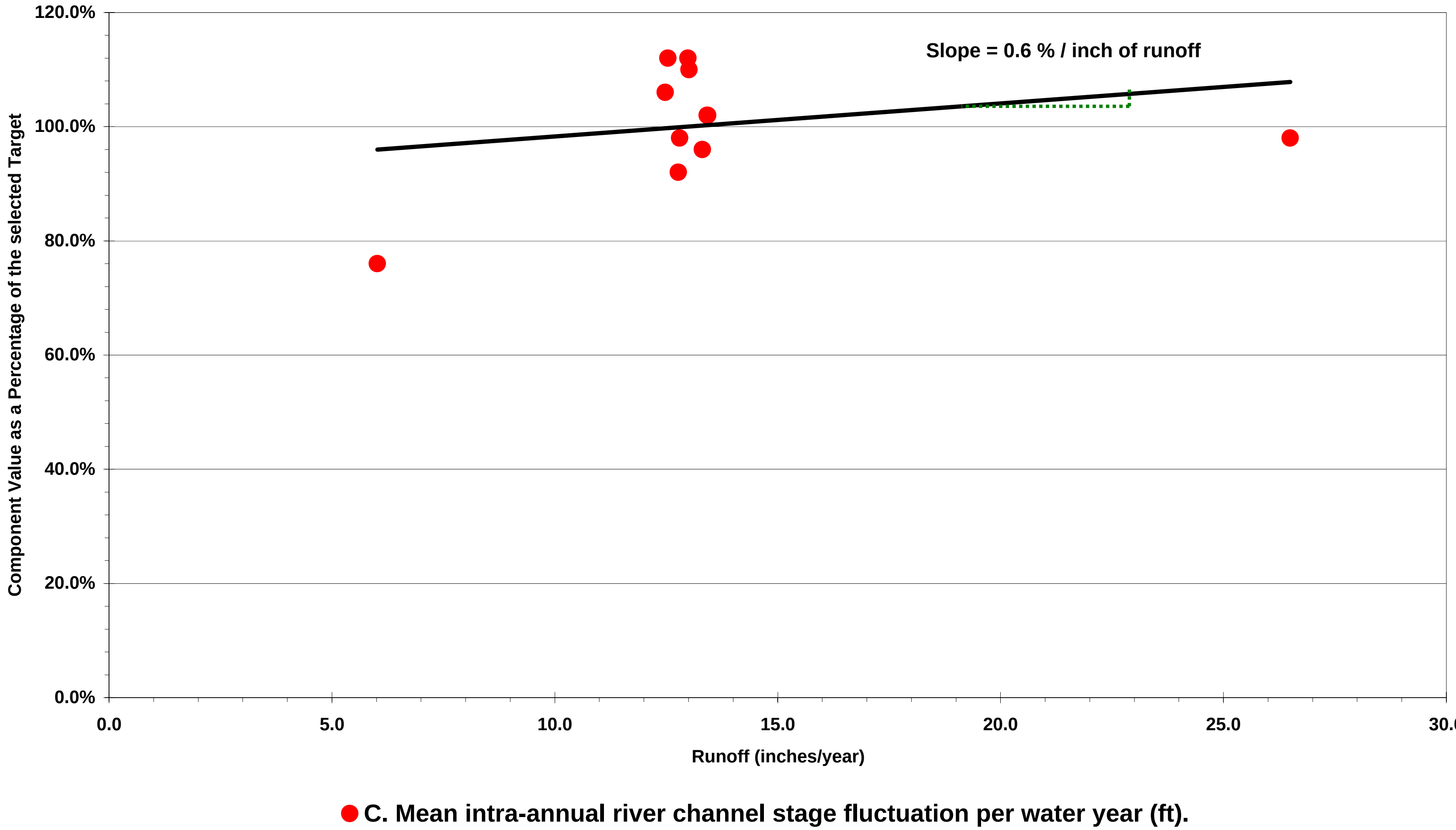
Component Value as a Percentage of the selected Target vs Annual Runoff

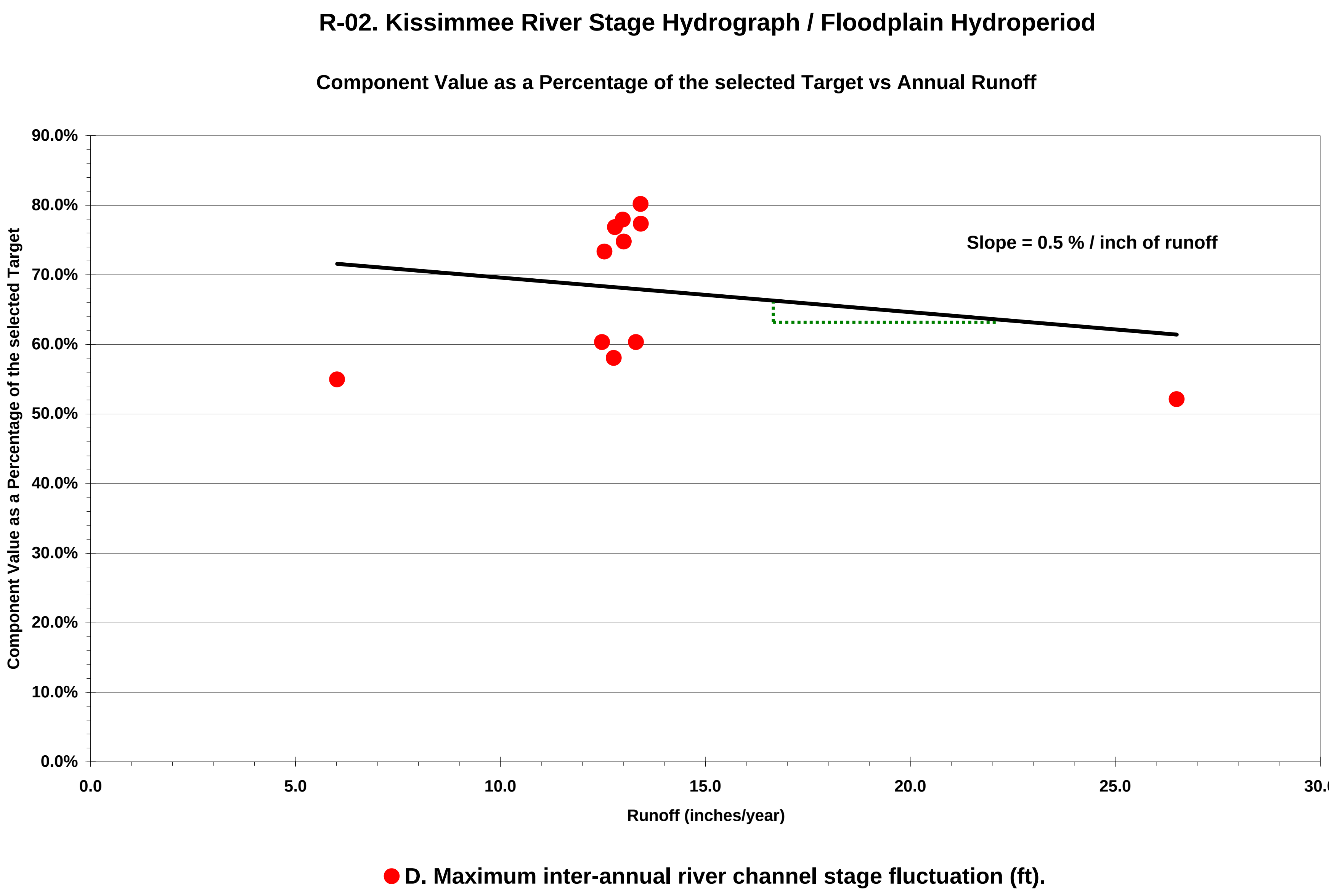



R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod
Component Value as a Percentage of the selected Target vs Annual Runoff
120.0%
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
-20.0%
Component Value as a Percentage of the selected Target
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
Slope = 4.6 % / inch of runoff
B. Number of days per water year that river channel depth is greater than zero. (standard deviation)

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

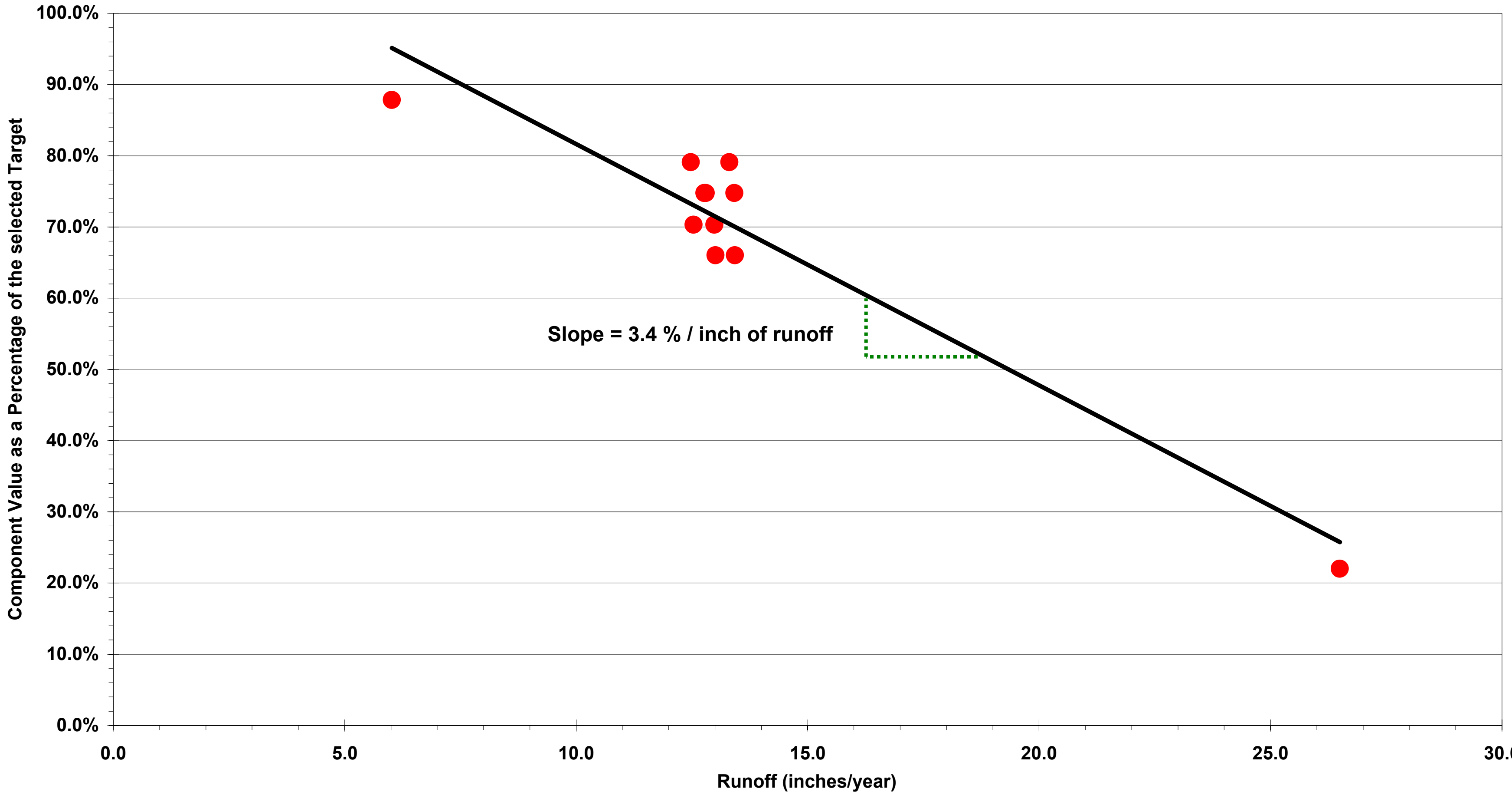
Component Value as a Percentage of the selected Target vs Annual Runoff




R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod
Component Value as a Percentage of the selected Target vs Annual Runoff
Slope = 0.5 % / inch of runoff
Component Value as a Percentage of the selected Target
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
0.0
5.0
10.0
15.0
20.0
25.0
30.0
Runoff (inches/year)
D. Maximum inter-annual river channel stage fluctuation (ft).

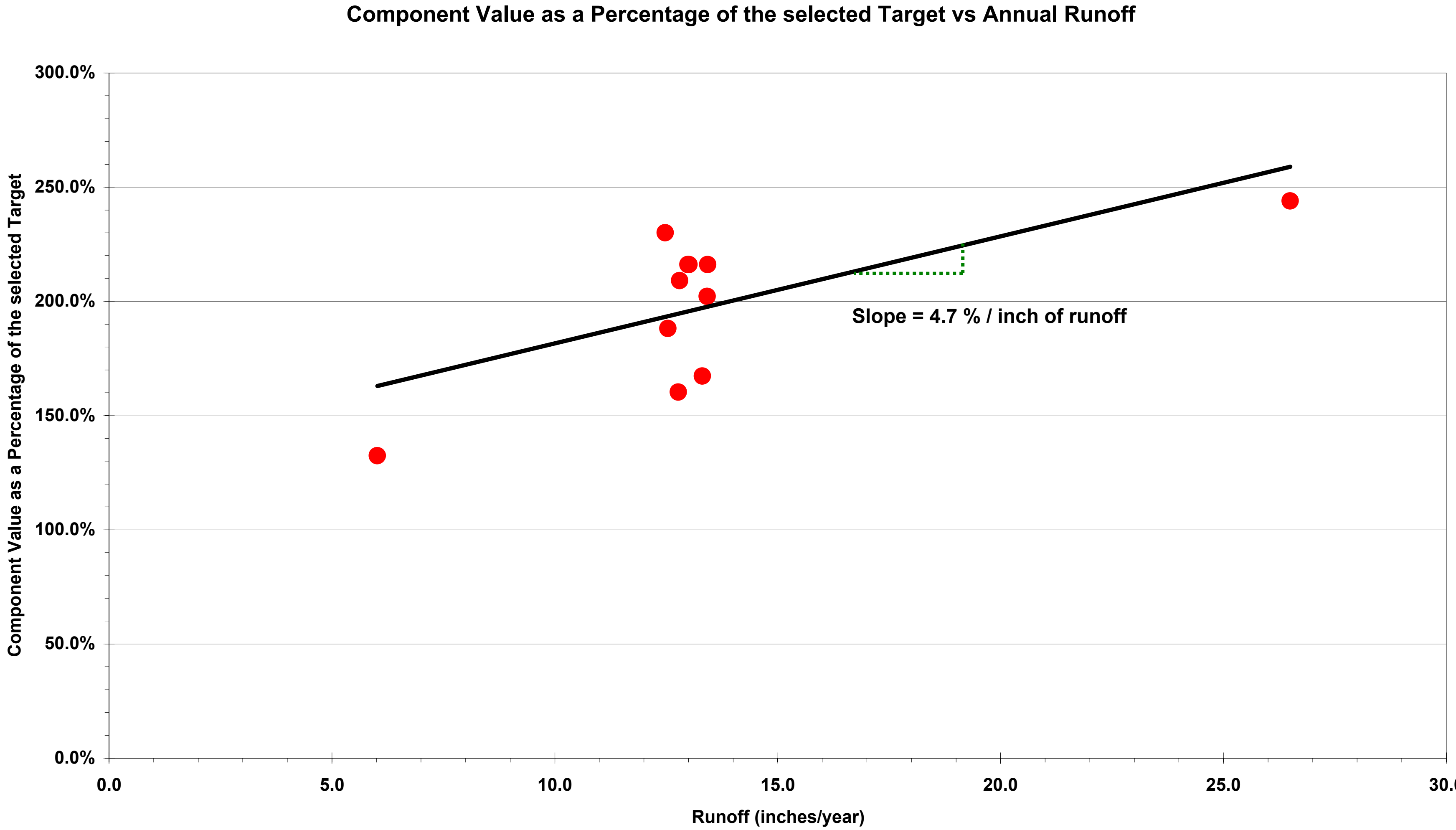
R-03. Kissimmee River Stage Recession / Ascension

Component Value as a Percentage of the selected Target vs Annual Runoff



● **A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.**

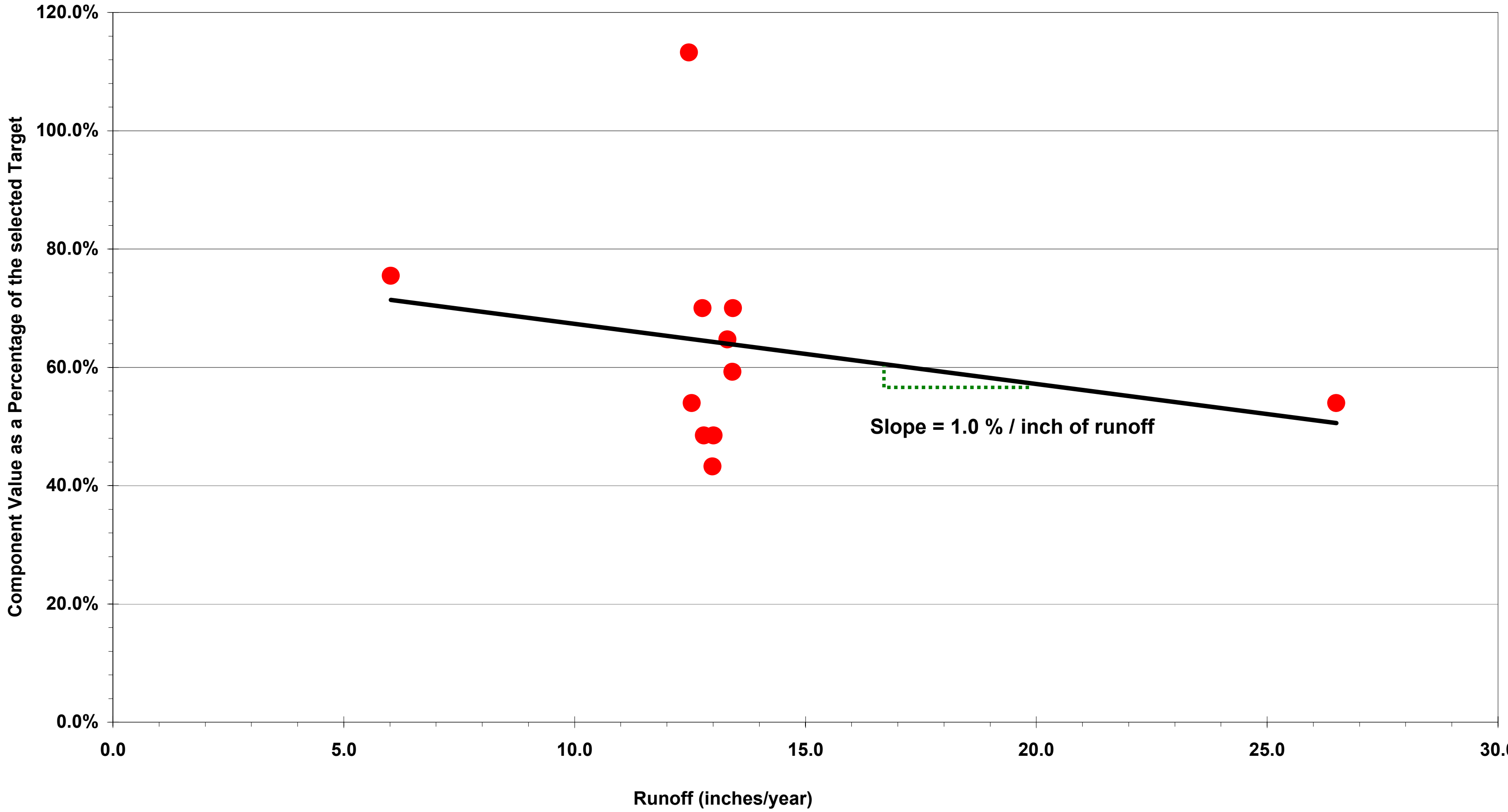
R-03. Kissimmee River Stage Recession / Ascension



B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.

R-03. Kissimmee River Stage Recession / Ascension

Component Value as a Percentage of the selected Target vs Annual Runoff



● C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.

Alligator Chain of Lakes looking south from Structure S-58
Photographs provided by South Florida Water Management District

APPENDIX B

CD of Summarized PME Tool Report for the Model Simulations

(CD affixed to the last page of this report)

KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation A1

Variation of Kc - crop coefficient LOW

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

EarthTech
A tyco International Ltd. Company

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation A1

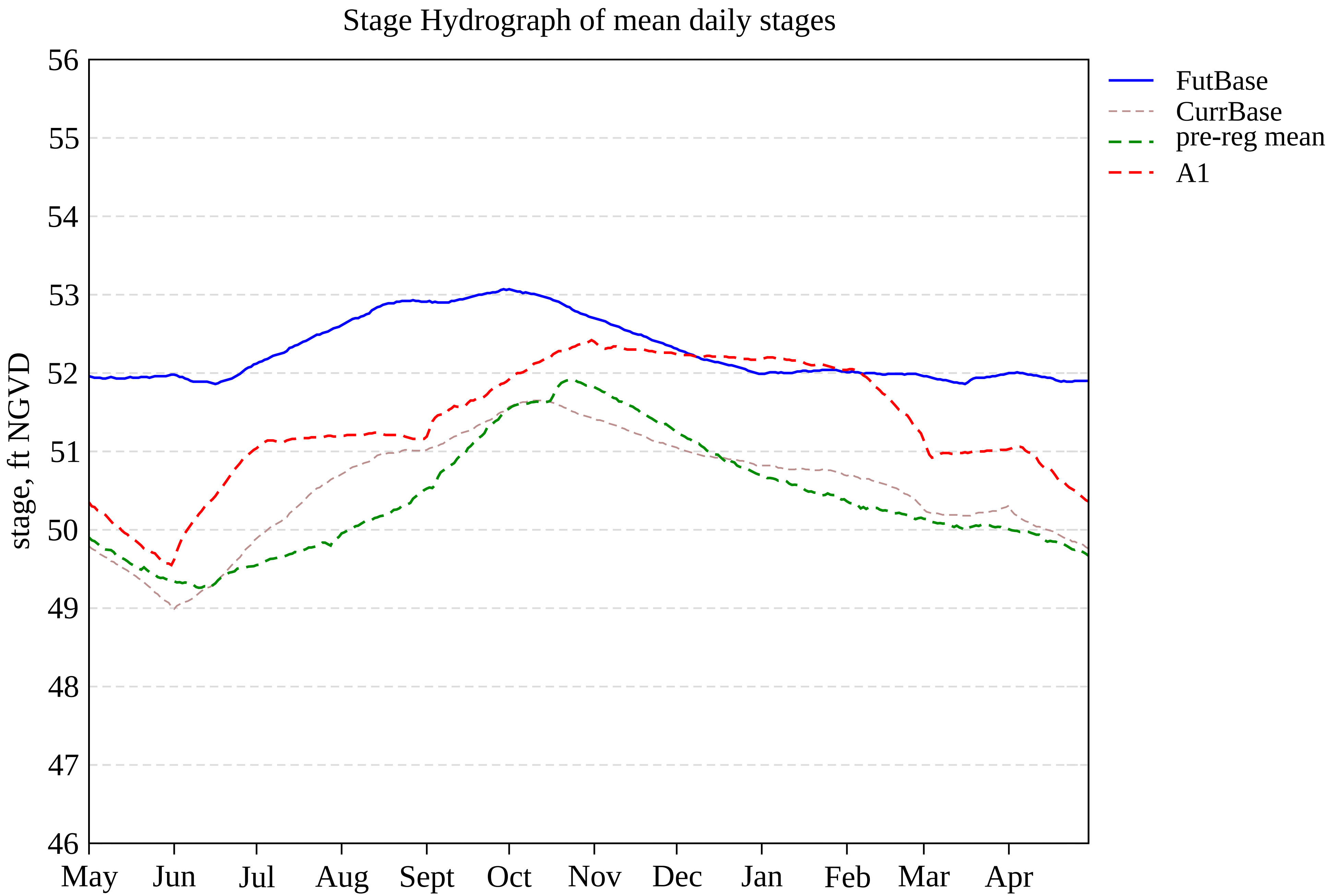
Run ID : Variation of Kc - crop coefficient LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	100.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	68.6	0.68	0.12	0.08
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	11.4	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	97.1	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (fl	5.0	3.2	2.6	3.2	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft	12.0	5.0	5.5	4.3	0.00	0.12	0.00
						PM Score	0.08
						Location Weight	0.30
						PM Composite Score	0.02

Tier 2 Report

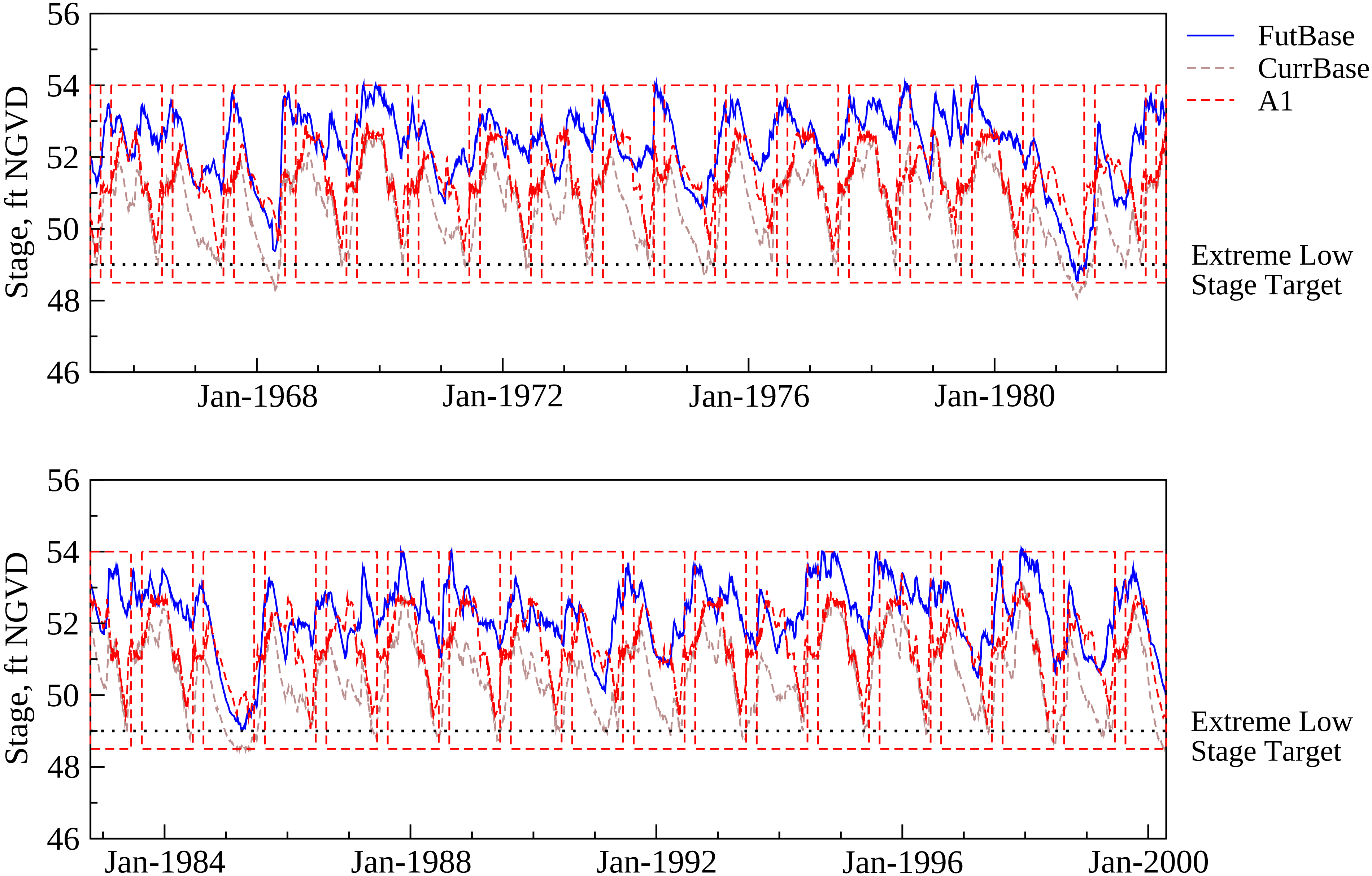
PDF Report for L01

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger



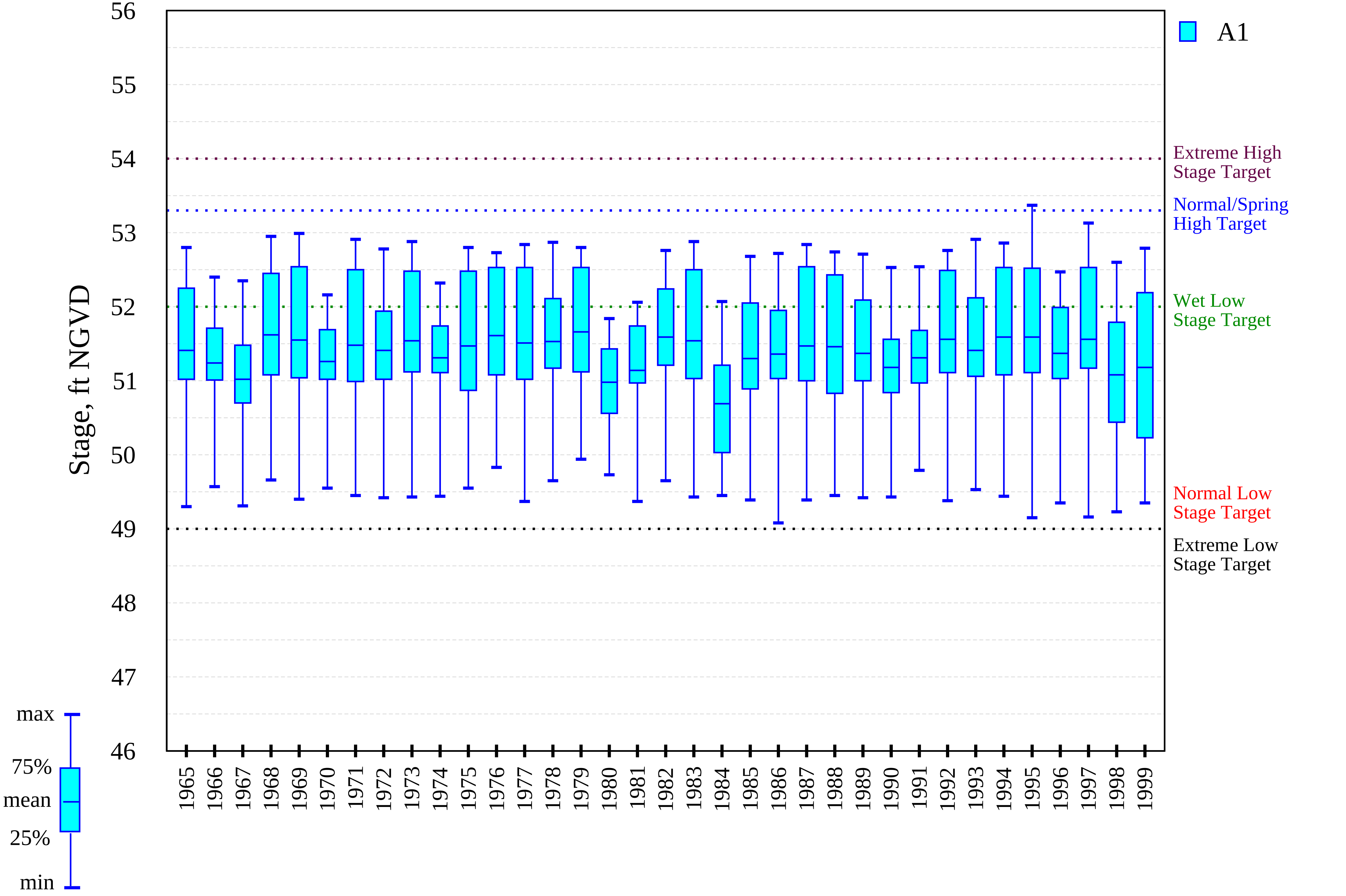
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

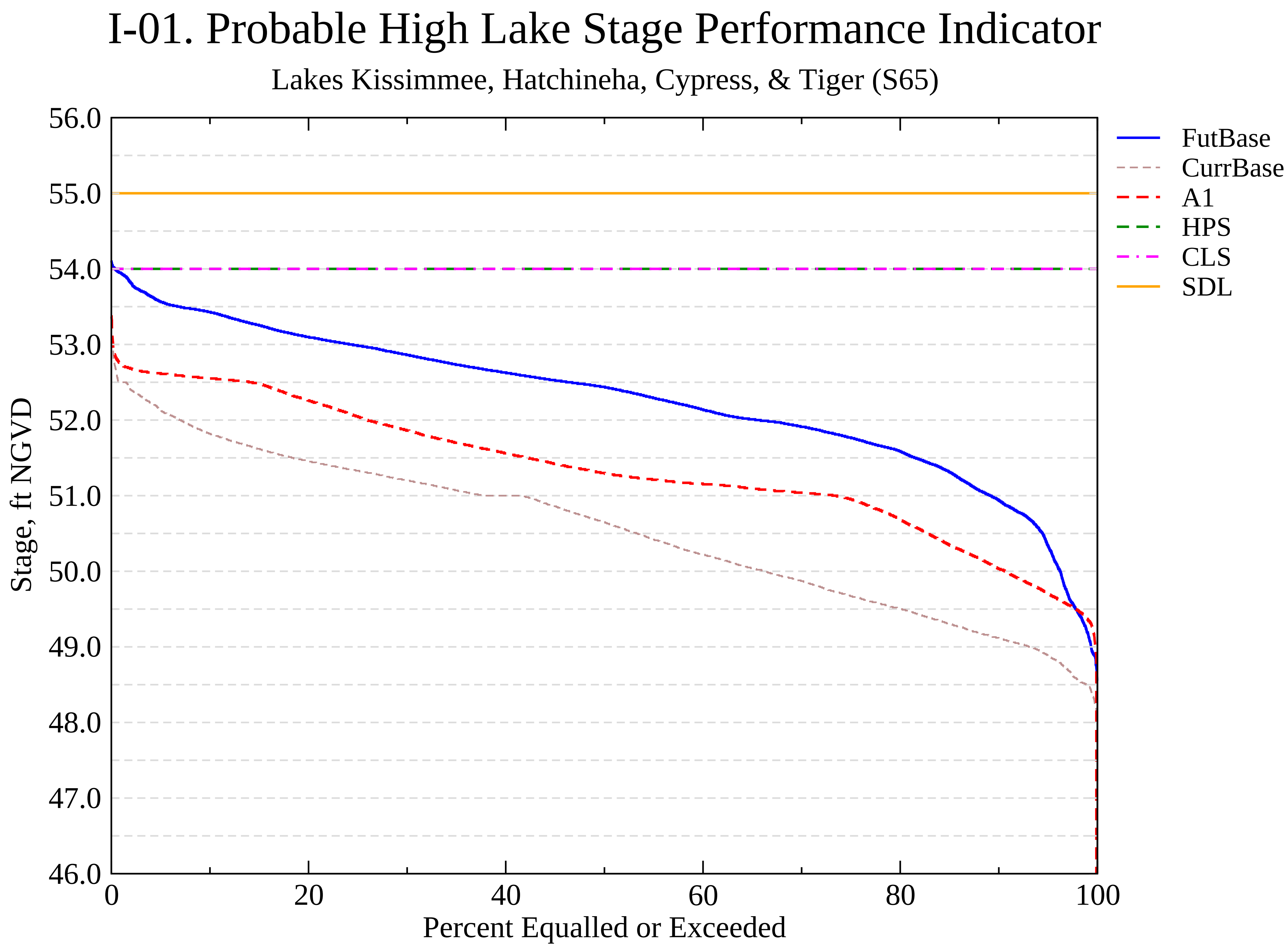
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

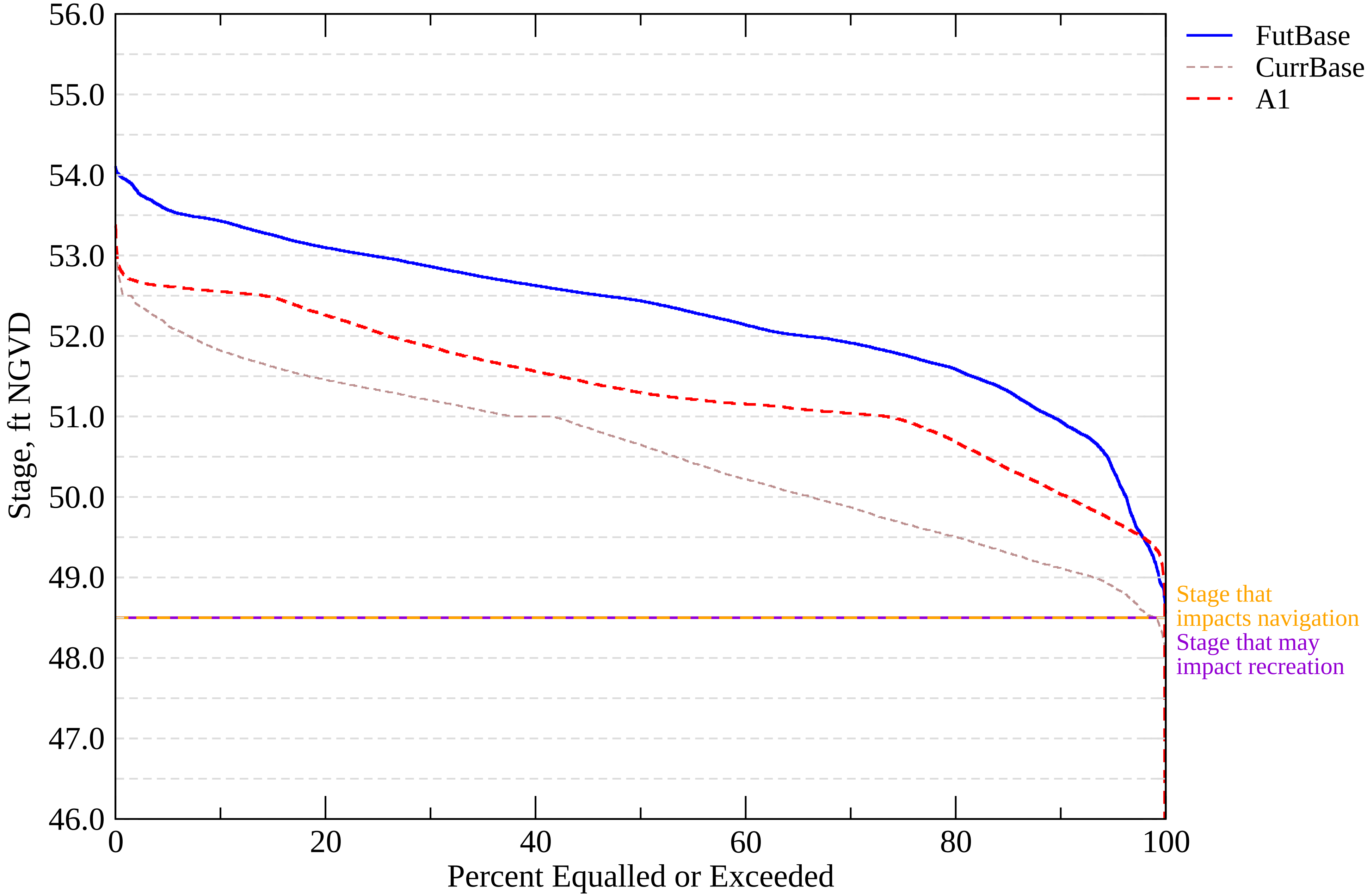
Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)



Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

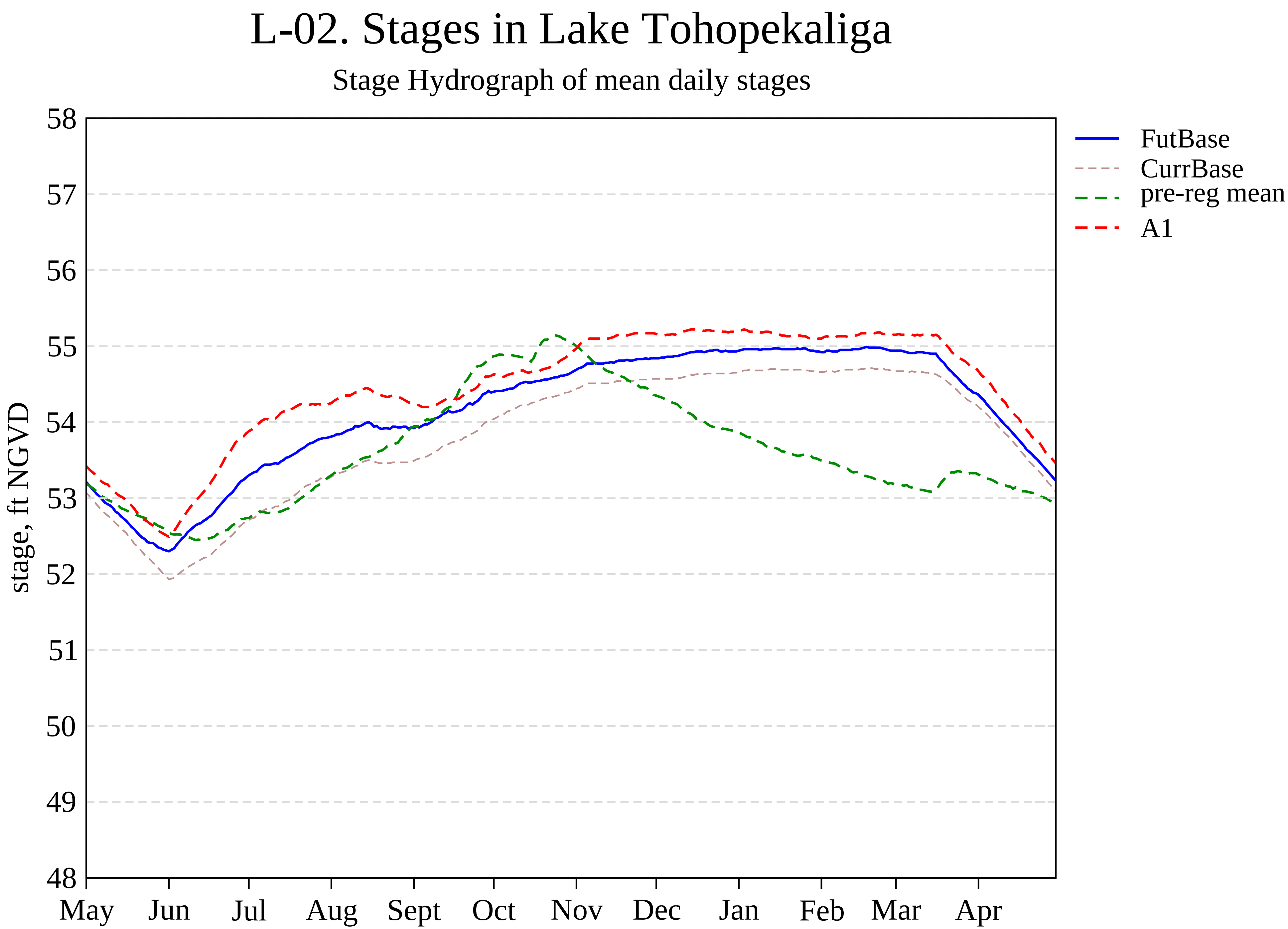
Alternative Description : Uncertainty Analysis - Simulation A1

Run ID : Variation of Kc - crop coefficient LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	100.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	71.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	37.0	1.00	0.04	0.04
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	25.7	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	17.1	0.70	0.04	0.03
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	91.4	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.4	-0.04	0.12	-0.01
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	4.9	0.00	0.12	0.00
						PM Score	**0.06**
						Location Weight	**0.20**
						PM Composite Score	**0.01**

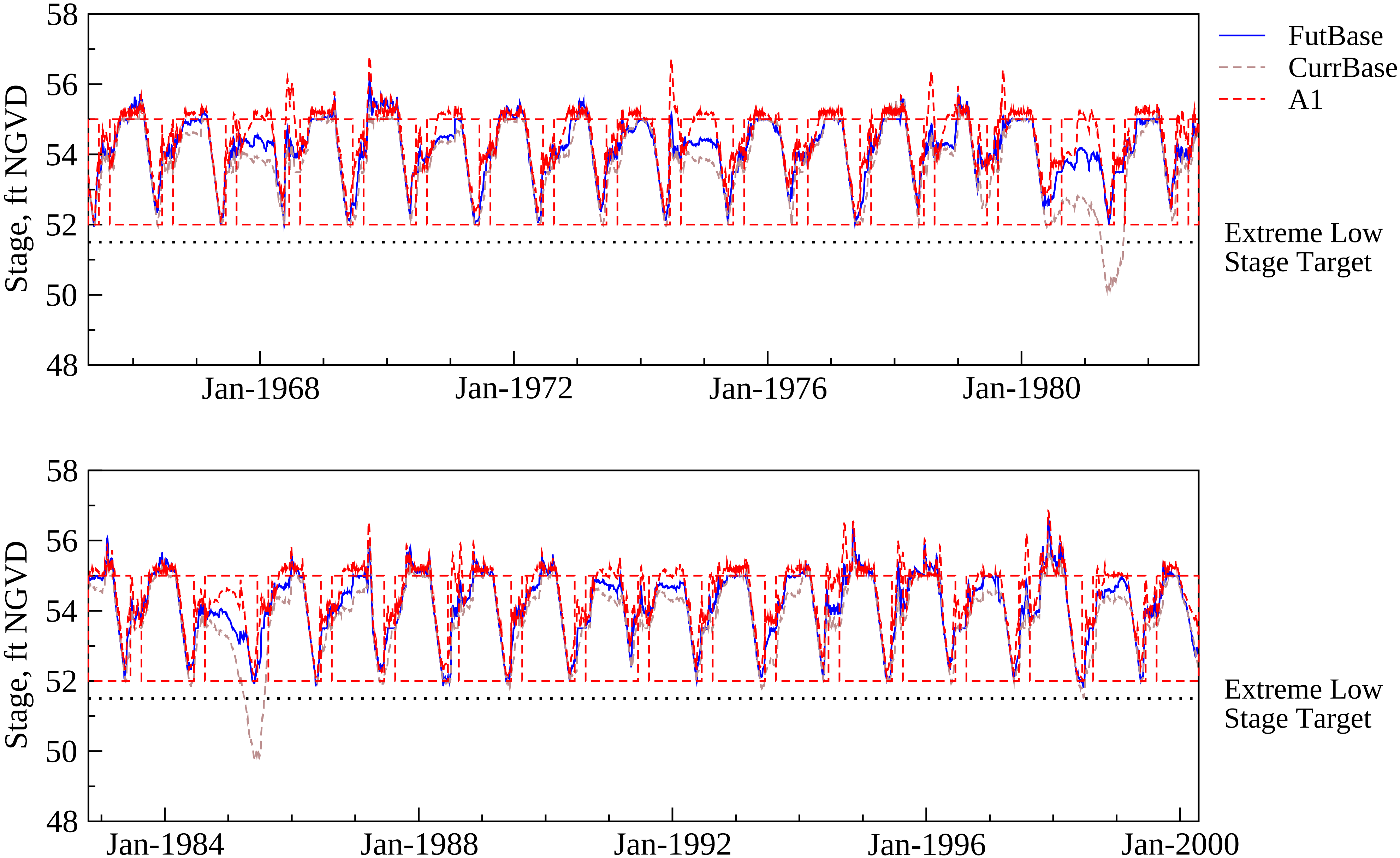
Tier 2 Report

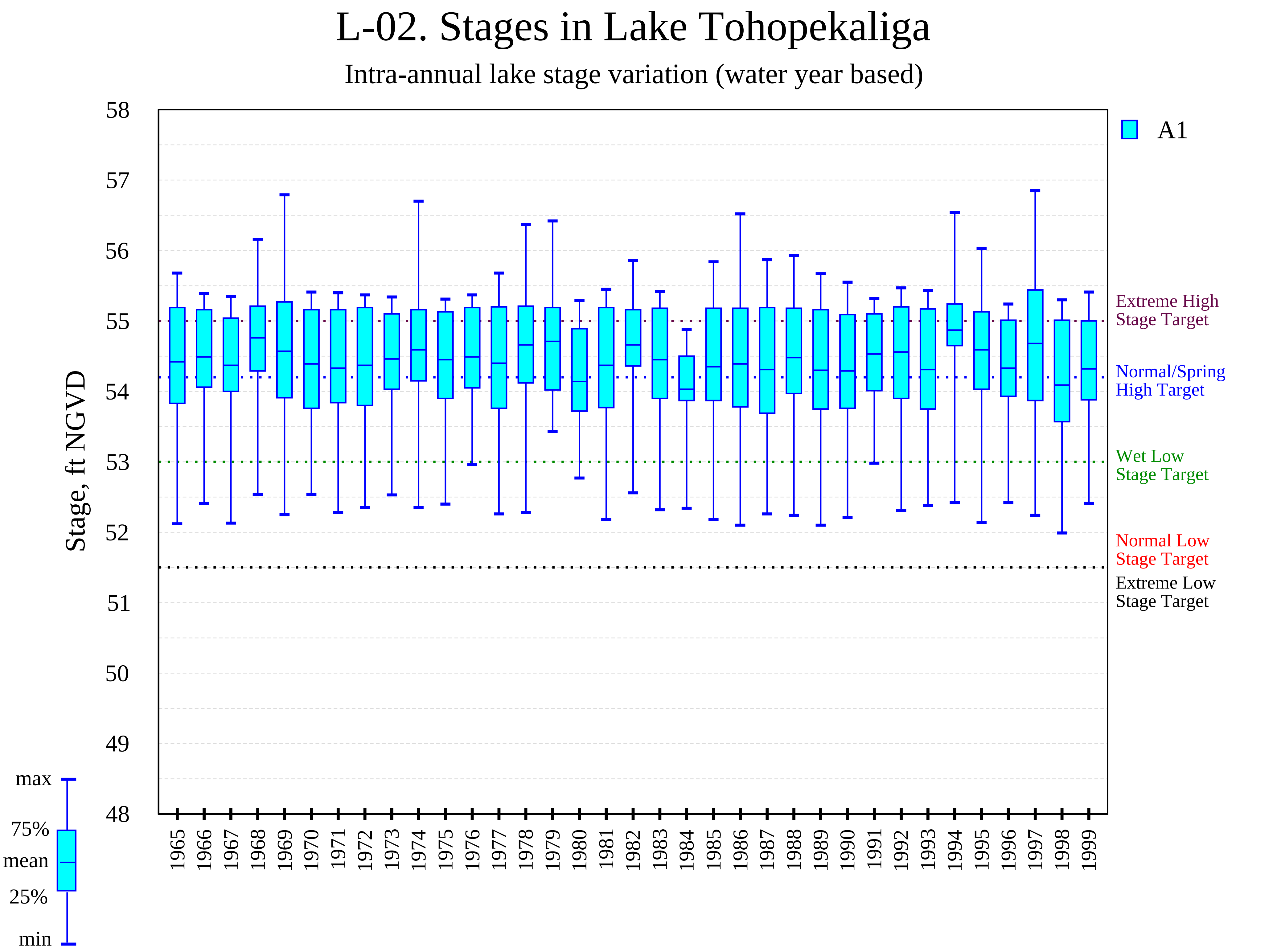
PDF Report for L02


L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
A1

L-02. Stages in Lake Tohopekaliga

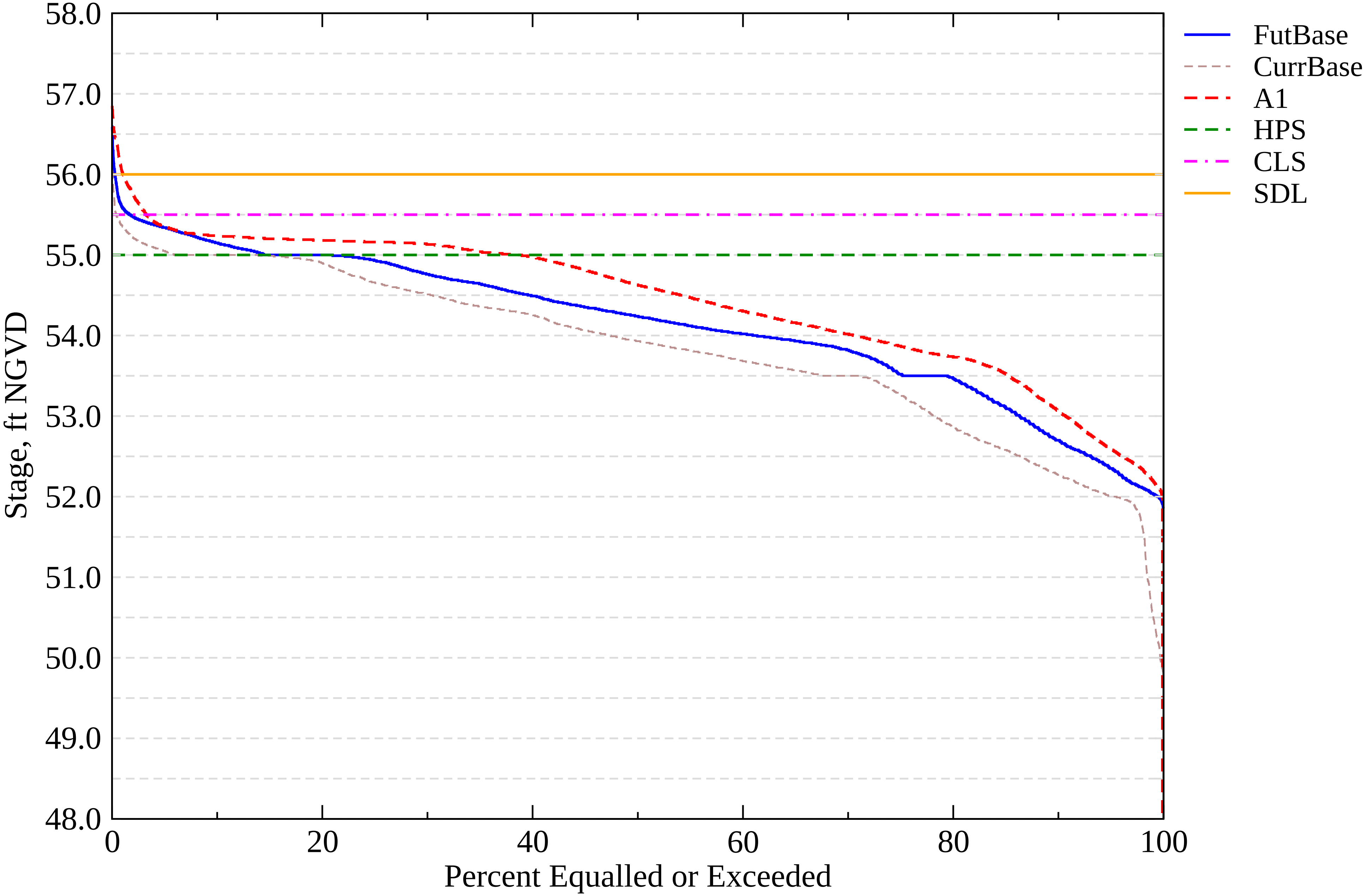
Daily Stage Hydrograph with Water Level recession windows (Sept-June)




L-02. Stages in Lake Tohopekaliga
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
A1
Extreme High
Stage Target
Normal/Spring
High Target
Wet Low
Stage Target
Normal Low
Stage Target
Extreme Low
Stage Target
max
75%
mean
25%
min

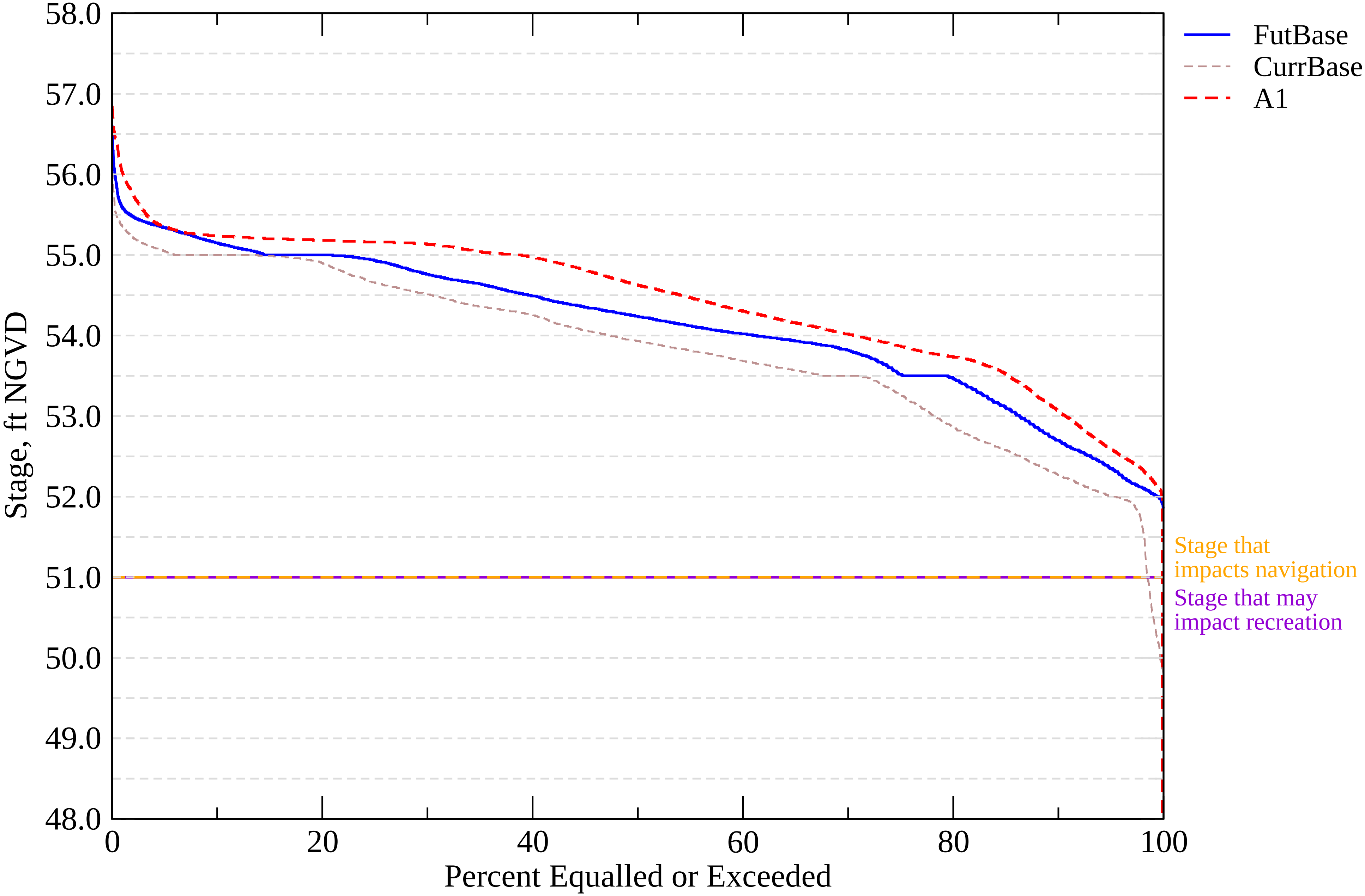
I-01. Probable High Lake Stage Performance Indicator

Lake Tohopekaliga (S61)



I-07. Stage Duration for Navigation and Recreation

Lake Tohopekaliga (S61)



Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

Alternative Description : Uncertainty Analysis - Simulation A1

Run ID : Variation of Kc - crop coefficient LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	100.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	51.4	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	25.7	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	82.9	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.7	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	3.5	0.00	0.12	0.00

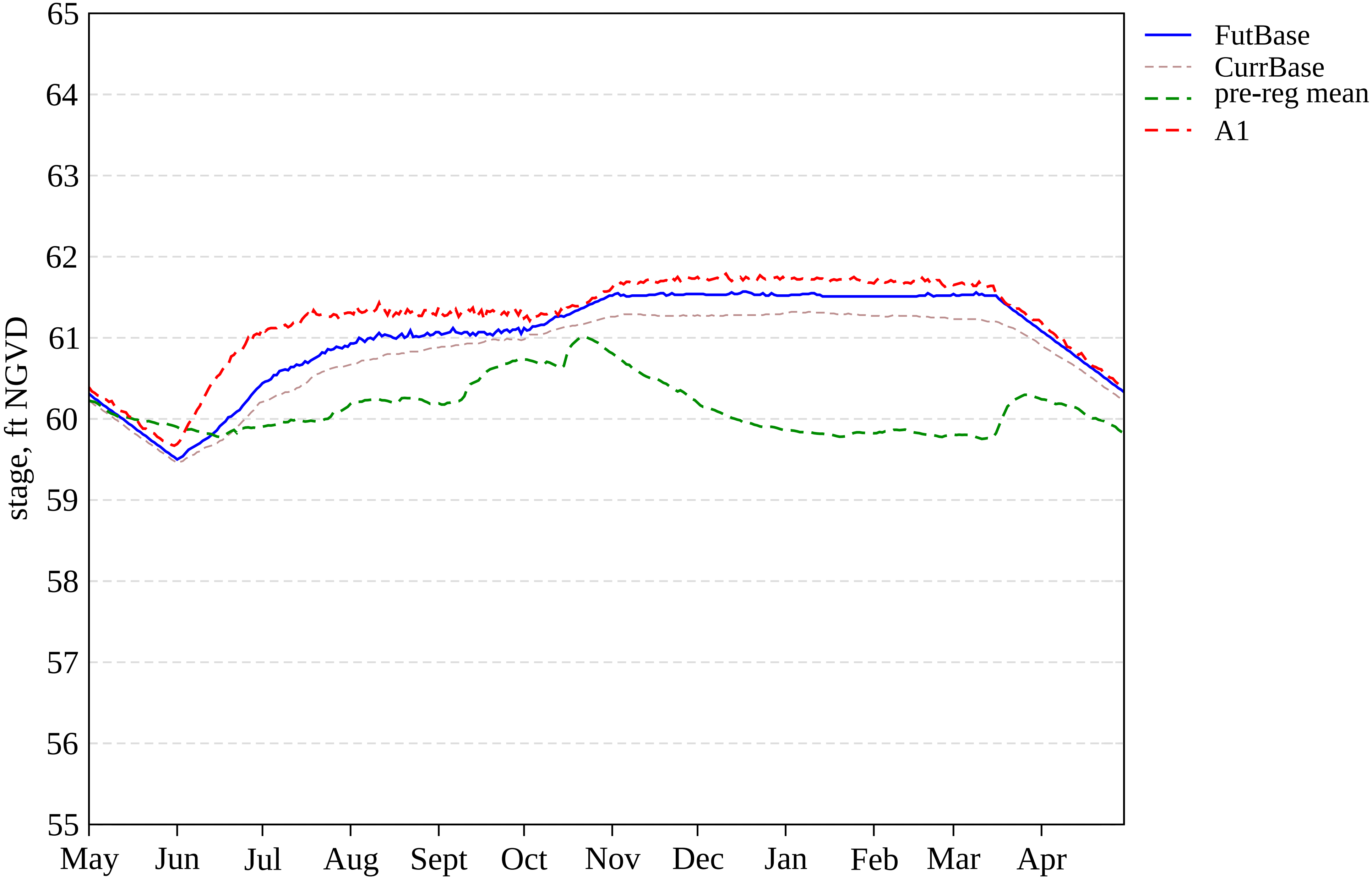
PM Score	**0.00**
Location Weight	**0.08**
PM Composite Score	**0.00**

Tier 2 Report

PDF Report for L03

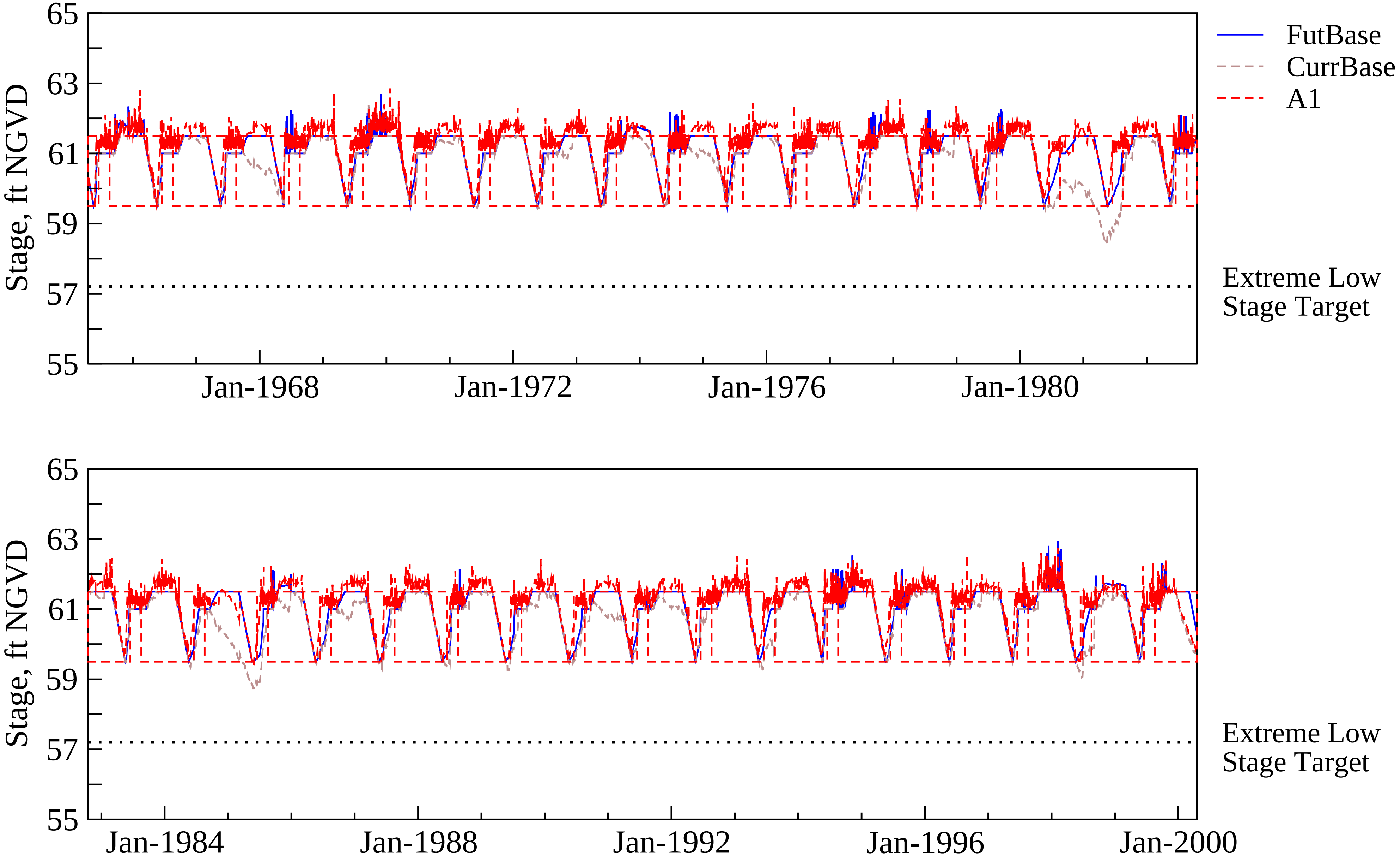
L-03. Stages in Lake Gentry

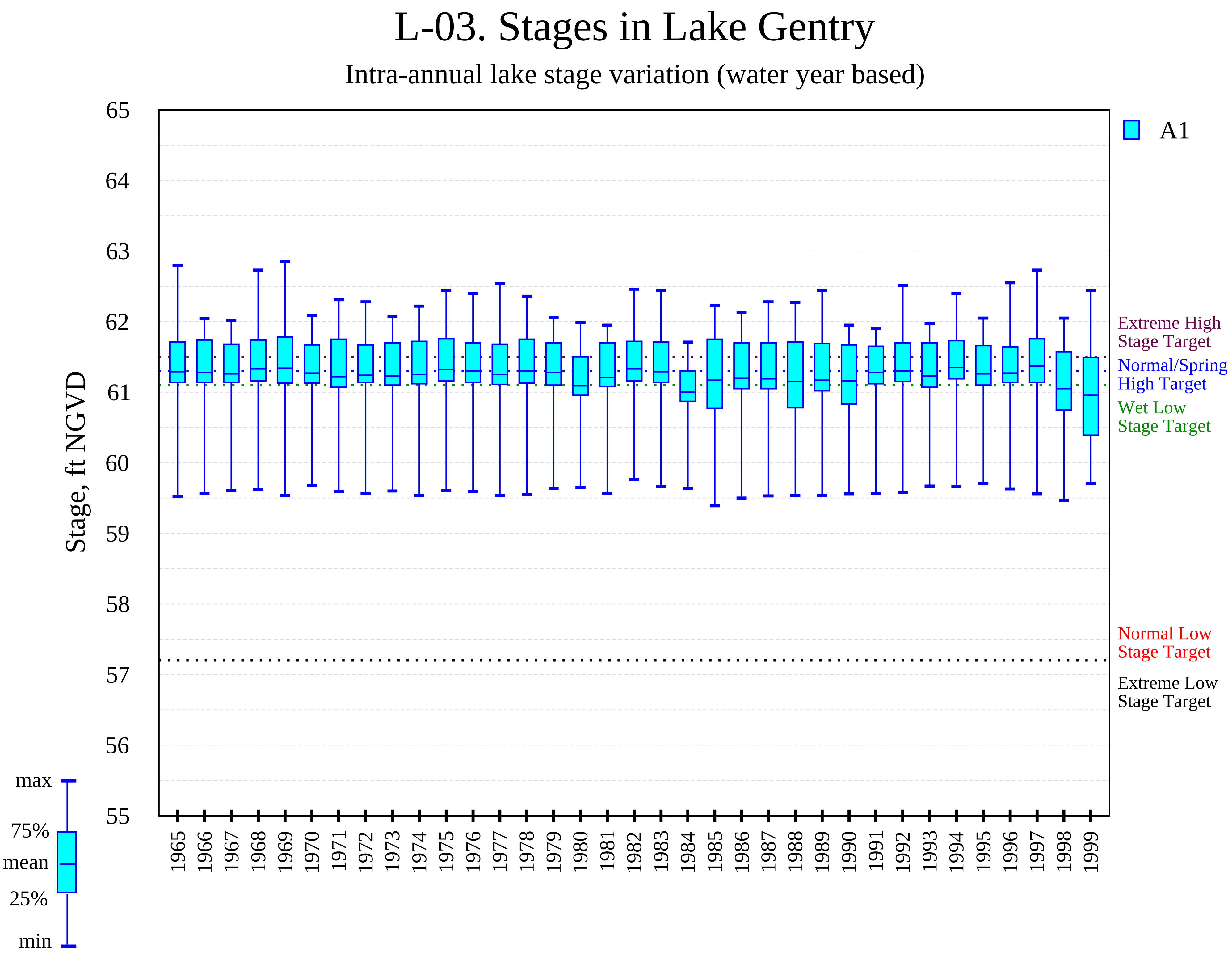
Stage Hydrograph of mean daily stages



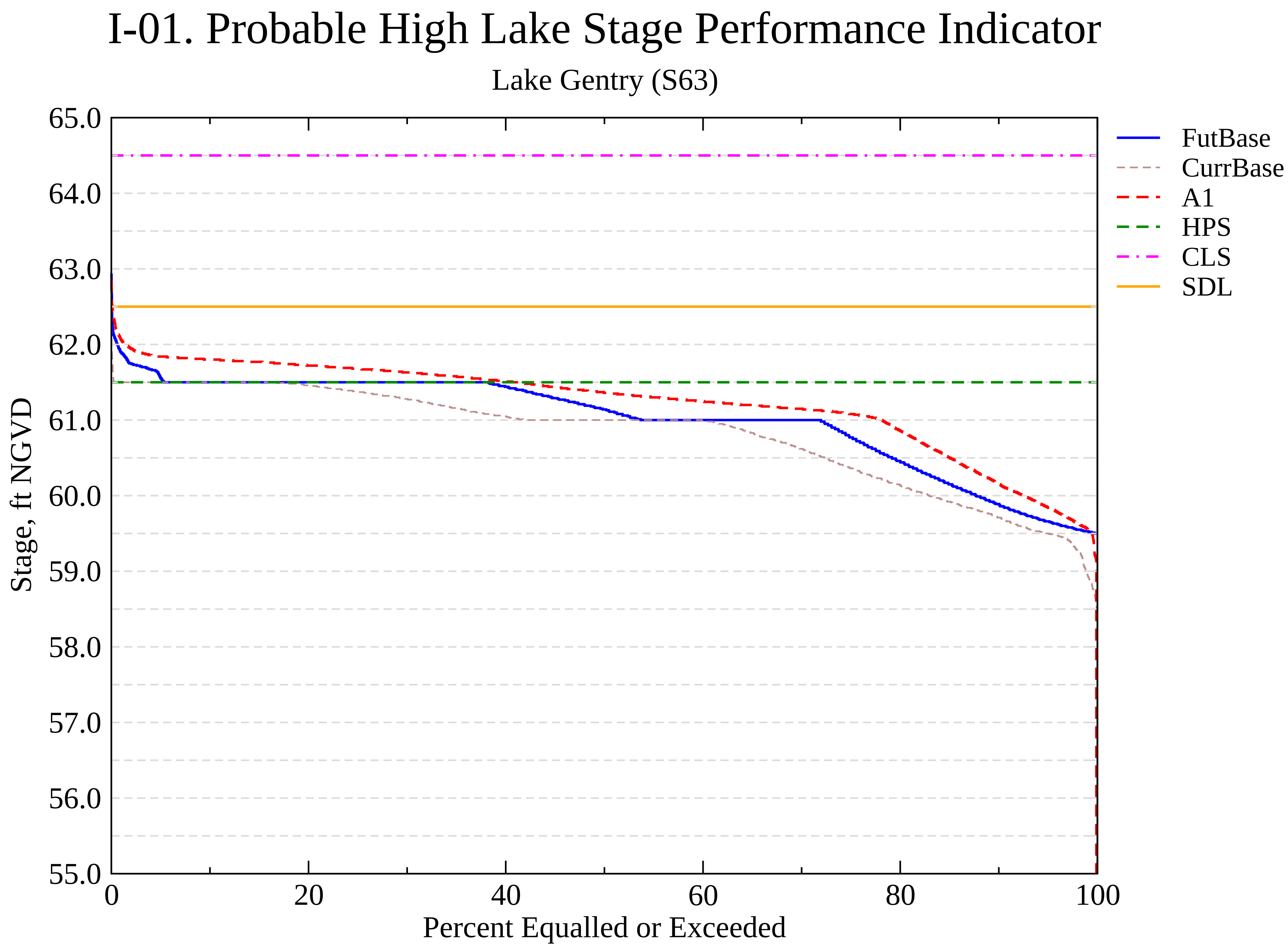
L-03. Stages in Lake Gentry

Daily Stage Hydrograph with Water Level recession windows (Sept-June)

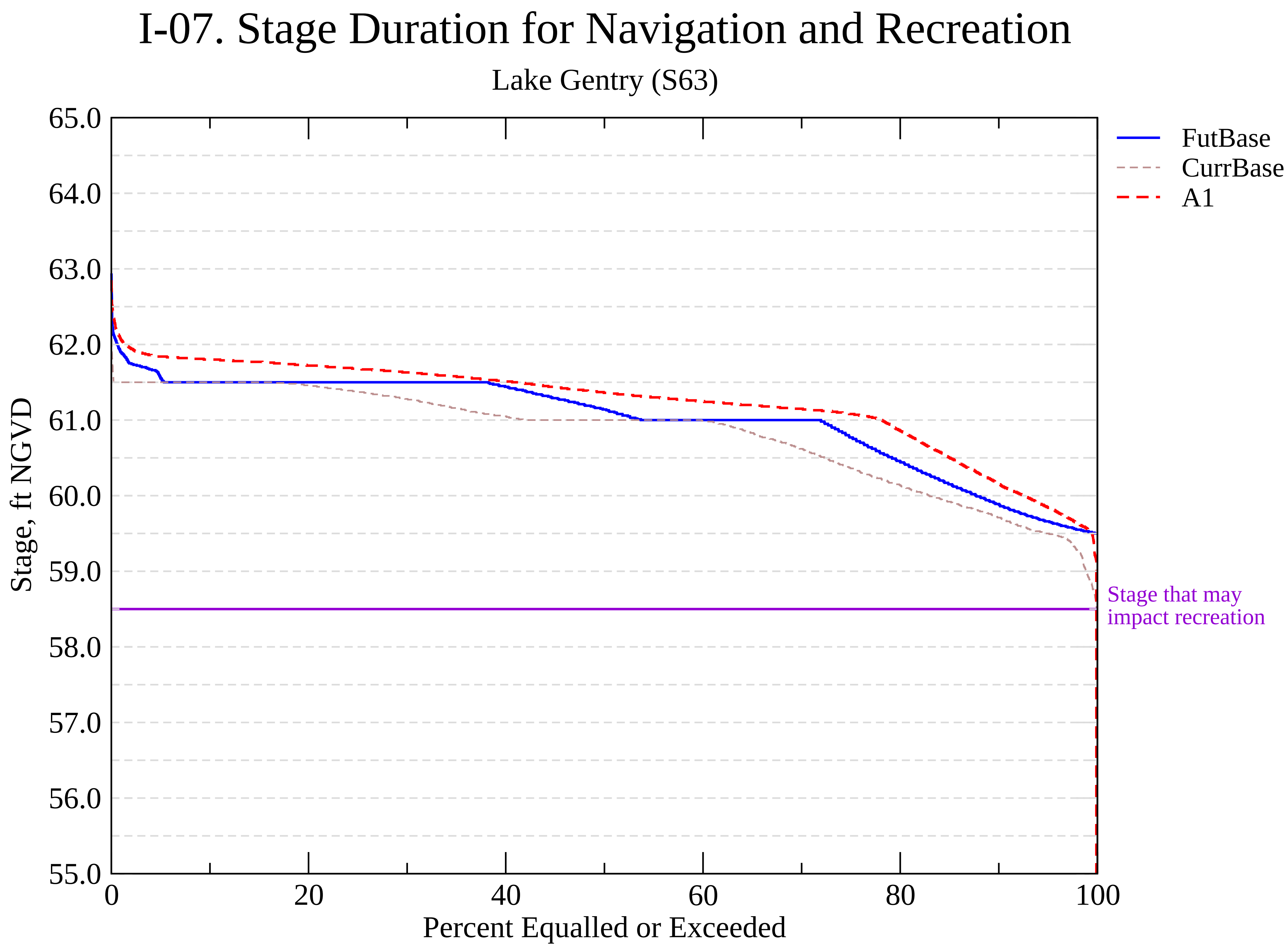




L-03. Stages in Lake Gentry
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
A1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min



I-01. Probable High Lake Stage Performance Indicator
Lake Gentry (S63)
Stage, ft NGVD
Percent Equalled or Exceeded
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
FutBase
CurrBase
A1
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
Lake Gentry (S63)
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A1
Stage that may impact recreation

Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

Alternative Description : Uncertainty Analysis - Simulation A1

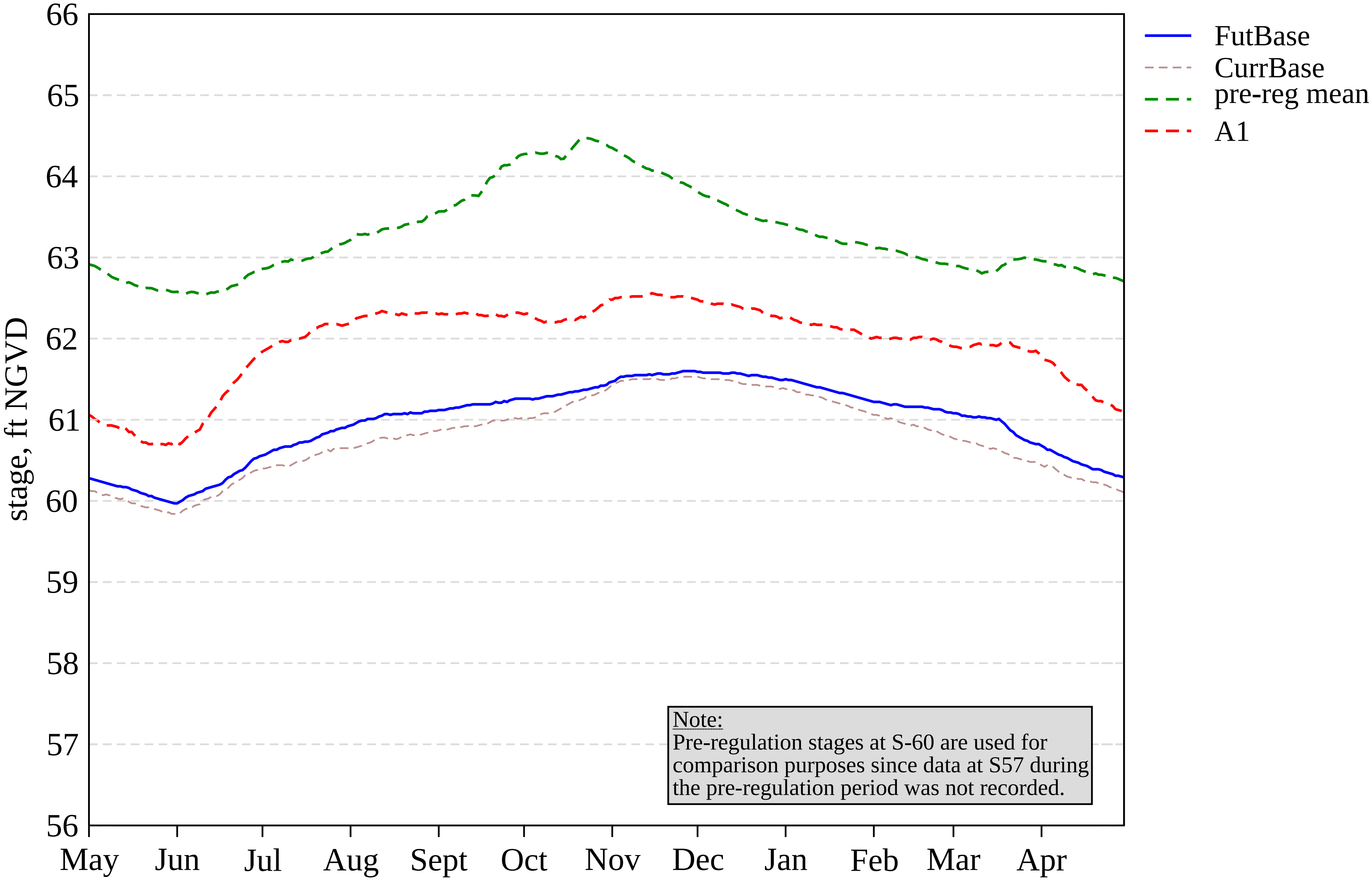
Run ID : Variation of Kc - crop coefficient LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	100.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	69.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	3.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	37.1	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	57.1	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	82.9	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.8	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	4.2	0.00	0.12	0.00
						PM Score	**0.00**
						Location Weight	**0.08**
						PM Composite Score	**0.00**

Tier 2 Report

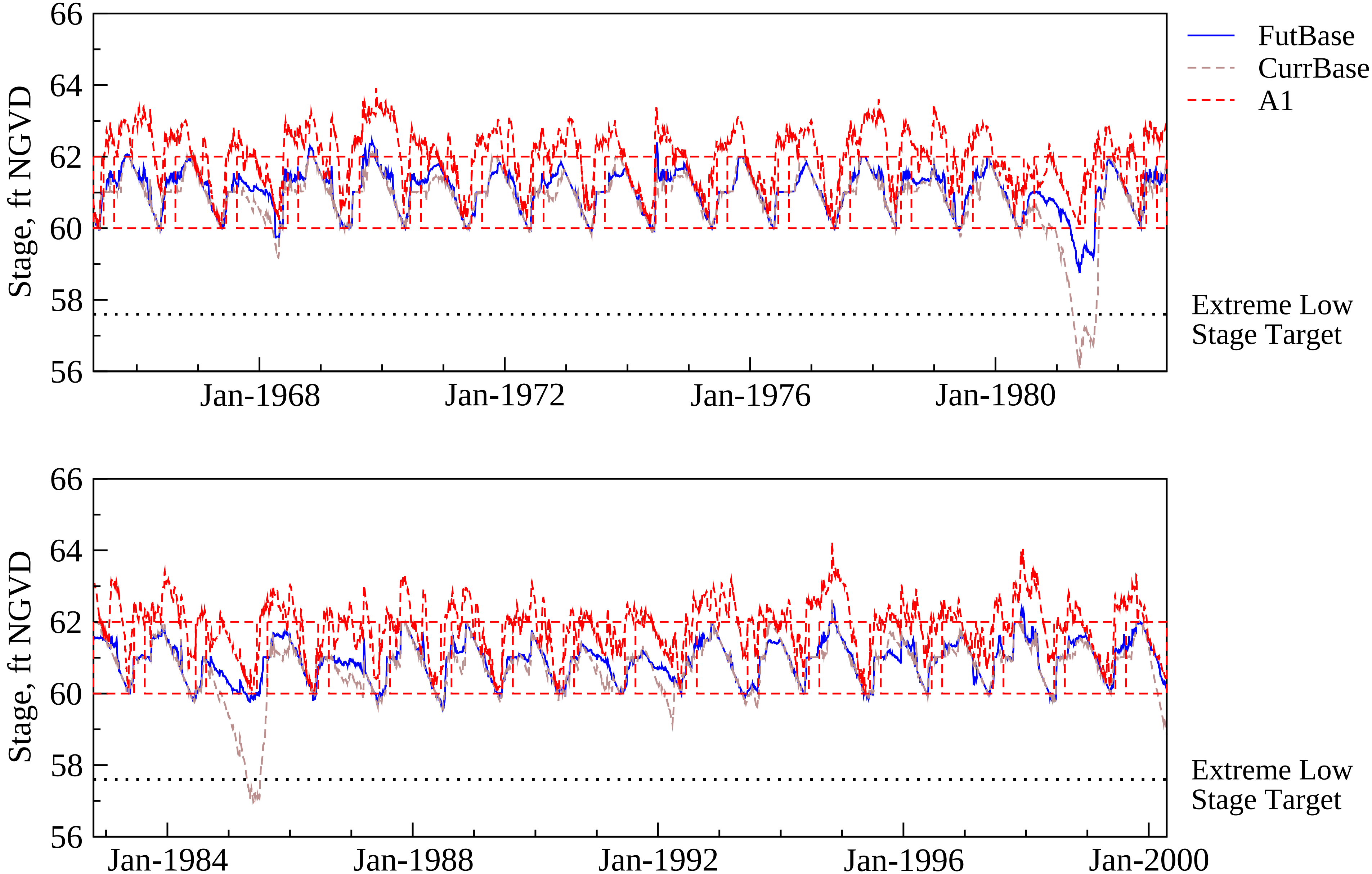
L-04. Stages in Lakes Joel, Myrtle, and Preston

Stage Hydrograph of mean daily stages



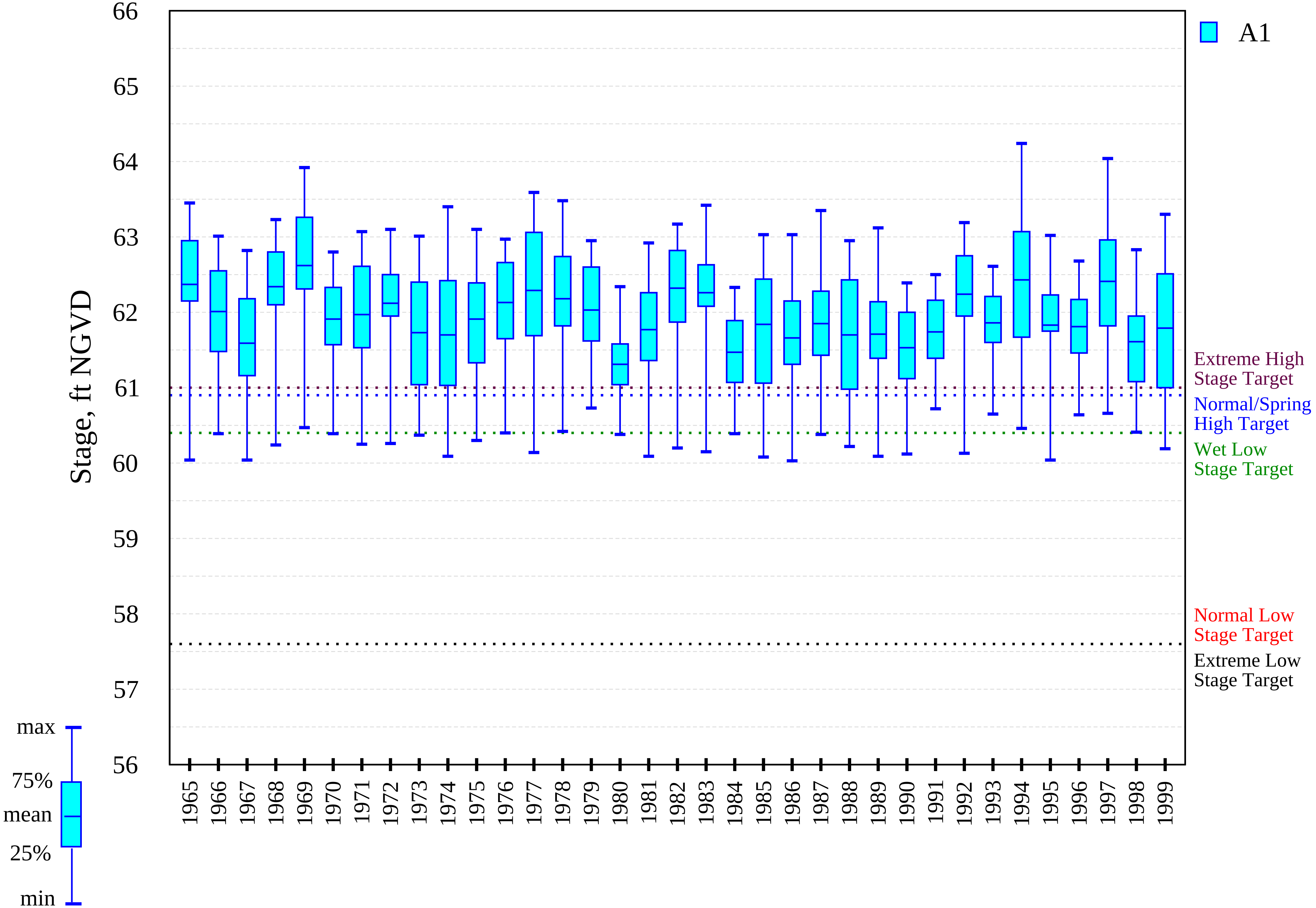
L-04. Stages in Lakes Joel, Myrtle, and Preston

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



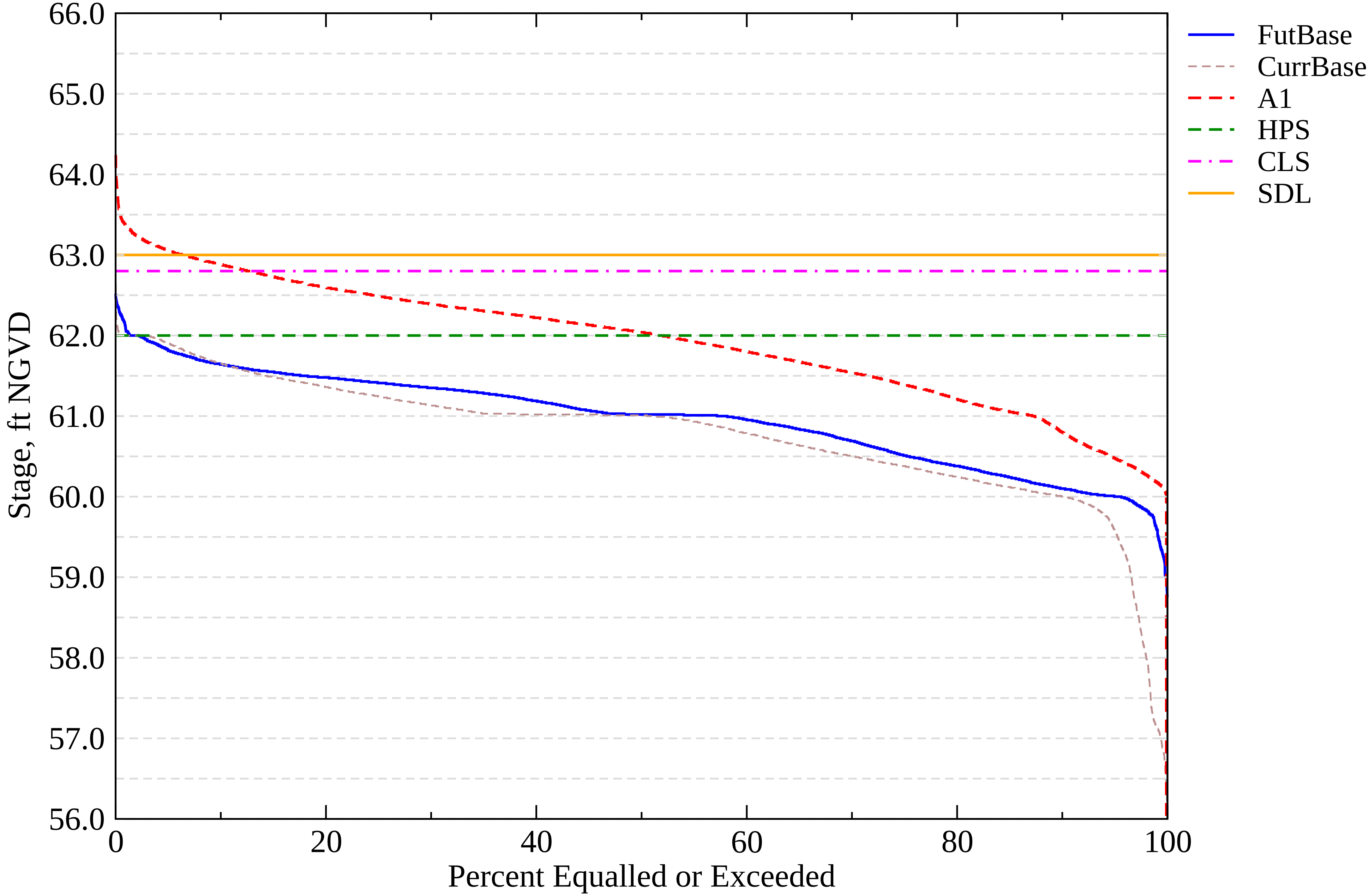
L-04. Stages in Lakes Joel, Myrtle, and Preston

Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Lake Myrtle, Joel, and Preston (S57)



Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation A1

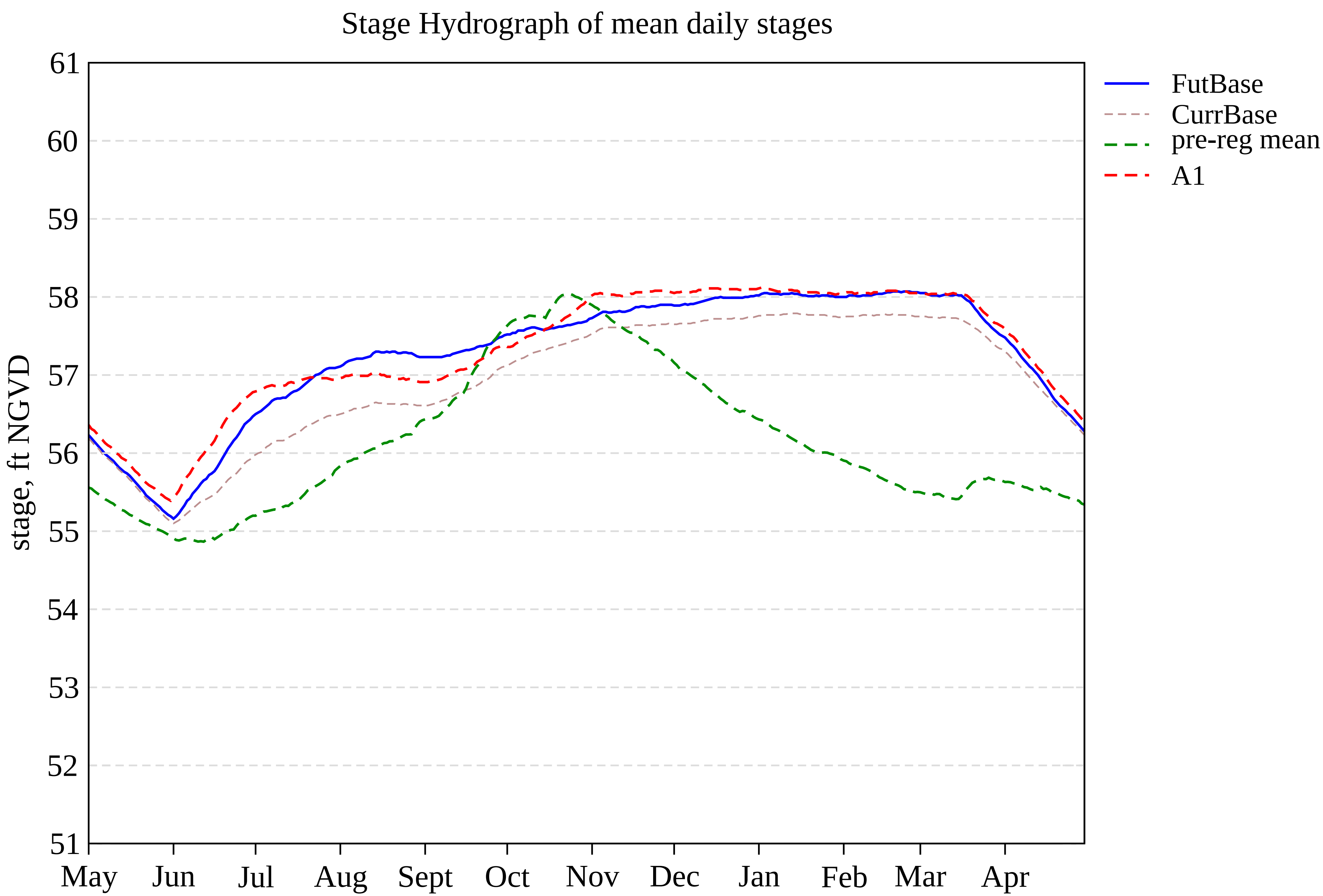
Run ID : Variation of Kc - crop coefficient LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	100.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	91.0	0.27	0.08	0.02
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	11.0	1.00	0.04	0.04
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	37.1	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	5.7	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	94.3	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.2	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.5	0.00	0.12	0.00
						PM Score	**0.06**
						Location Weight	**0.13**
						PM Composite Score	**0.01**

Tier 2 Report

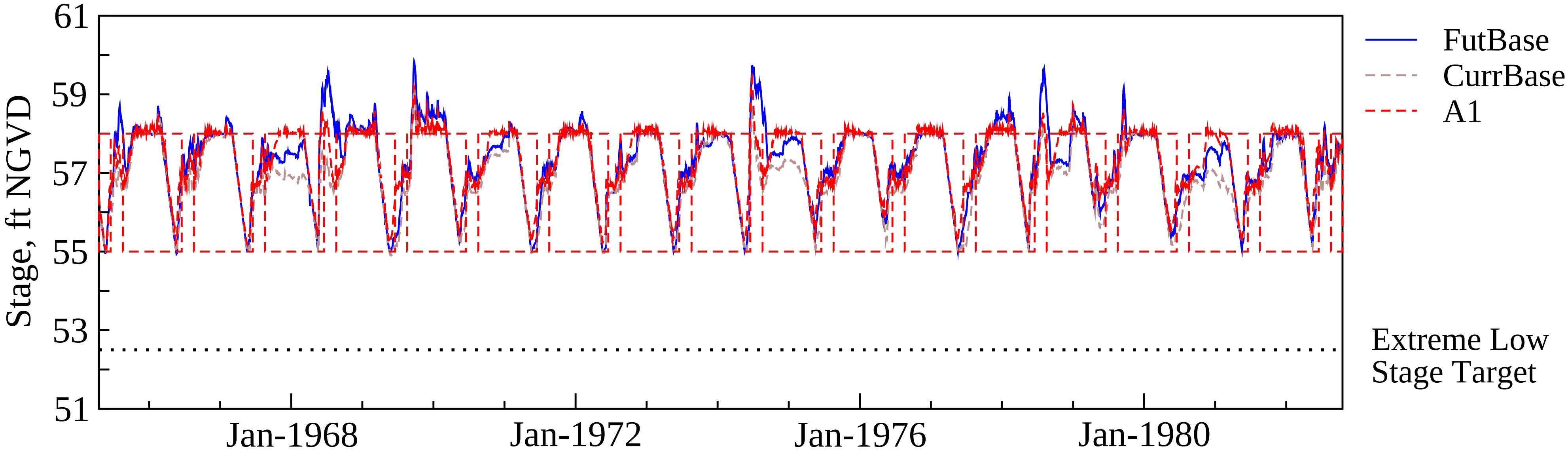
PDF Report for L05

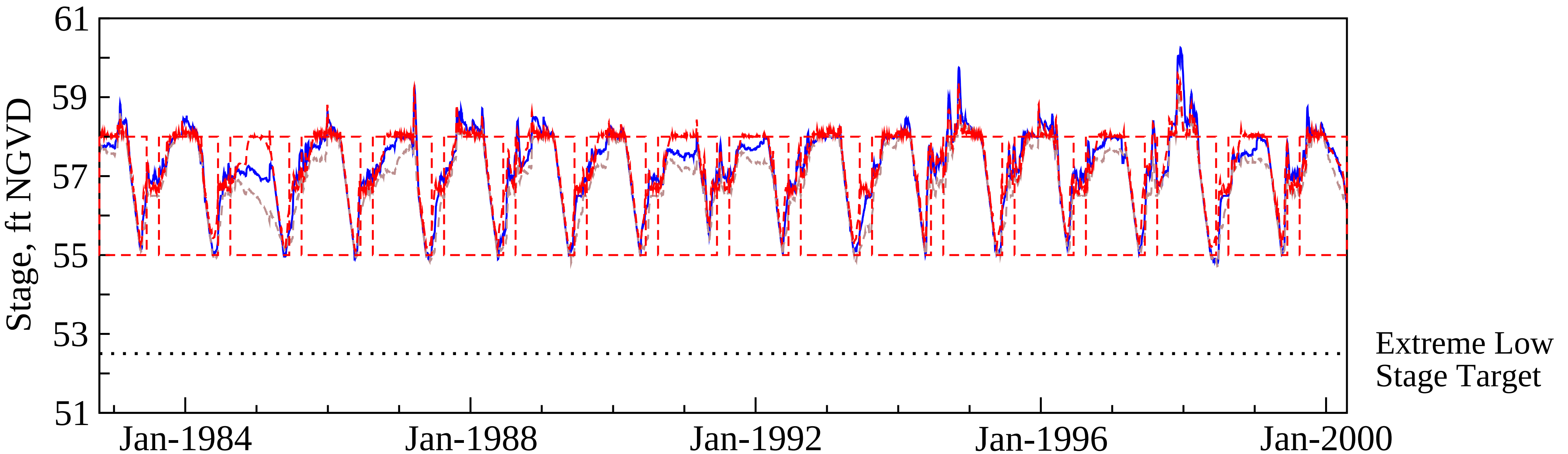
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

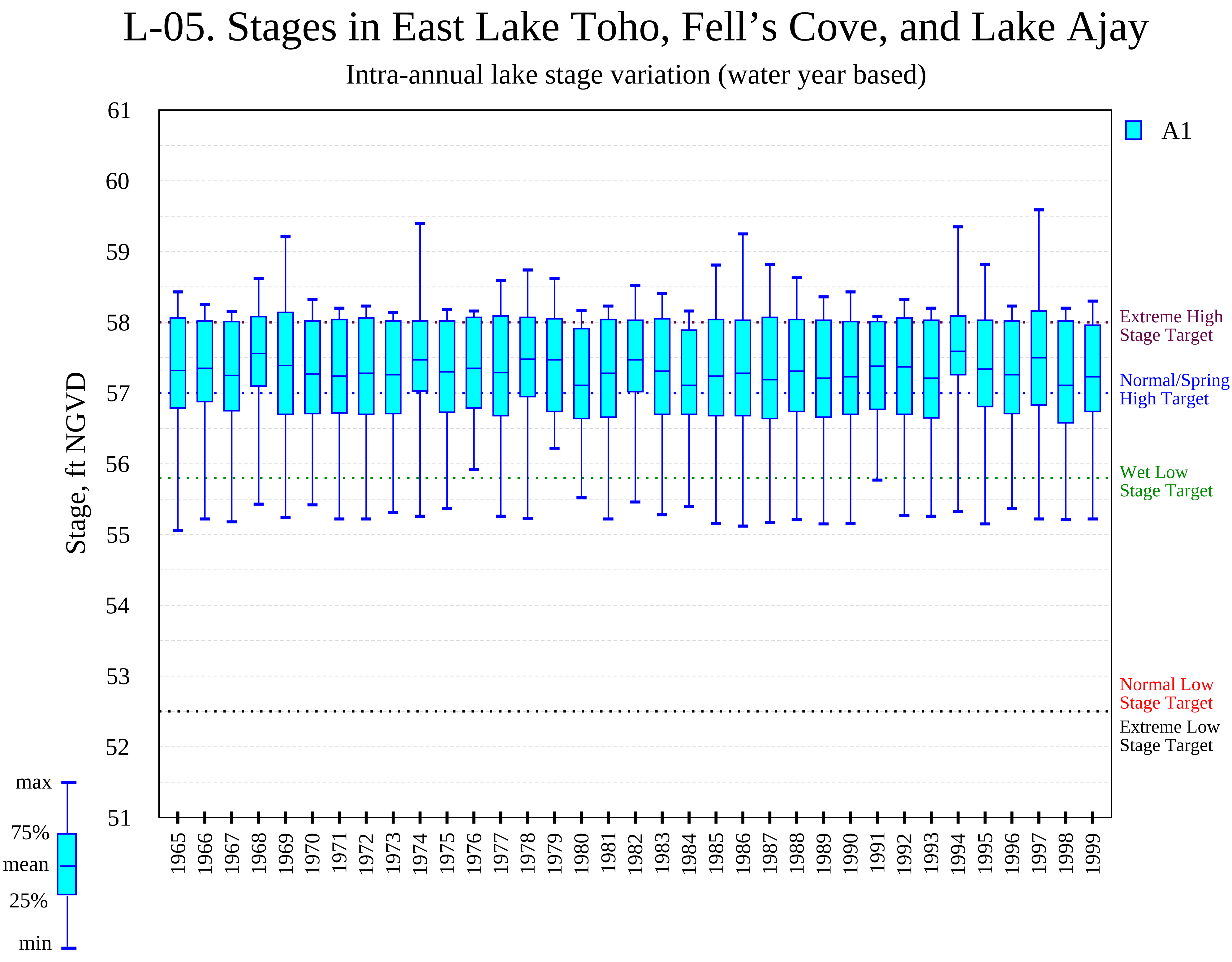


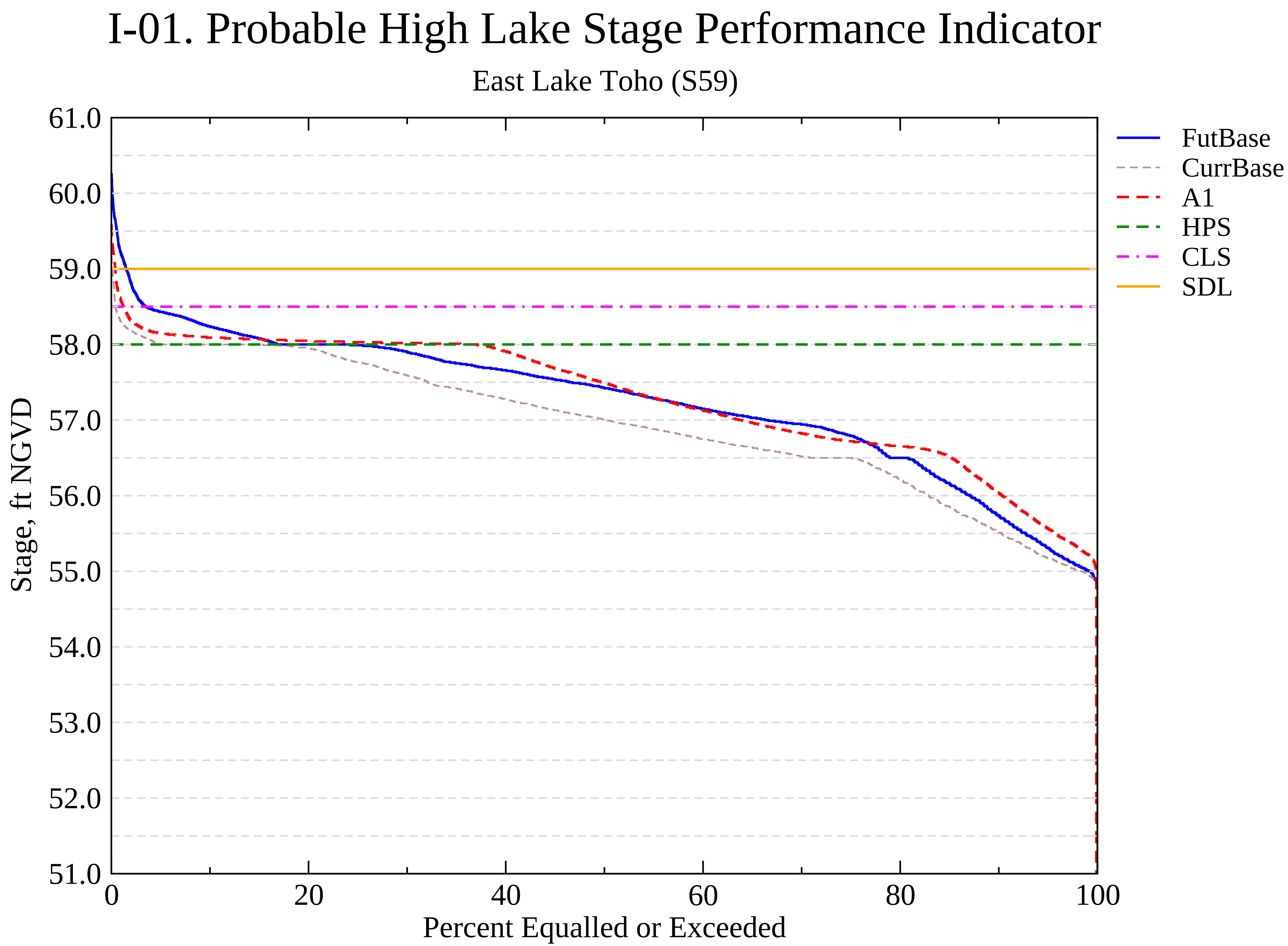
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Daily Stage Hydrograph with Water Level recession windows (Sept-June)





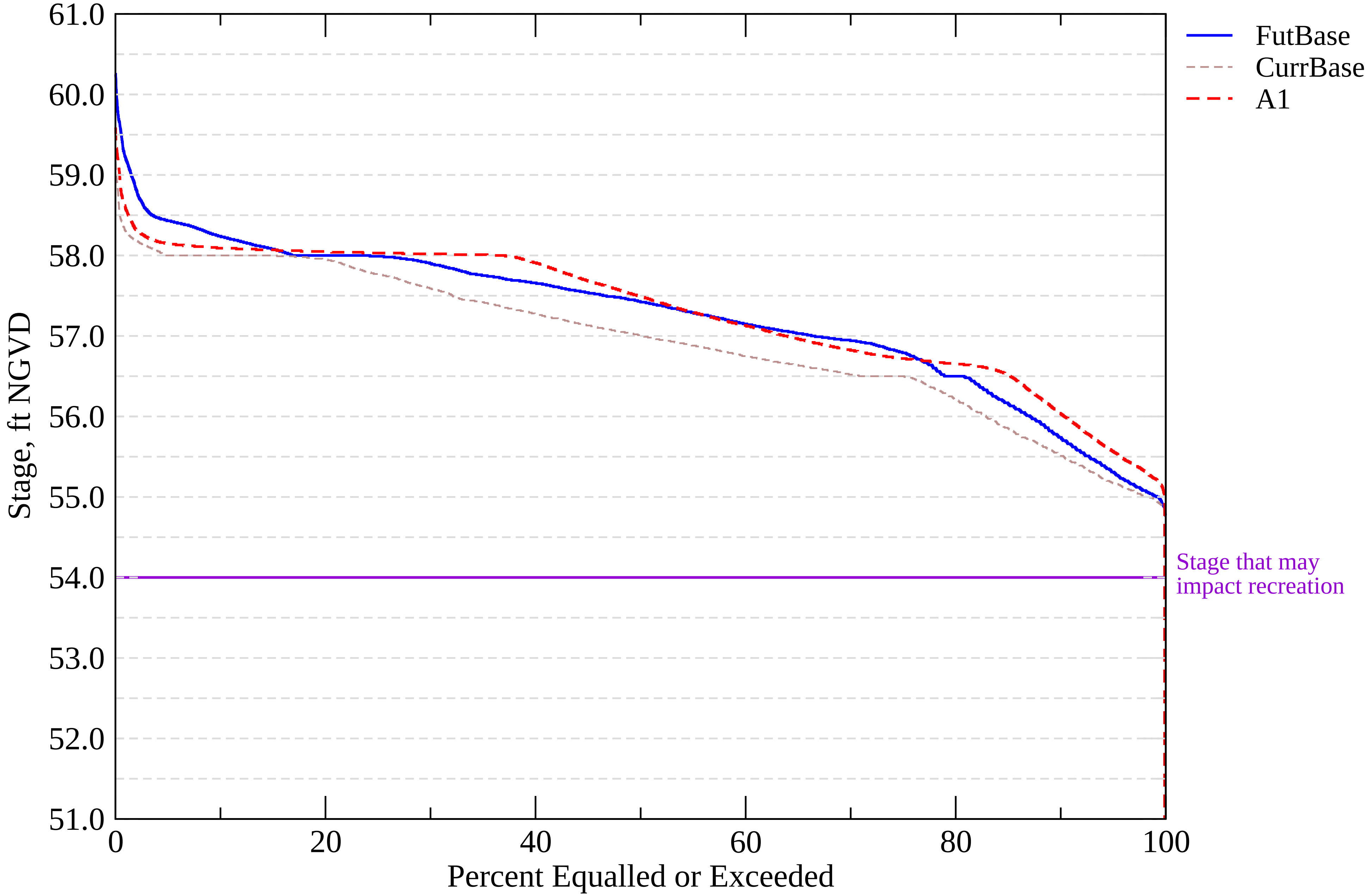

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
61
60
59
58
57
56
55
54
53
52
51
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
A1
Extreme High
Stage Target
Normal/Spring
High Target
Wet Low
Stage Target
Normal Low
Stage Target
Extreme Low
Stage Target
max
75%
mean
25%
min



I-01. Probable High Lake Stage Performance Indicator
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

East Lake Toho (S59)



Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Alternative Description : Uncertainty Analysis - Simulation A1

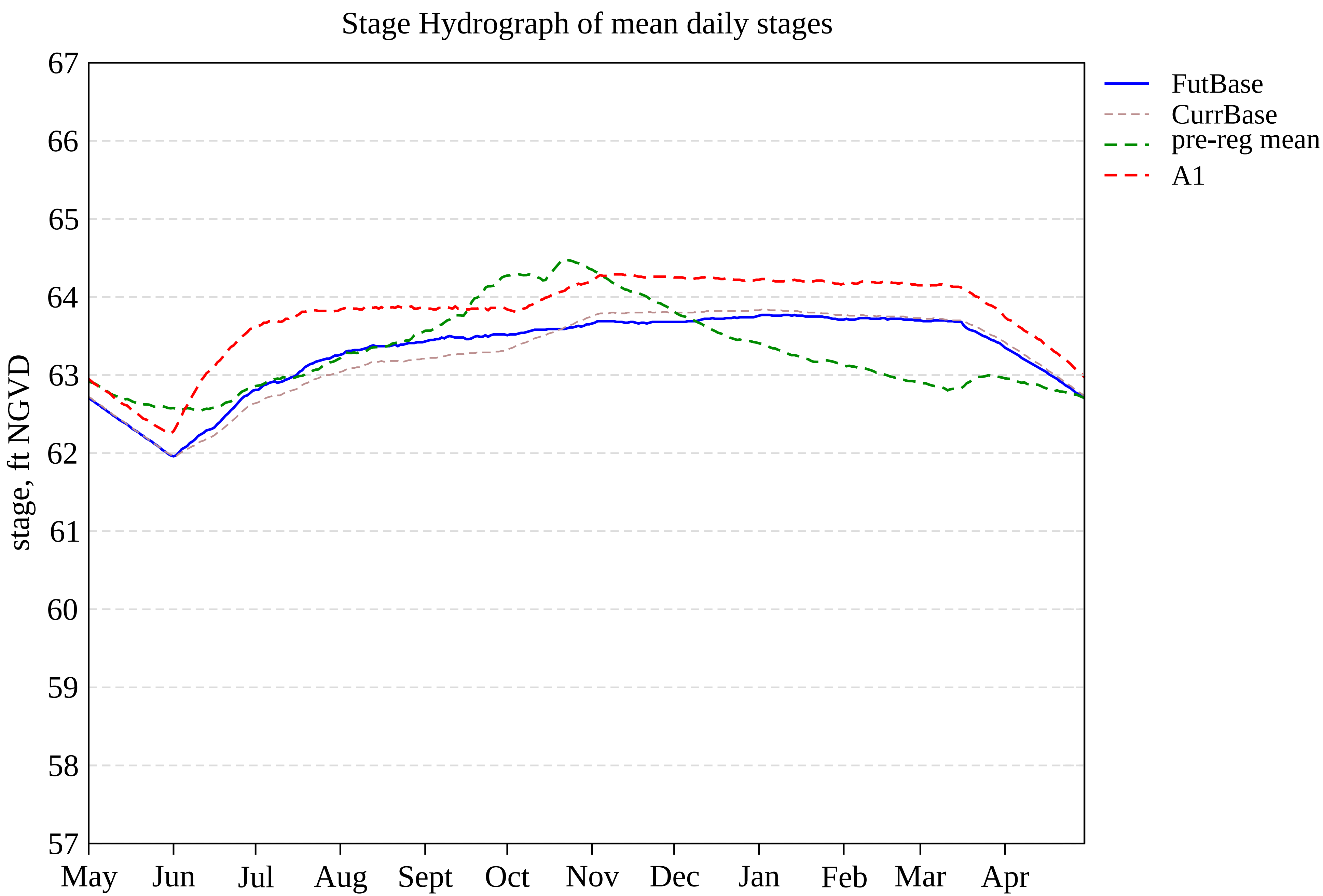
Run ID : Variation of Kc - crop coefficient LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	100.0	-0.03	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	14.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	94.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	40.0	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	0.0	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	100.0	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.4	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	3.2	0.00	0.12	0.00
						PM Score	**0.00**
						Location Weight	**0.08**
						PM Composite Score	**0.00**

Tier 2 Report

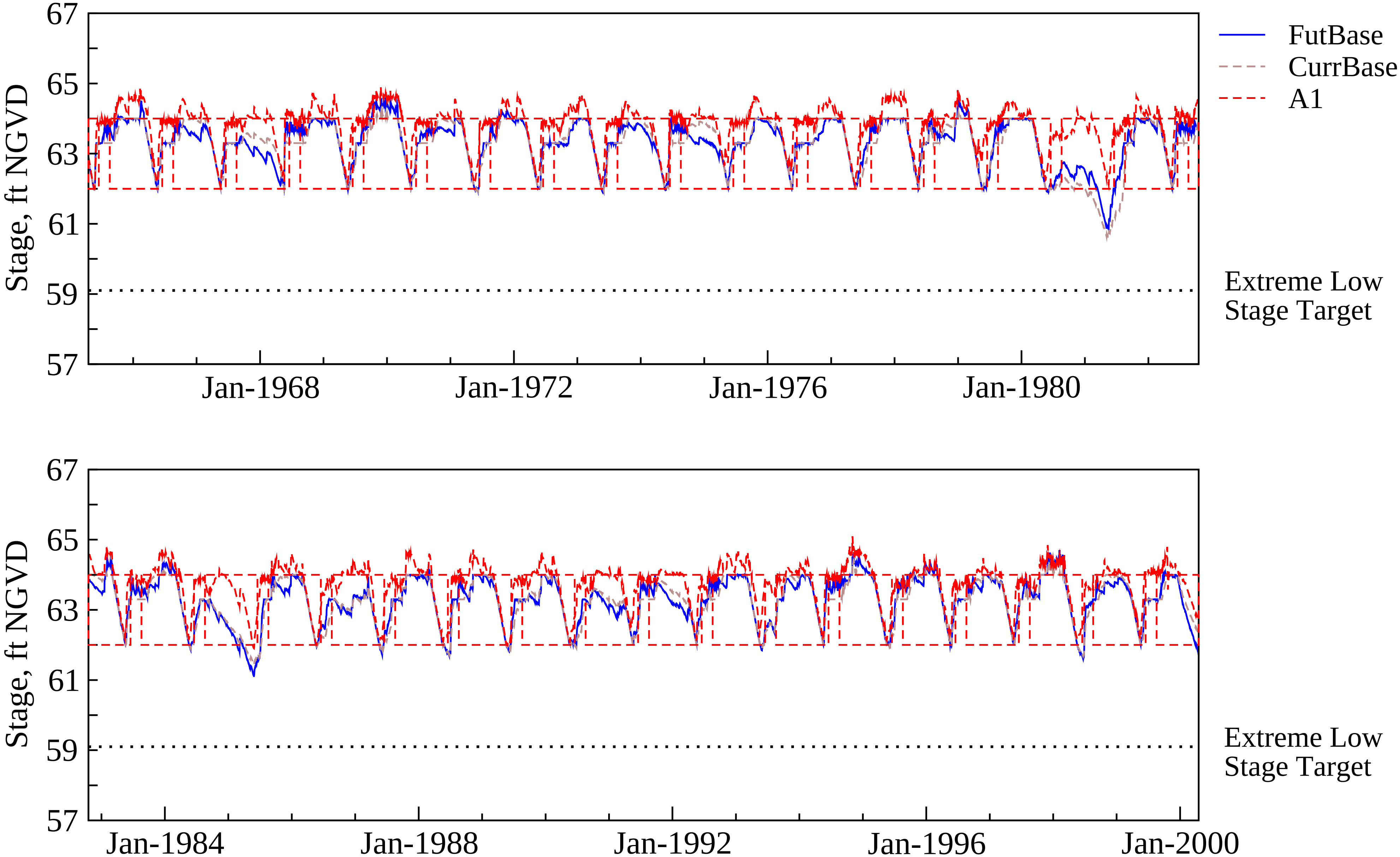
PDF Report for L06

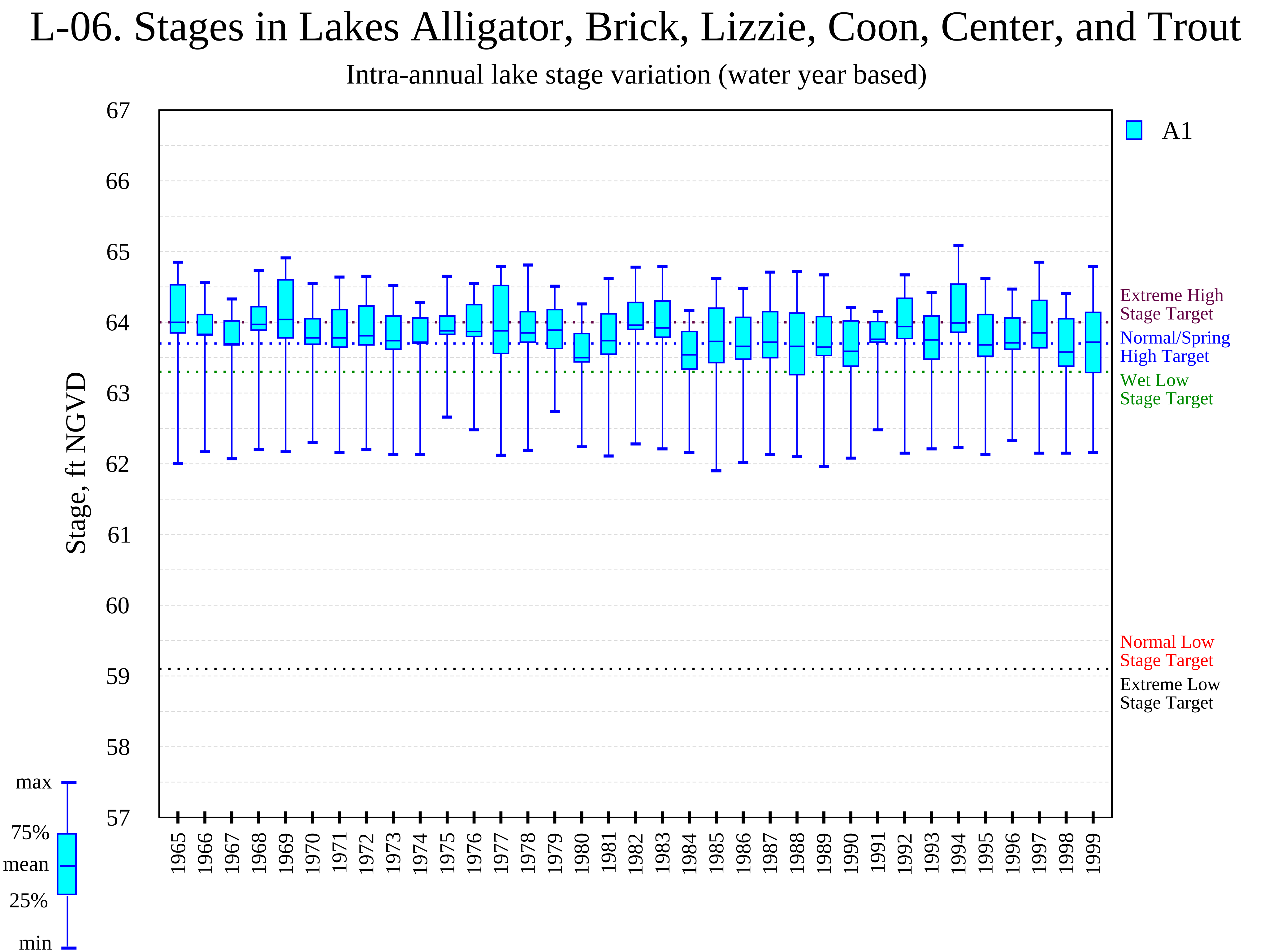
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout



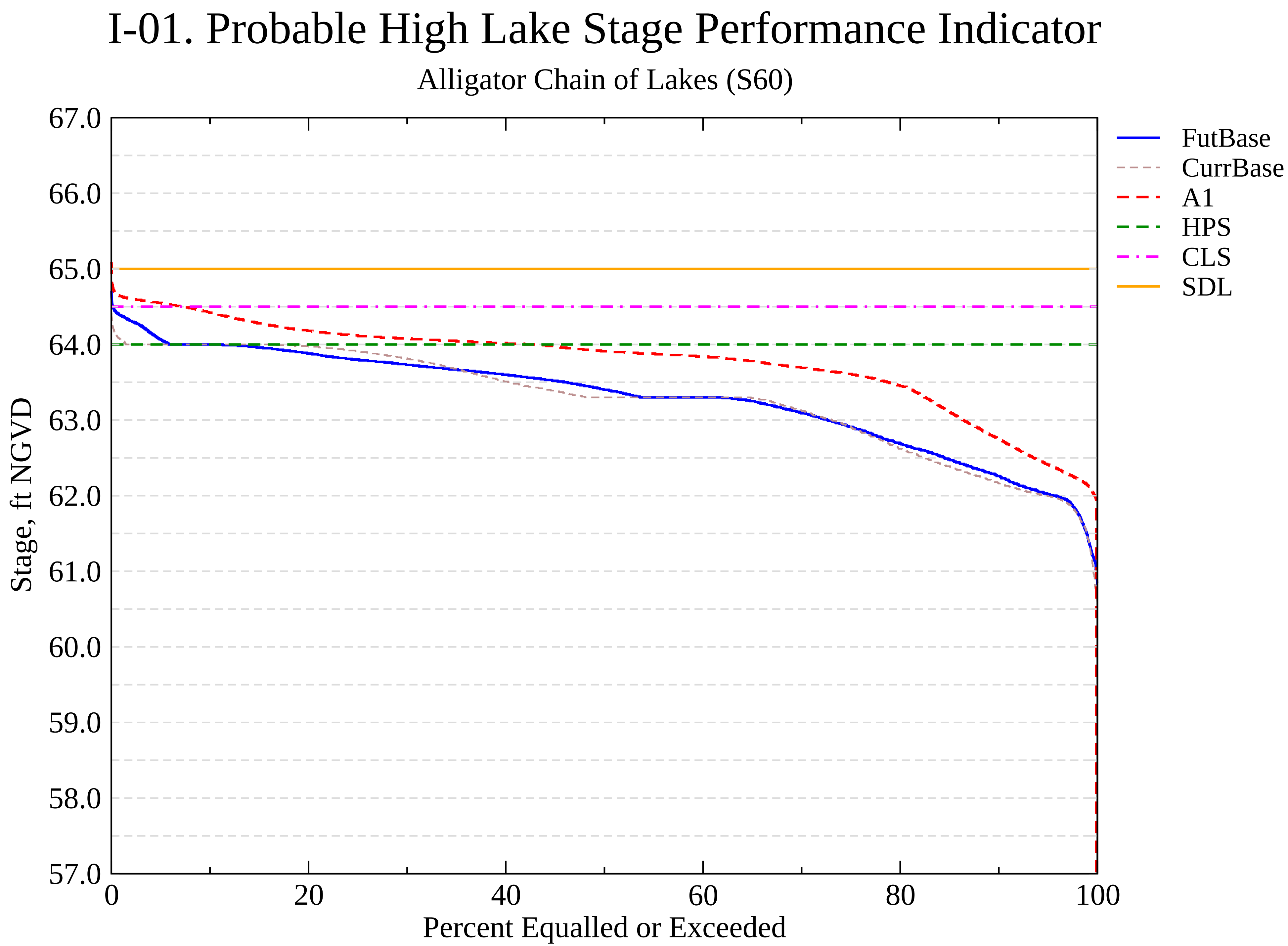
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Daily Stage Hydrograph with Water Level recession windows (Sept-June)

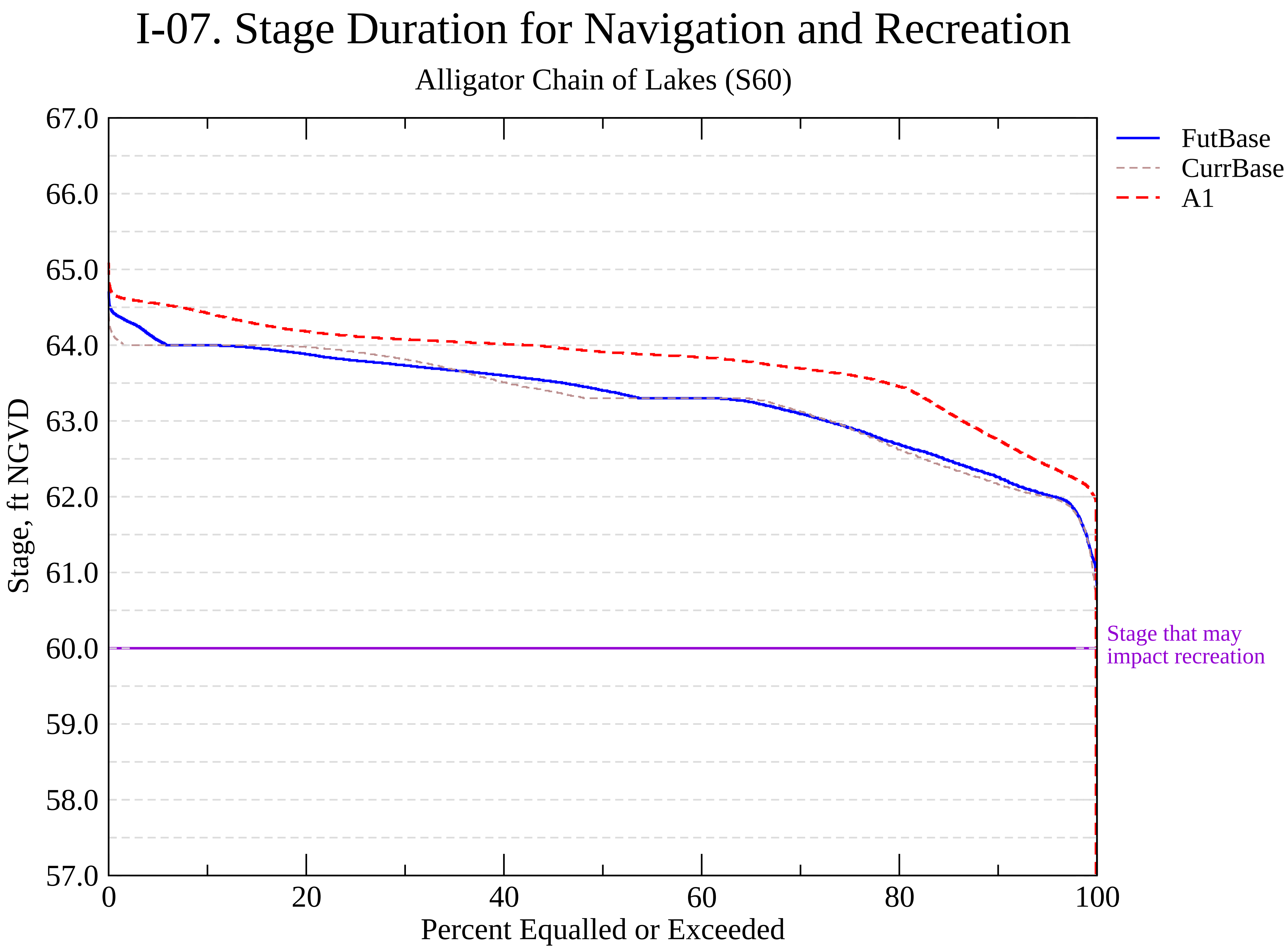




L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
67
66
65
64
63
62
61
60
59
58
57
A1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999



I-01. Probable High Lake Stage Performance Indicator
Alligator Chain of Lakes (S60)
Stage, ft NGVD
Percent Equalled or Exceeded
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
0
20
40
60
80
100
FutBase
CurrBase
A1
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
Alligator Chain of Lakes (S60)
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A1
Stage that may impact recreation

Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

Alternative Description : Uncertainty Analysis - Simulation A1

Run ID : Variation of Kc - crop coefficient LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	100.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.06	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	100.0	0.00	0.06	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	0.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	34.3	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	2.9	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	97.1	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	2.1	0.00	0.12	0.00
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	100.0		0.04	

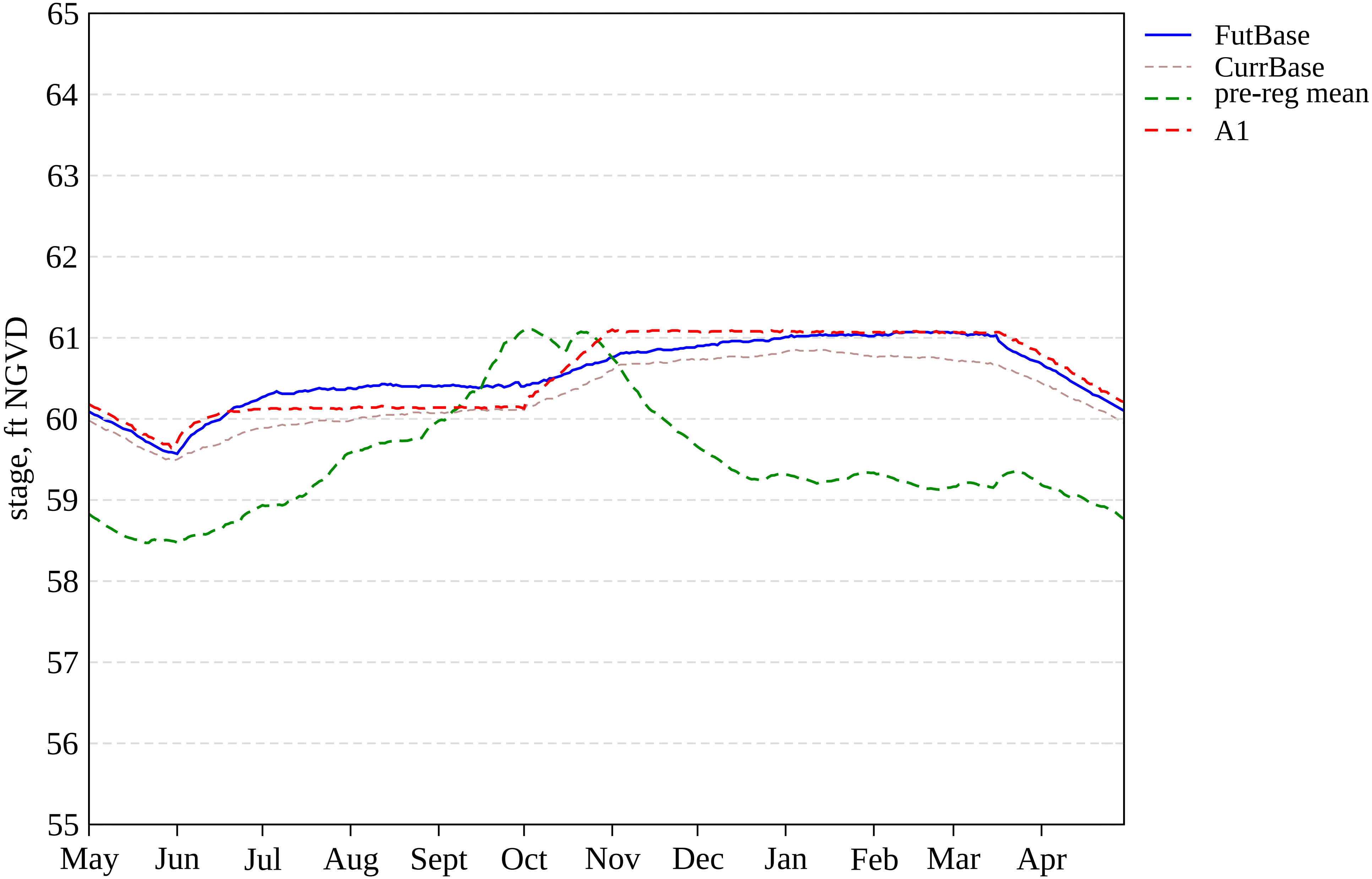
PM Score	**0.00**
Location Weight	**0.08**
PM Composite Score	**0.00**

Tier 2 Report

PDF Report for L07

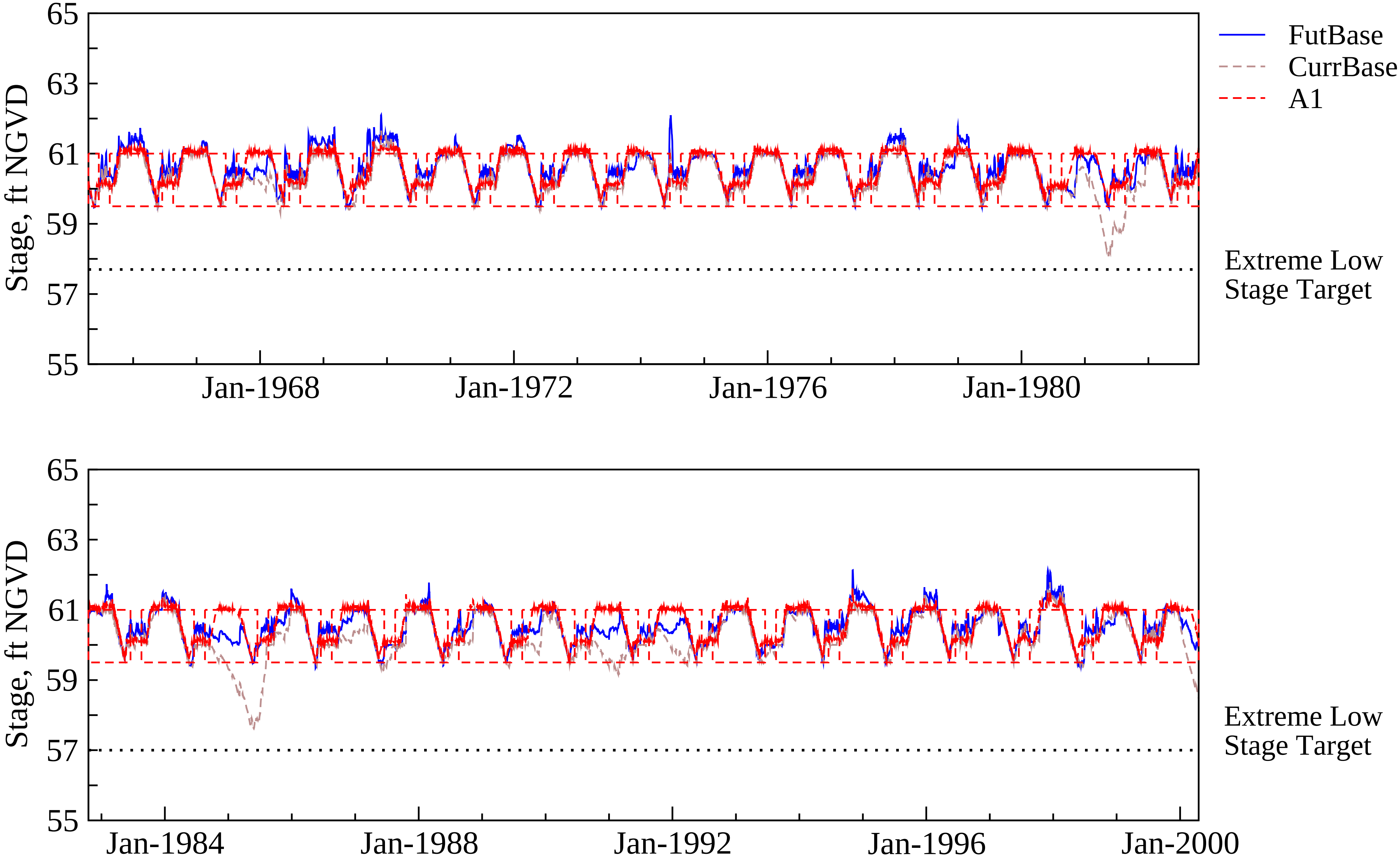
L-07. Stages in Lake Hart and Mary Jane

Stage Hydrograph of mean daily stages



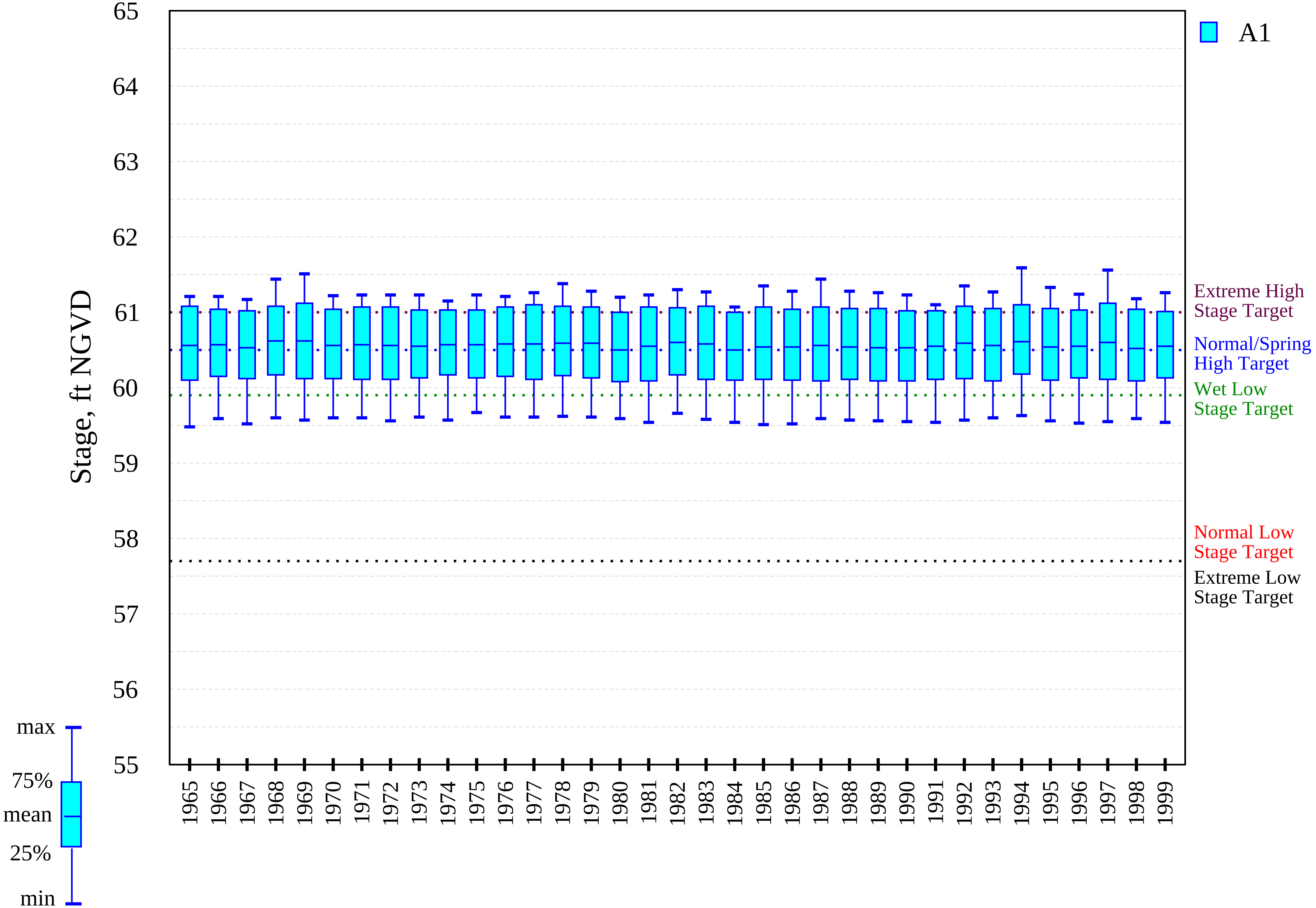
L-07. Stages in Lakes Hart and Mary Jane

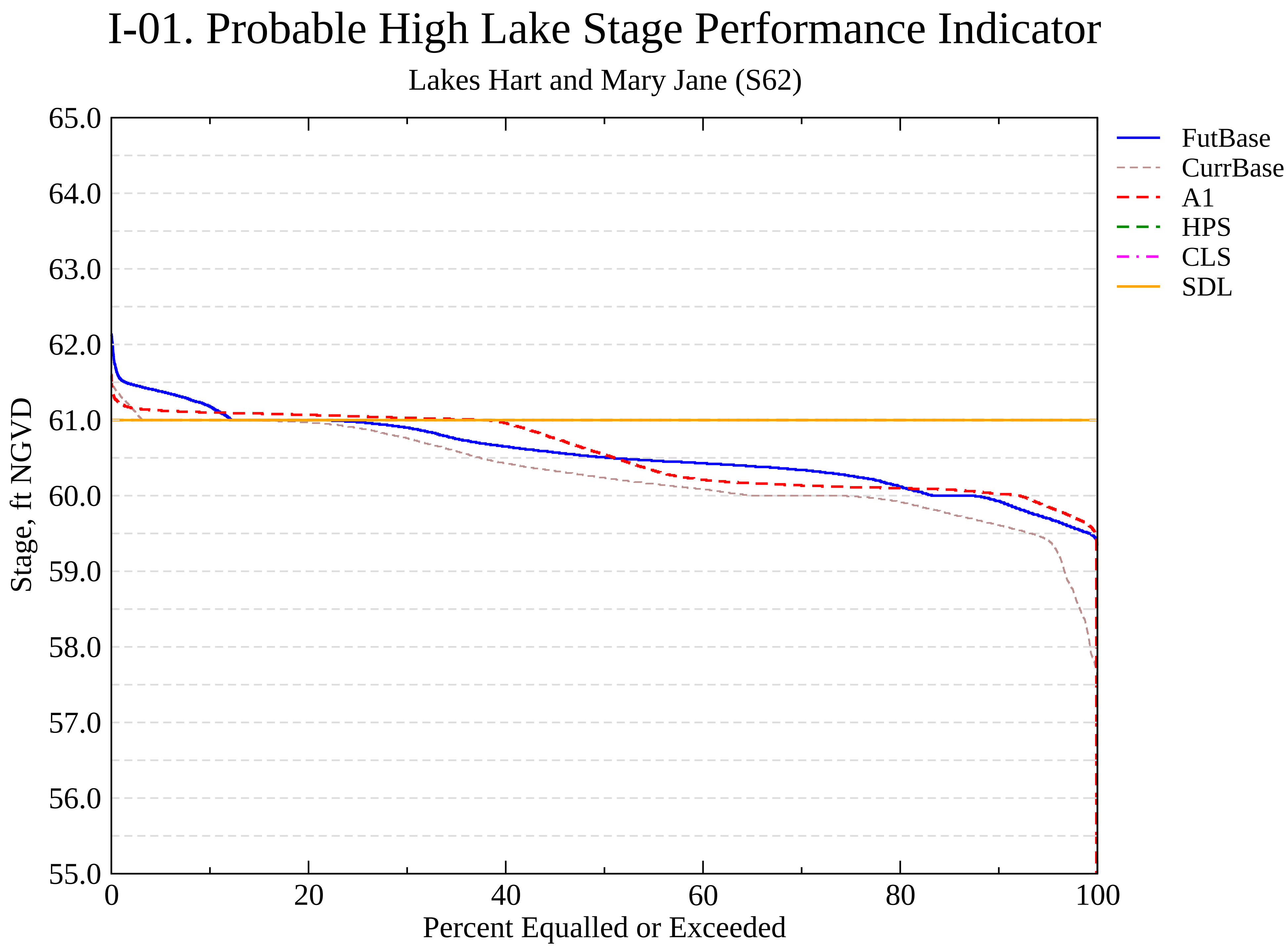
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



L-07. Stages in Lakes Hart and Mary Jane

Intra-annual lake stage variation (water year based)

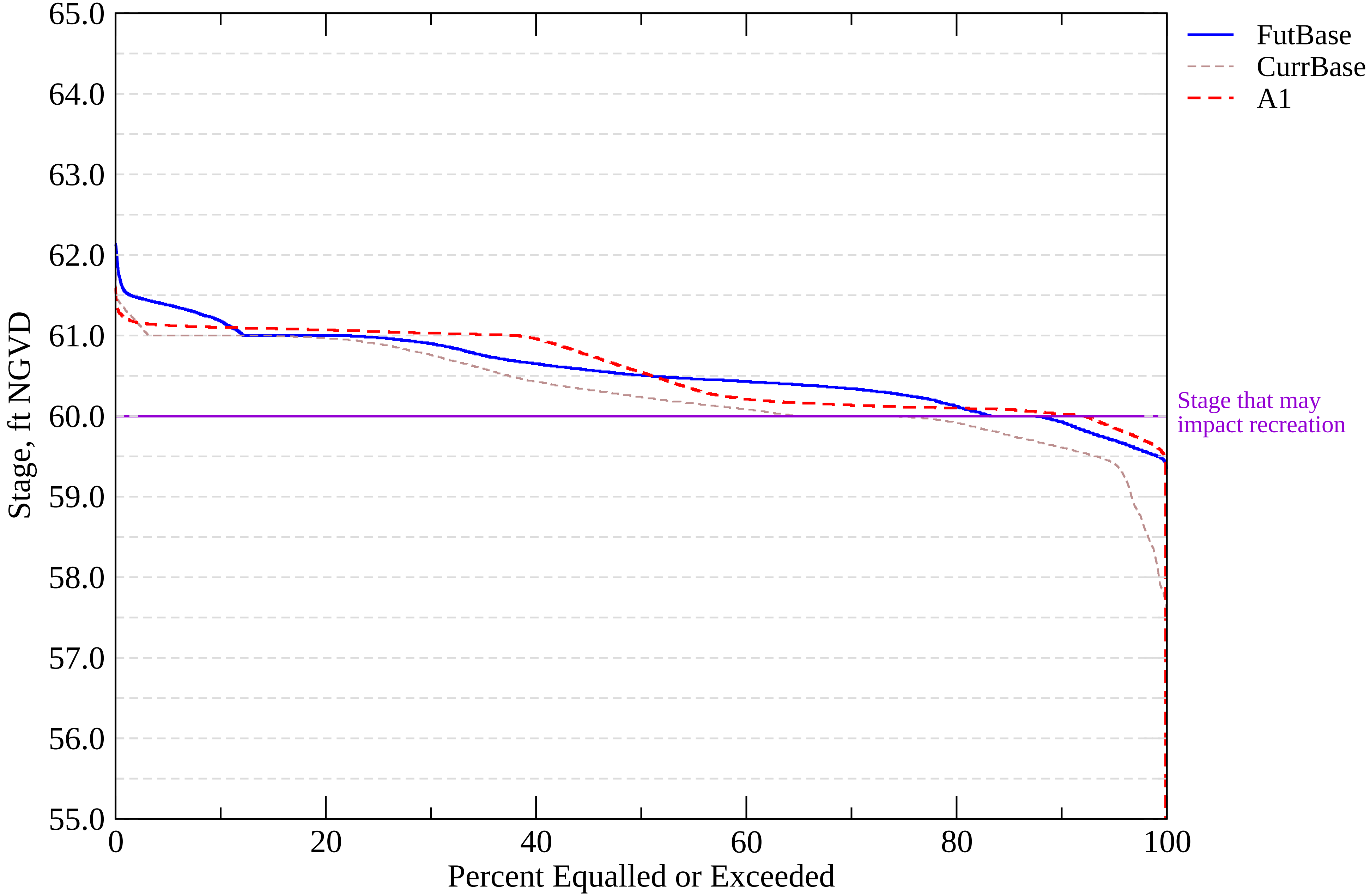




I-01. Probable High Lake Stage Performance Indicator
Lakes Hart and Mary Jane (S62)
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Stage, ft NGVD
Percent Equalled or Exceeded
FutBase
CurrBase
A1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lake Hart and Mary Jane (S62)



Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

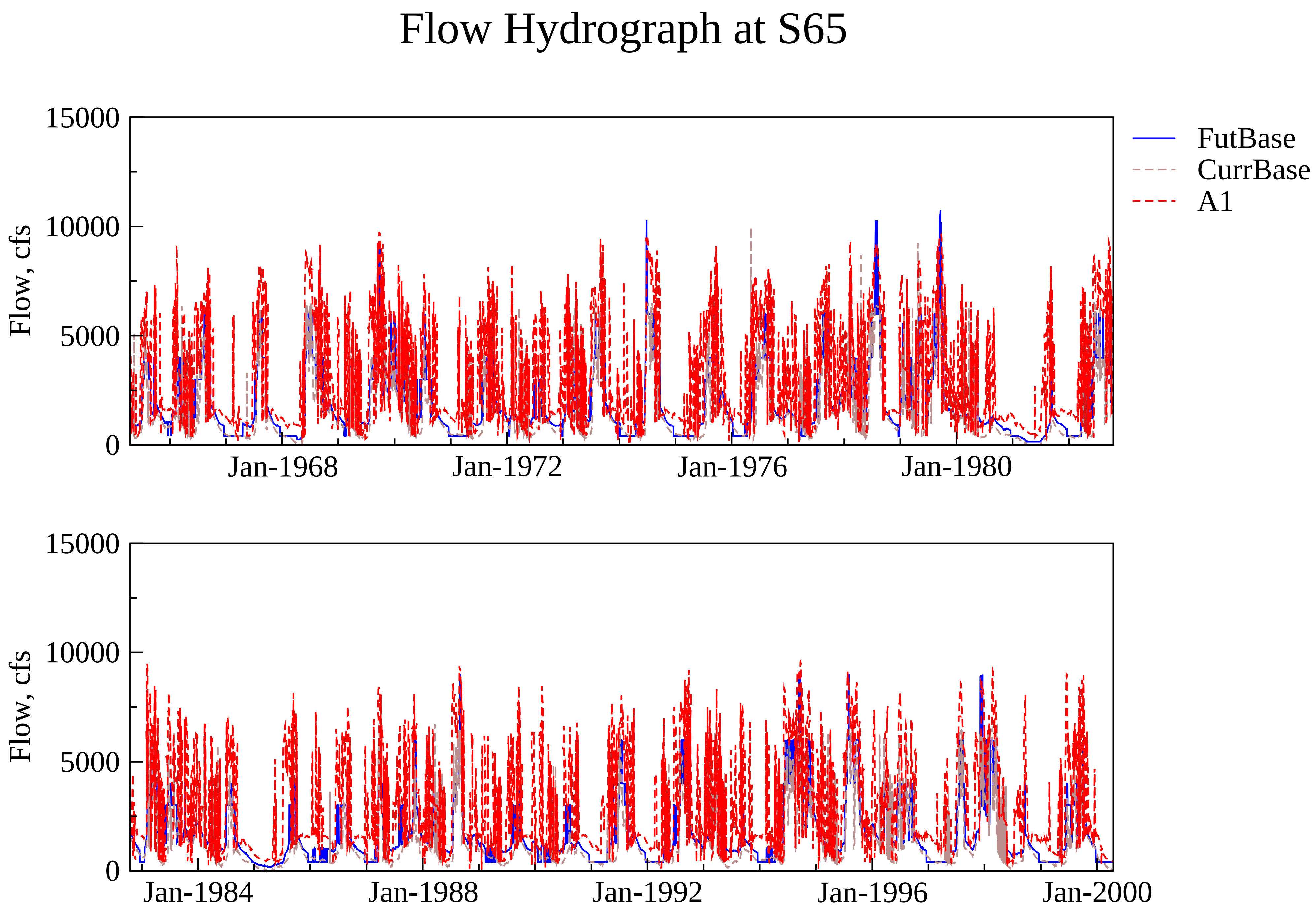
Alternative Description : Uncertainty Analysis - Simulation A1

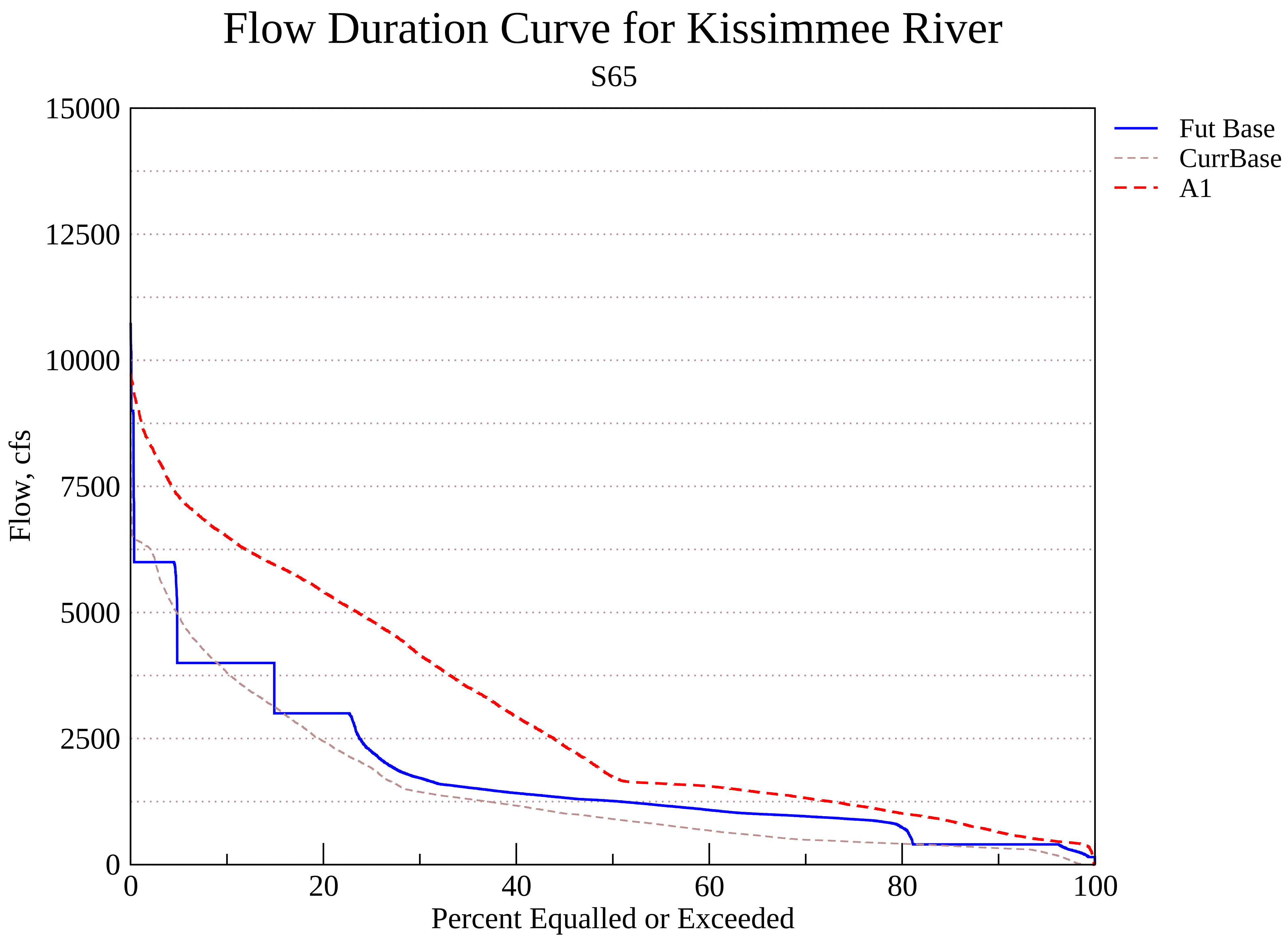
Run ID : Variation of Kc - crop coefficient LOW

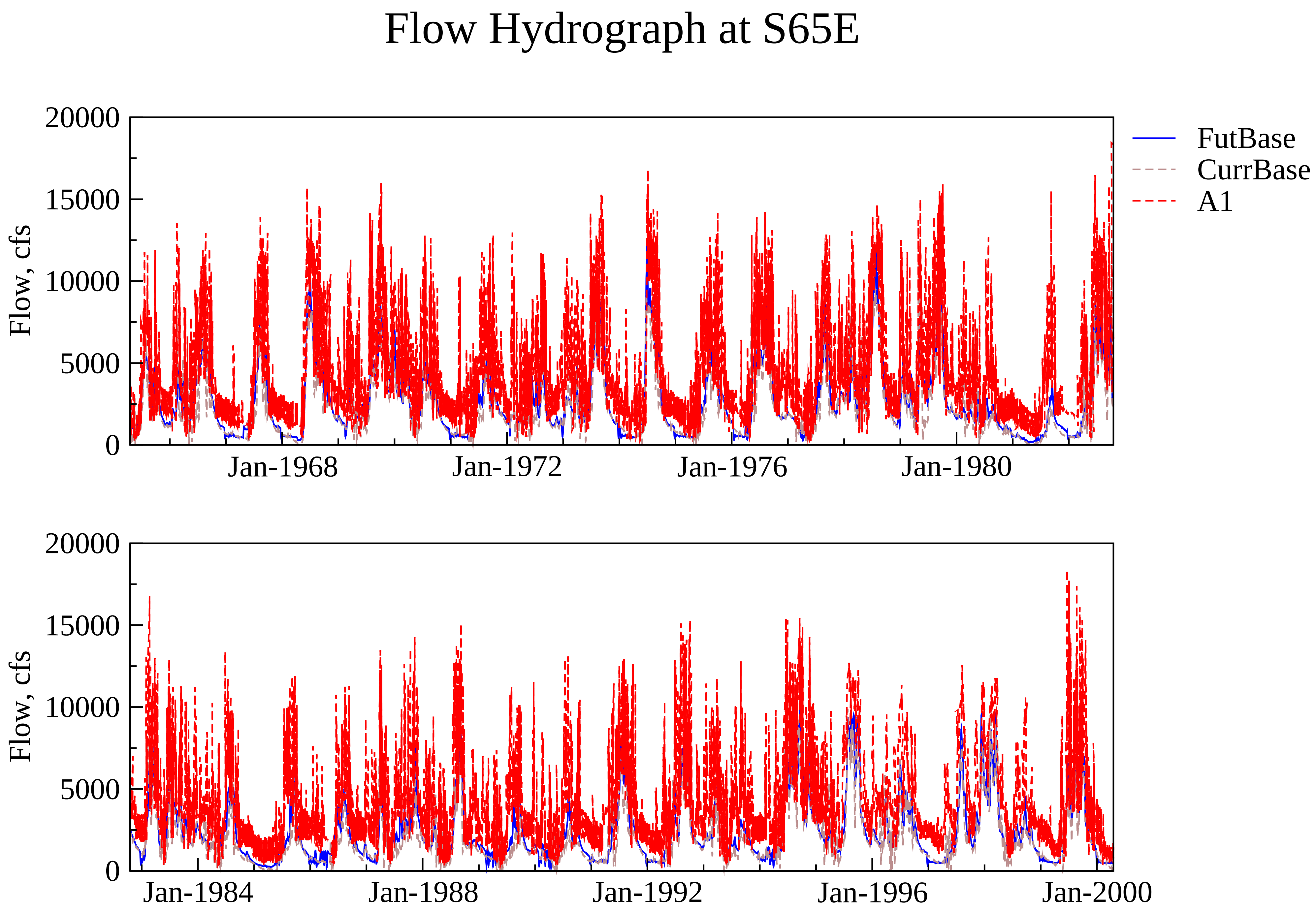
Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value		Utility Based on Linear Functions: Utility Index Score		Component Weight	Component Score	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E		S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	25.7	31.4	0.00	0.00	0.15	0.00	0.00
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	68.6	65.7	0.00	0.00	0.1	0.00	0.00
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	60.0	60.0	0.65	0.10	0.15	0.10	0.01
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	25.7	22.9	0.00	0.00	0.1	0.00	0.00
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	309.0	386.0	0.00	0.00	0.15	0.00	0.00
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	536.0	717.0	0.15	1.00	0.15	0.02	0.15
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	33.4	0.0	0.00	0.00	0.15	0.00	0.00
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00	1.00	0.05	0.05	0.05
												0.17	**0.22**
												0.65	**0.35**
												0.19	

Tier 2 Report

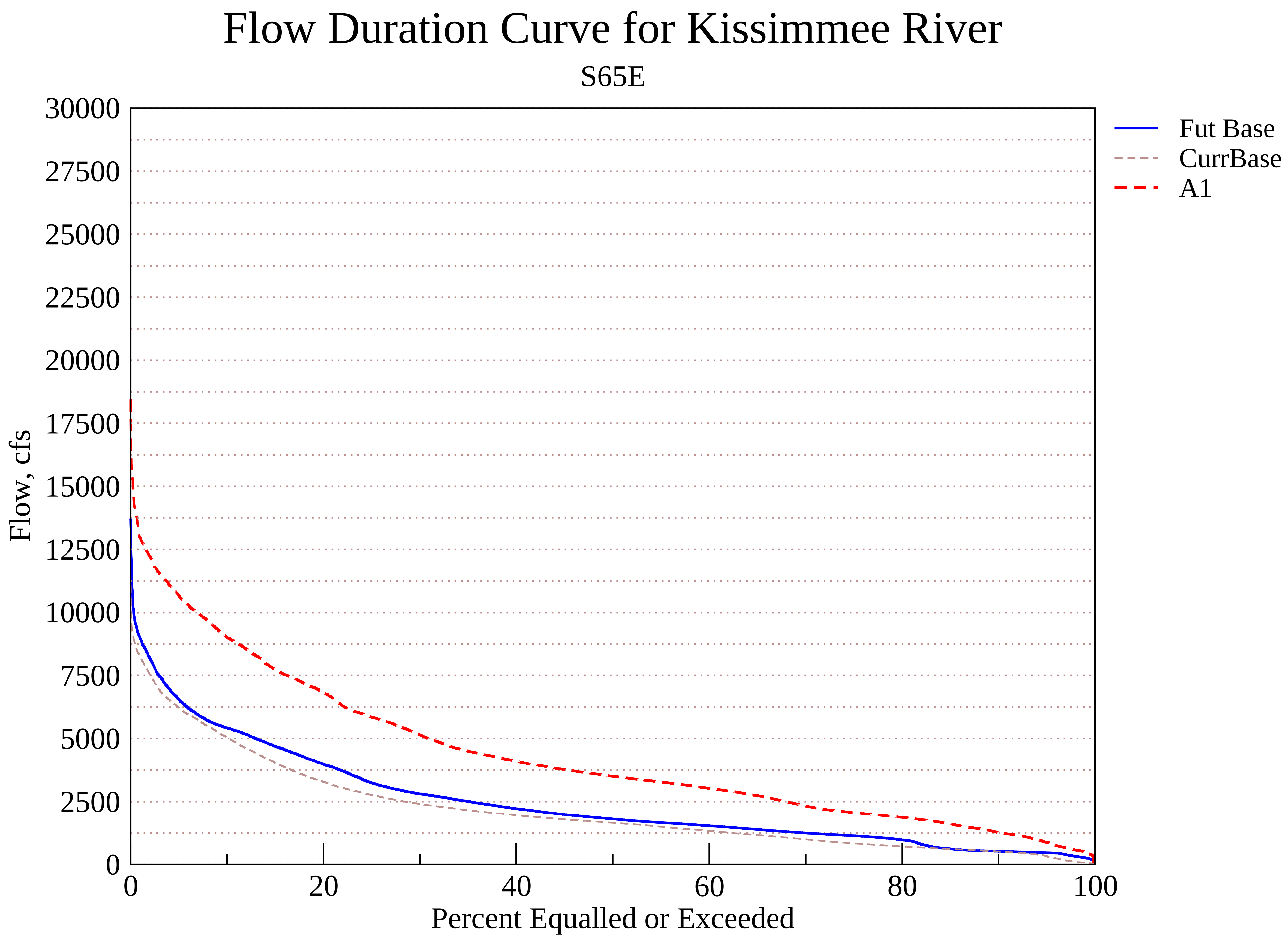
PDF Report for R01


Flow Hydrograph at S65
FutBase
CurrBase
A1
Flow, cfs
15000
10000
5000
0
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000


Flow Duration Curve for Kissimmee River
S65
Flow, cfs
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
A1



Flow Hydrograph at S65E
FutBase
CurrBase
A1
Flow, cfs
0
5000
10000
15000
20000
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Flow, cfs
0
5000
10000
15000
20000
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000



Flow Duration Curve for Kissimmee River
S65E
Flow, cfs
30000
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
A1

Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation A1

Run ID : Variation of Kc - crop coefficient LOW

				Calculated	Utility Based on Linear Functions		
Evaluation Component	**Target**	**Current Base Condition**	**Future Base Conditions**	**Component Value**	**Utility Index Score**	**Component Weight**	**Component Score**
A. Number of days per water year that river channel depth is greater than average floodplain ground elelvation (average).	252.0	250.0	203.0	365.0	0.00	0.2	0.00
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	2.0	0.00	0.2	0.00
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	4.9	1.00	0.3	0.30
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	6.1	0.00	0.3	0.00
						PM Score	**0.30**
						Location Weight	**1.00**
						PM Composite Score	**0.30**

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

Alternative Description : Uncertainty Analysis - Simulation A1

Run ID : Variation of Kc - crop coefficient LOW

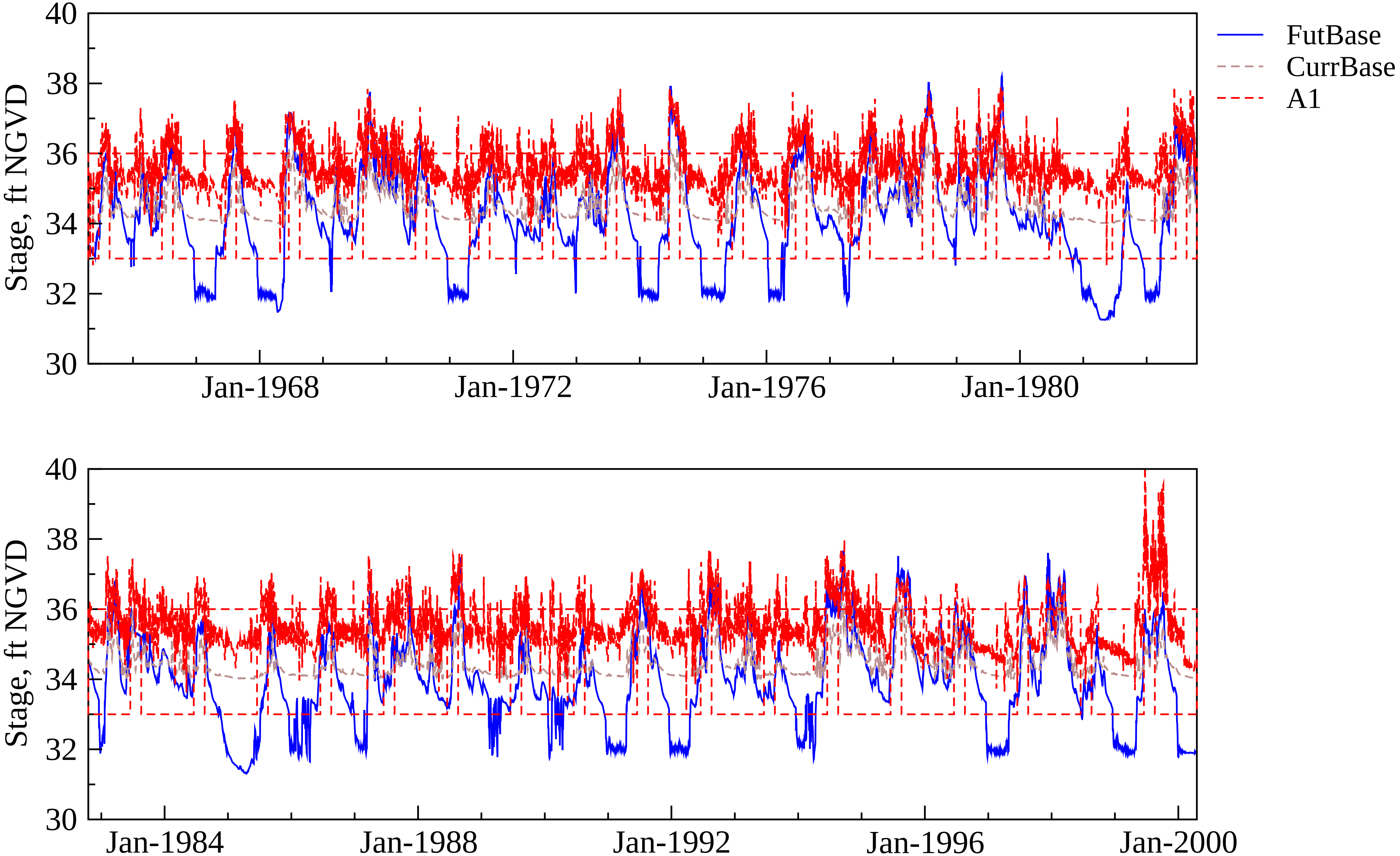
Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Index Score	Component Weight	Component Score
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	14.3	0.00	0.33	0.00
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	100.0	0.00	0.33	0.00
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	28.6	0.00	0.34	0.00
						PM Score	**0.00**
						Location Weight	**1.00**
						PM Composite Score	**0.00**

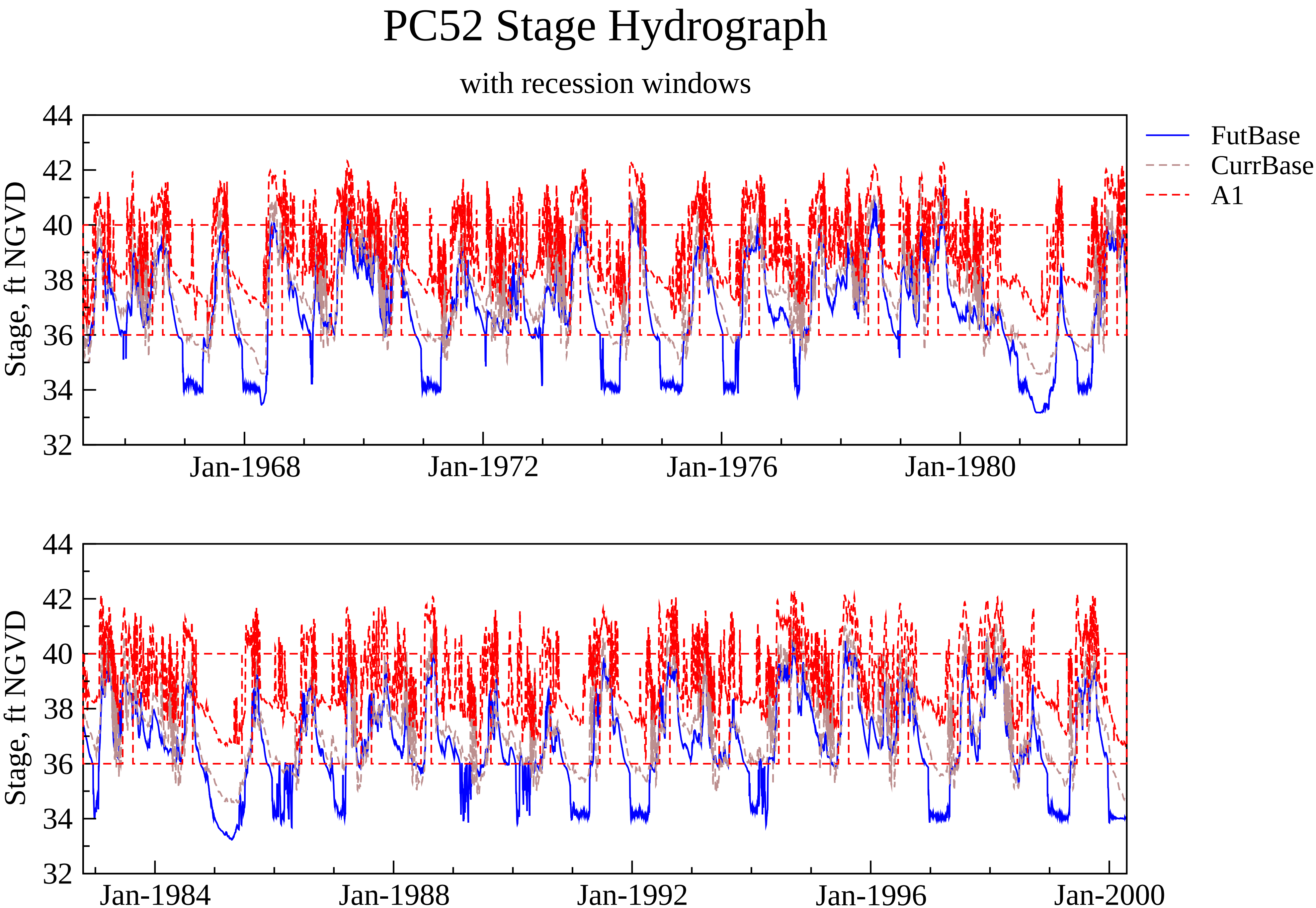
Tier 2 Report

PDF Report for R03

PC33 Stage Hydrograph

with recession windows





PC52 Stage Hydrograph
with recession windows
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
A1
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation A2

Variation of Kc - crop coefficient HIGH

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation A2

Run ID : Variation of Kc - crop coefficient HIGH

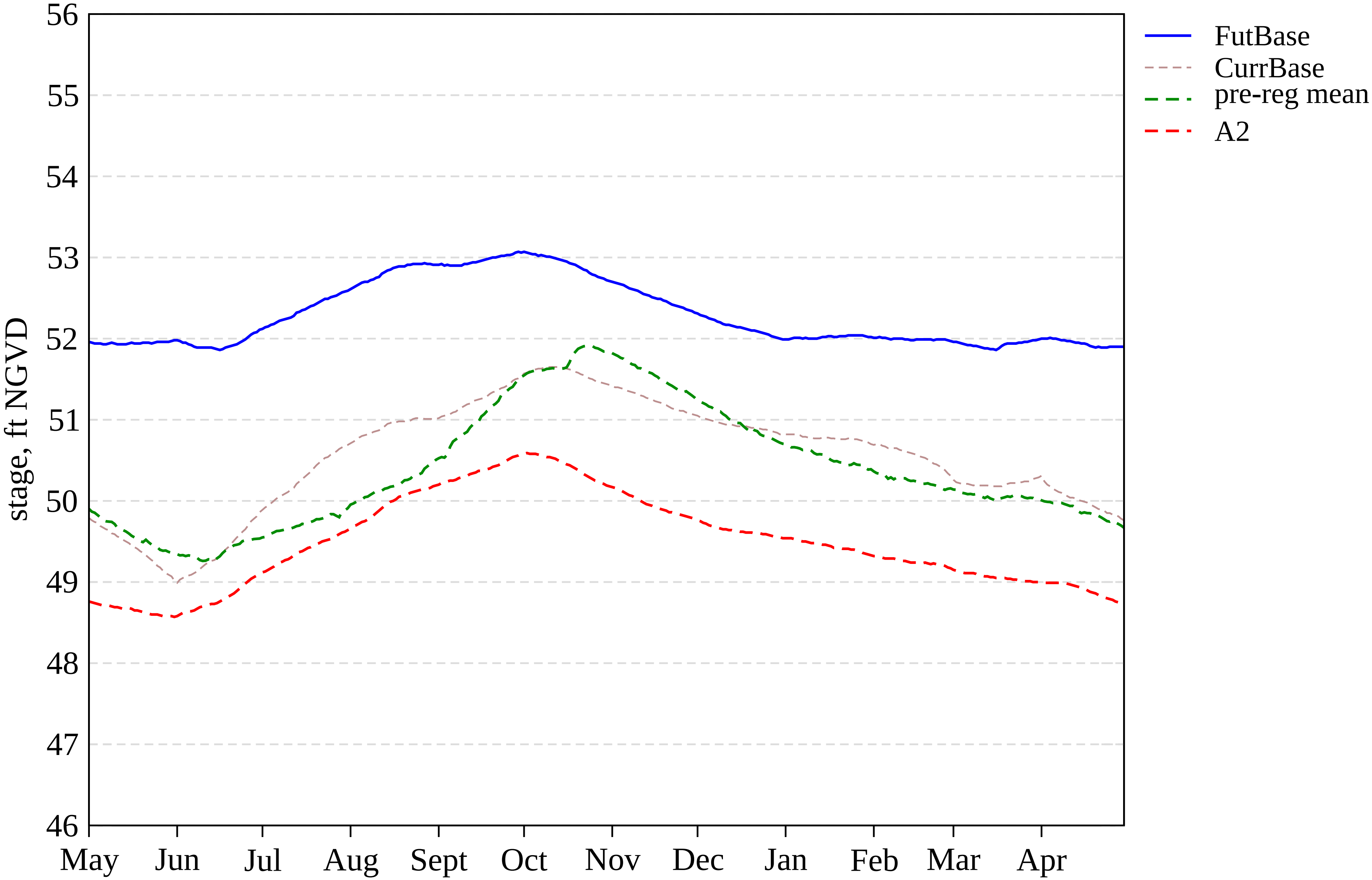
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	40.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	57.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	68.6
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	20.0
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	74.3
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	2.6	3.1
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	5.5	6.3

Tier 2 Report

PDF Report for L01

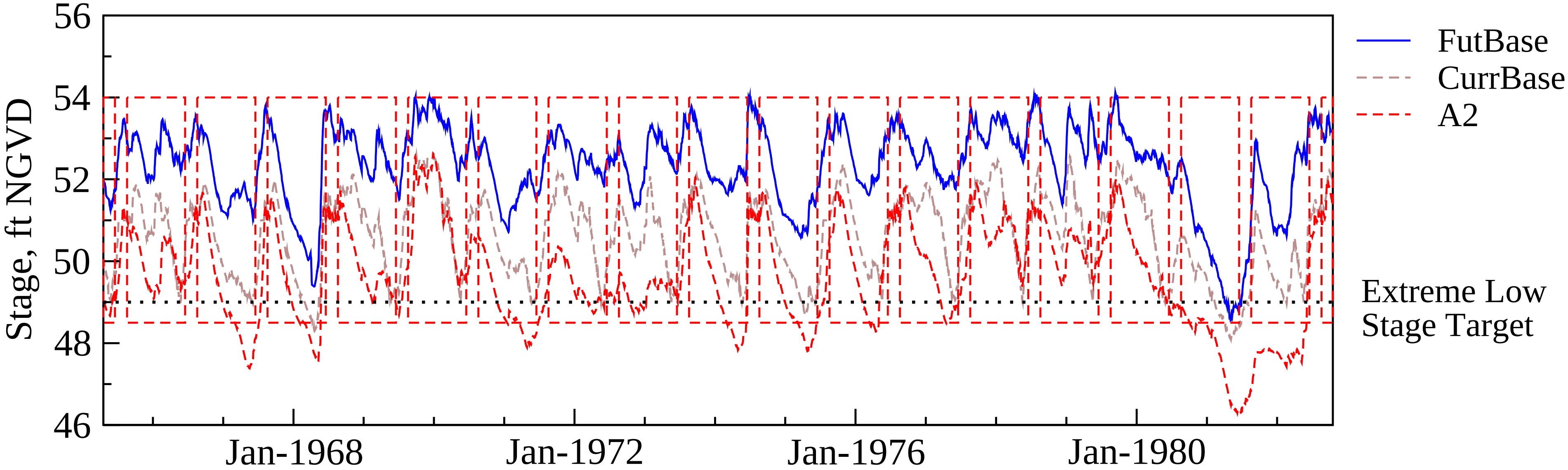
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

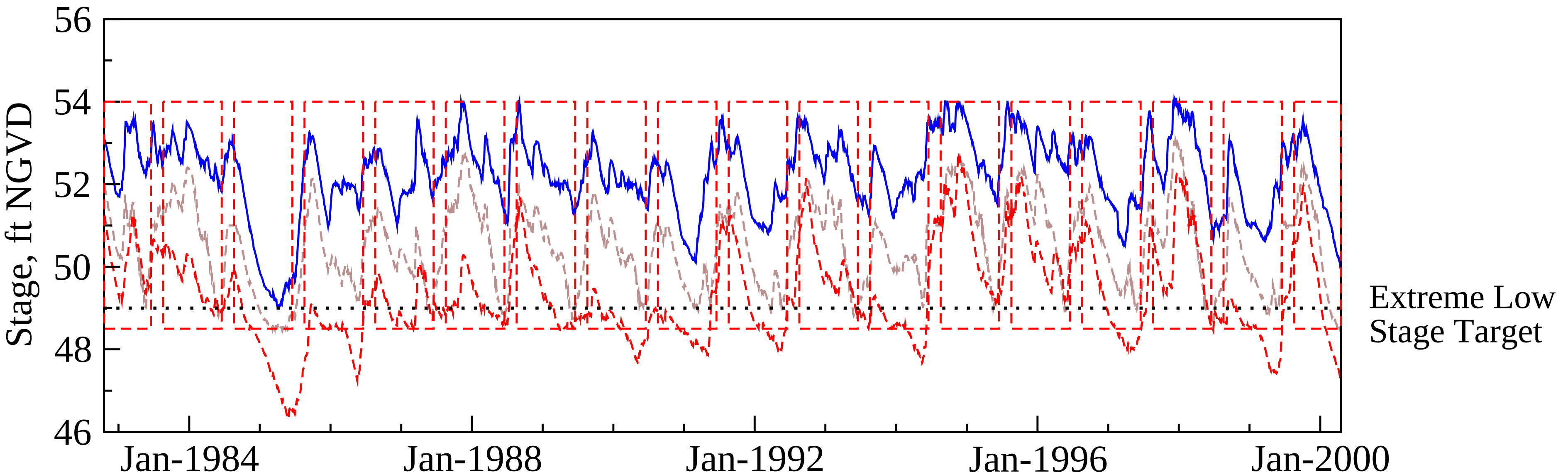
Stage Hydrograph of mean daily stages

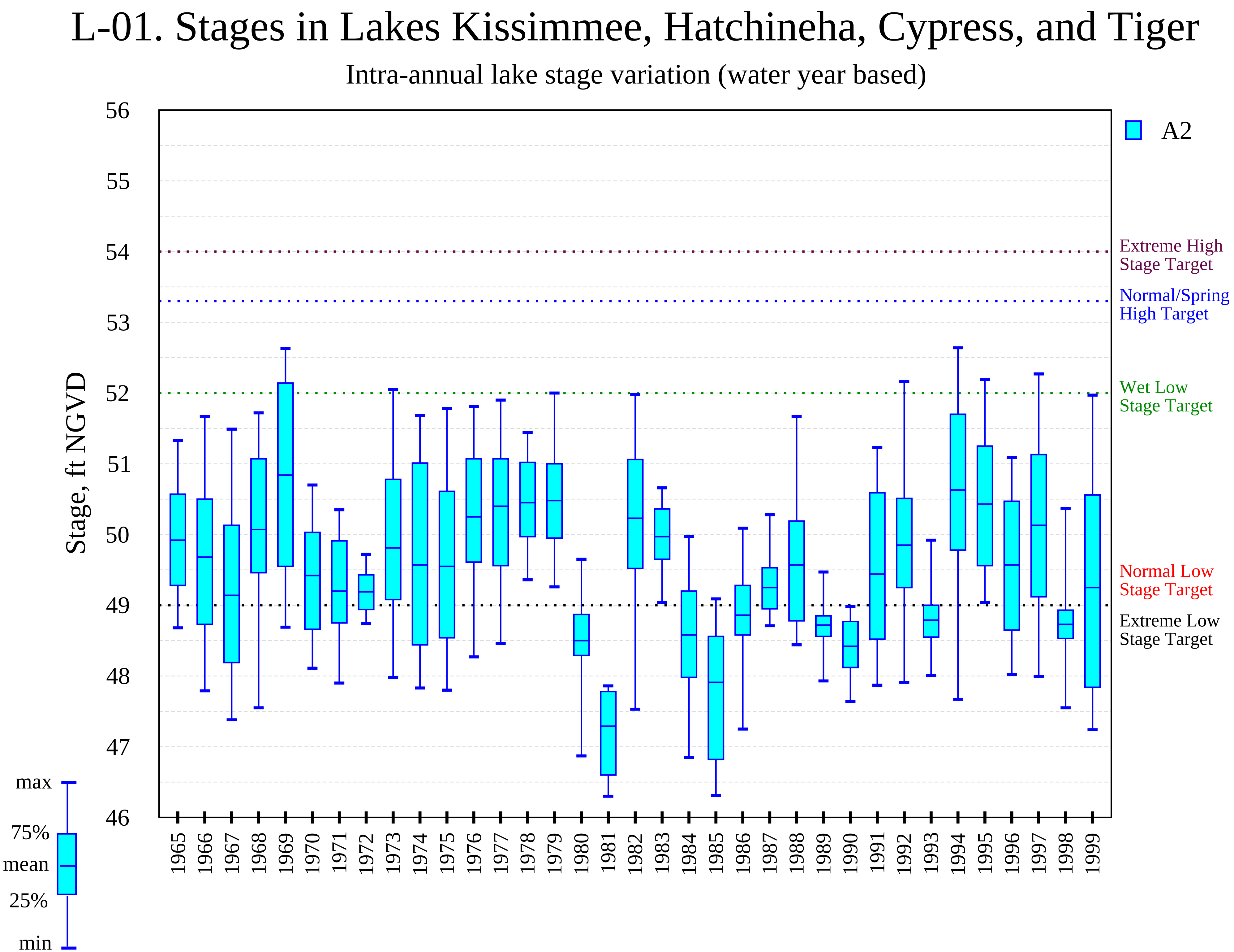


L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



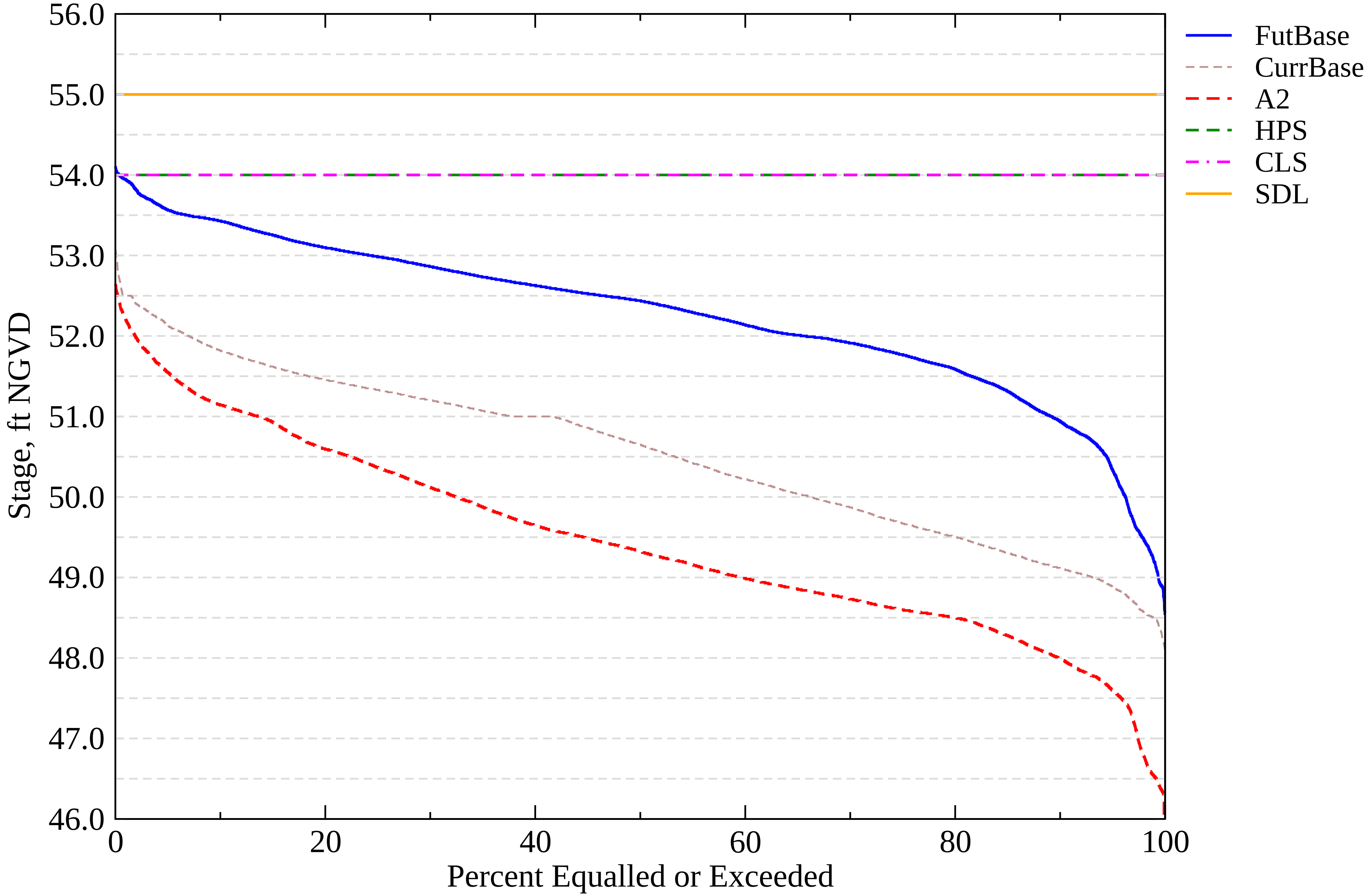




L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
56
55
54
53
52
51
50
49
48
47
46
A2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min

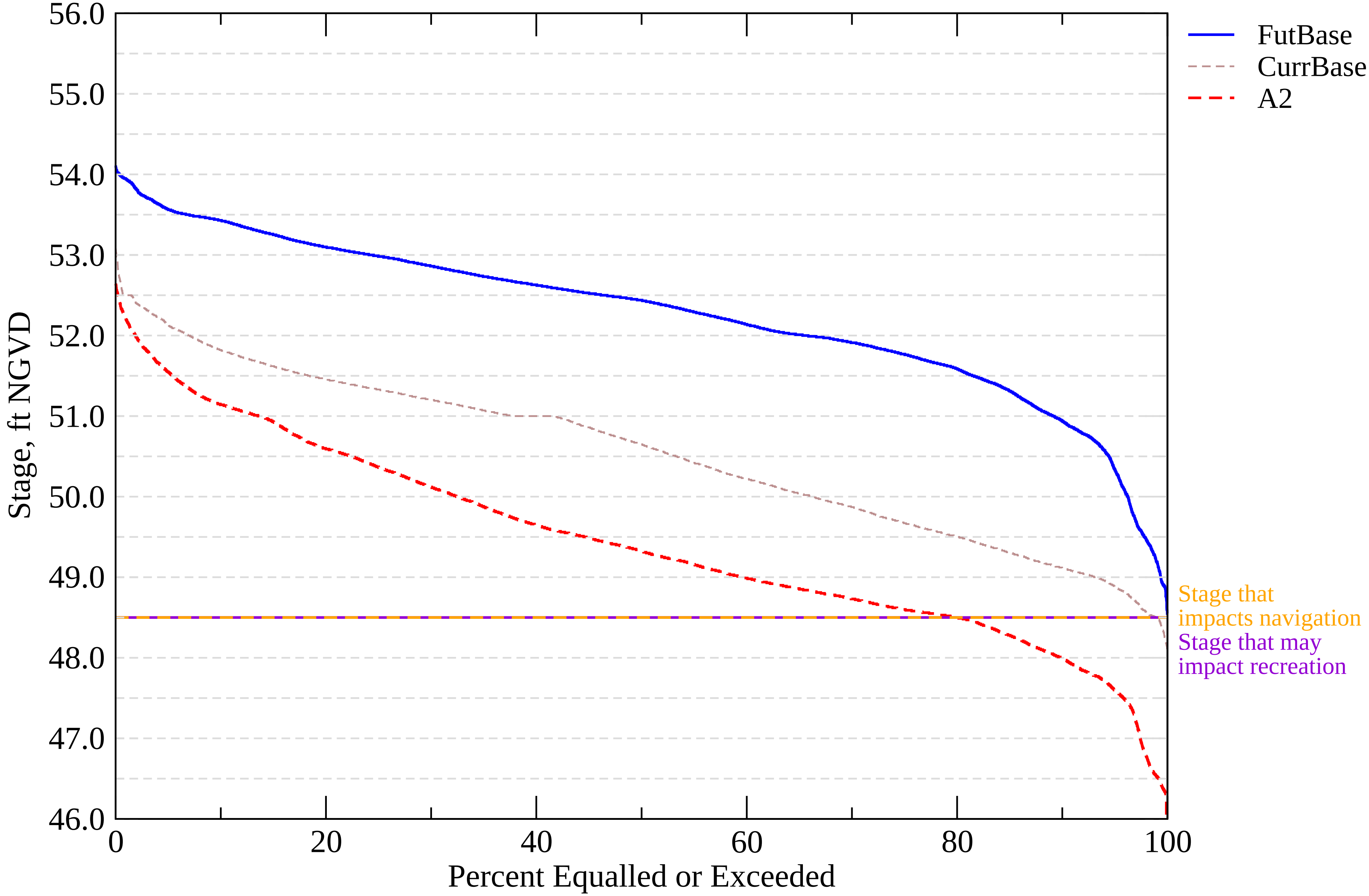
I-01. Probable High Lake Stage Performance Indicator

Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)



I-07. Stage Duration for Navigation and Recreation

Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)



Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

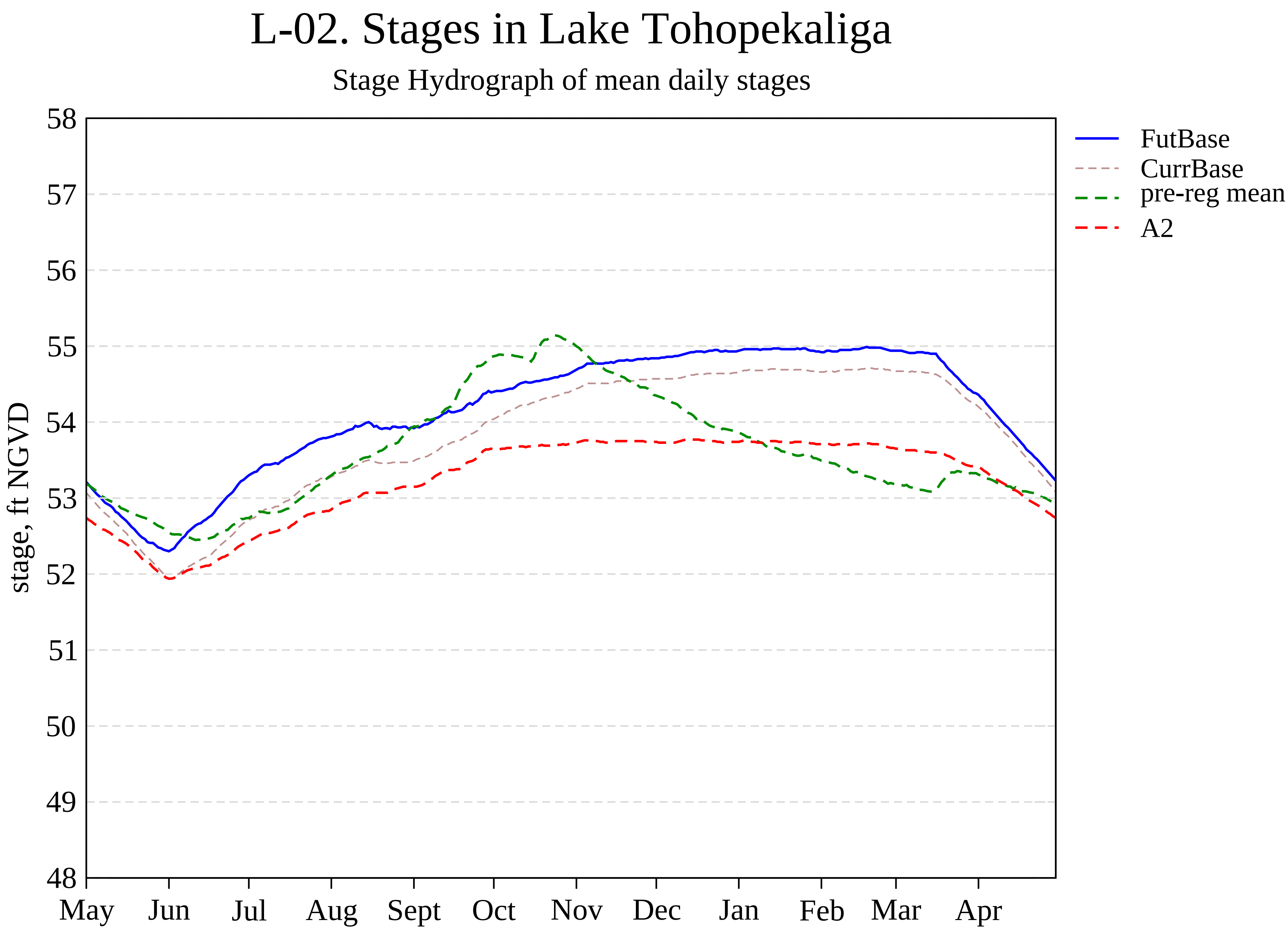
Alternative Description : Uncertainty Analysis - Simulation A2

Run ID : Variation of Kc - crop coefficient HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	14.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	91.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	9.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	54.3
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	71.4
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	2.8
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	7.2

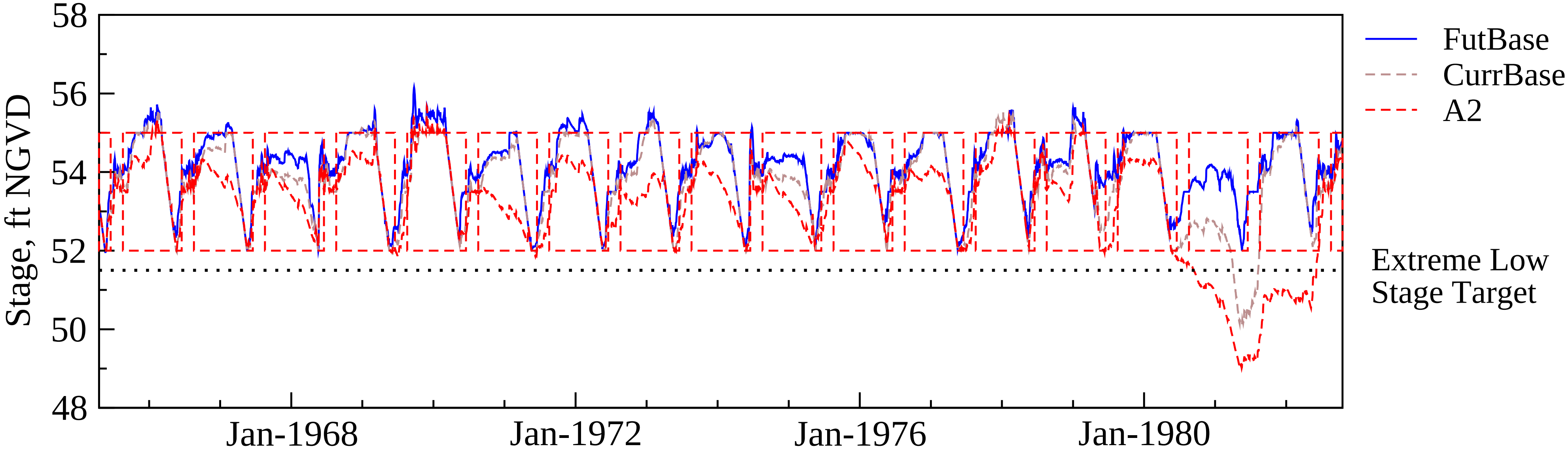
Tier 2 Report

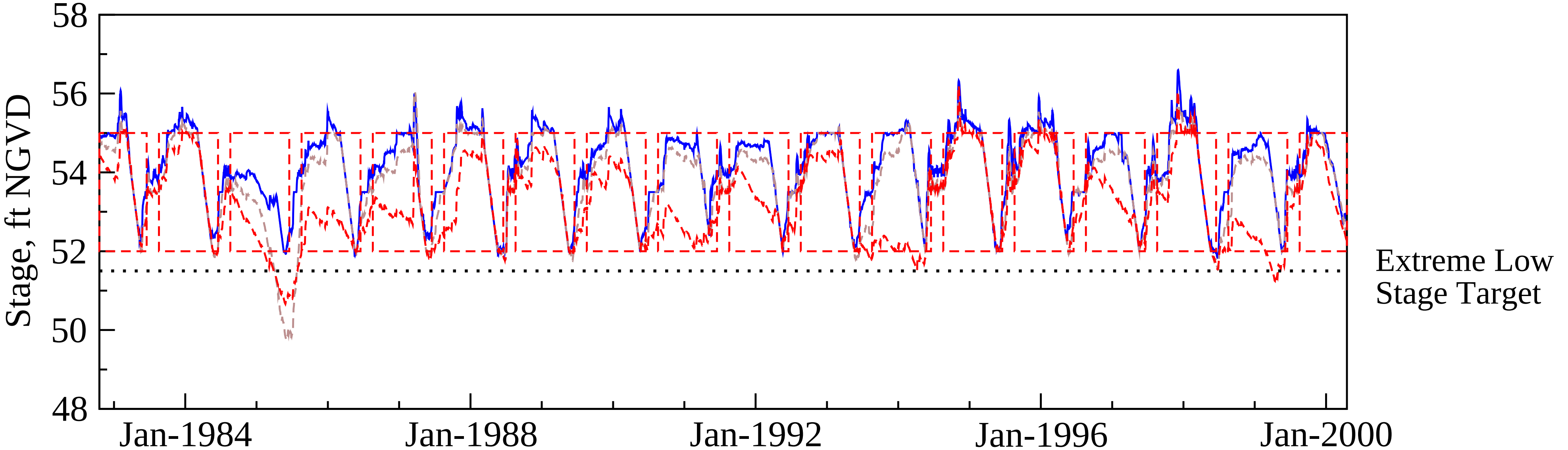
PDF Report for L02


L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
A2

L-02. Stages in Lake Tohopekaliga

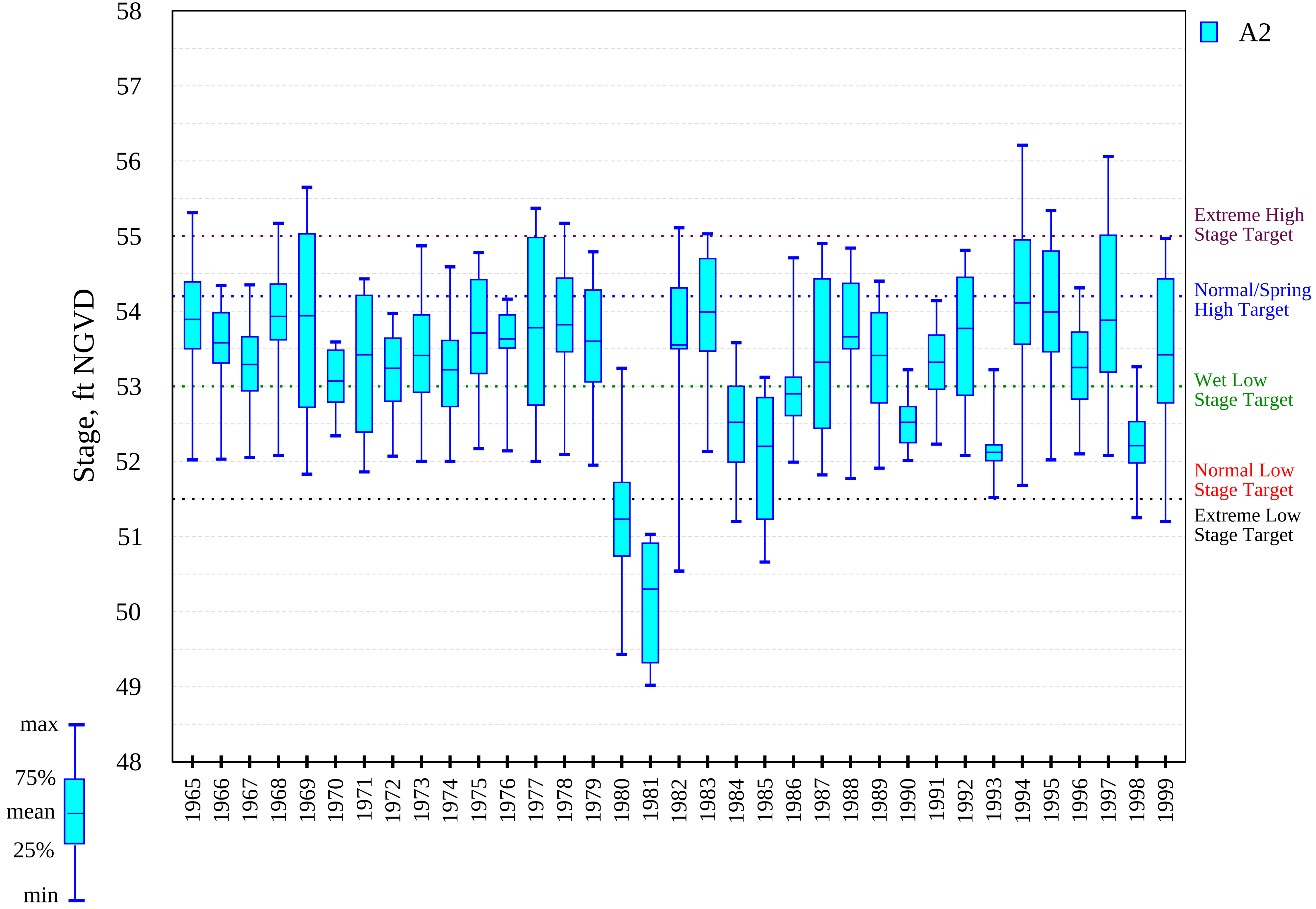
Daily Stage Hydrograph with Water Level recession windows (Sept-June)





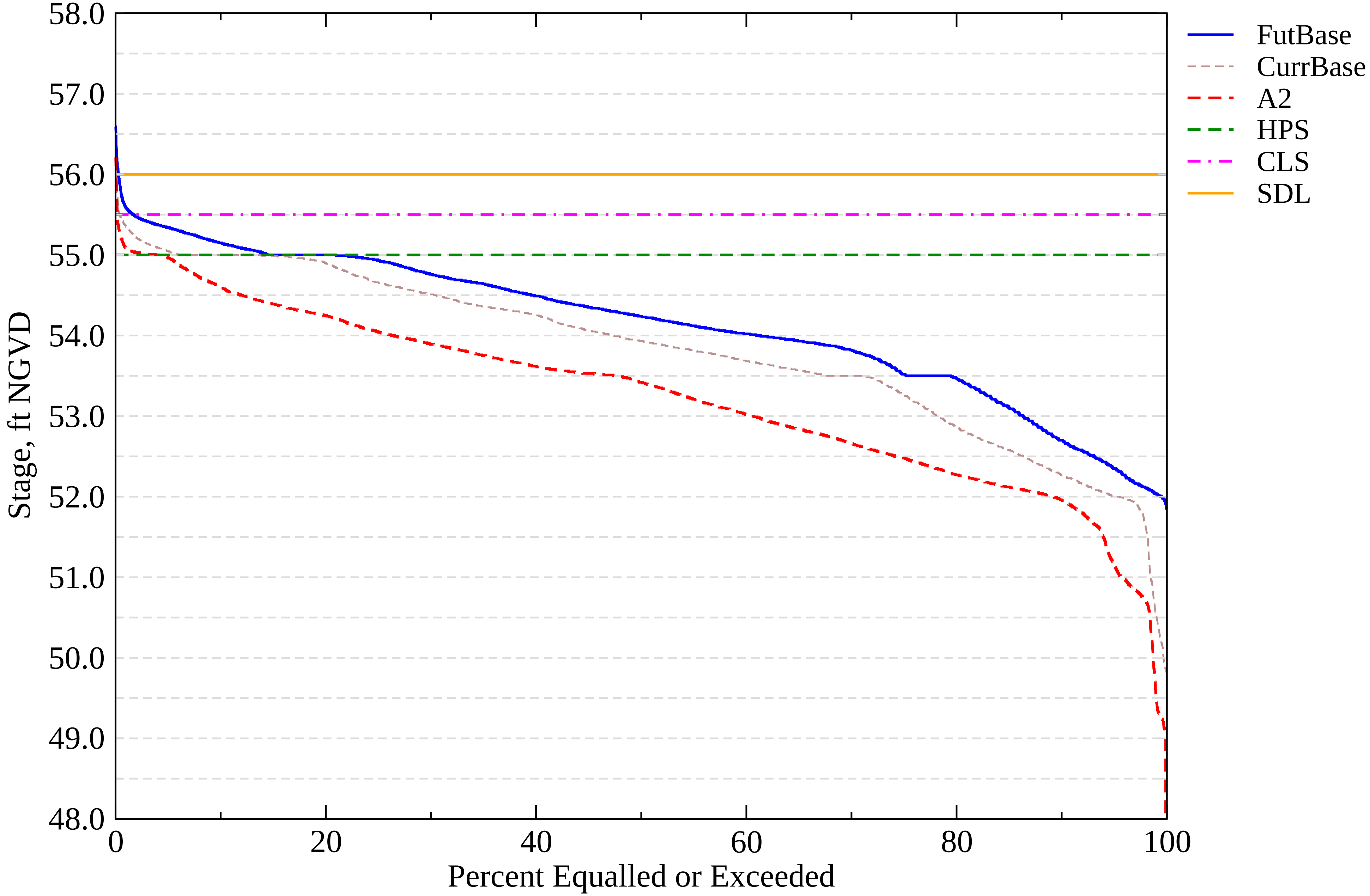
L-02. Stages in Lake Tohopekaliga

Intra-annual lake stage variation (water year based)



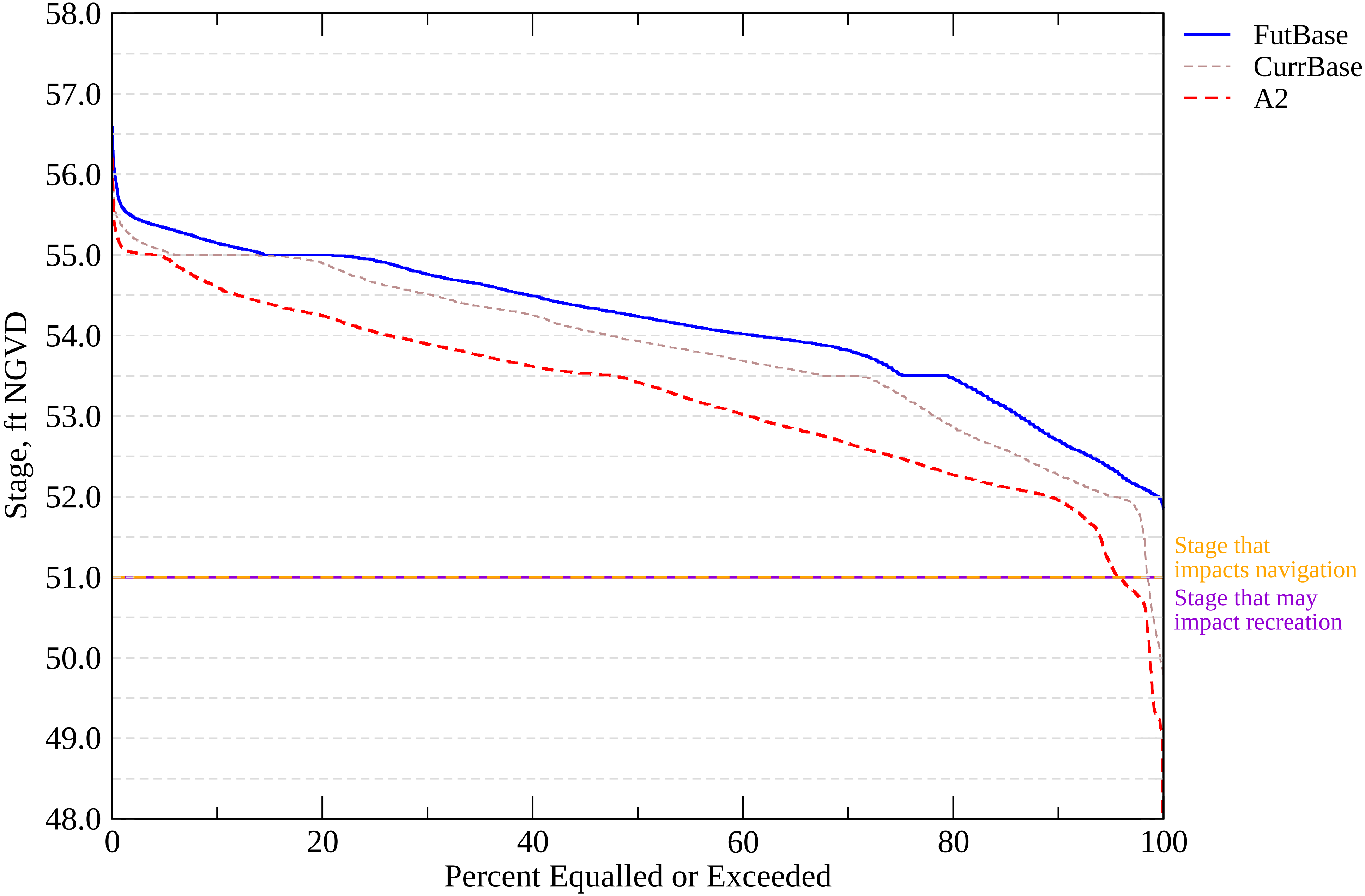
I-01. Probable High Lake Stage Performance Indicator

Lake Tohopekaliga (S61)



I-07. Stage Duration for Navigation and Recreation

Lake Tohopekaliga (S61)



Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

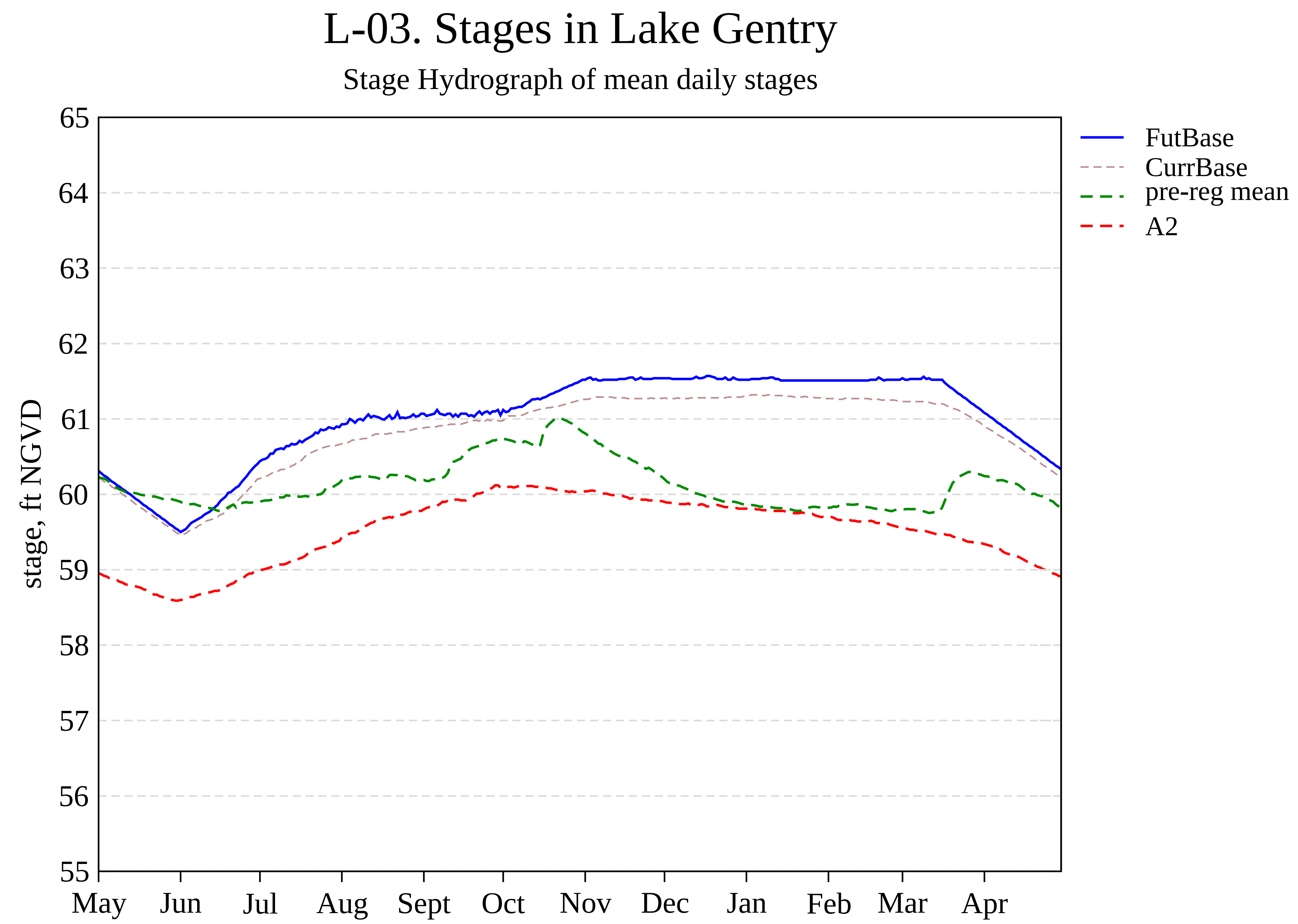
Alternative Description : Uncertainty Analysis - Simulation A2

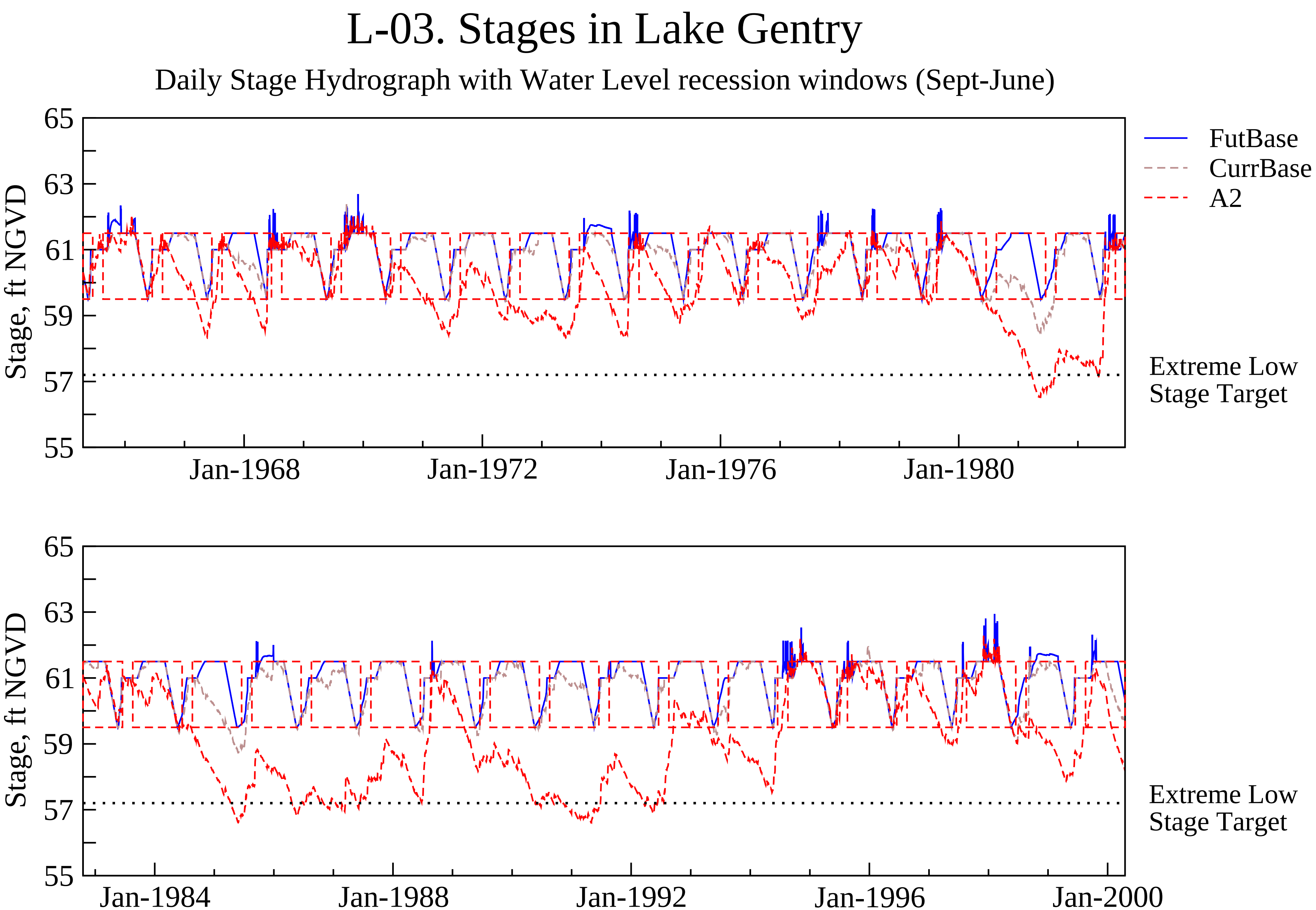
Run ID : Variation of Kc - crop coefficient HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	11.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	86.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	9.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	62.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	11.4
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	54.3
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.5
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.8

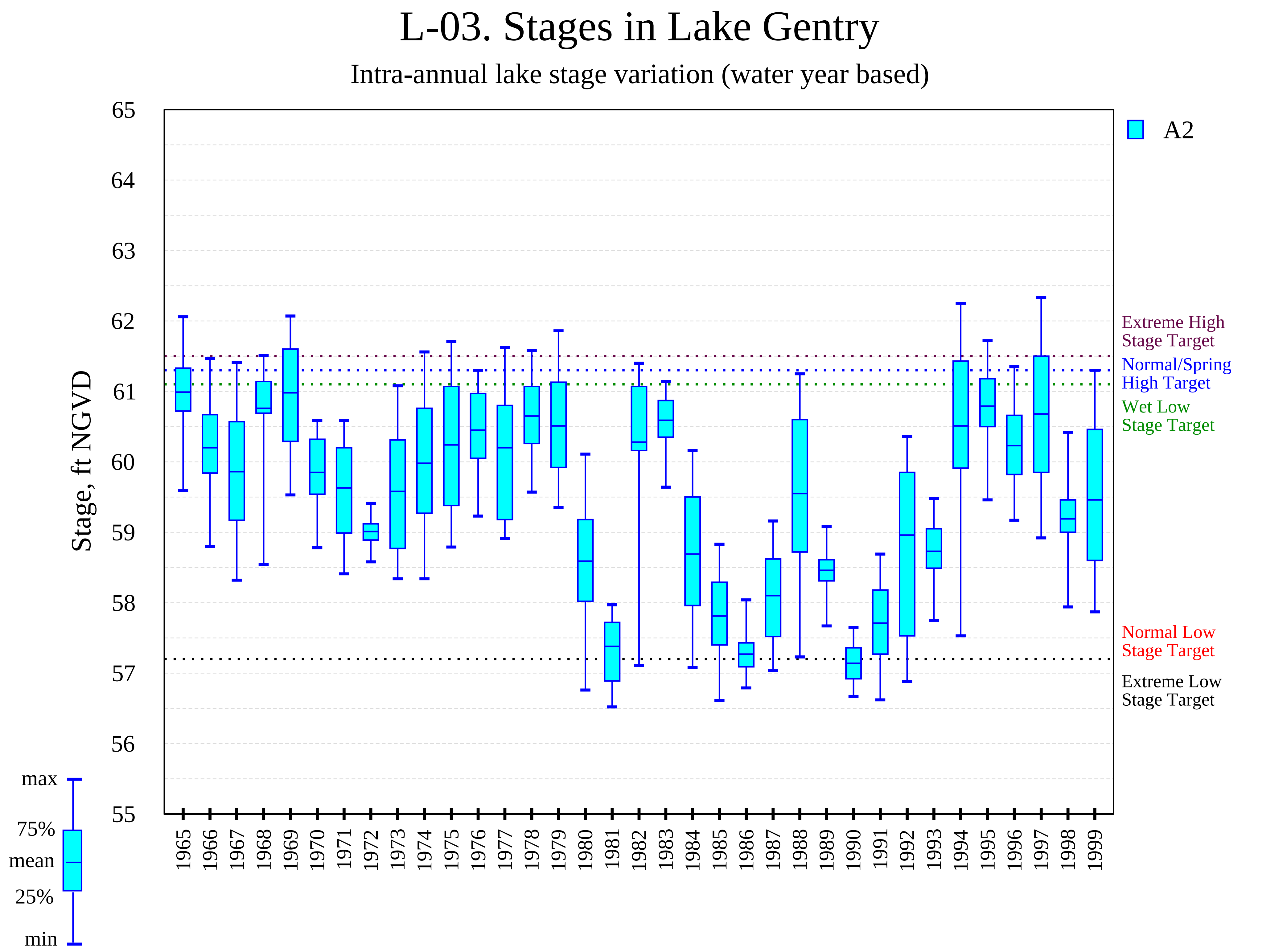
Tier 2 Report

PDF Report for L03

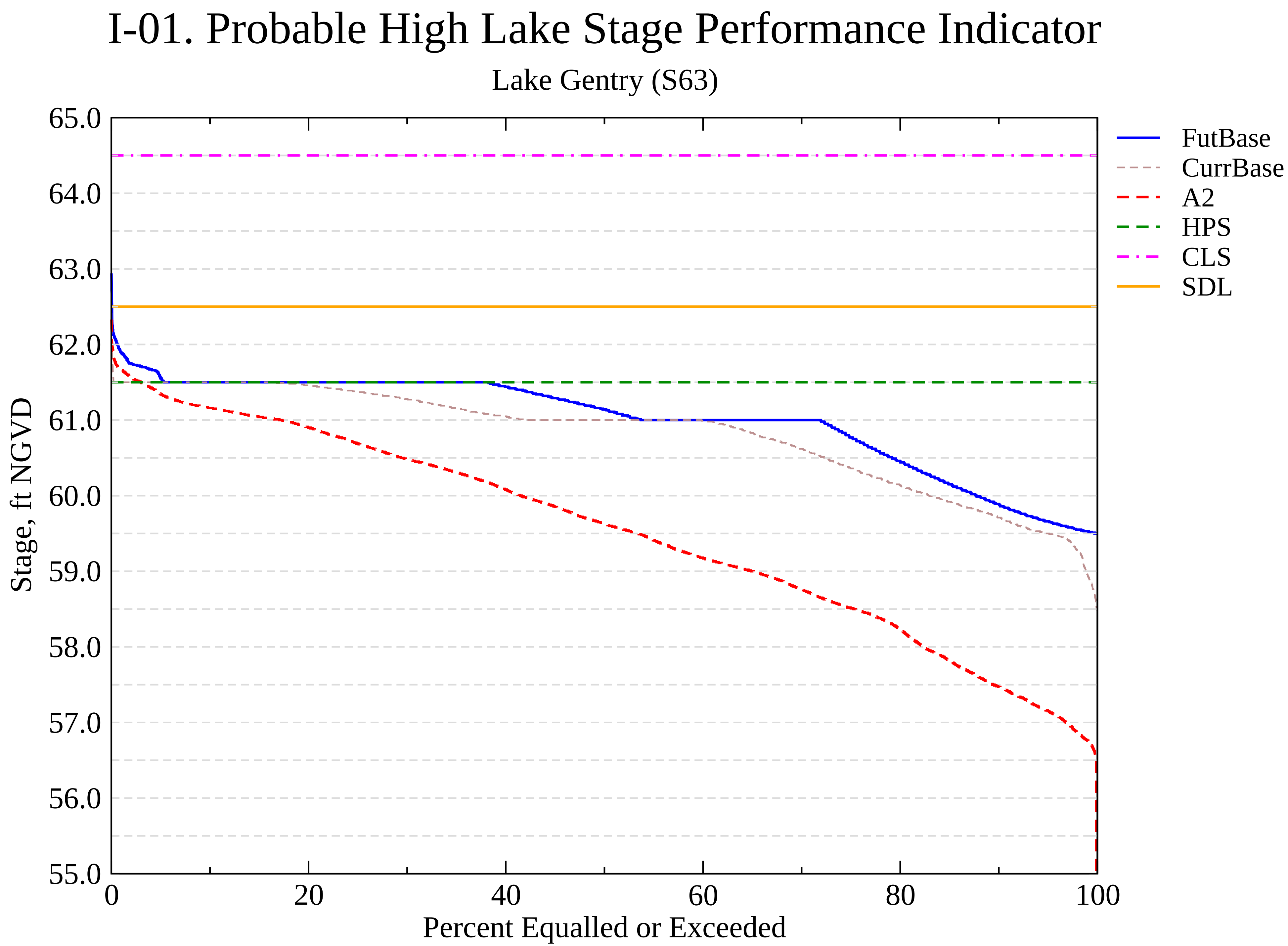

L-03. Stages in Lake Gentry
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
A2



L-03. Stages in Lake Gentry
Daily Stage Hydrograph with Water Level recession windows (Sept-June)
Stage, ft NGVD
65
63
61
59
57
55
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
A2
Extreme Low
Stage Target
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

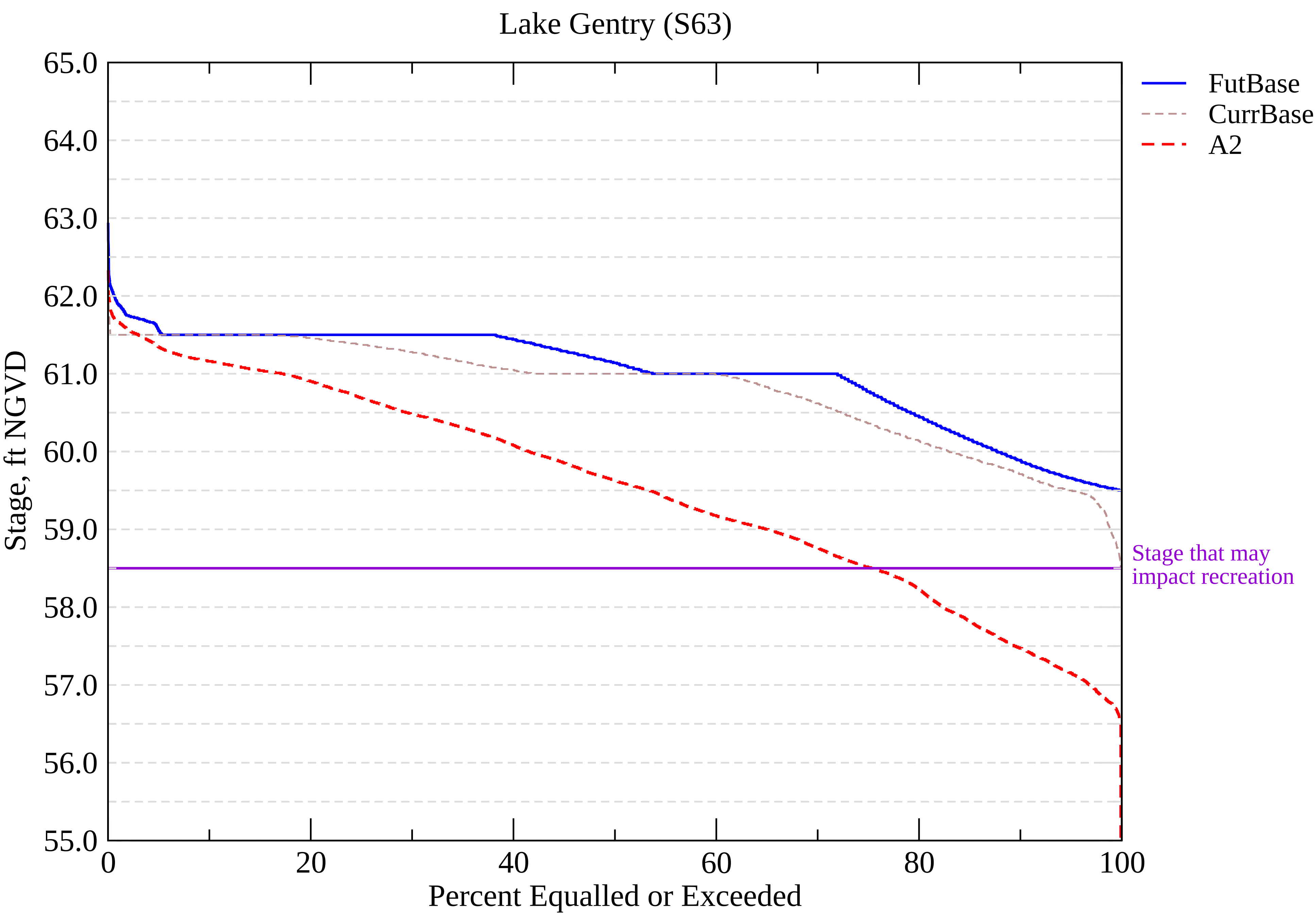


L-03. Stages in Lake Gentry
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
A2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999



I-01. Probable High Lake Stage Performance Indicator
Lake Gentry (S63)
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A2
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation



Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

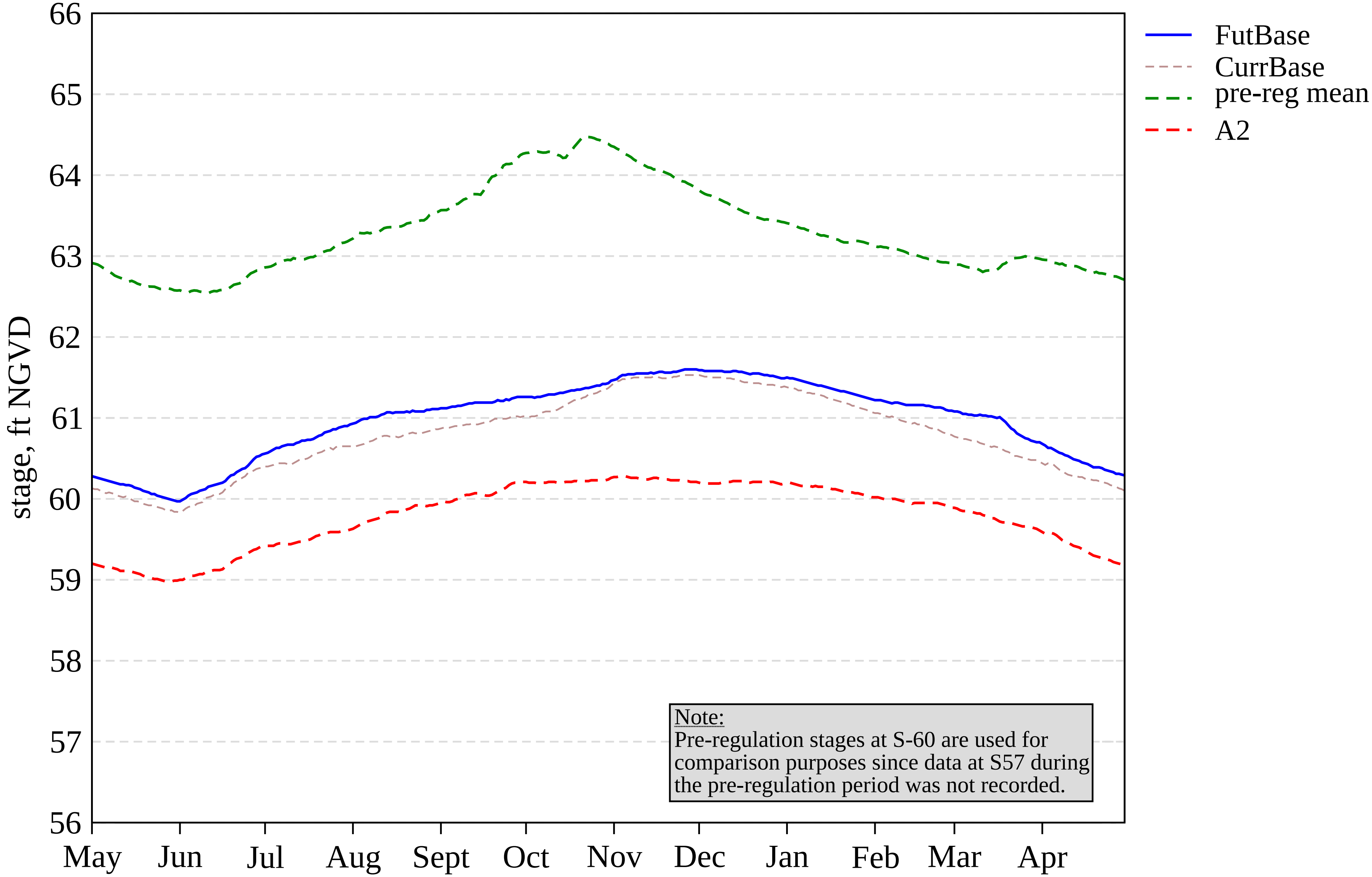
Alternative Description : Uncertainty Analysis - Simulation A2

Run ID : Variation of Kc - crop coefficient HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	74.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	3.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	63.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	23.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	54.3
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	17.1
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	60.0
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.2
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	7.9

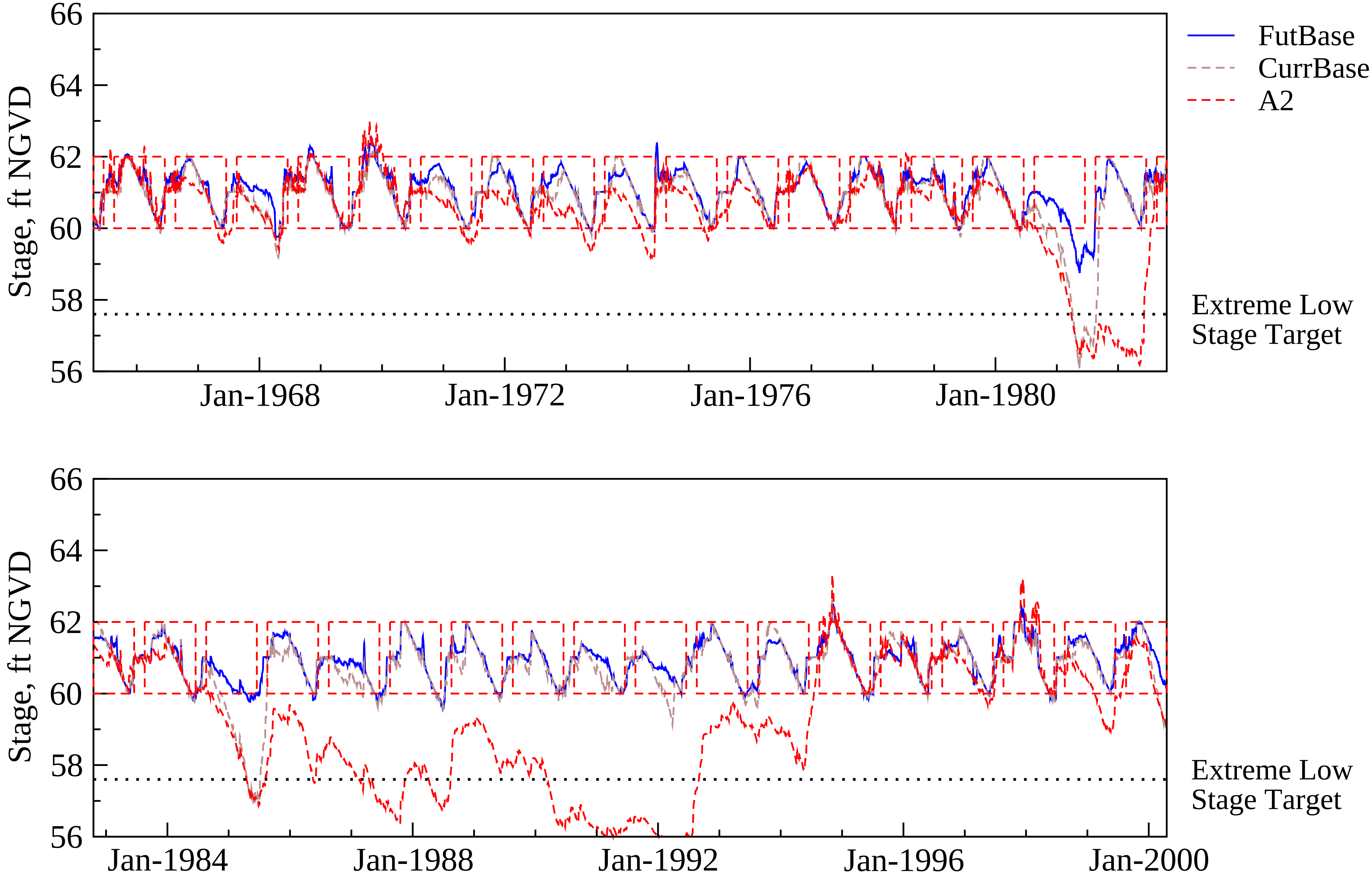
L-04. Stages in Lakes Joel, Myrtle, and Preston

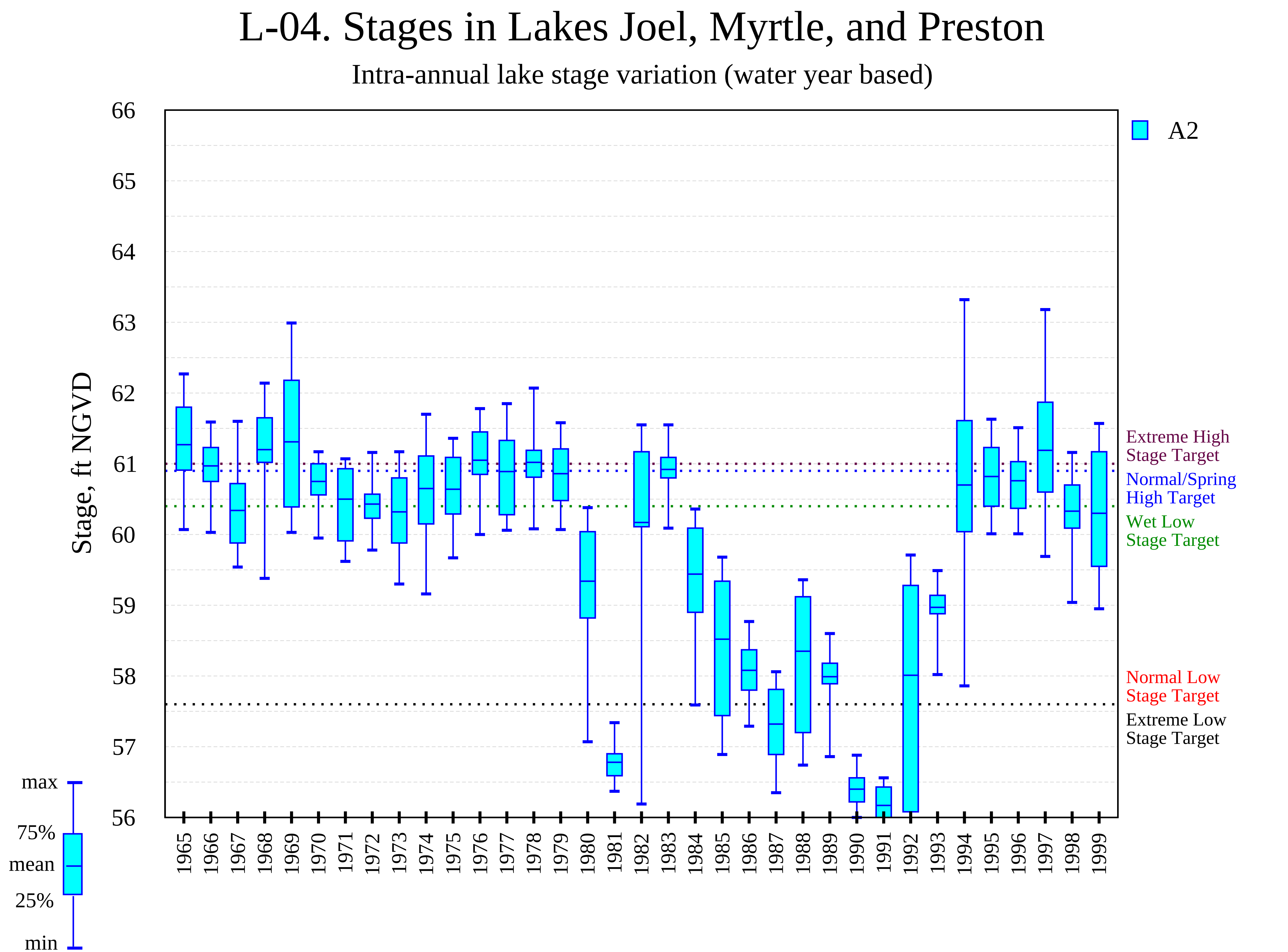
Stage Hydrograph of mean daily stages



L-04. Stages in Lakes Joel, Myrtle, and Preston

Daily Stage Hydrograph with Water Level recession windows (Sept-June)

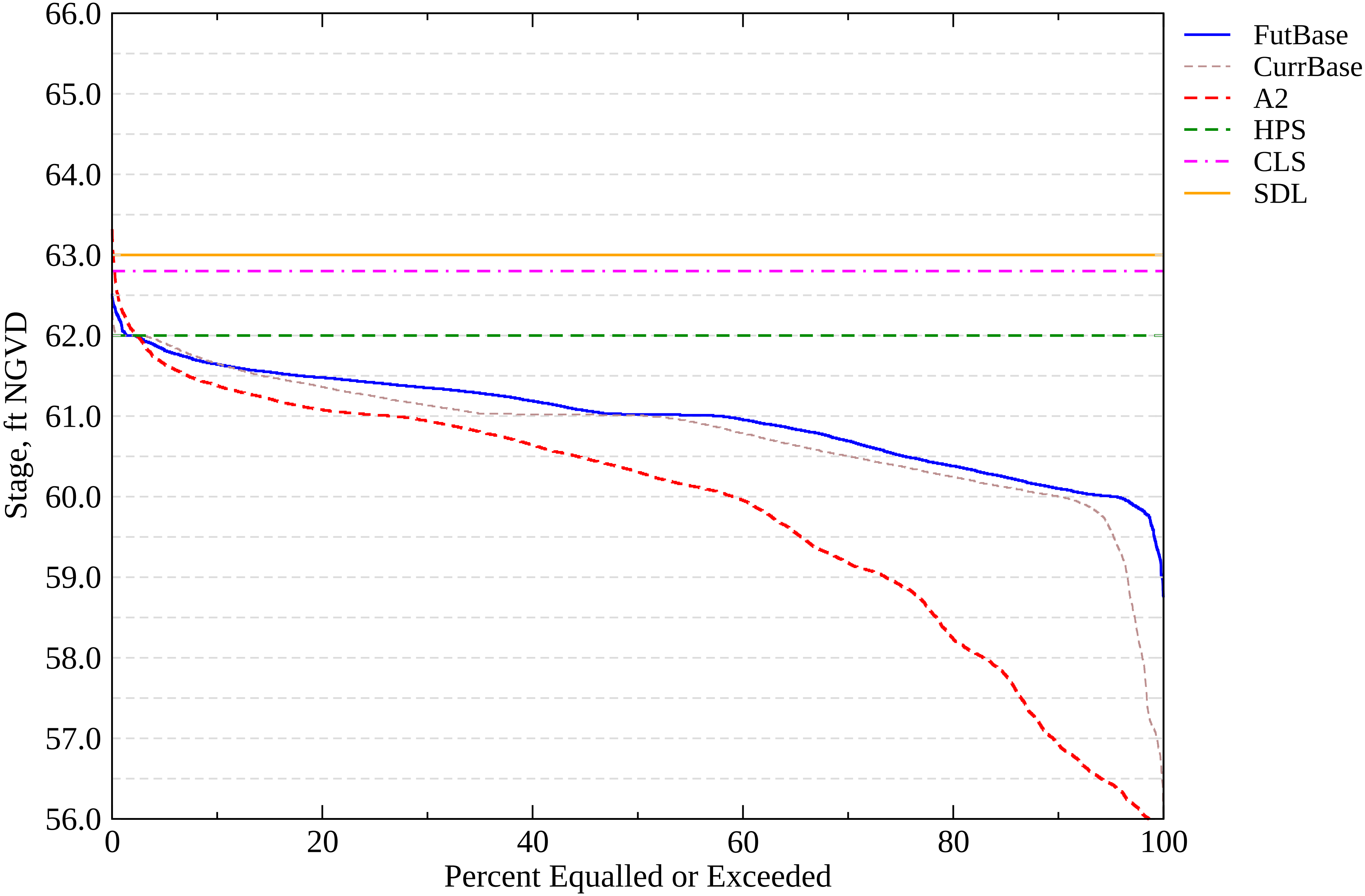




L-04. Stages in Lakes Joel, Myrtle, and Preston
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
66
65
64
63
62
61
60
59
58
57
56
A2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

I-01. Probable High Lake Stage Performance Indicator

Lake Myrtle, Joel, and Preston (S57)



Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation A2

Run ID : Variation of Kc - crop coefficient HIGH

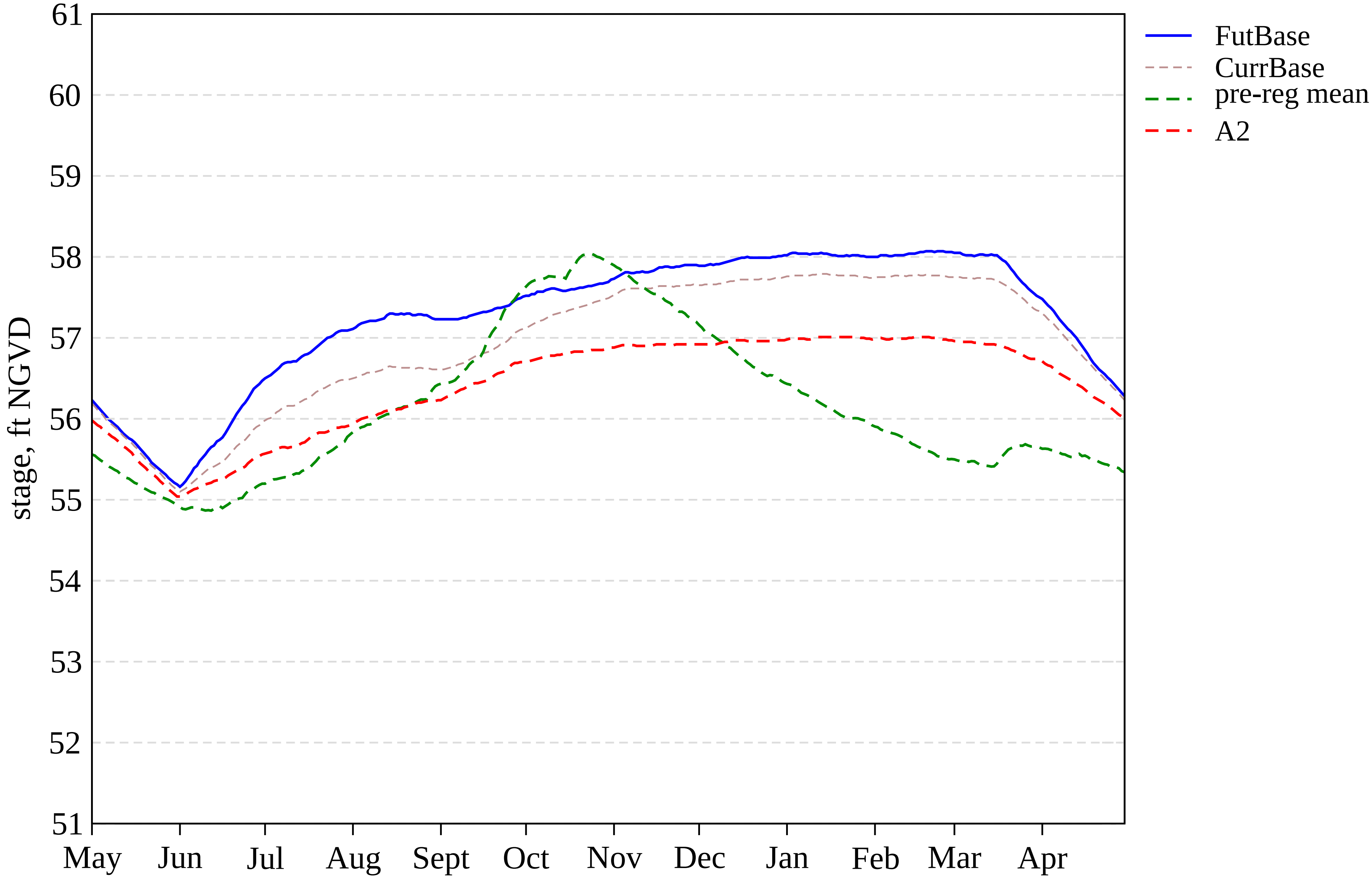
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	11.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	17.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	91.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	42.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	0.0
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	80.0
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	6.5

Tier 2 Report

PDF Report for L05

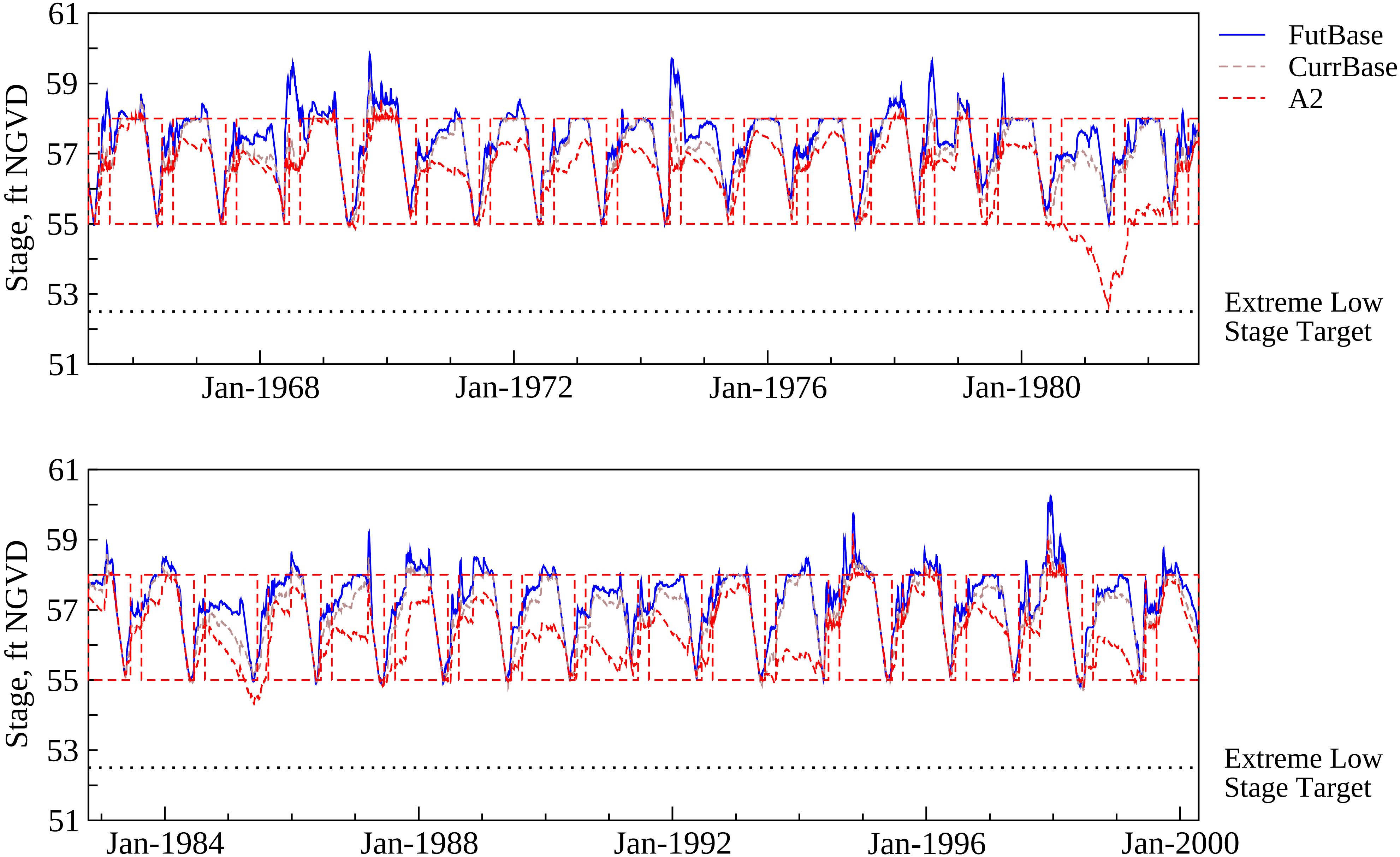
L-05. Stages in East Lake Toho, Fell’s Cove, and Lake Ajay

Stage Hydrograph of mean daily stages



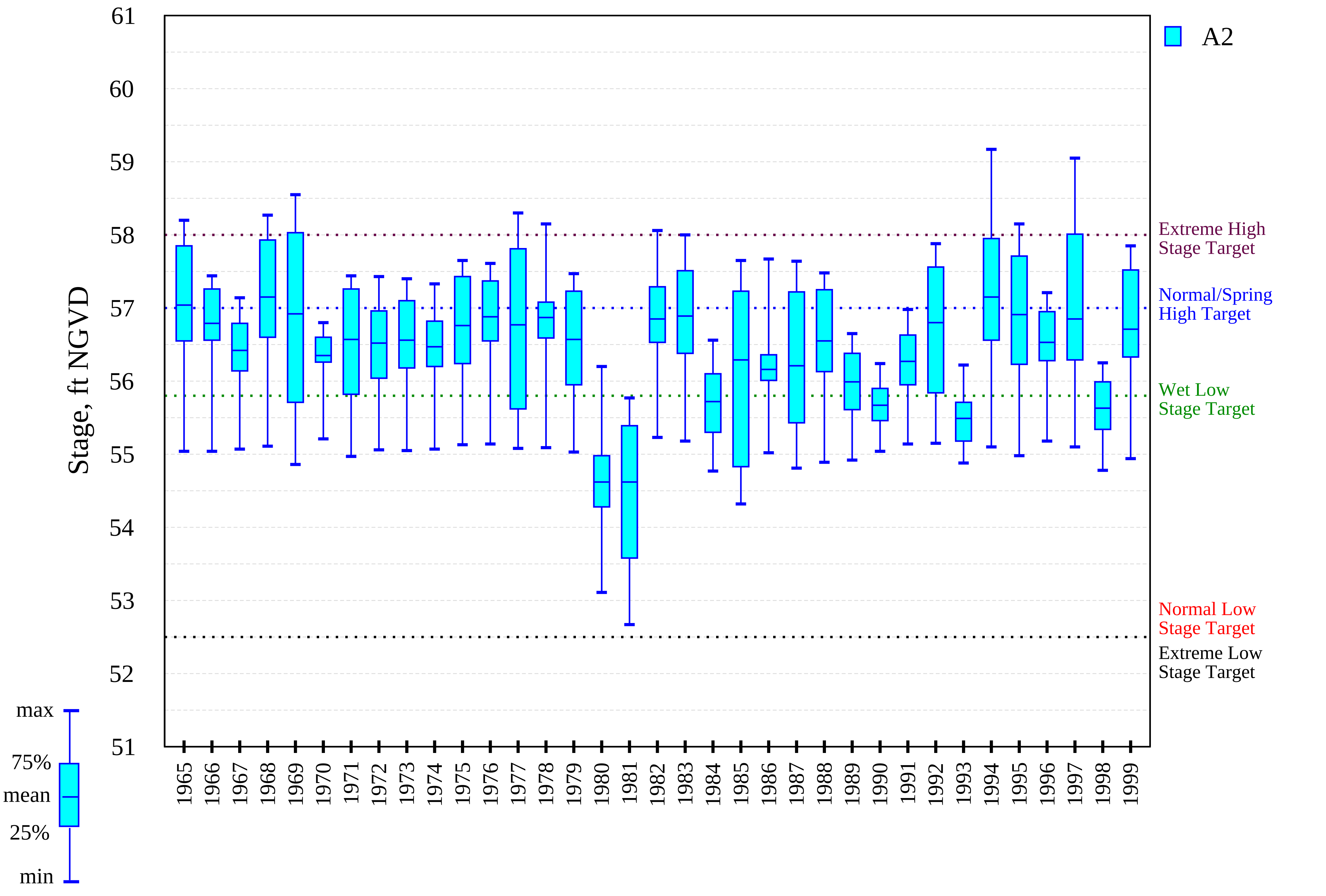
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

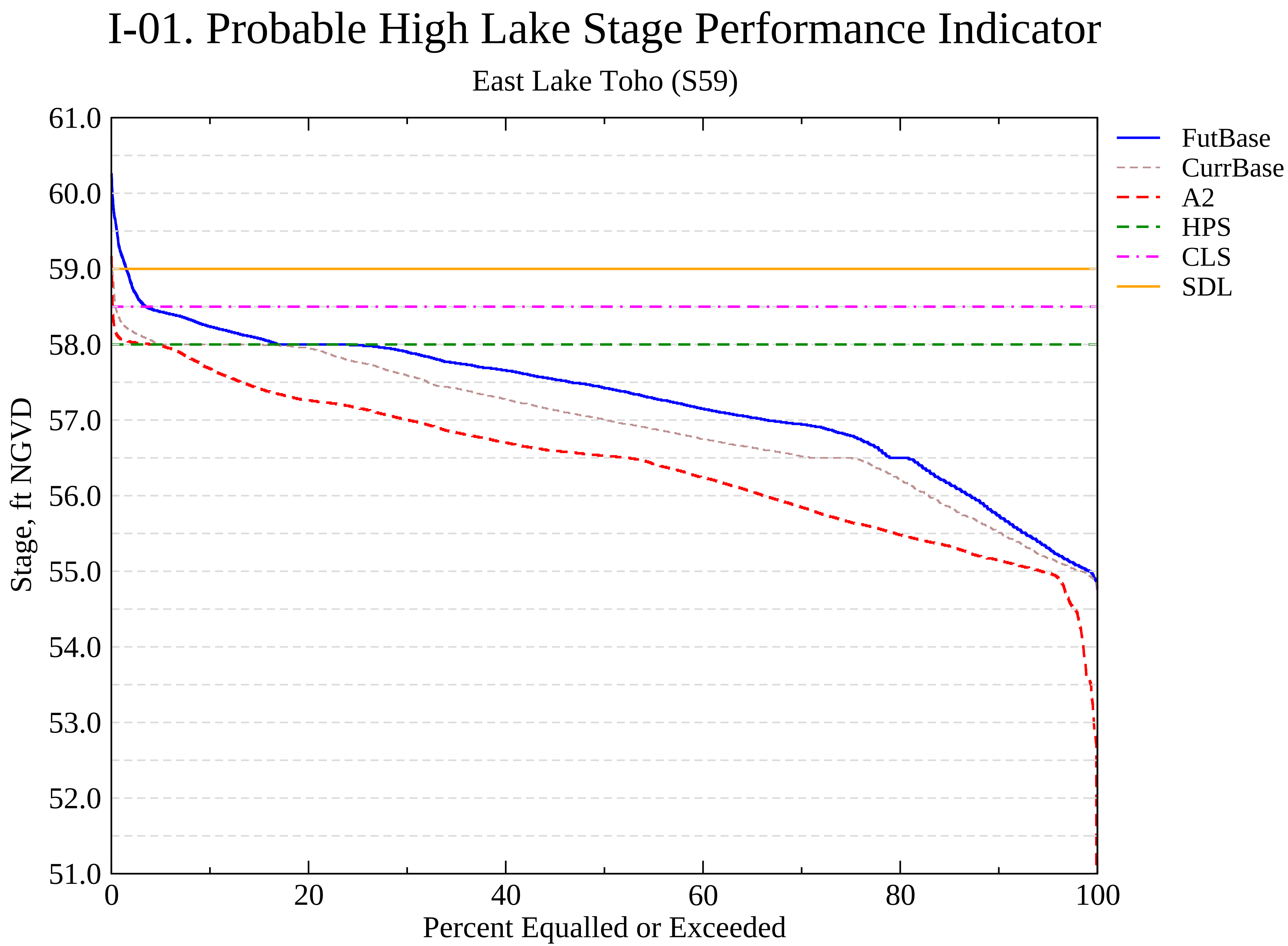
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

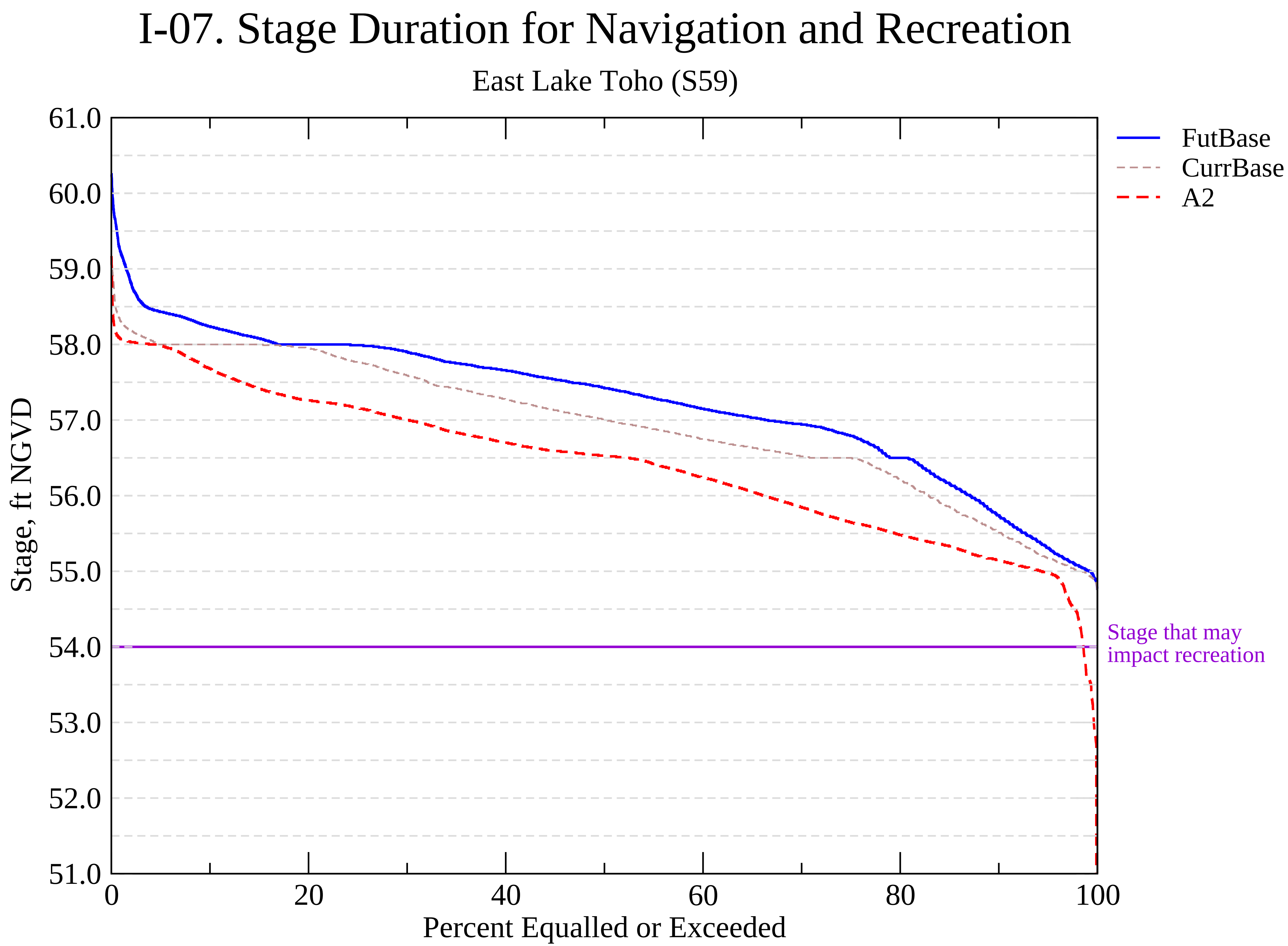


L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
East Lake Toho (S59)
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A2
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A2
Stage that may
impact recreation

Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Alternative Description : Uncertainty Analysis - Simulation A2

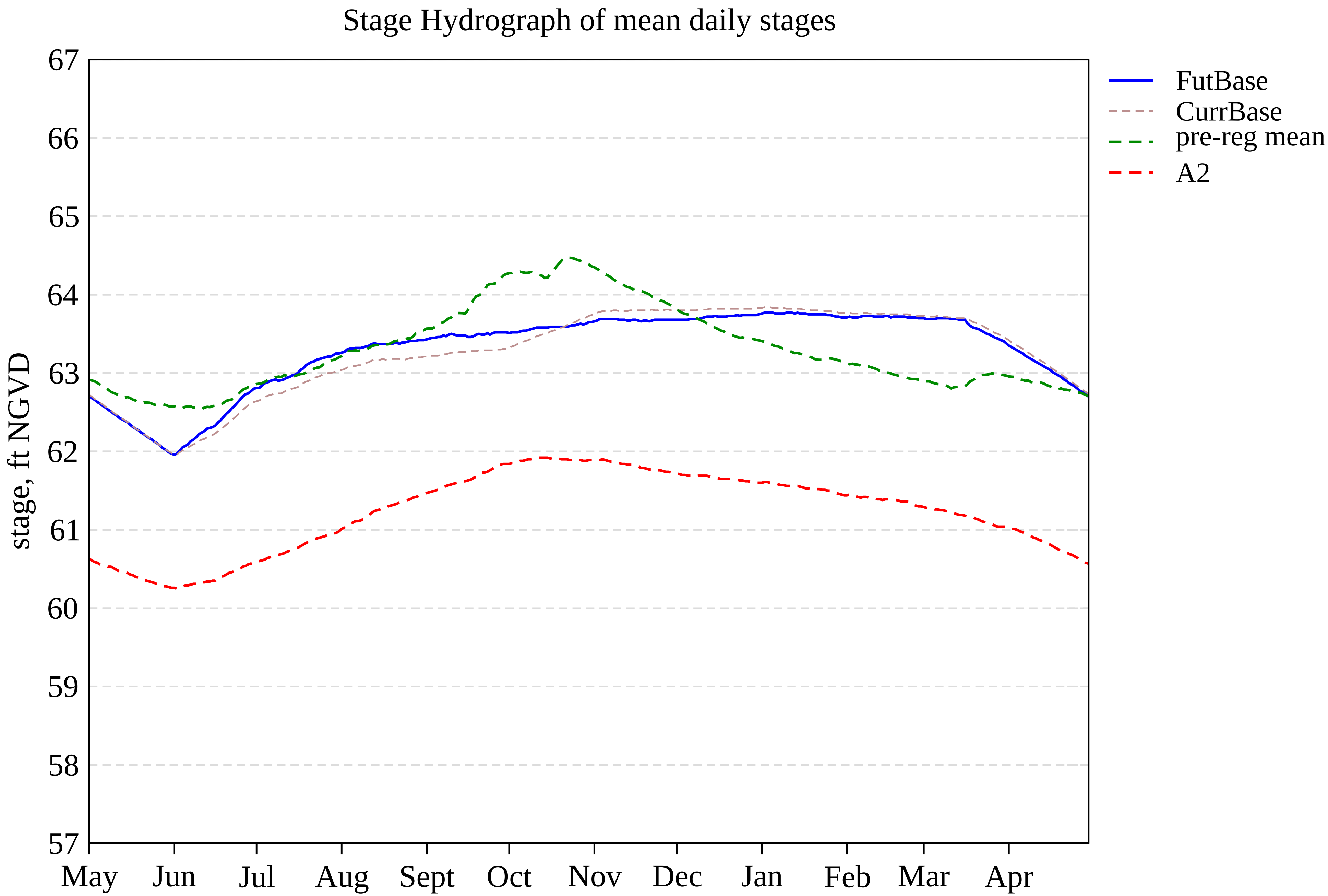
Run ID : Variation of Kc - crop coefficient HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	9.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	71.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	29.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	62.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	8.6
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	57.1
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.8
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	7.8

Tier 2 Report

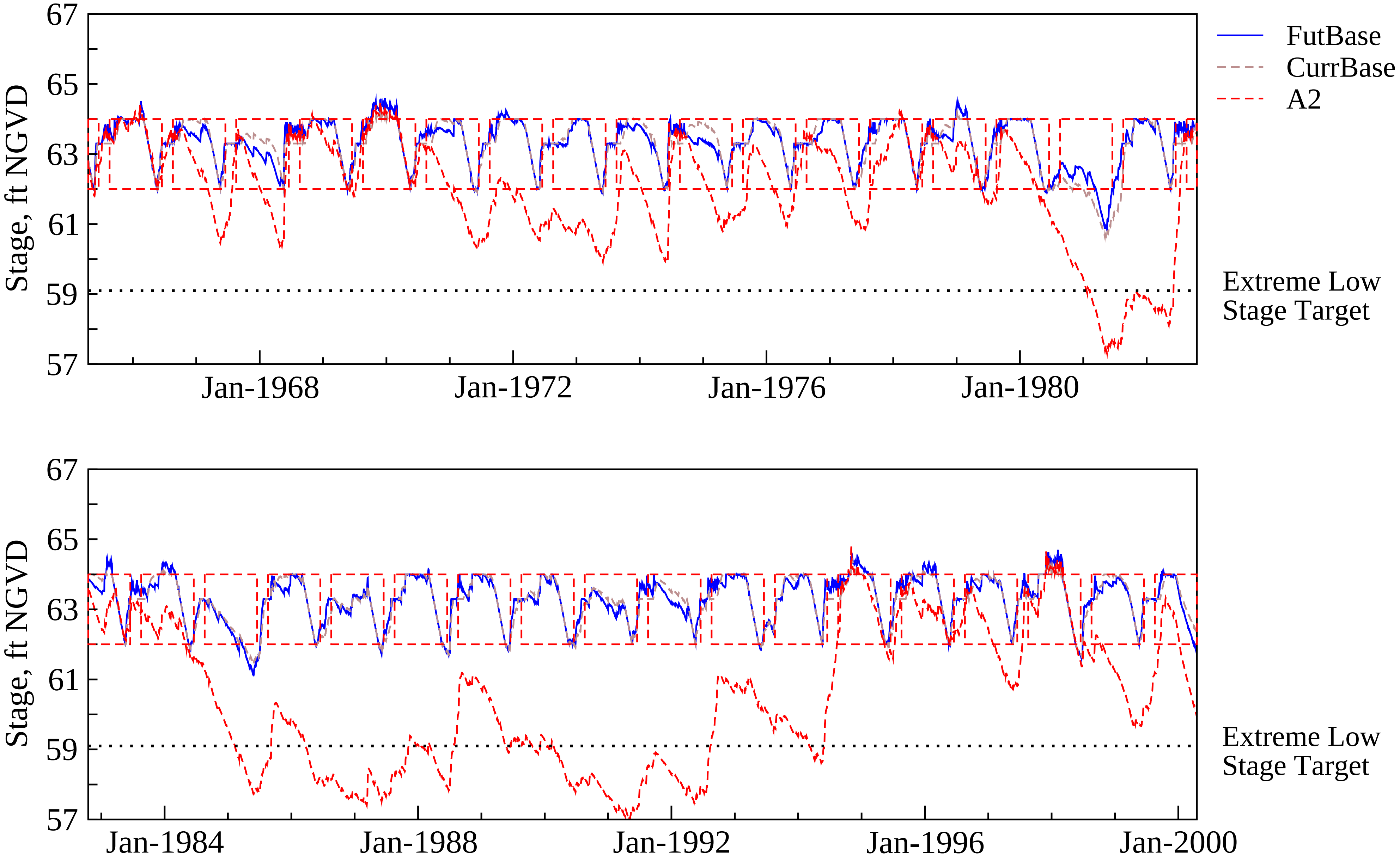
PDF Report for L06

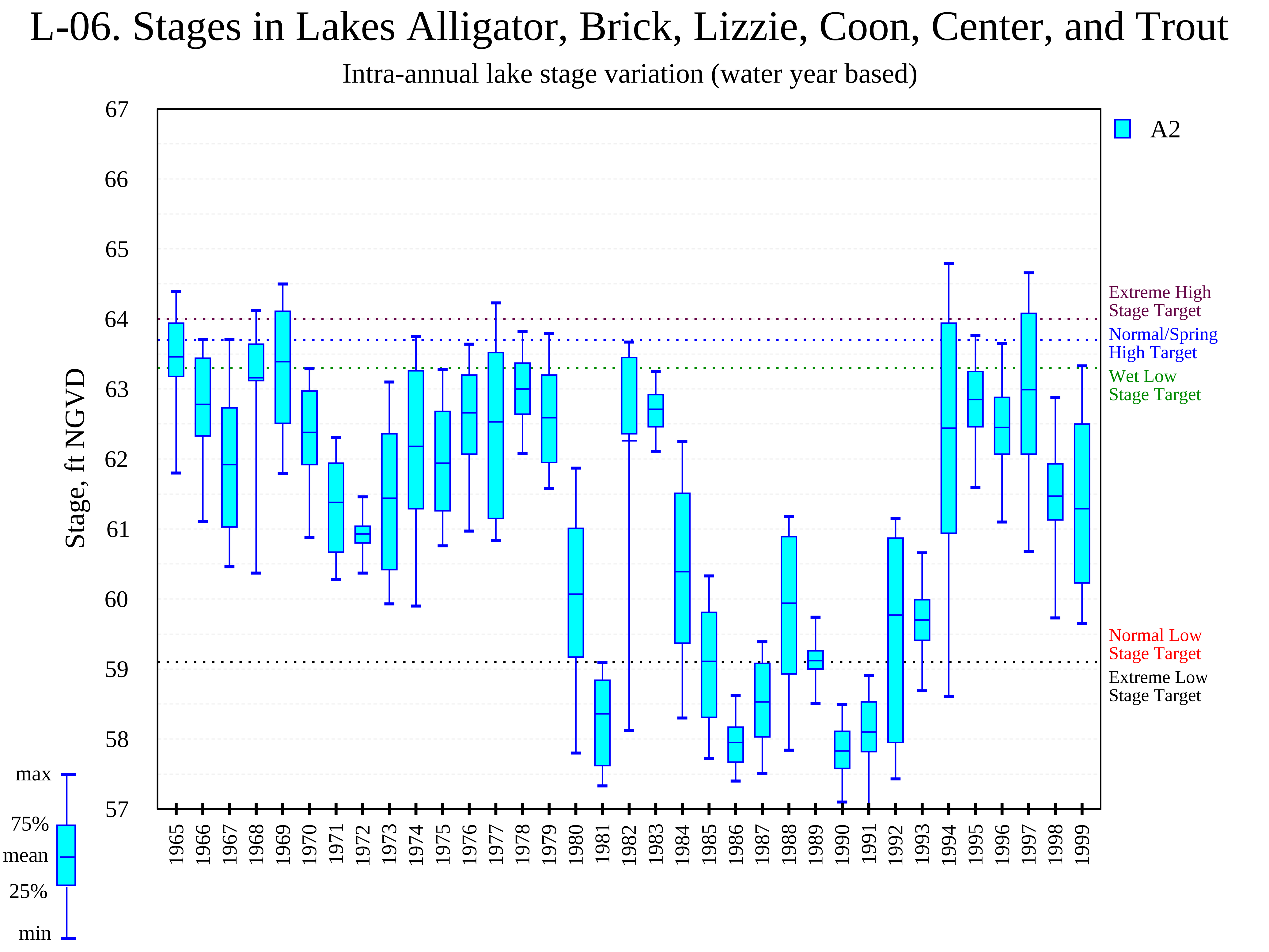
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout

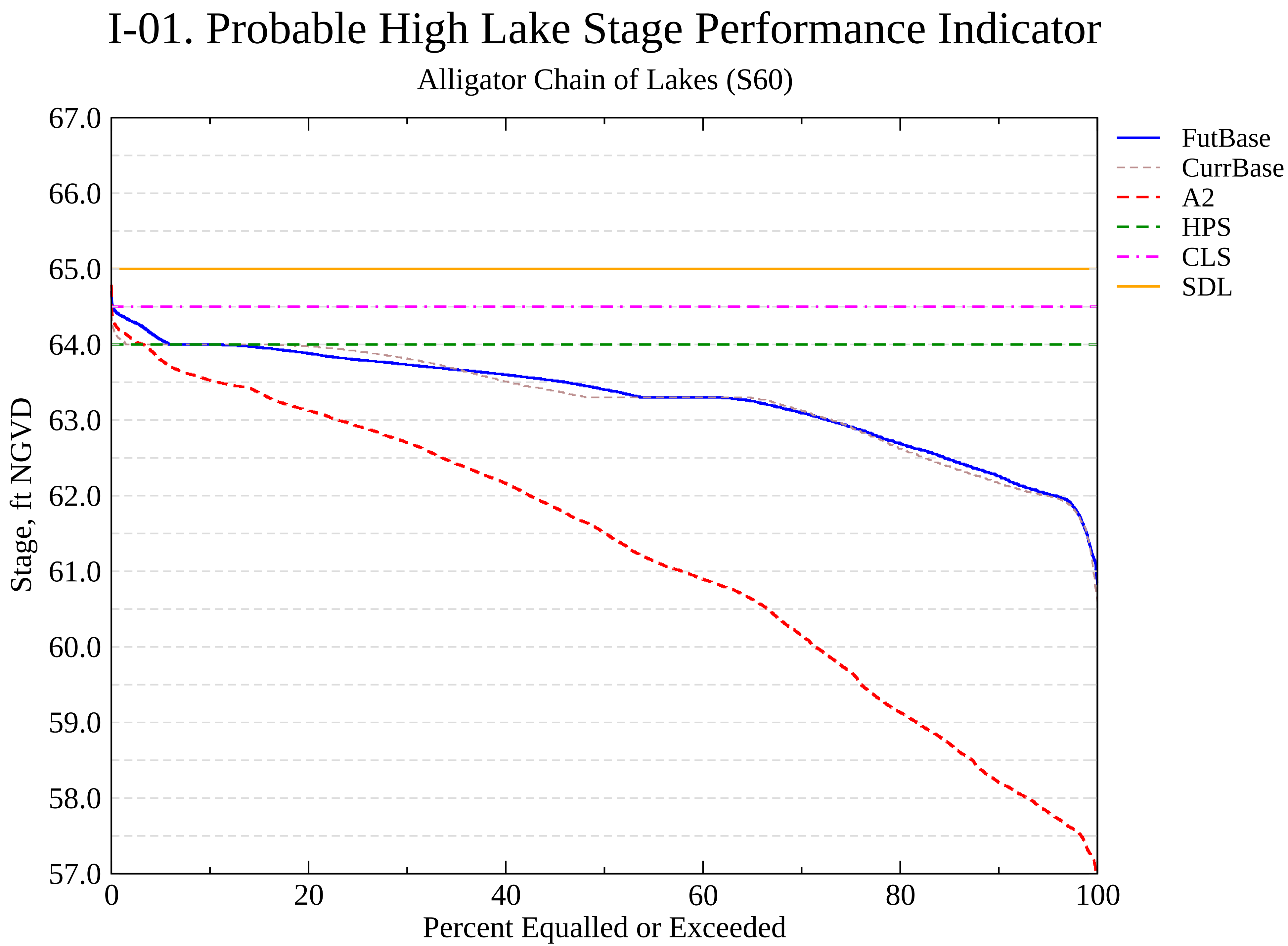


L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Daily Stage Hydrograph with Water Level recession windows (Sept-June)

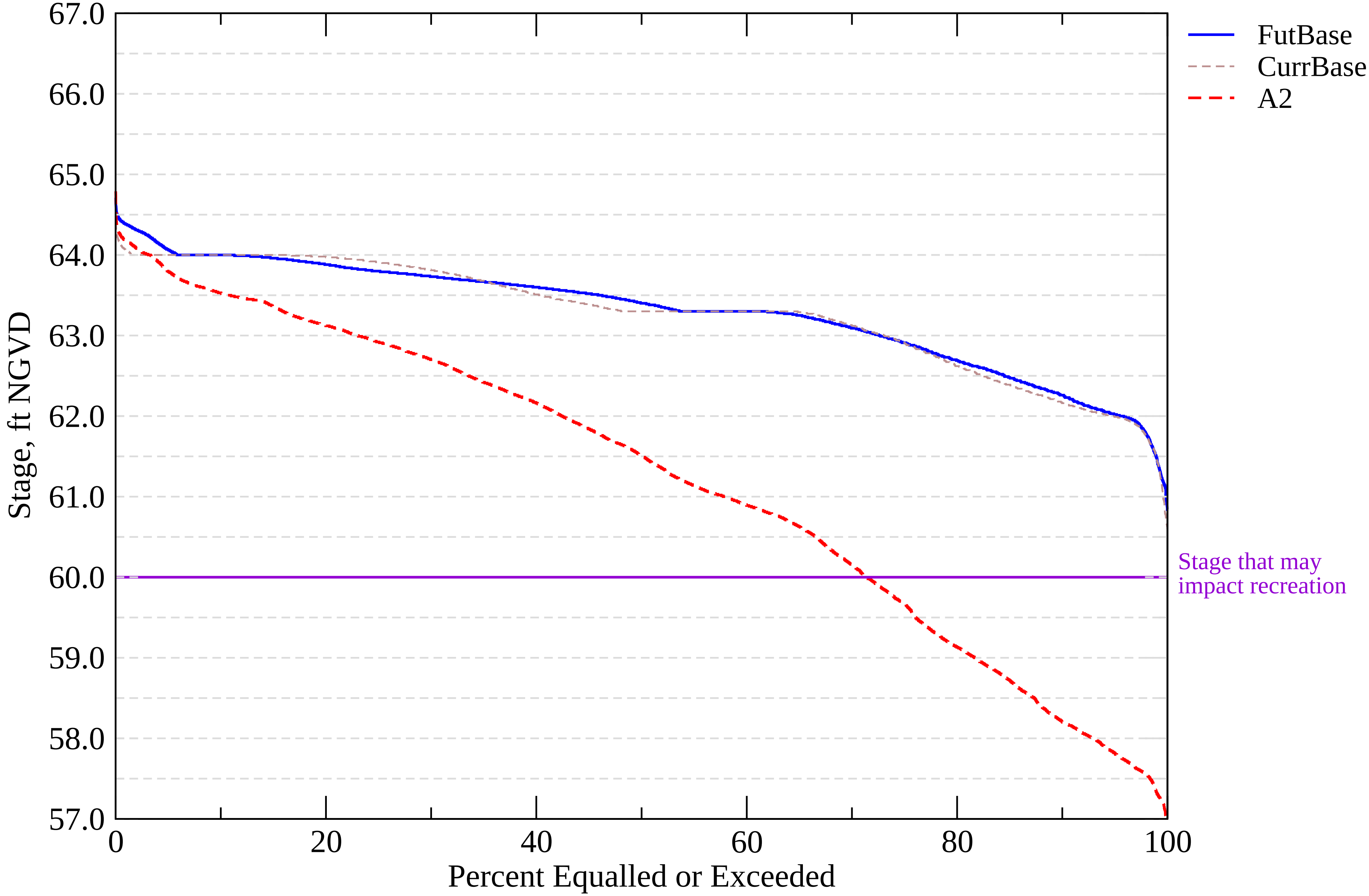



L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
67
66
65
64
63
62
61
60
59
58
57
A2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min


I-01. Probable High Lake Stage Performance Indicator
Alligator Chain of Lakes (S60)
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A2
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Alligator Chain of Lakes (S60)



Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

Alternative Description : Uncertainty Analysis - Simulation A2

Run ID : Variation of Kc - crop coefficient HIGH

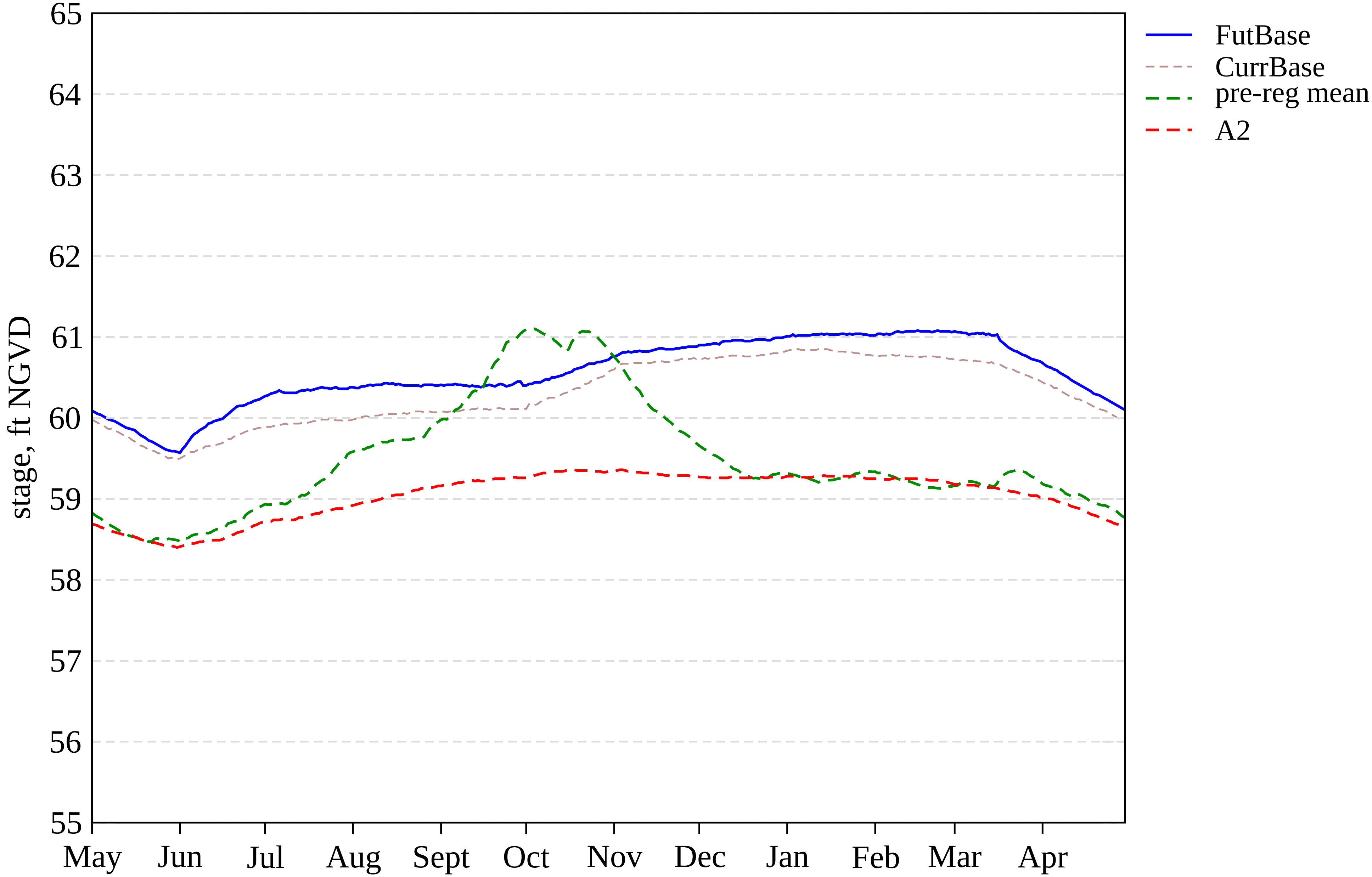
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	11.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	14.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	63.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	26.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	45.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	51.4
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.8
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	6.2
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	9.0

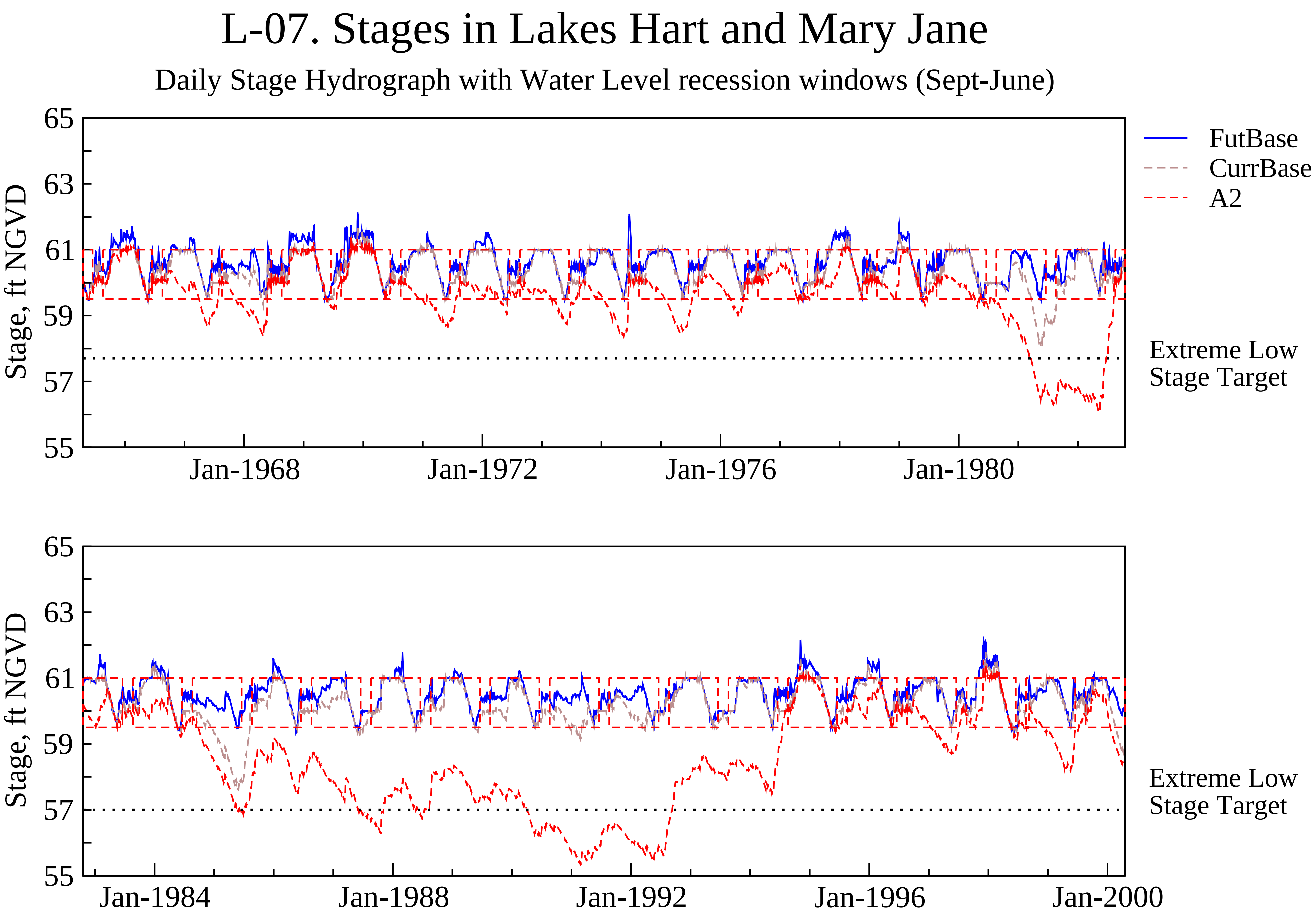
Tier 2 Report

PDF Report for L07

L-07. Stages in Lake Hart and Mary Jane

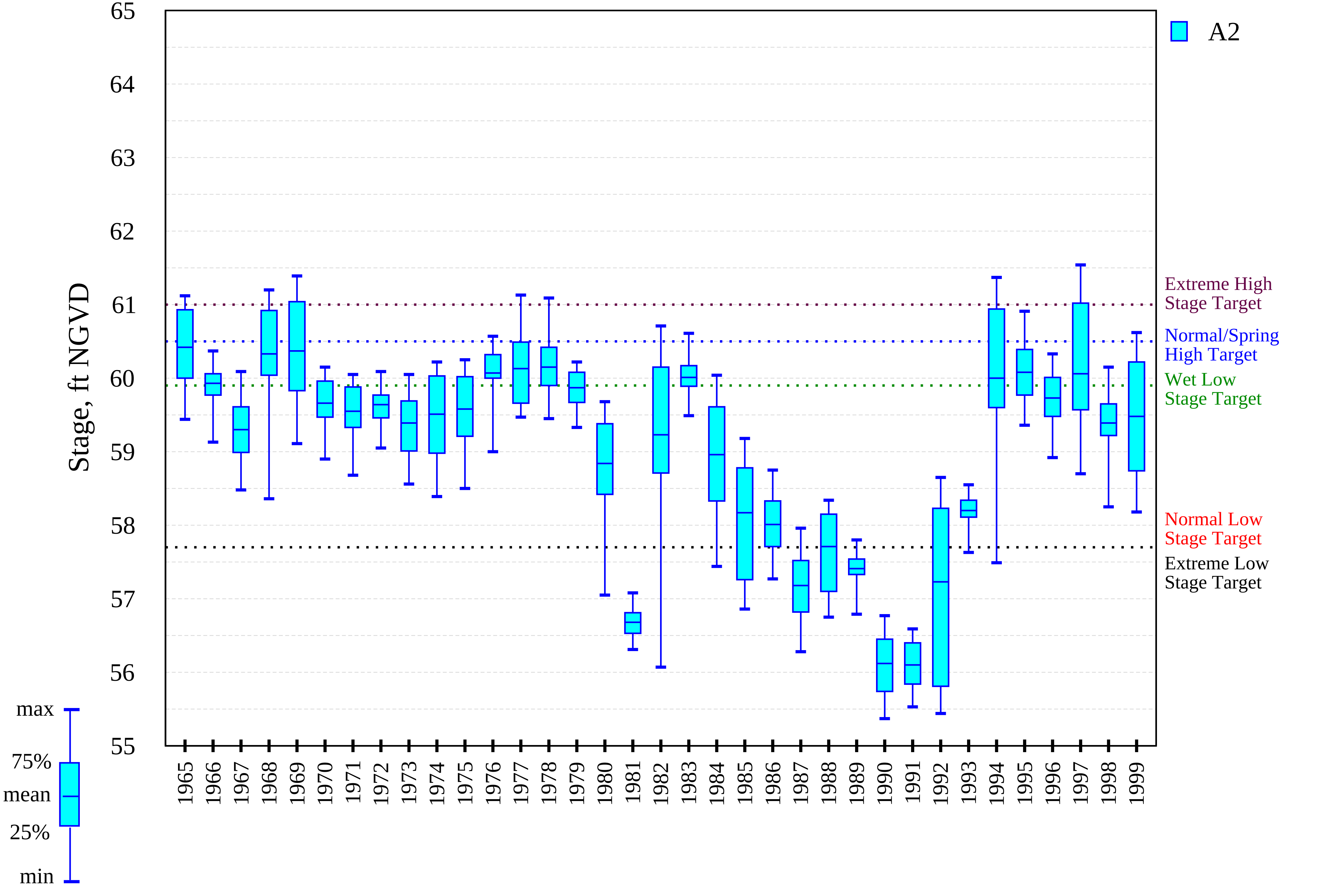
Stage Hydrograph of mean daily stages

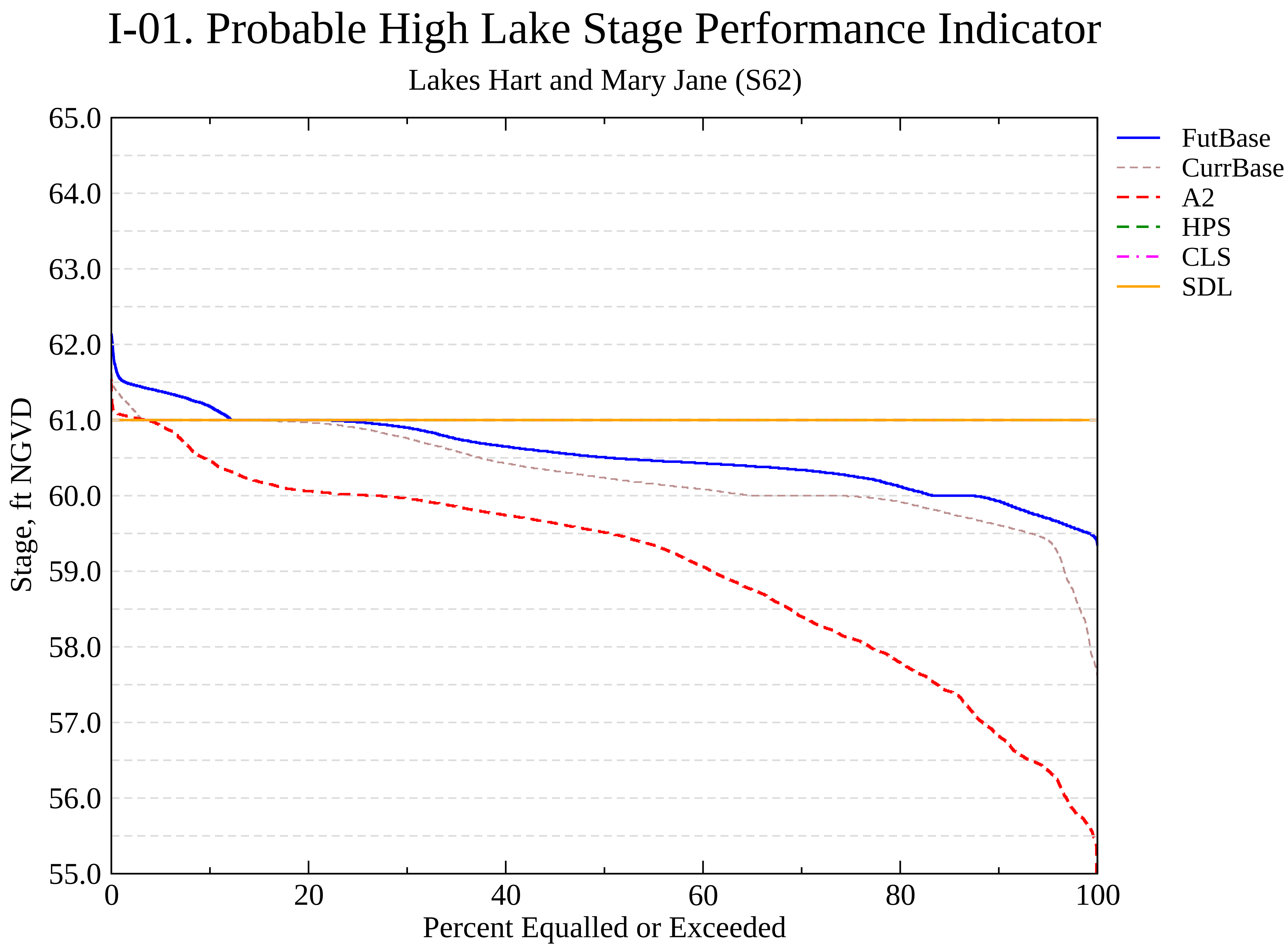



L-07. Stages in Lakes Hart and Mary Jane
Daily Stage Hydrograph with Water Level recession windows (Sept-June)
Stage, ft NGVD
65
63
61
59
57
55
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
A2
Extreme Low
Stage Target
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

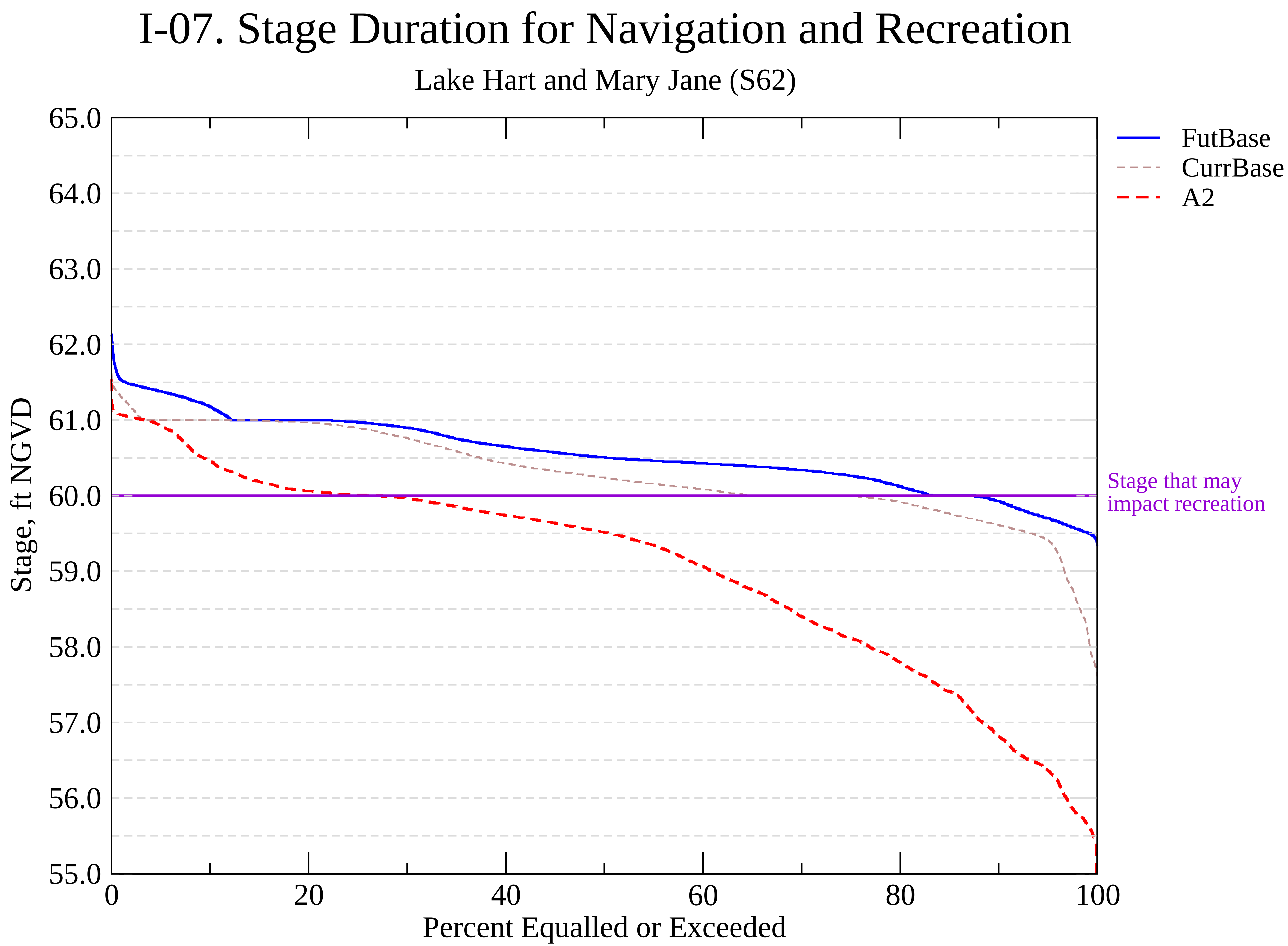
L-07. Stages in Lakes Hart and Mary Jane

Intra-annual lake stage variation (water year based)





I-01. Probable High Lake Stage Performance Indicator
Lakes Hart and Mary Jane (S62)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A2
HPS
CLS
SDL



I-07. Stage Duration for Navigation and Recreation
Lake Hart and Mary Jane (S62)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
A2
Stage that may impact recreation

Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

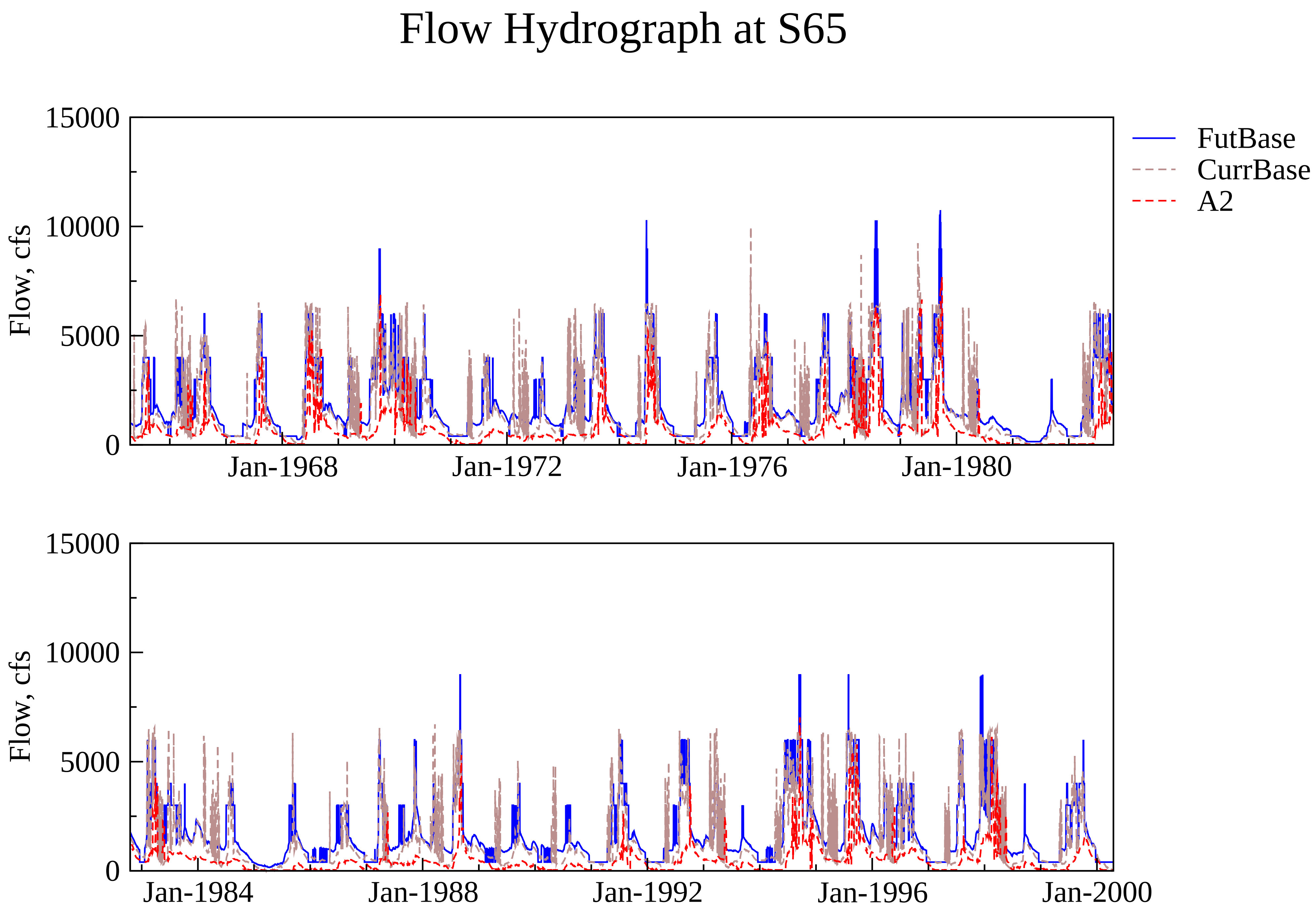
Alternative Description : Uncertainty Analysis - Simulation A2

Run ID : Variation of Kc - crop coefficient HIGH

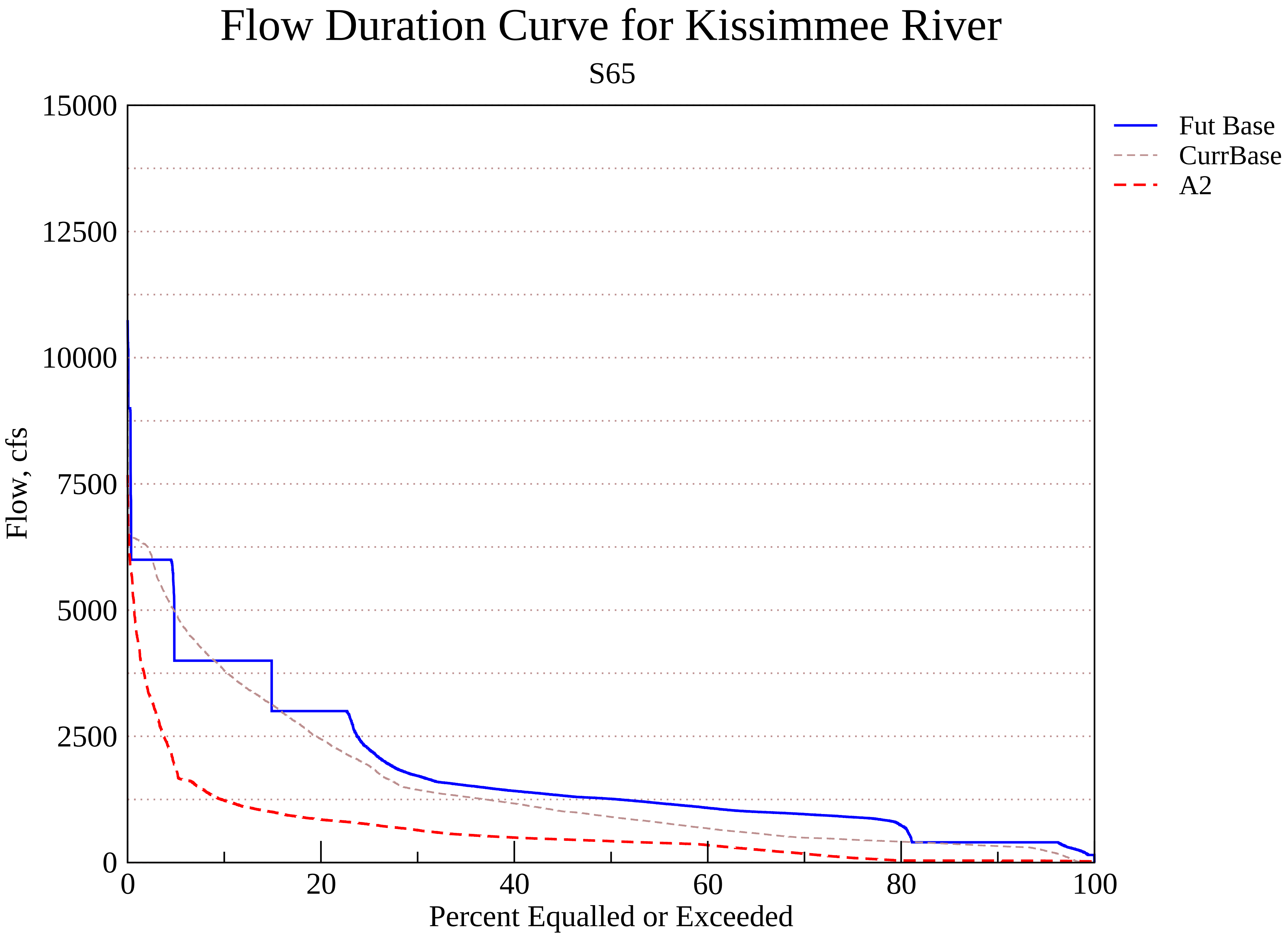
Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	37.1	54.3
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	31.4	37.1
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	88.6	82.9
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	5.7	14.3
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	94.0	127.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	312.0	419.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	1.2	1.3
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0

Tier 2 Report

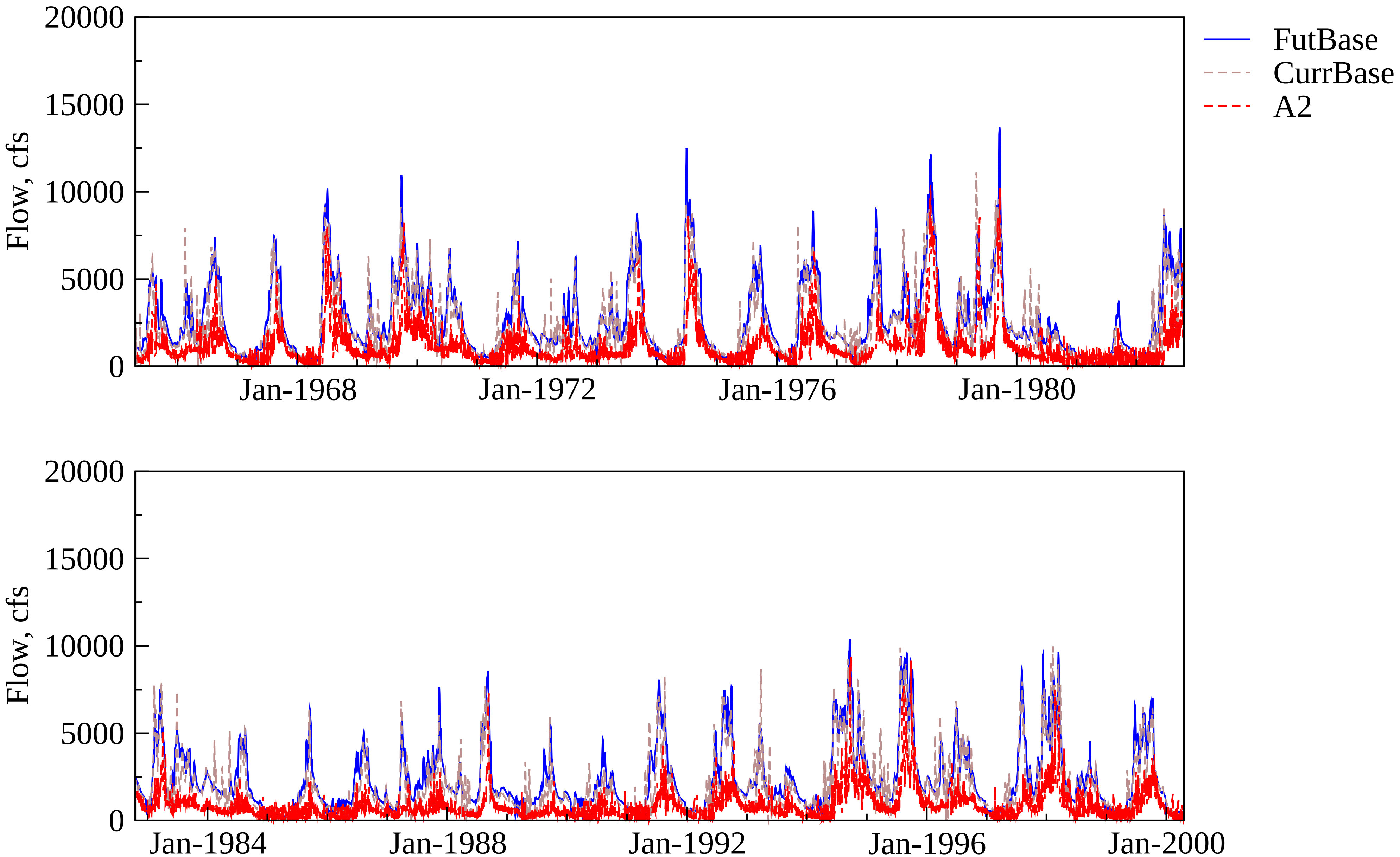
PDF Report for R01

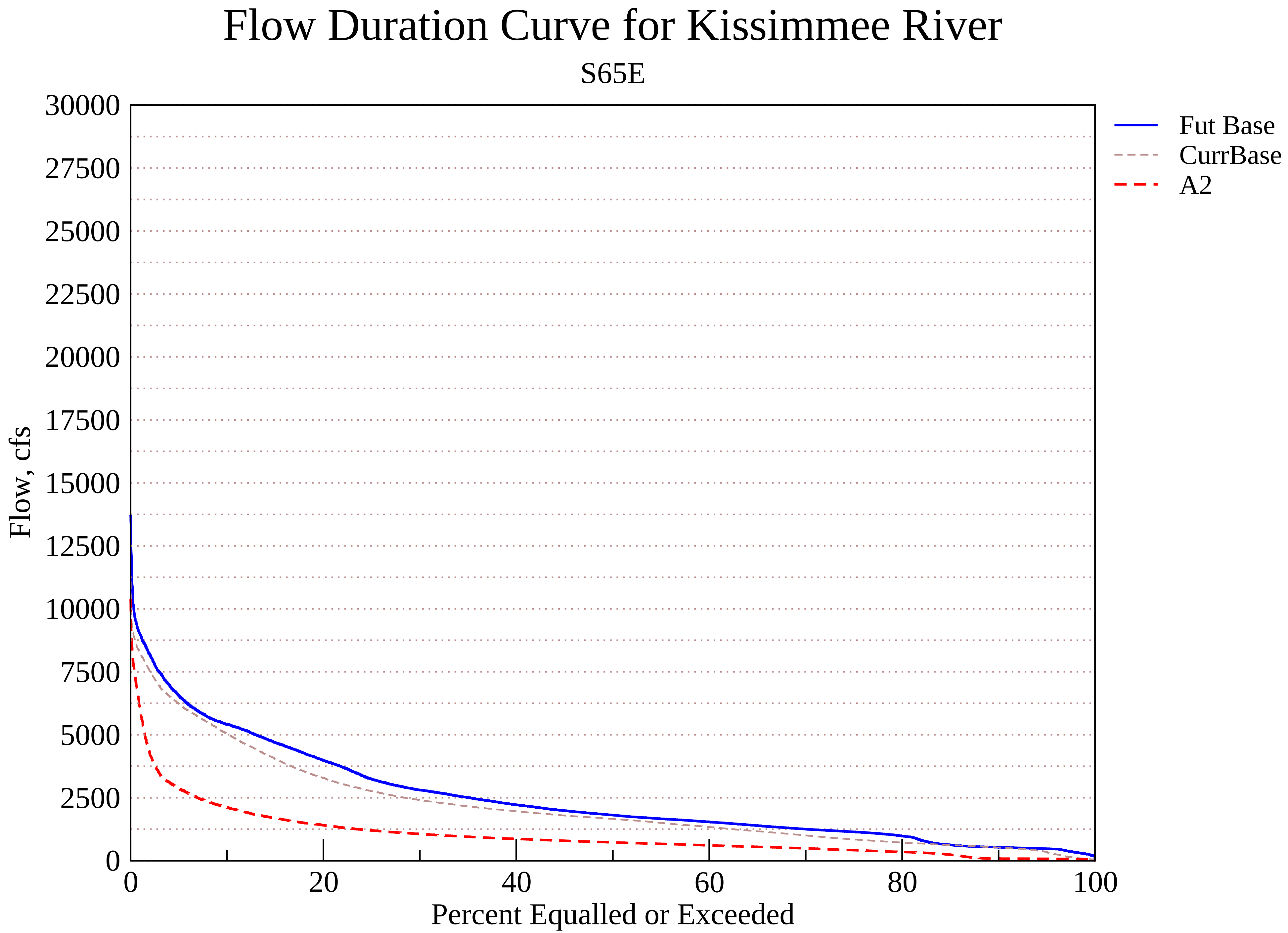


Flow Hydrograph at S65
15000
10000
5000
0
Flow, cfs
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
A2
15000
10000
5000
0
Flow, cfs
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000


Flow Duration Curve for Kissimmee River
S65
Flow, cfs
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
A2

Flow Hydrograph at S65E





Flow Duration Curve for Kissimmee River
S65E
Flow, cfs
30000
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
A2

Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation A2

Run ID : Variation of Kc - crop coefficient HIGH

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Number of days per water year that river channel depth is greater than average floodplain ground elevation (average).	252.0	250.0	203.0	183.0
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	106.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	3.8
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	6.4

Tier 2 Report

[PDF Report for R02]

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

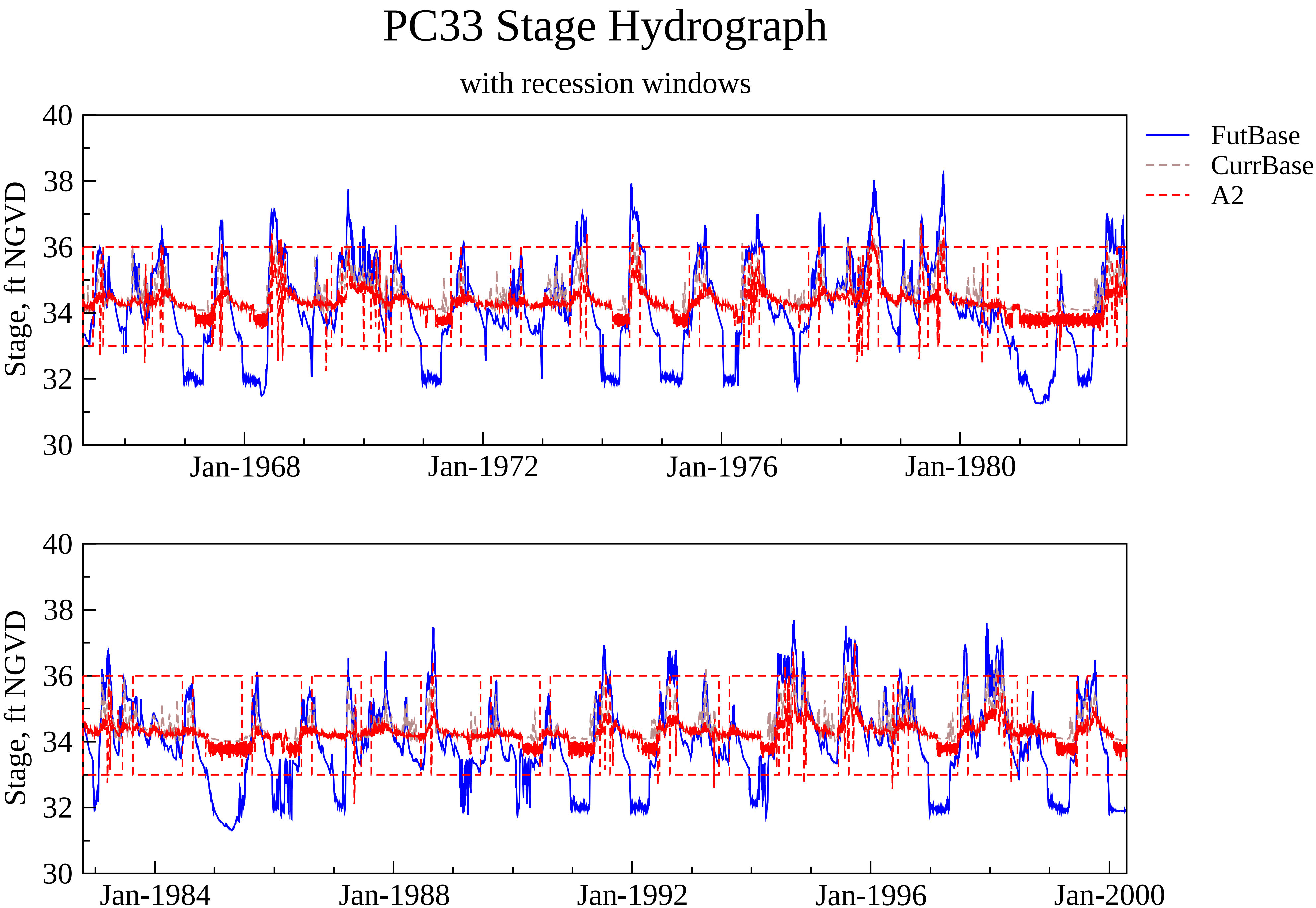
Alternative Description : Uncertainty Analysis - Simulation A2

Run ID : Variation of Kc - crop coefficient HIGH

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	57.1
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	54.3
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	40.0

Tier 2 Report

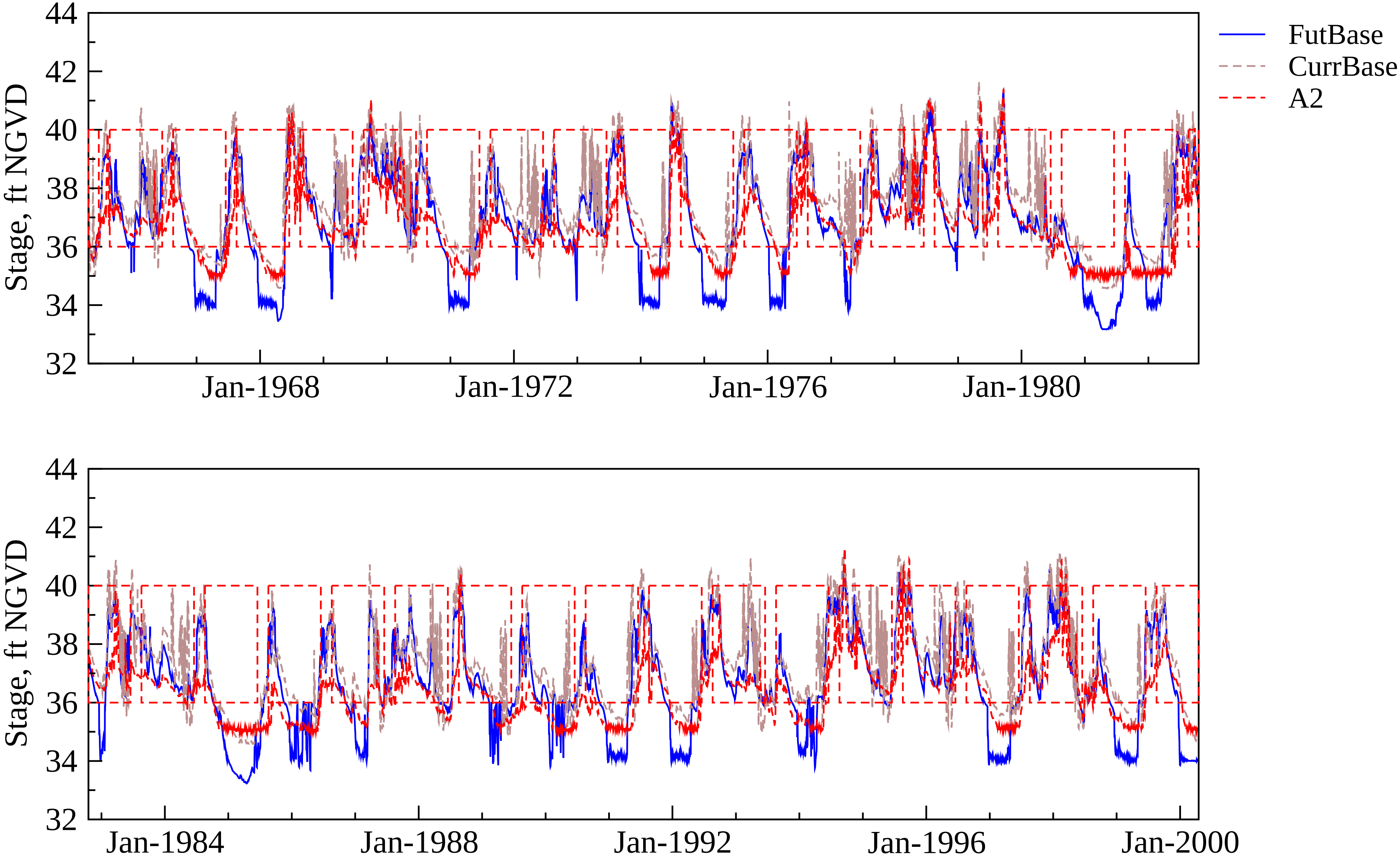
PDF Report for R03



PC33 Stage Hydrograph
with recession windows
Stage, ft NGVD
40
38
36
34
32
30
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
A2
Stage, ft NGVD
40
38
36
34
32
30
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

PC52 Stage Hydrograph

with recession windows



KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation B1

Variation of Kh_SAS, Kh - horizontal conductivity - LOW

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation B1

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

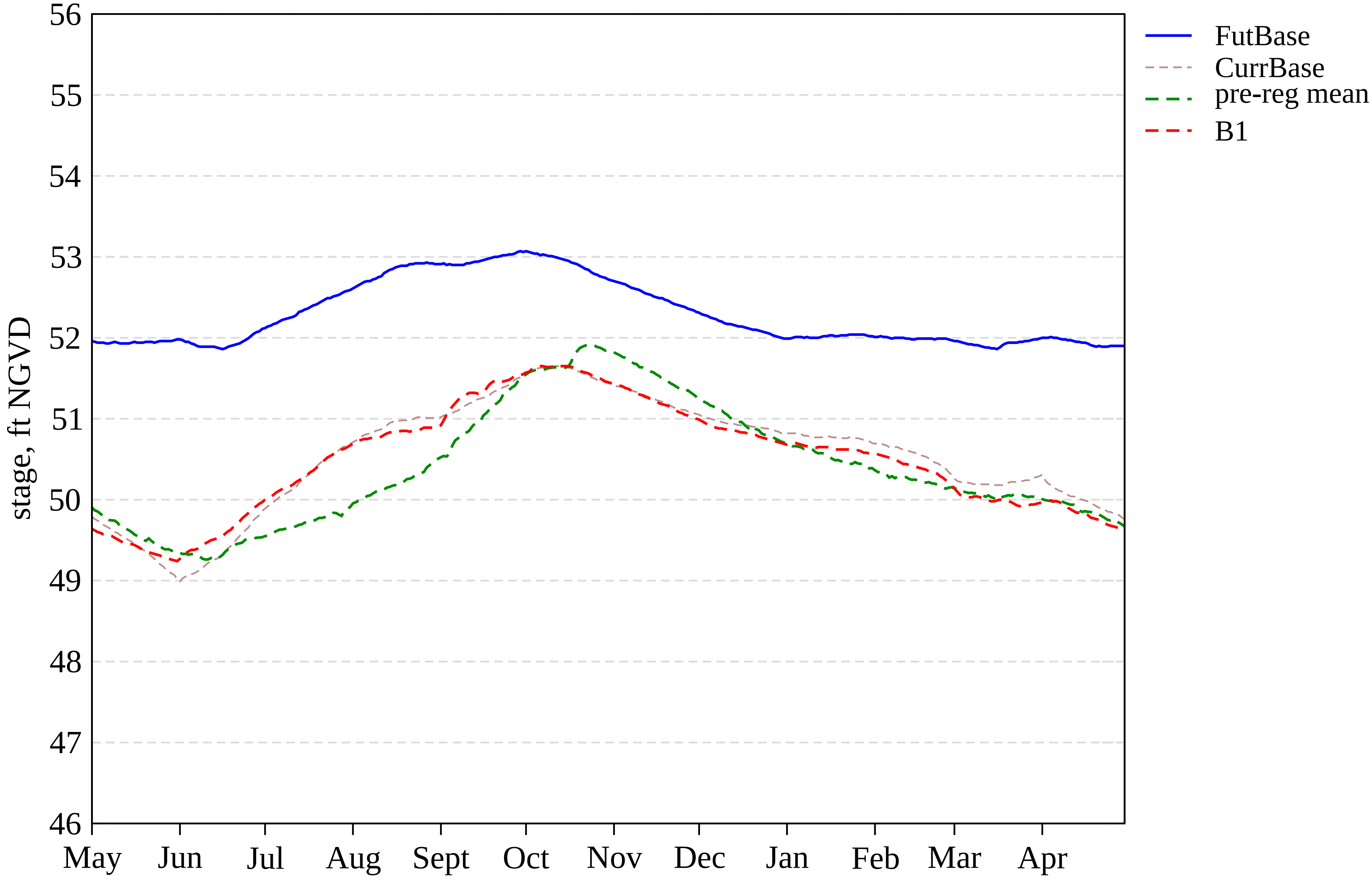
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	83.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	23.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	71.4
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	14.3
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	88.6
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	2.6	3.4
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	5.5	6.0

Tier 2 Report

PDF Report for L01

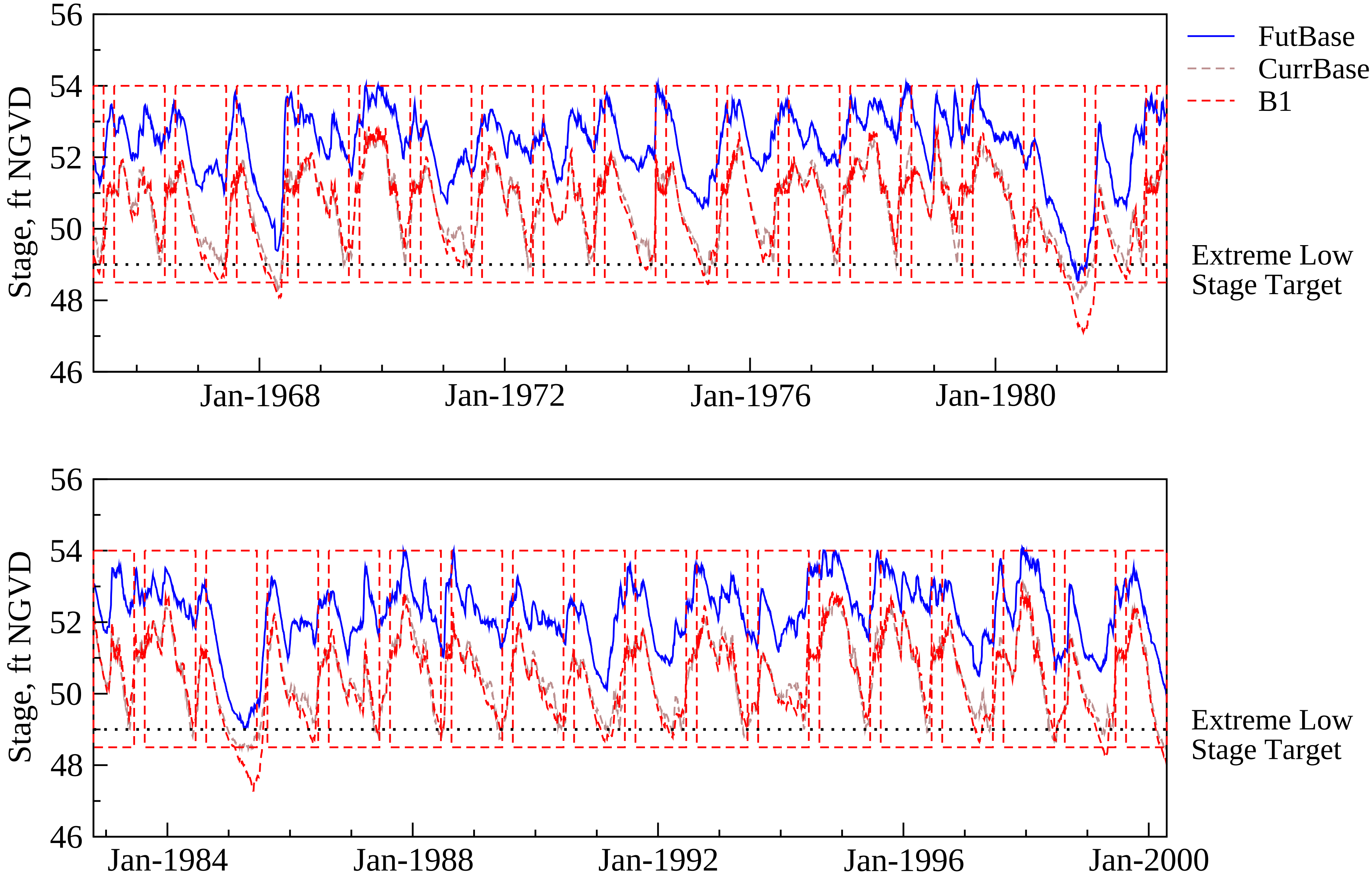
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Stage Hydrograph of mean daily stages



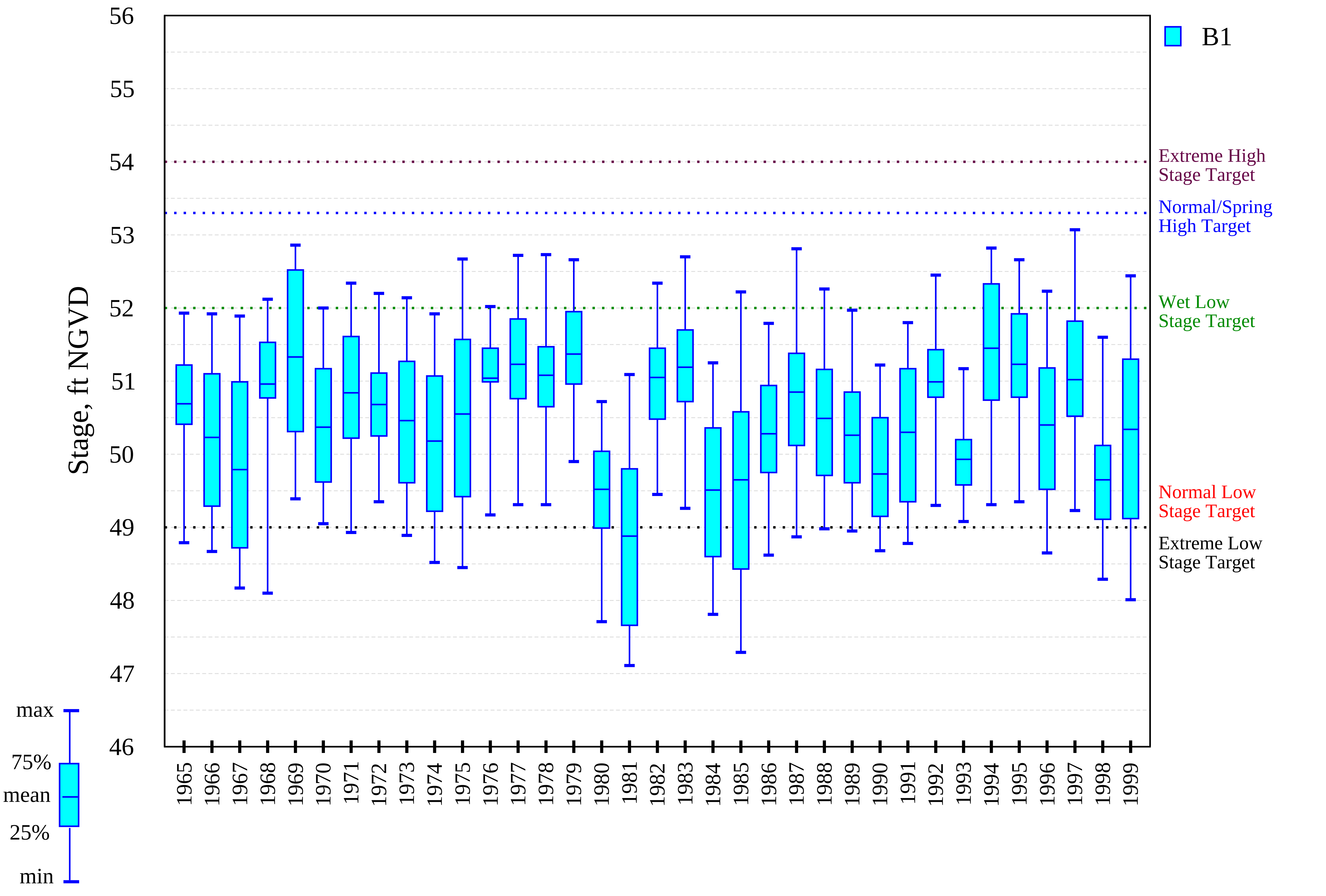
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

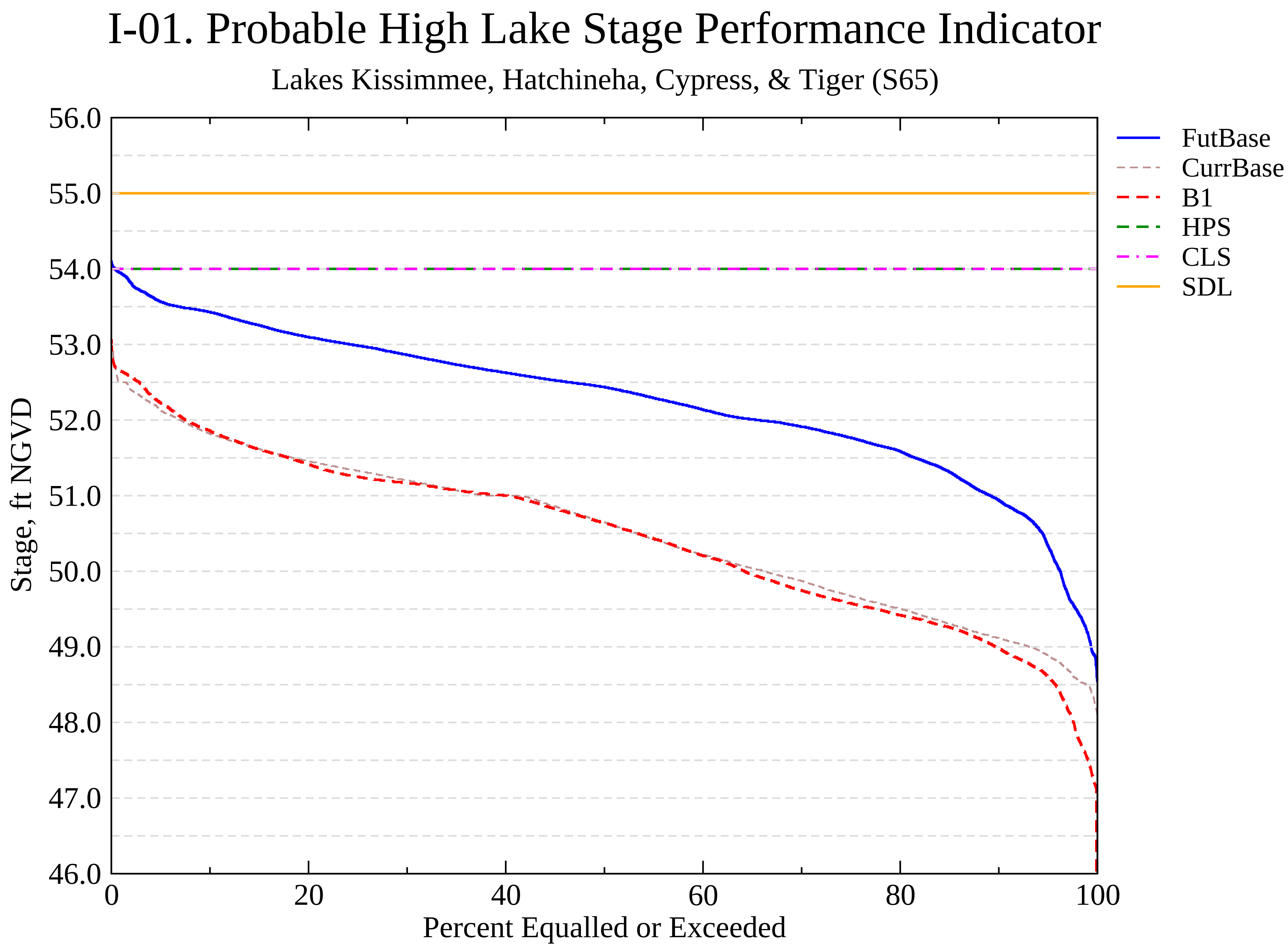
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Intra-annual lake stage variation (water year based)

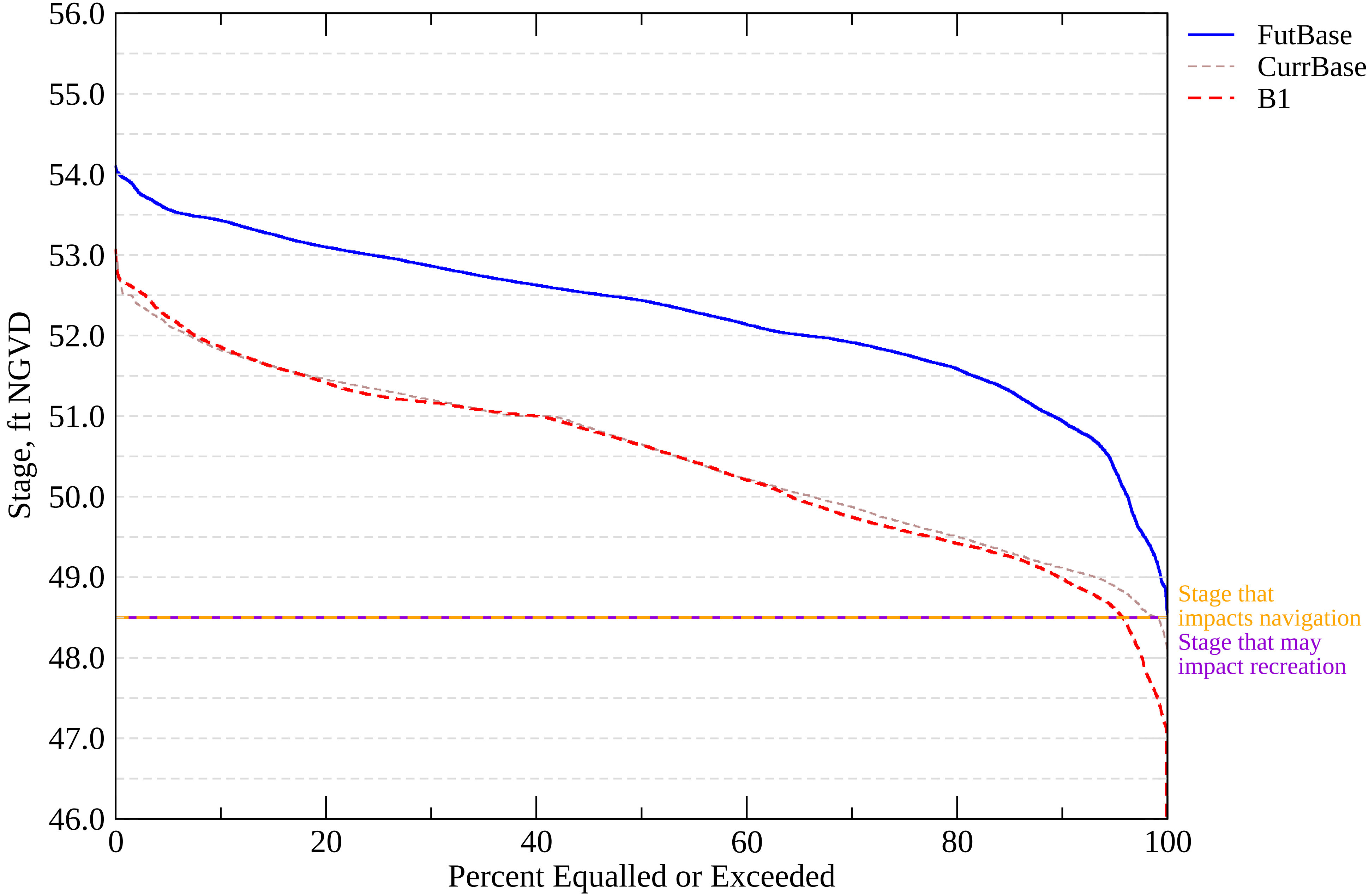




I-01. Probable High Lake Stage Performance Indicator
Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)
Stage, ft NGVD
Percent Equalled or Exceeded
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
FutBase
CurrBase
B1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)



Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

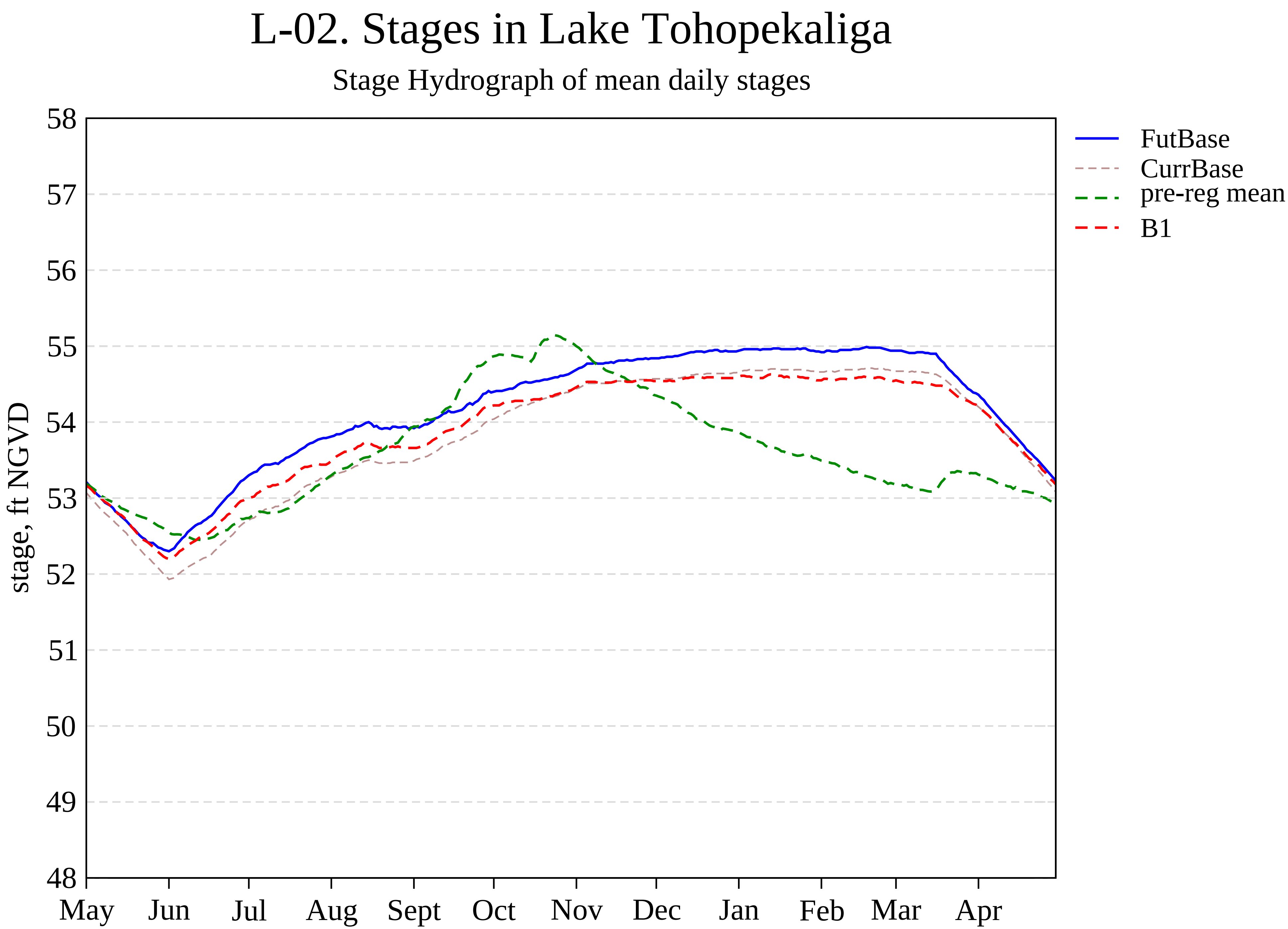
Alternative Description : Uncertainty Analysis - Simulation B1

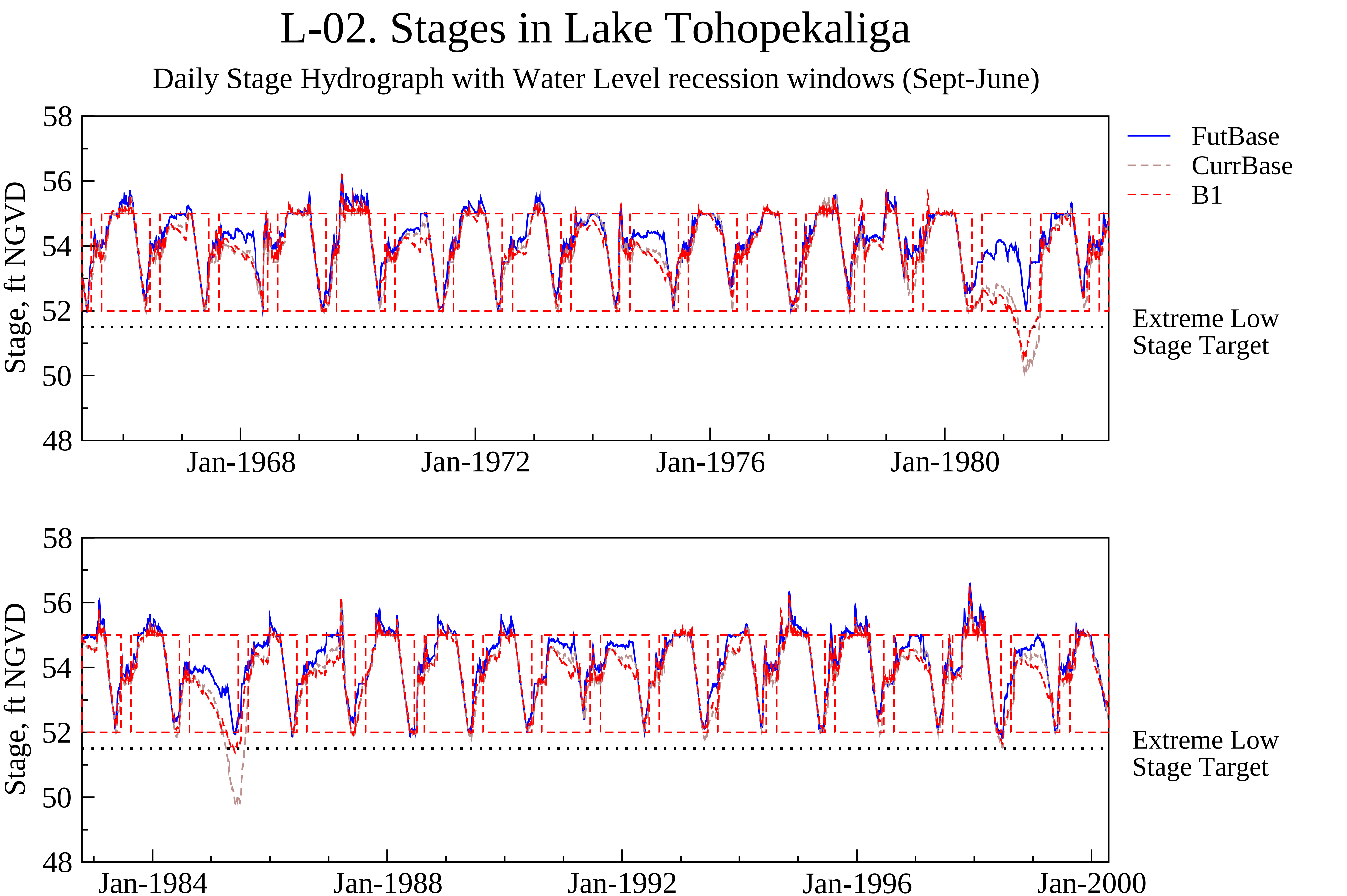
Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	49.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	29.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	63.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	3.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	42.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	5.7
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.1
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	5.9

Tier 2 Report

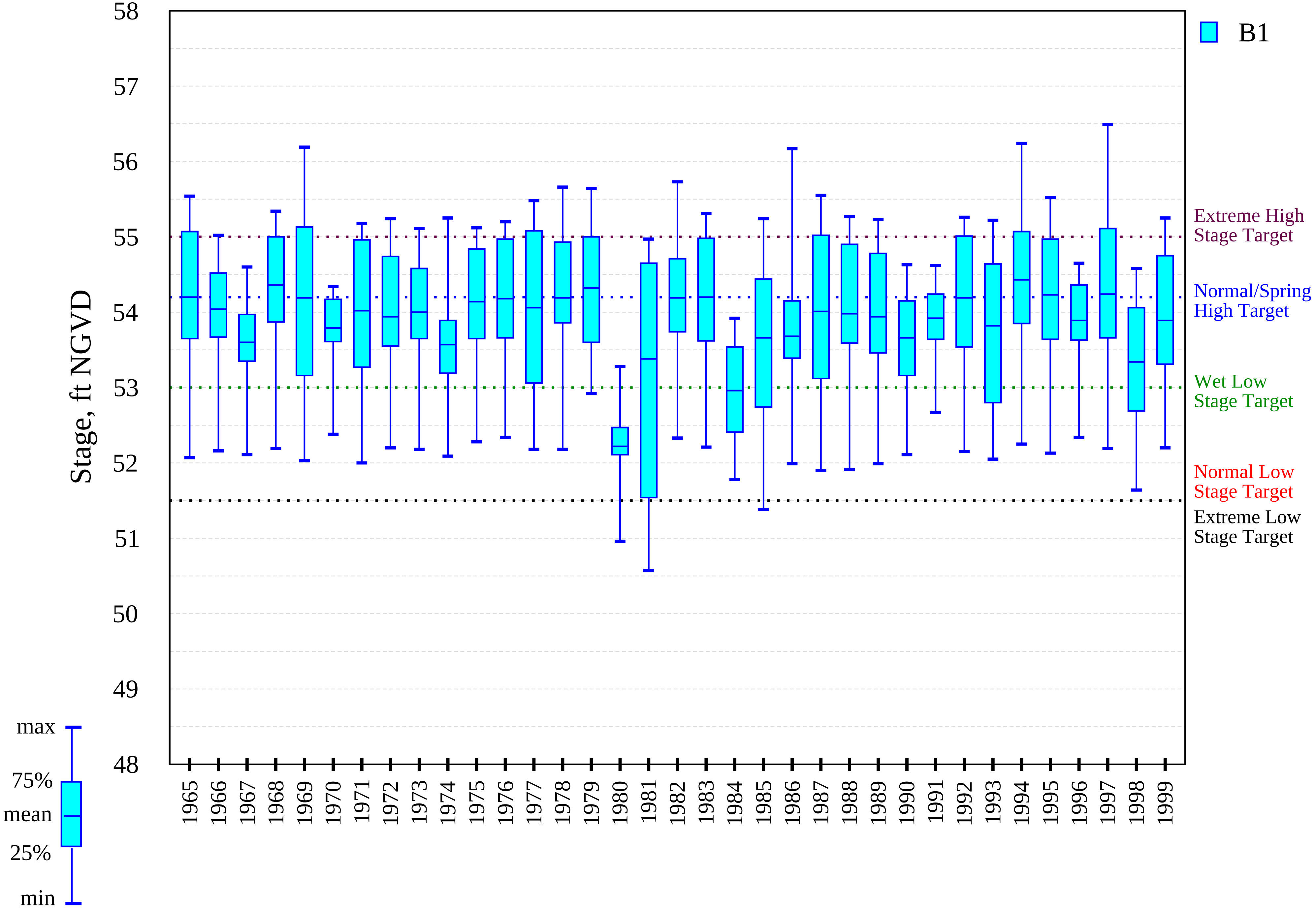
PDF Report for L02


L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
B1


L-02. Stages in Lake Tohopekaliga
Daily Stage Hydrograph with Water Level recession windows (Sept-June)
Stage, ft NGVD
58
56
54
52
50
48
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
B1
Extreme Low
Stage Target
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

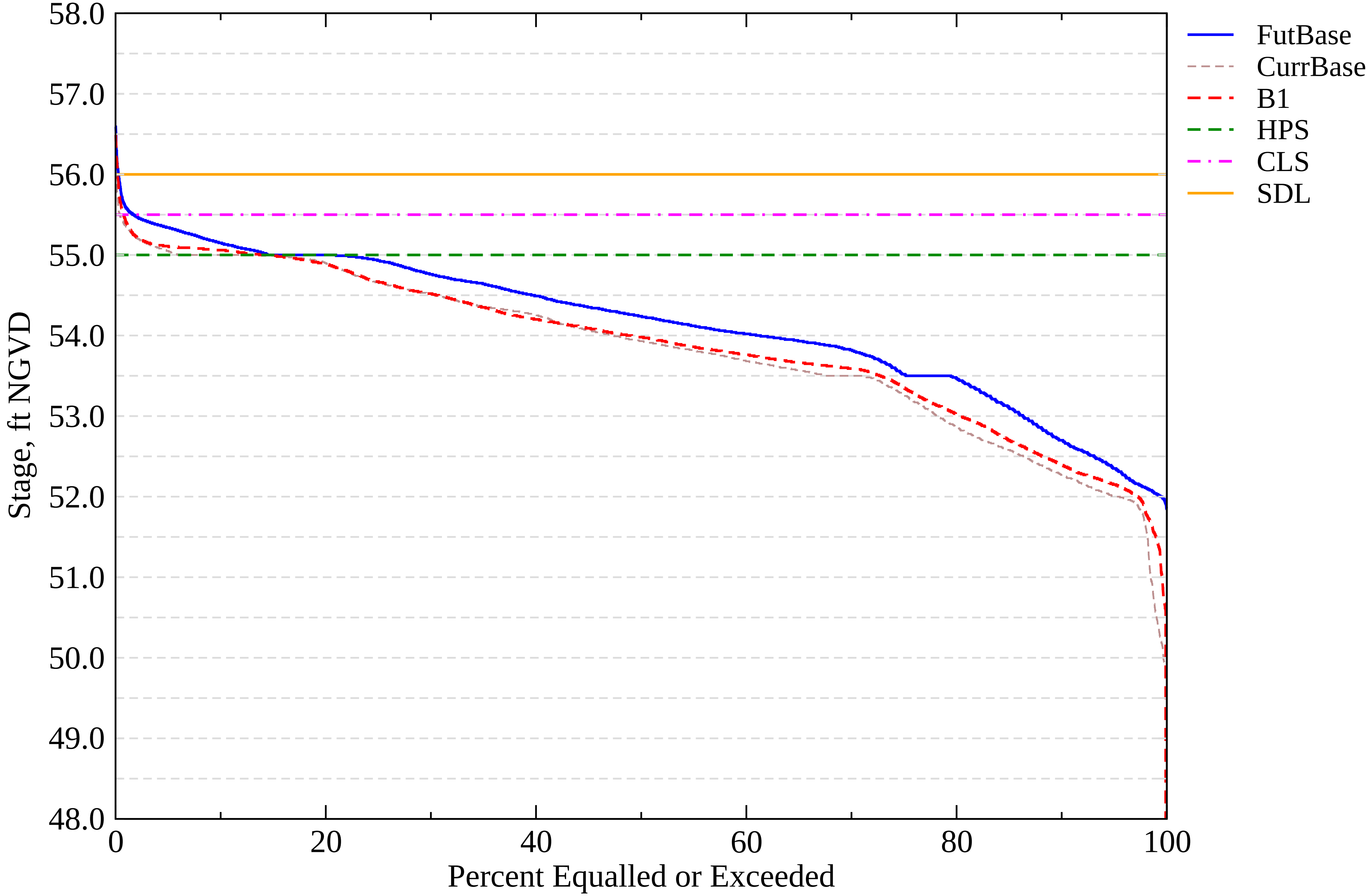
L-02. Stages in Lake Tohopekaliga

Intra-annual lake stage variation (water year based)



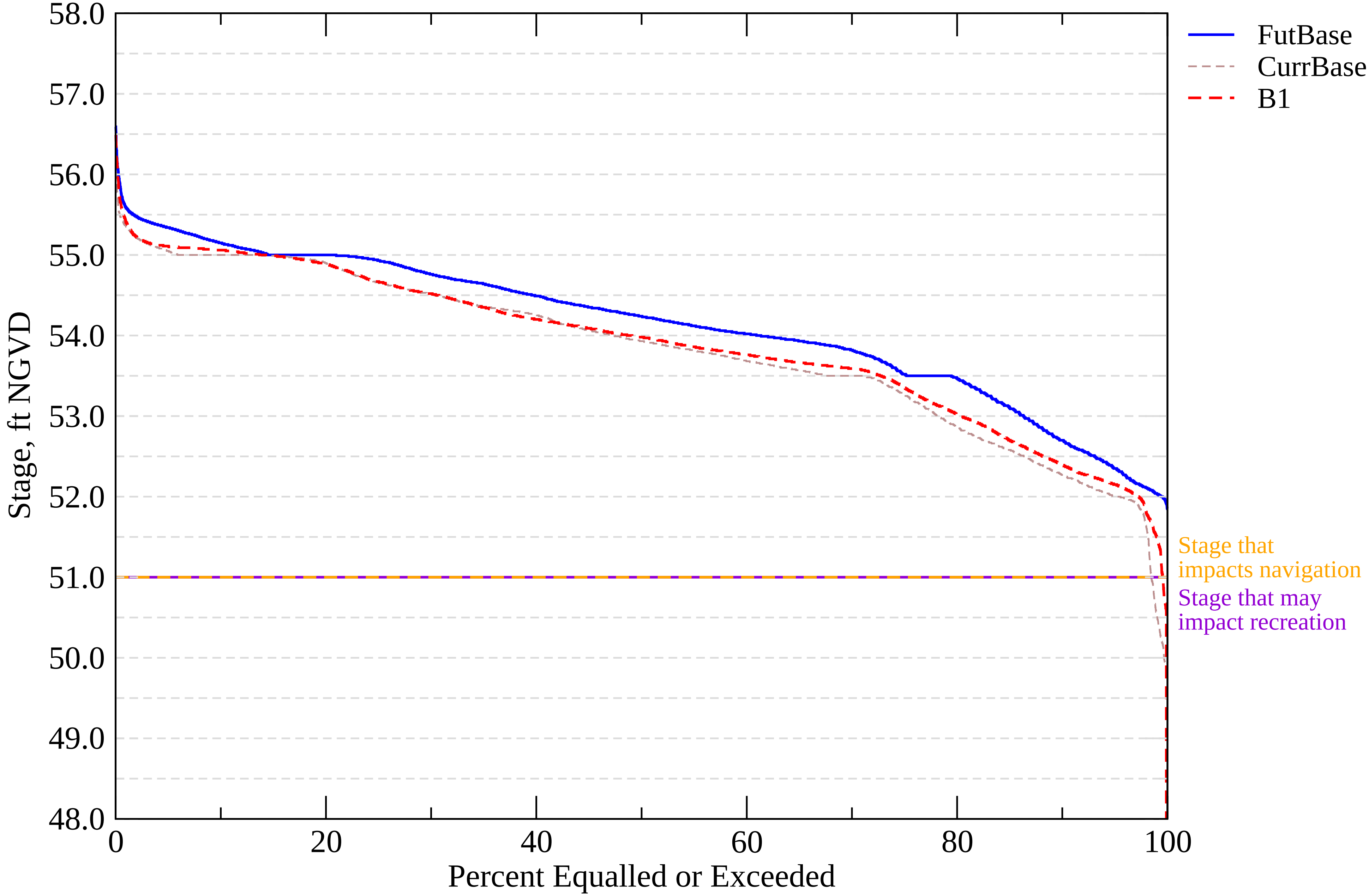
I-01. Probable High Lake Stage Performance Indicator

Lake Tohopekaliga (S61)



I-07. Stage Duration for Navigation and Recreation

Lake Tohopekaliga (S61)



Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

Alternative Description : Uncertainty Analysis - Simulation B1

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

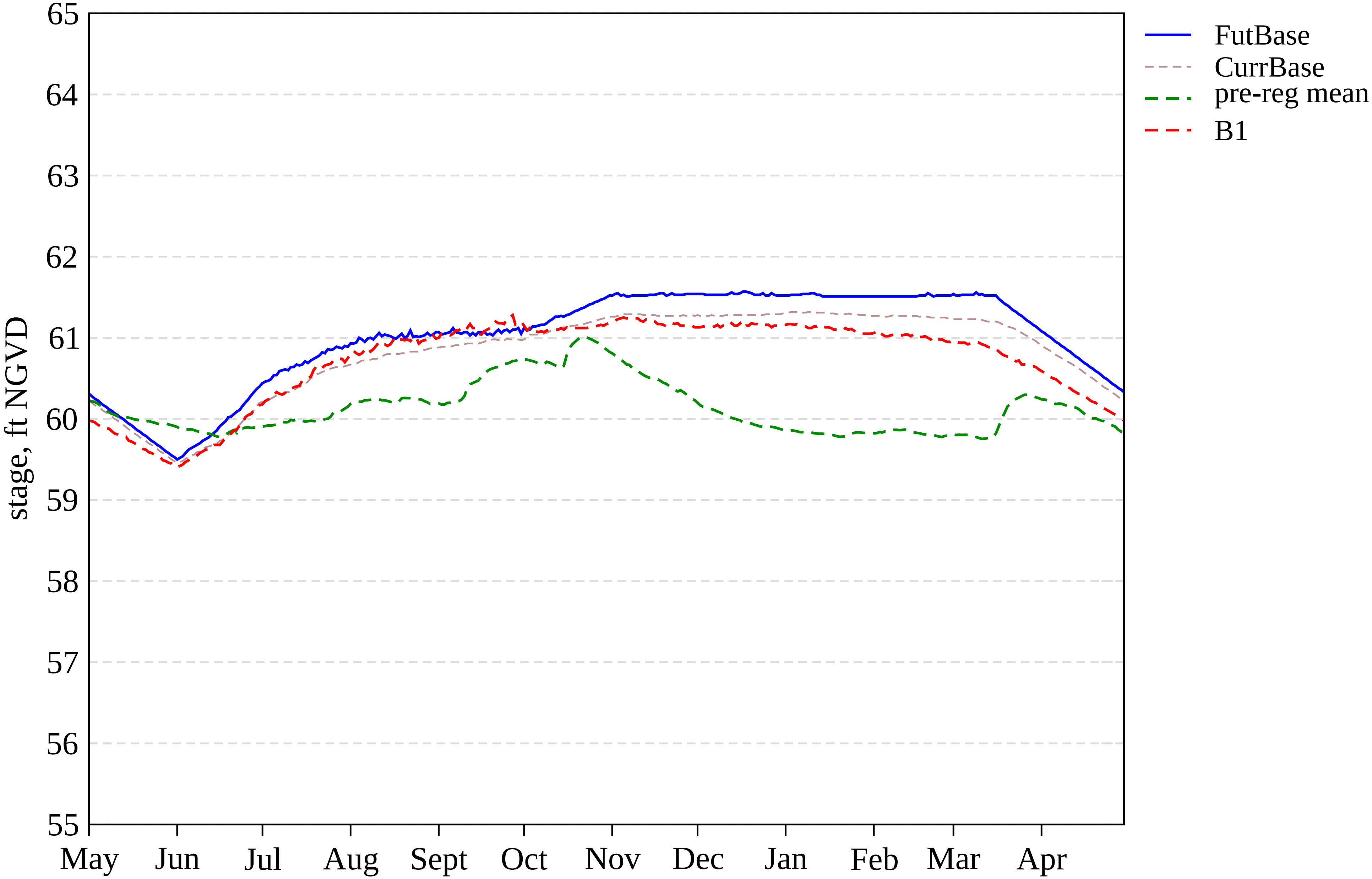
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	34.3
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	74.3
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.8
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.7

Tier 2 Report

PDF Report for L03

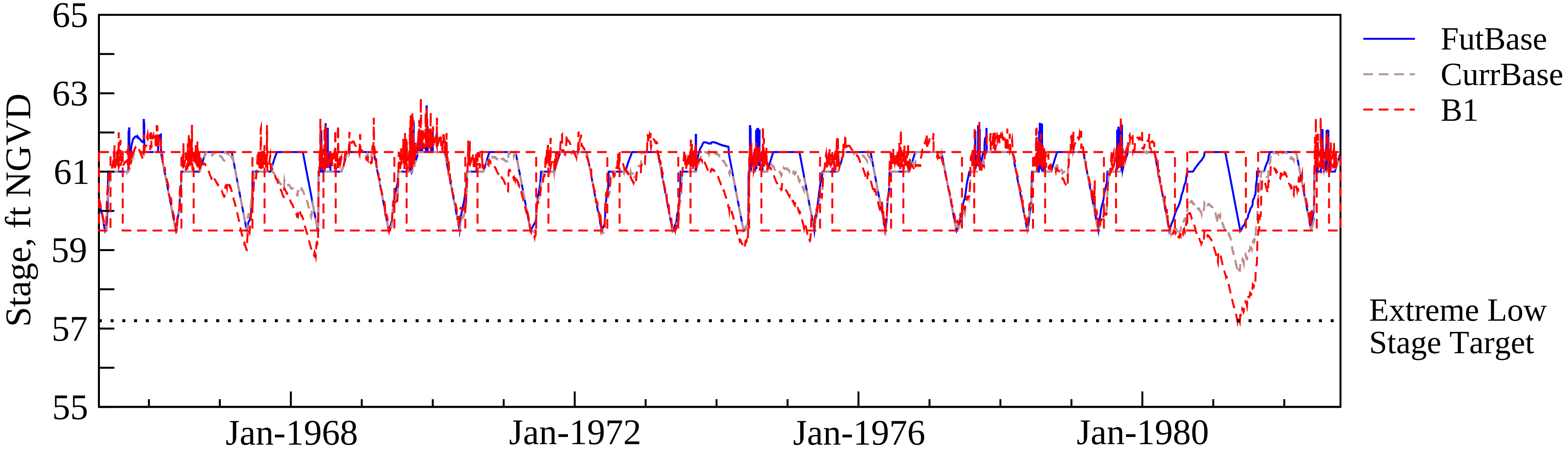
L-03. Stages in Lake Gentry

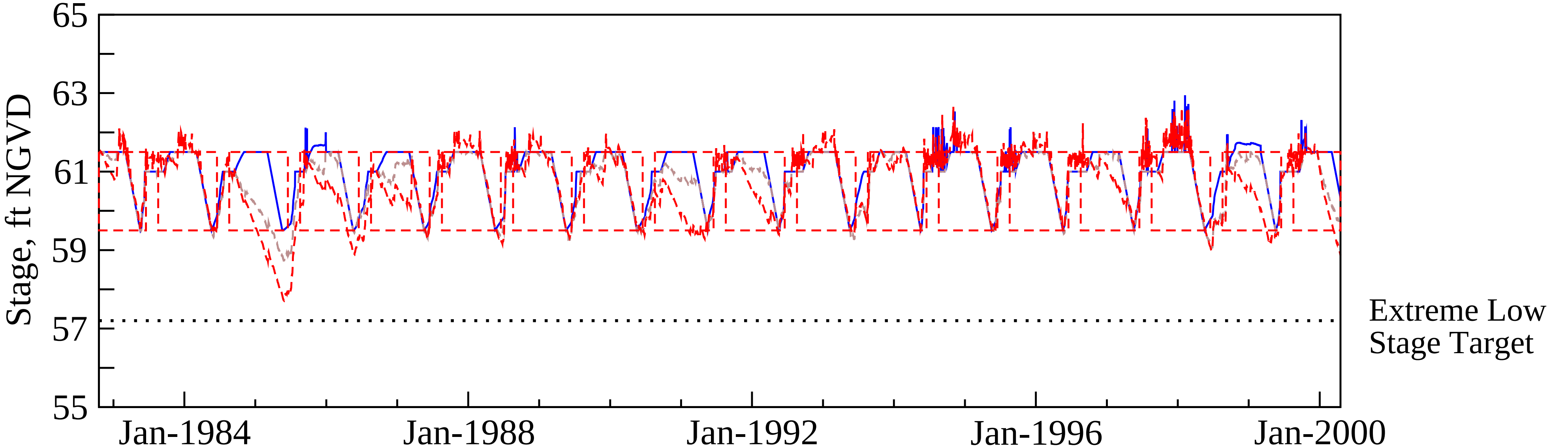
Stage Hydrograph of mean daily stages

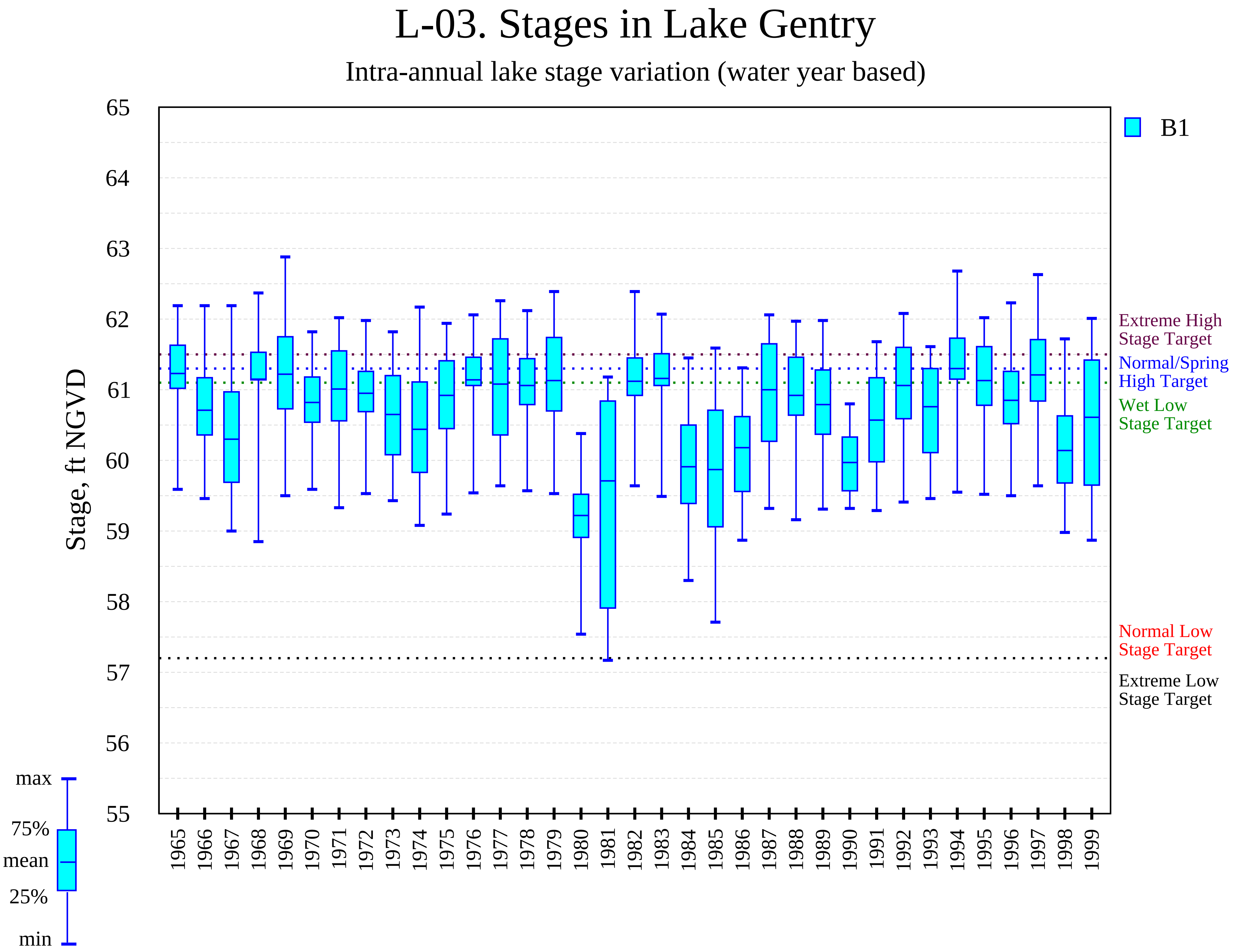


L-03. Stages in Lake Gentry

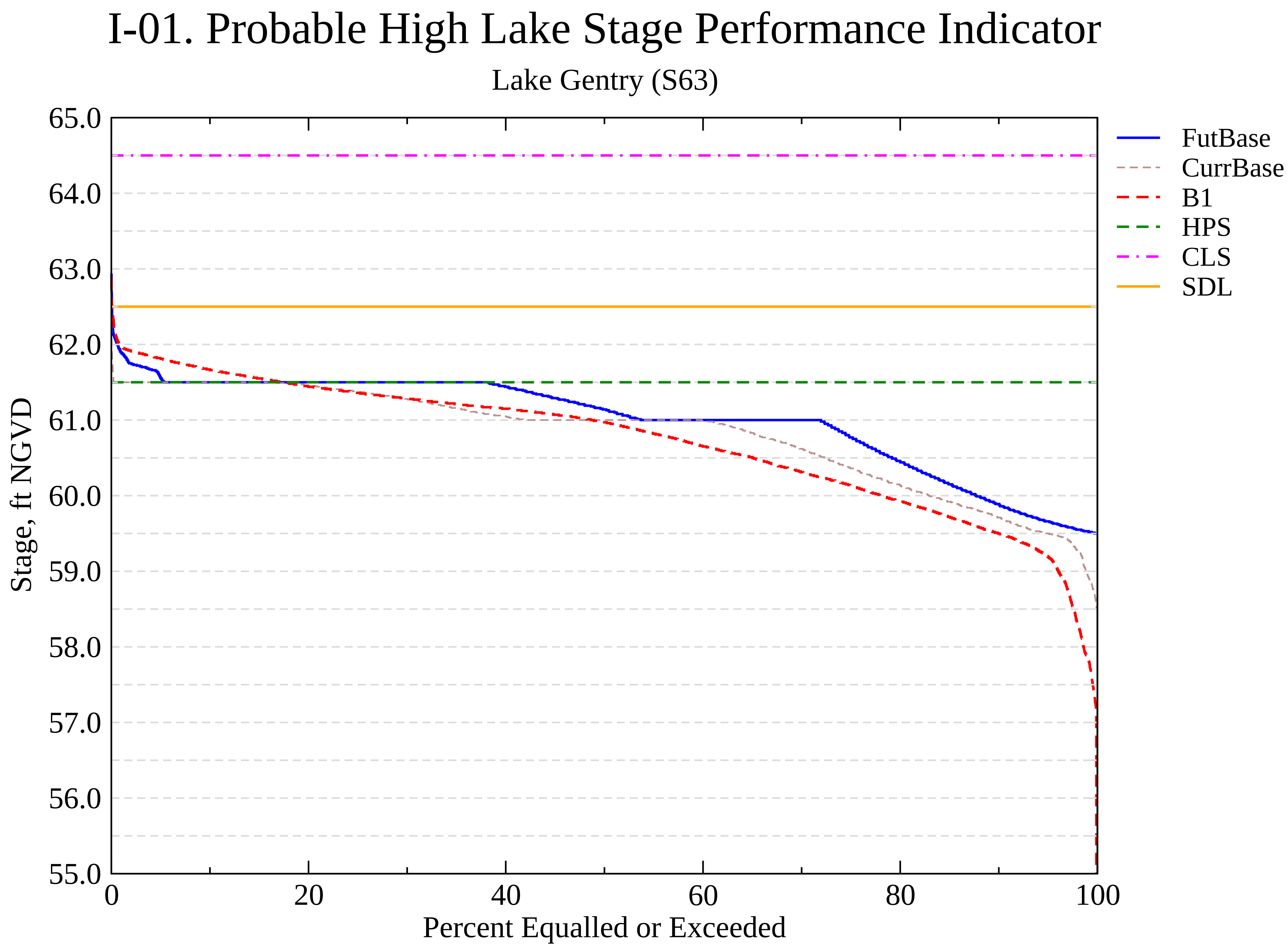
Daily Stage Hydrograph with Water Level recession windows (Sept-June)







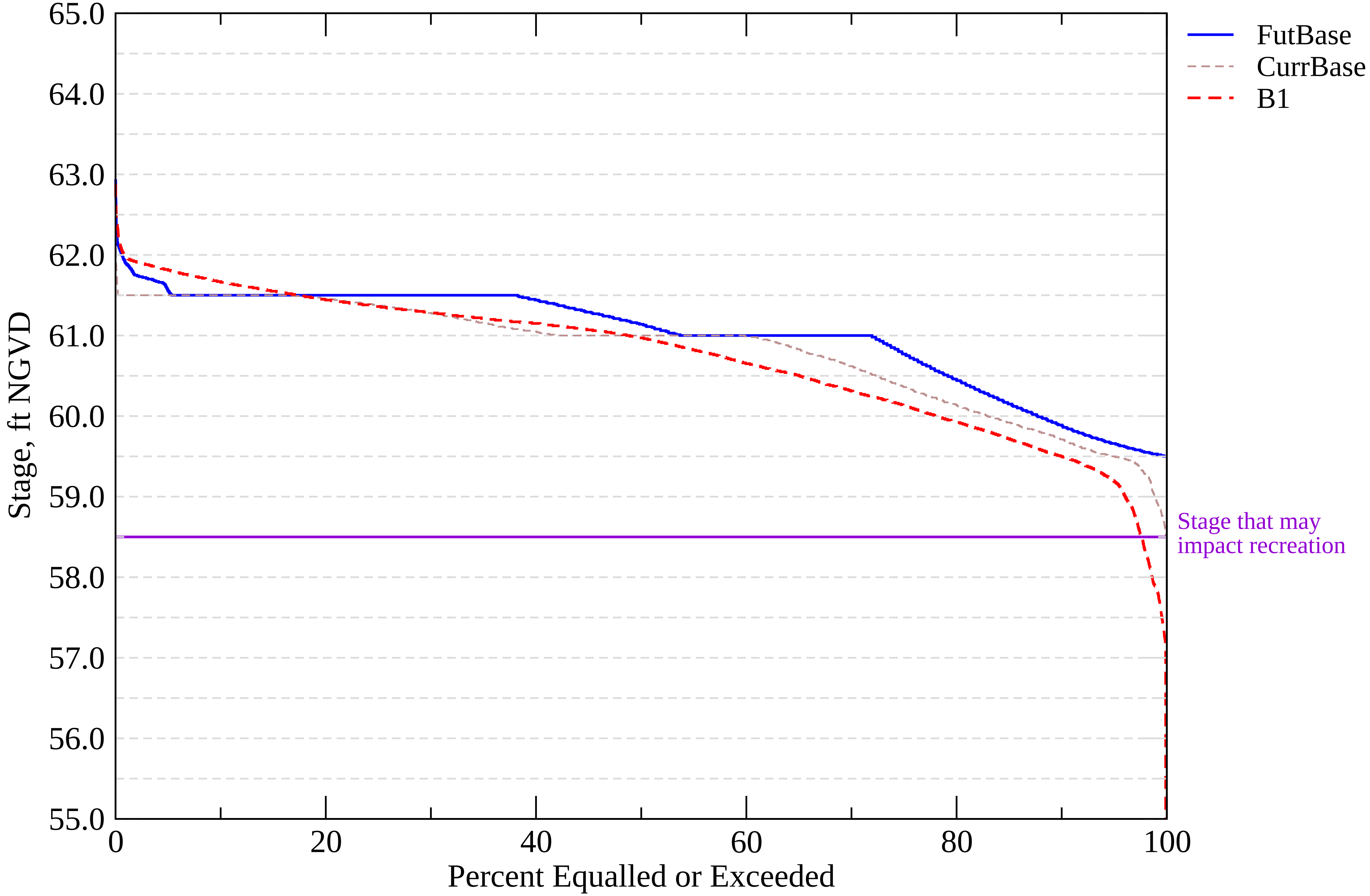
L-03. Stages in Lake Gentry
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
B1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min



I-01. Probable High Lake Stage Performance Indicator
Lake Gentry (S63)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lake Gentry (S63)



Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

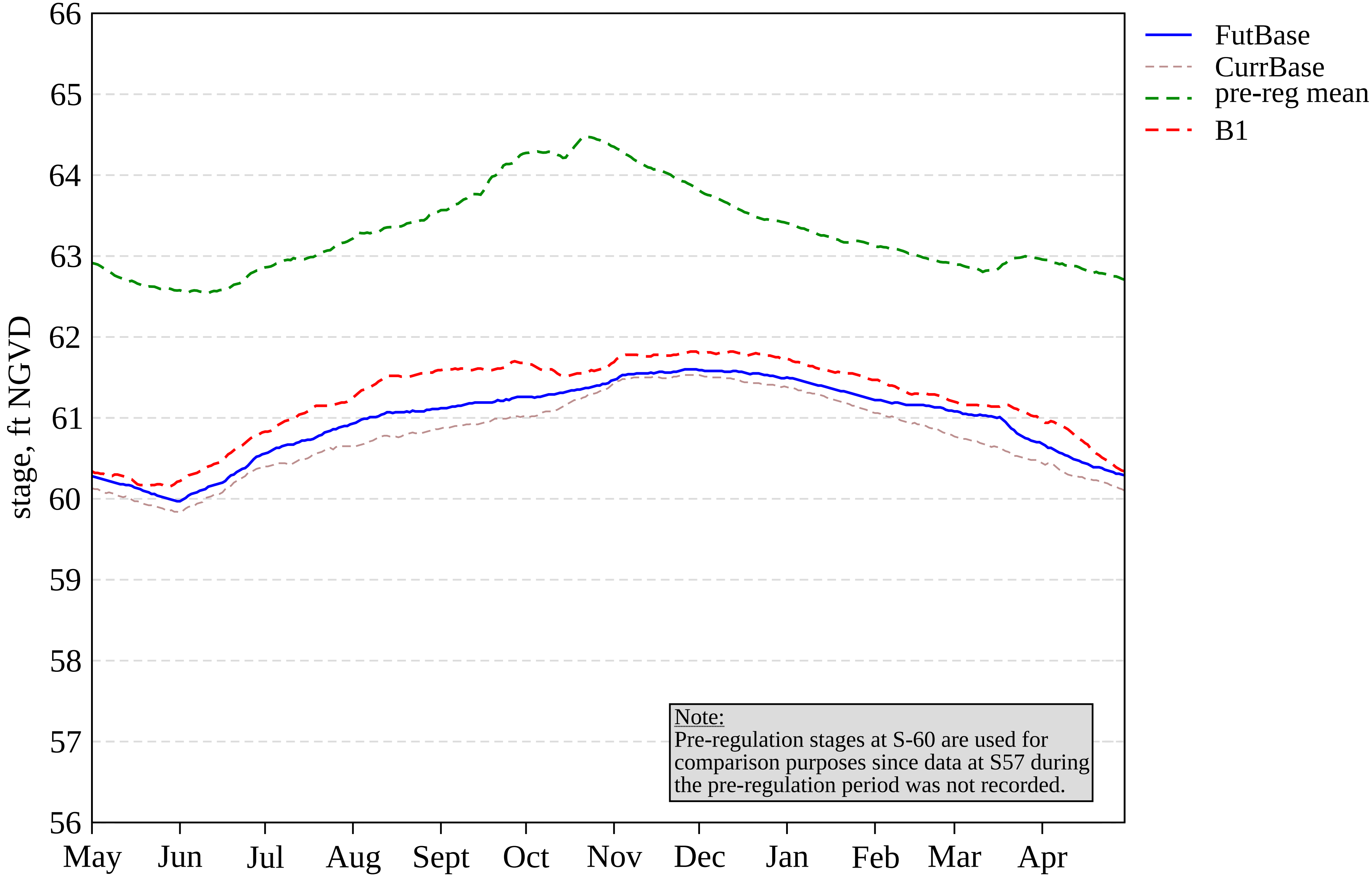
Alternative Description : Uncertainty Analysis - Simulation B1

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	100.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	20.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	51.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	60.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	22.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	77.1
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.5
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	5.7

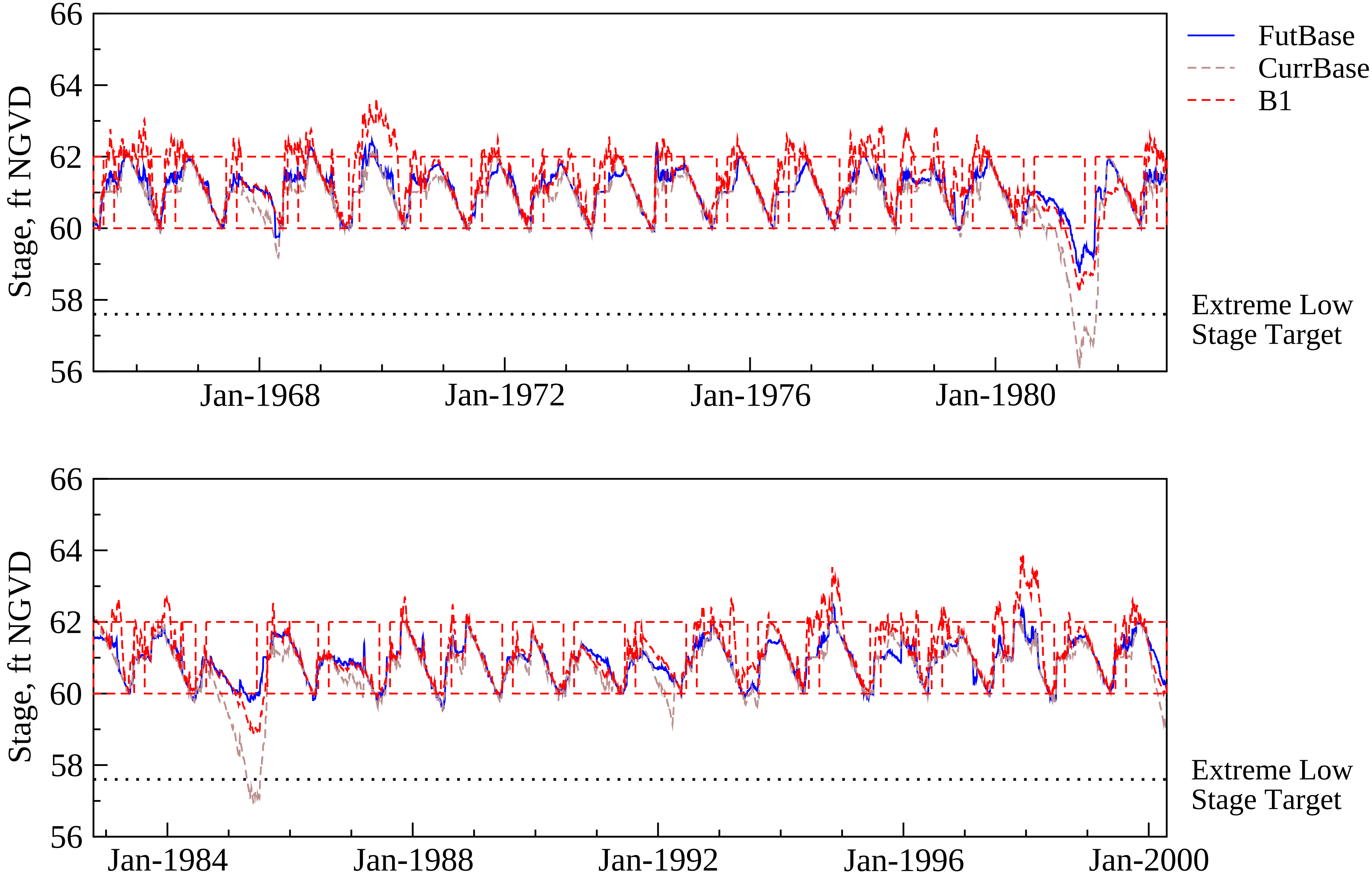
L-04. Stages in Lakes Joel, Myrtle, and Preston

Stage Hydrograph of mean daily stages



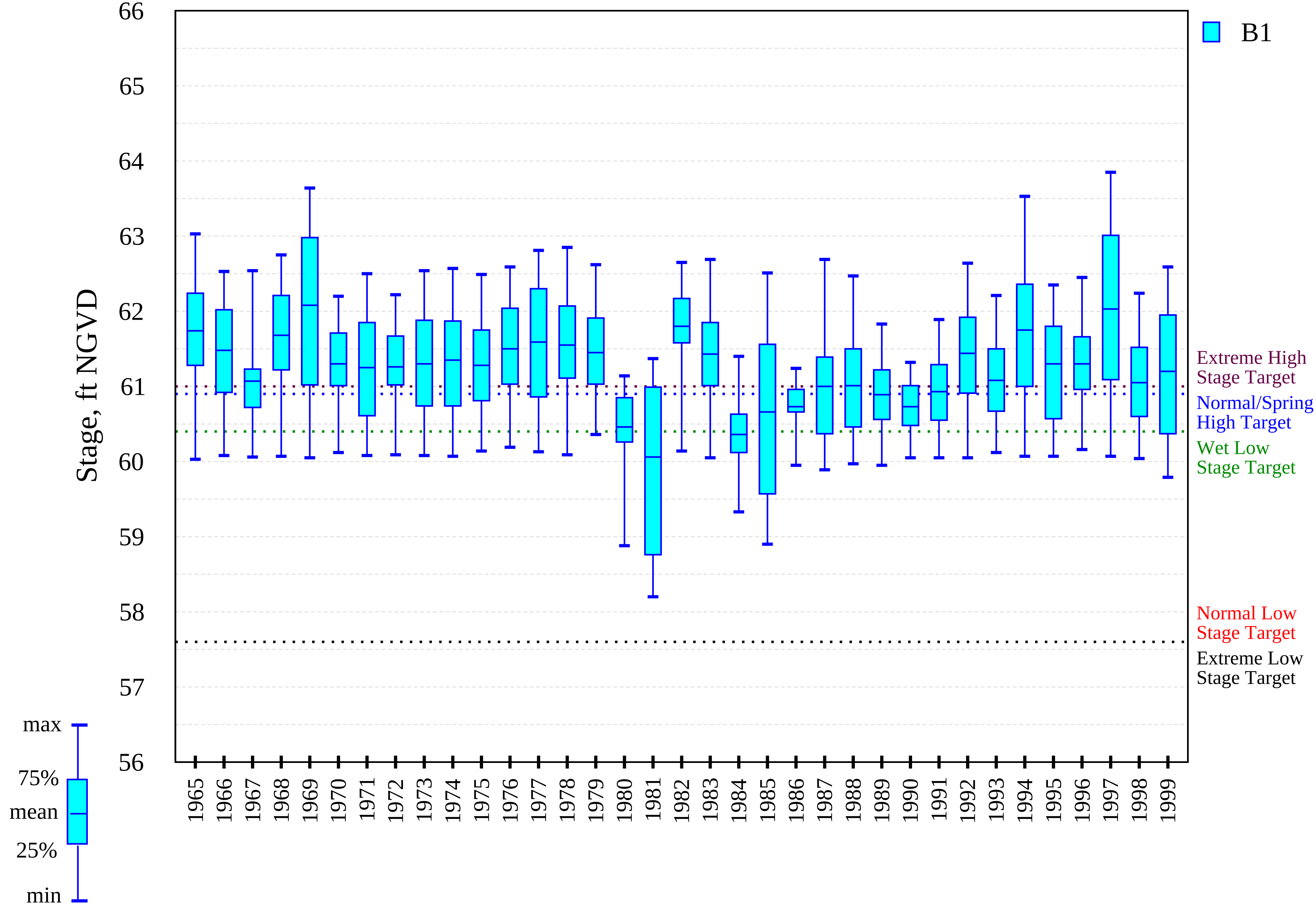
L-04. Stages in Lakes Joel, Myrtle, and Preston

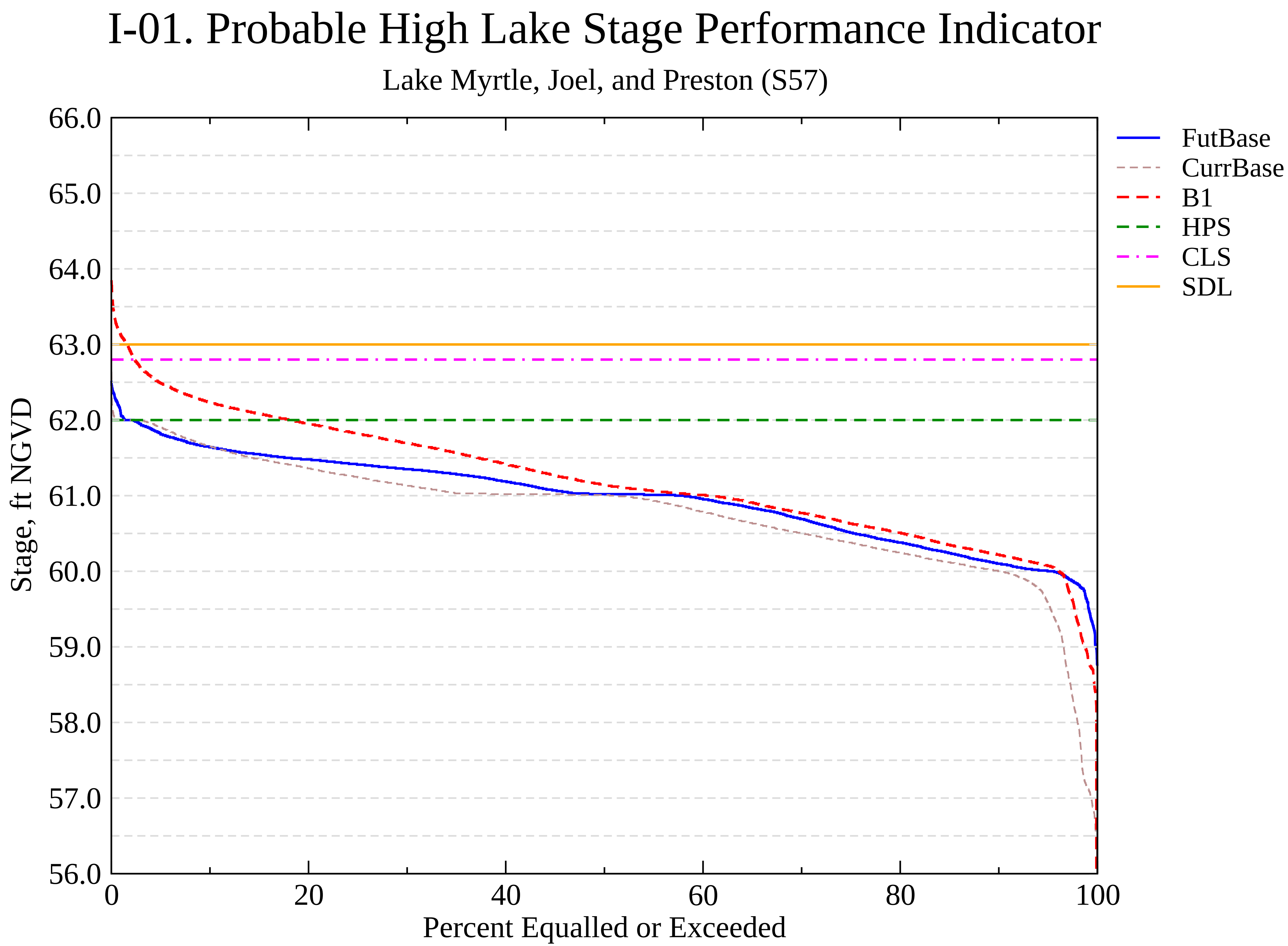
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



L-04. Stages in Lakes Joel, Myrtle, and Preston

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Lake Myrtle, Joel, and Preston (S57)
Stage, ft NGVD
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B1
HPS
CLS
SDL

Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

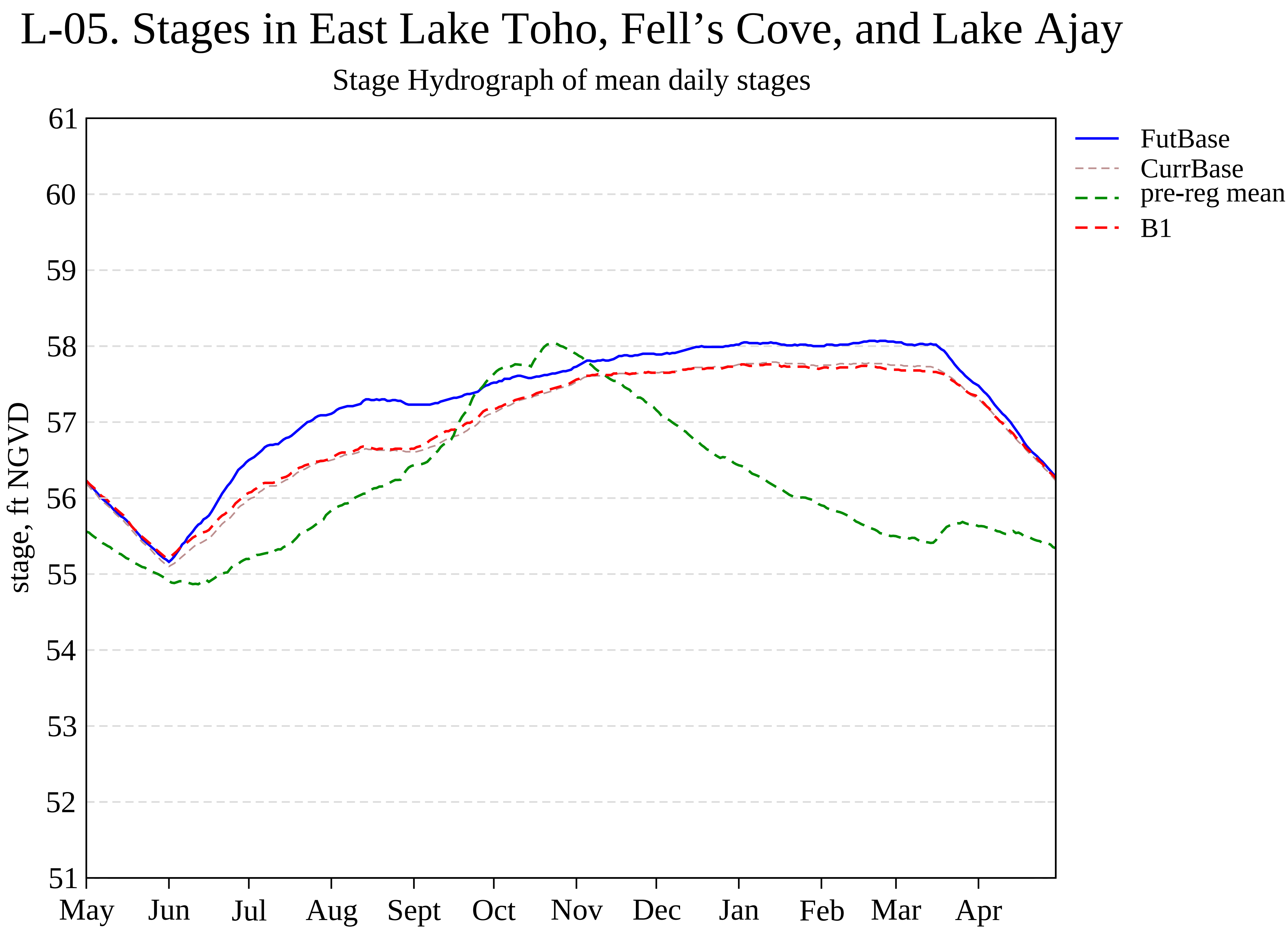
Alternative Description : Uncertainty Analysis - Simulation B1

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	51.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	57.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	63.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	31.4
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	91.4
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.0
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.4

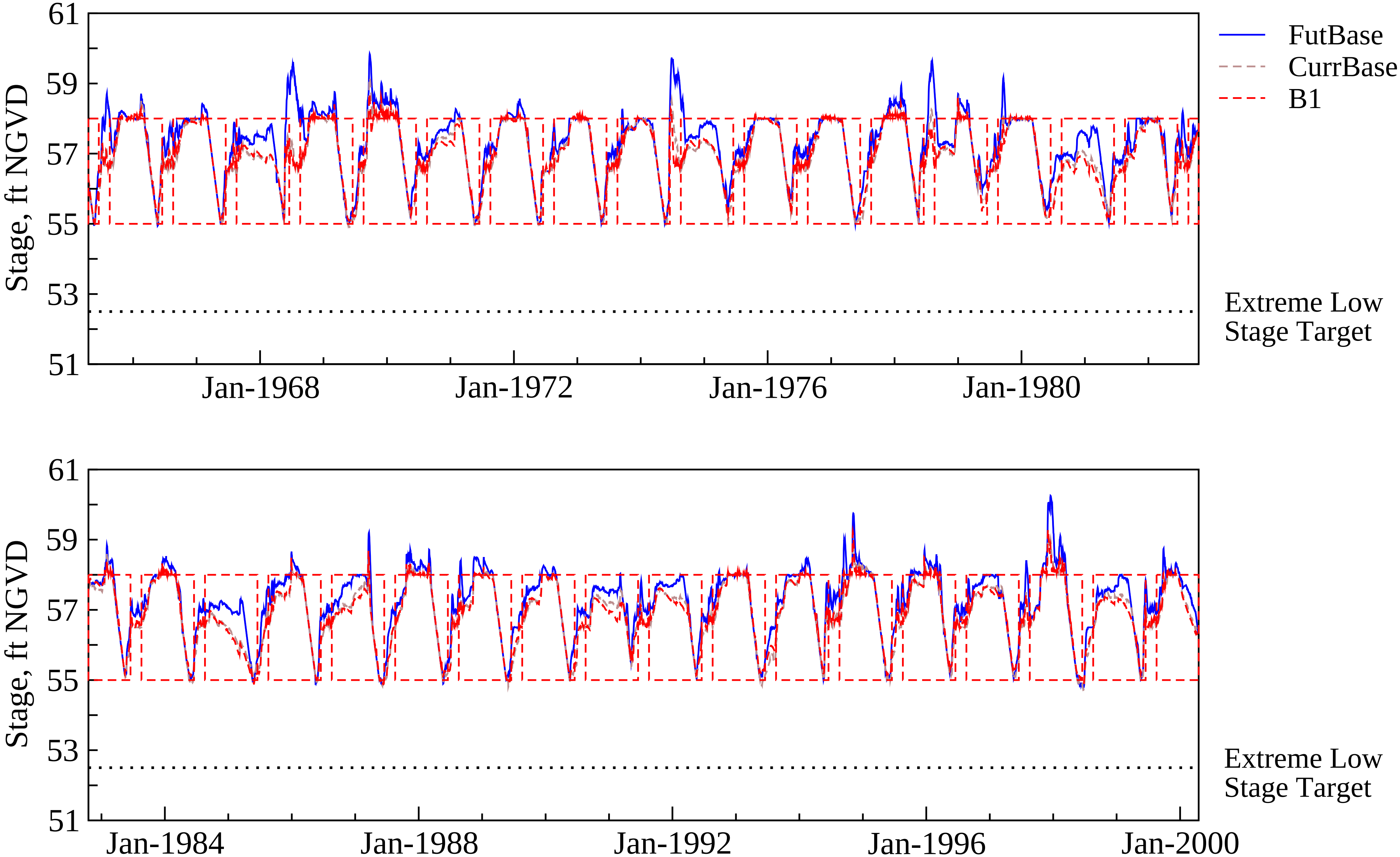
Tier 2 Report

PDF Report for L05


L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay
Stage Hydrograph of mean daily stages
stage, ft NGVD
61
60
59
58
57
56
55
54
53
52
51
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
B1

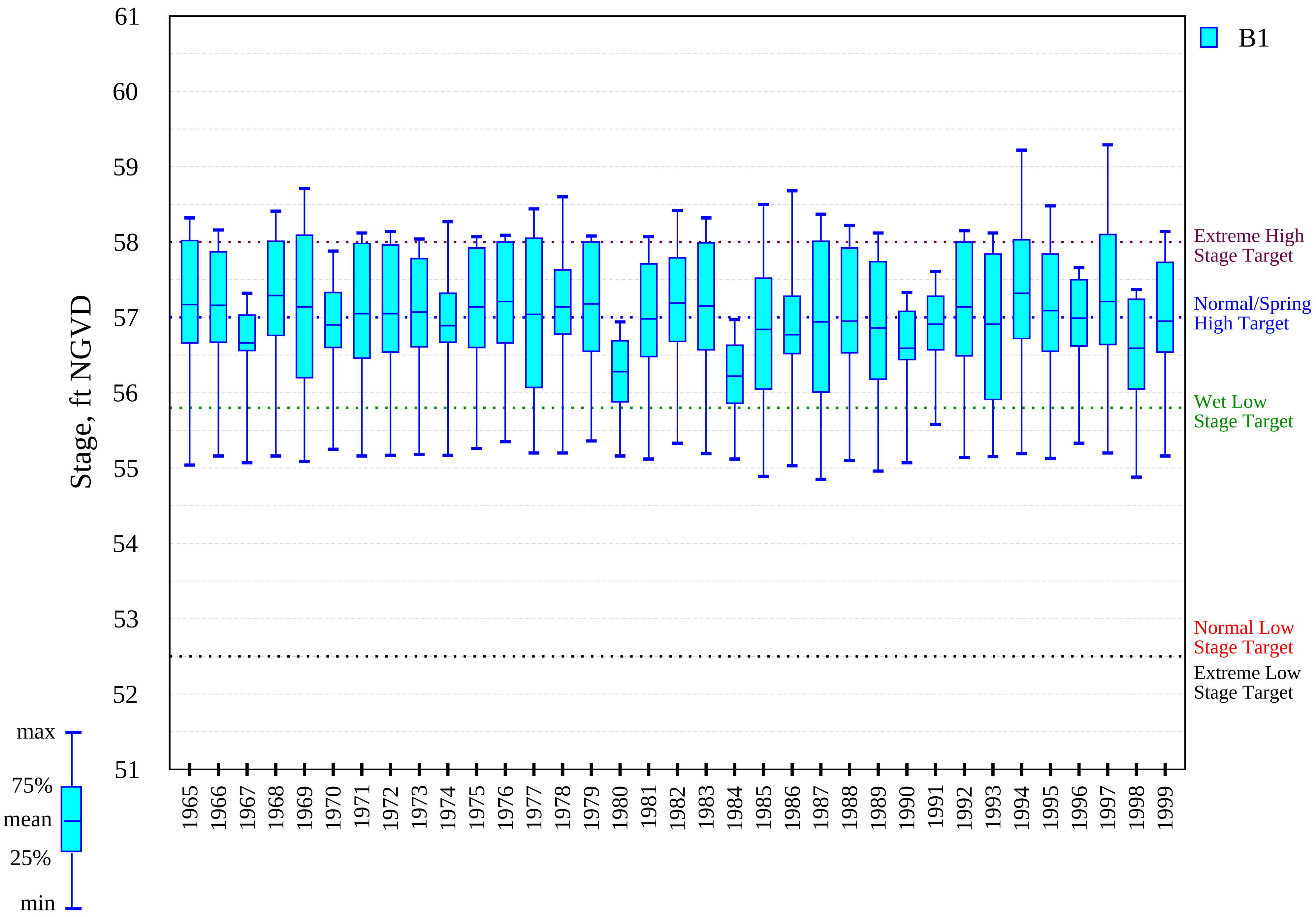
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

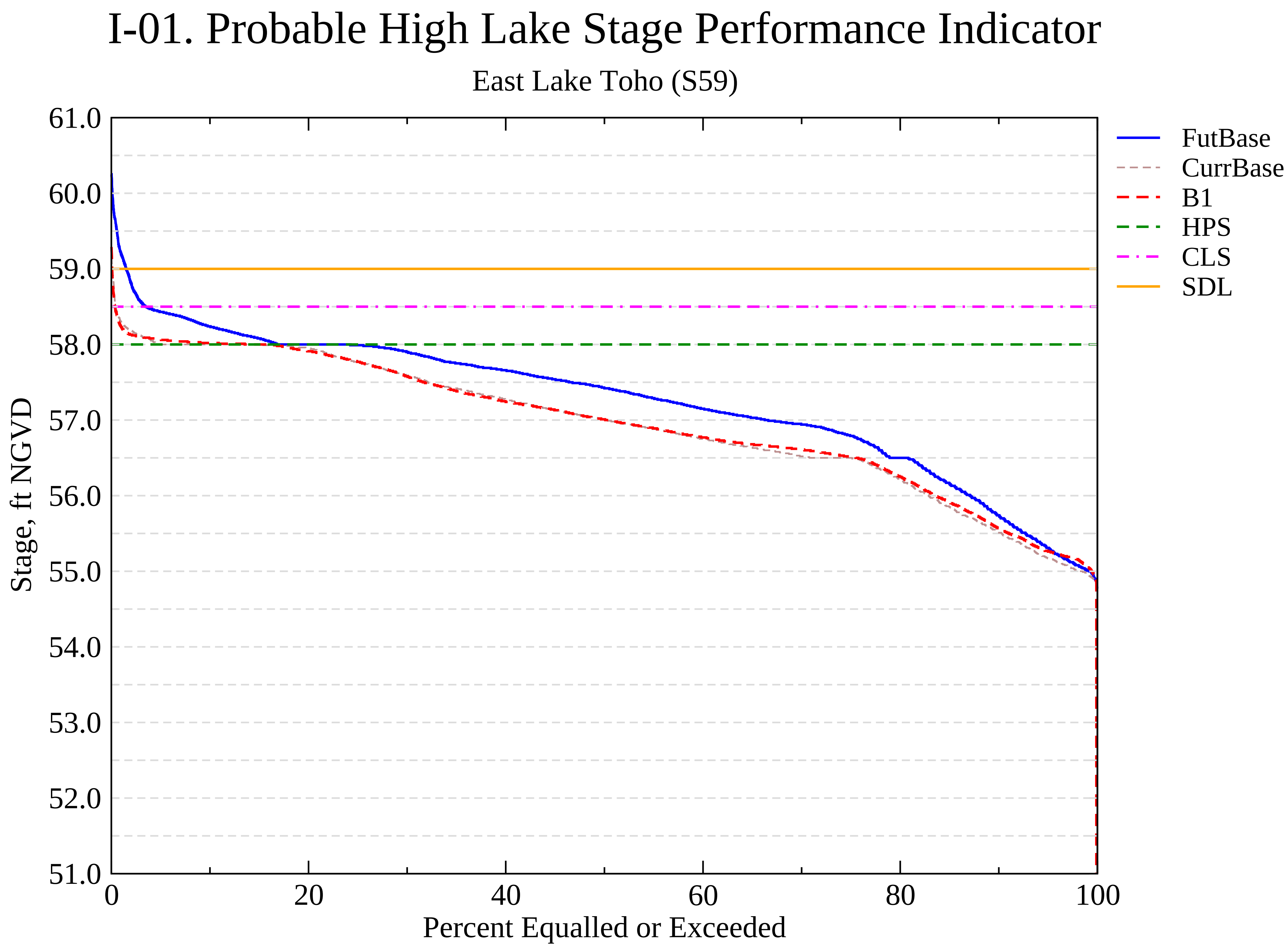
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

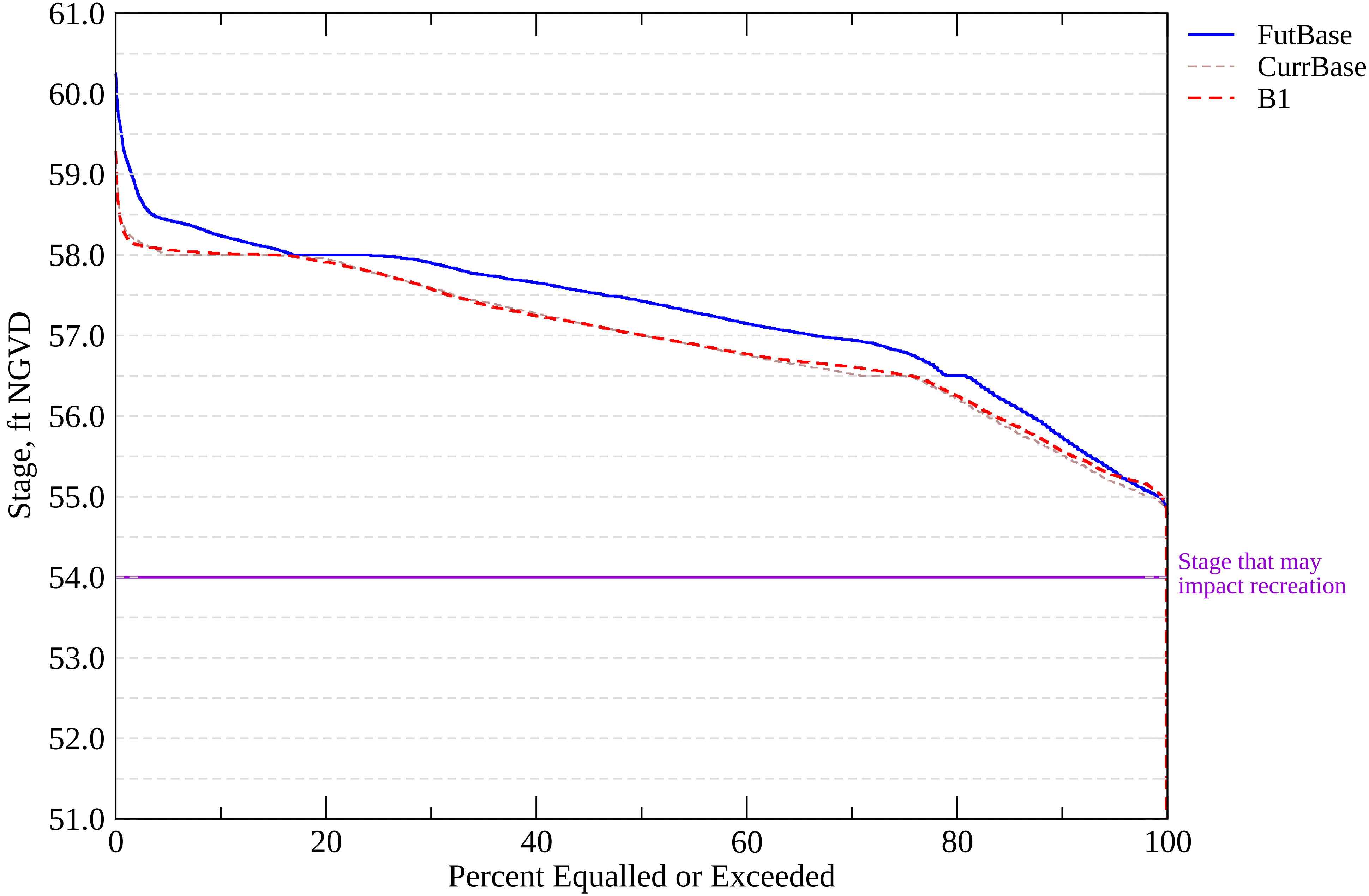
Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

East Lake Toho (S59)



Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Alternative Description : Uncertainty Analysis - Simulation B1

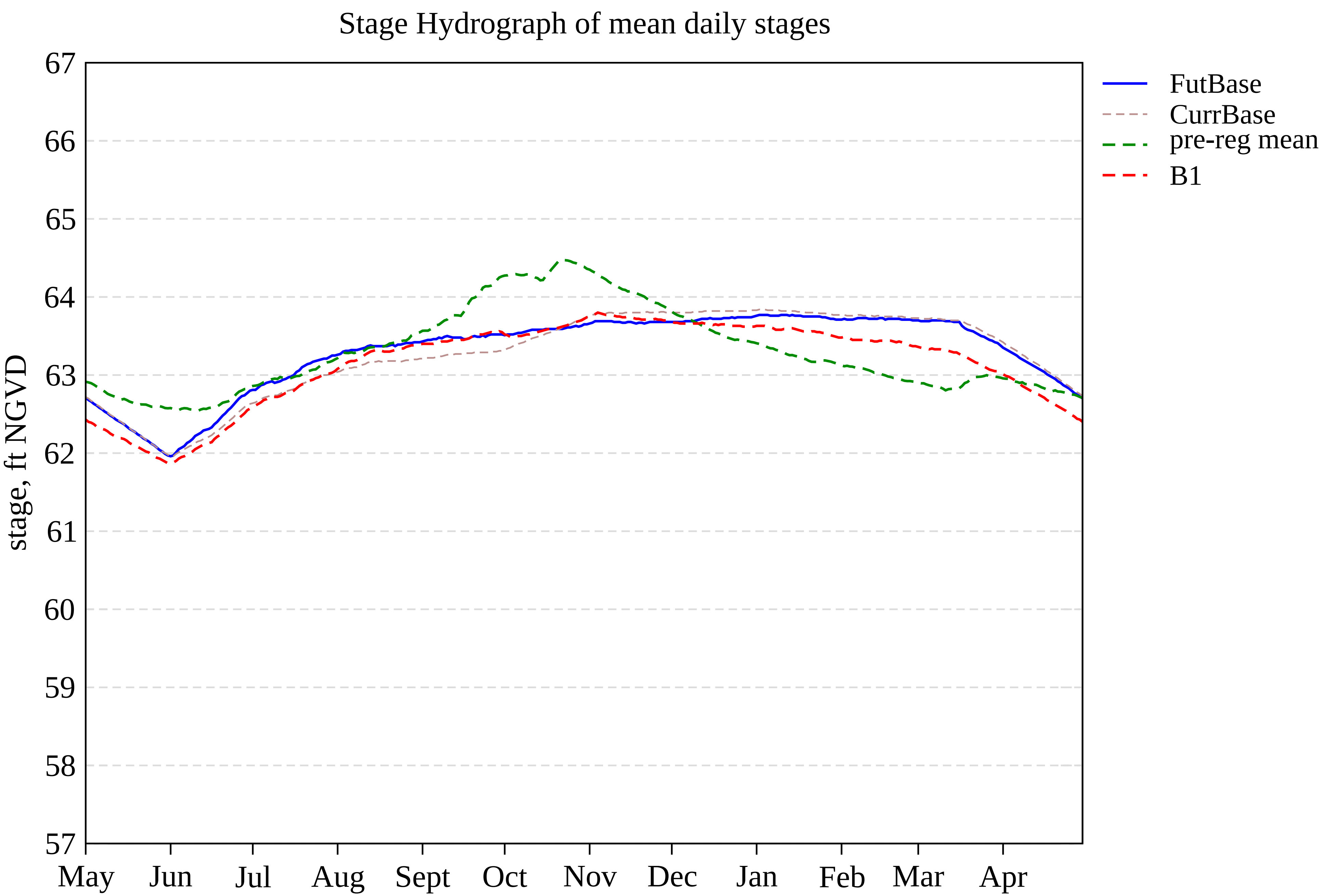
Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	51.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	97.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	62.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	0.0
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	91.4
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	6.4

Tier 2 Report

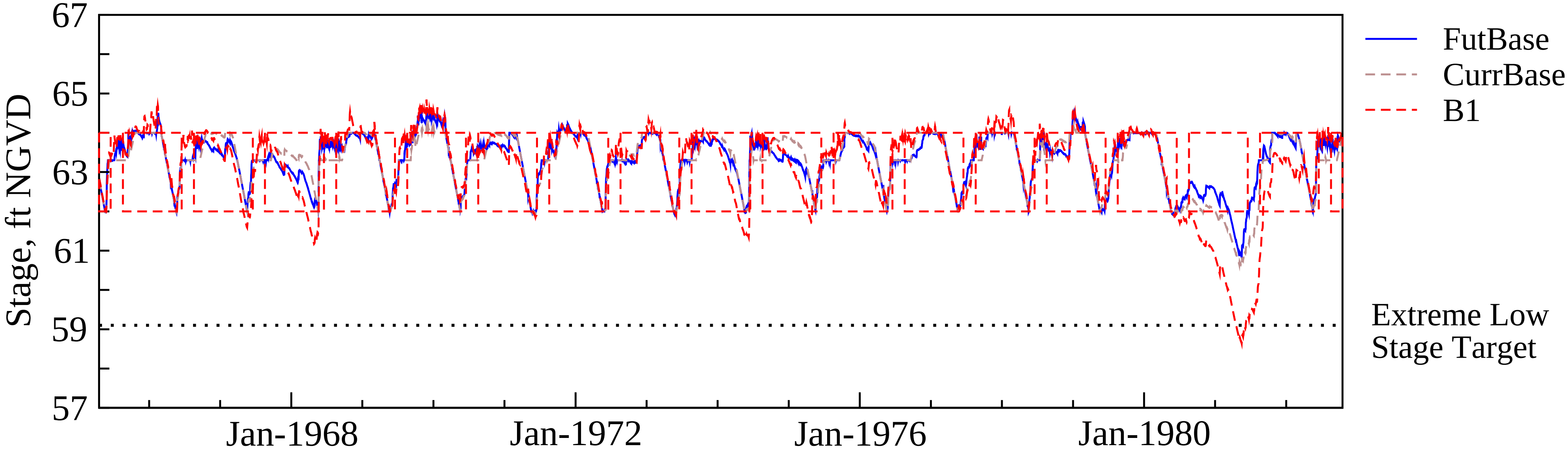
PDF Report for L06

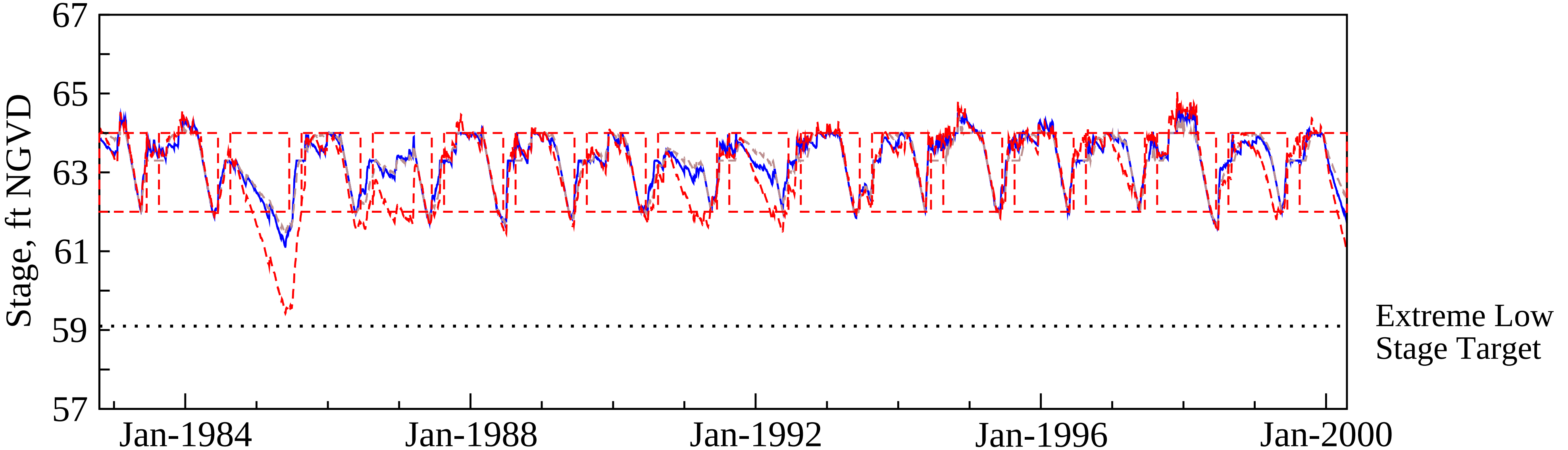
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout



L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

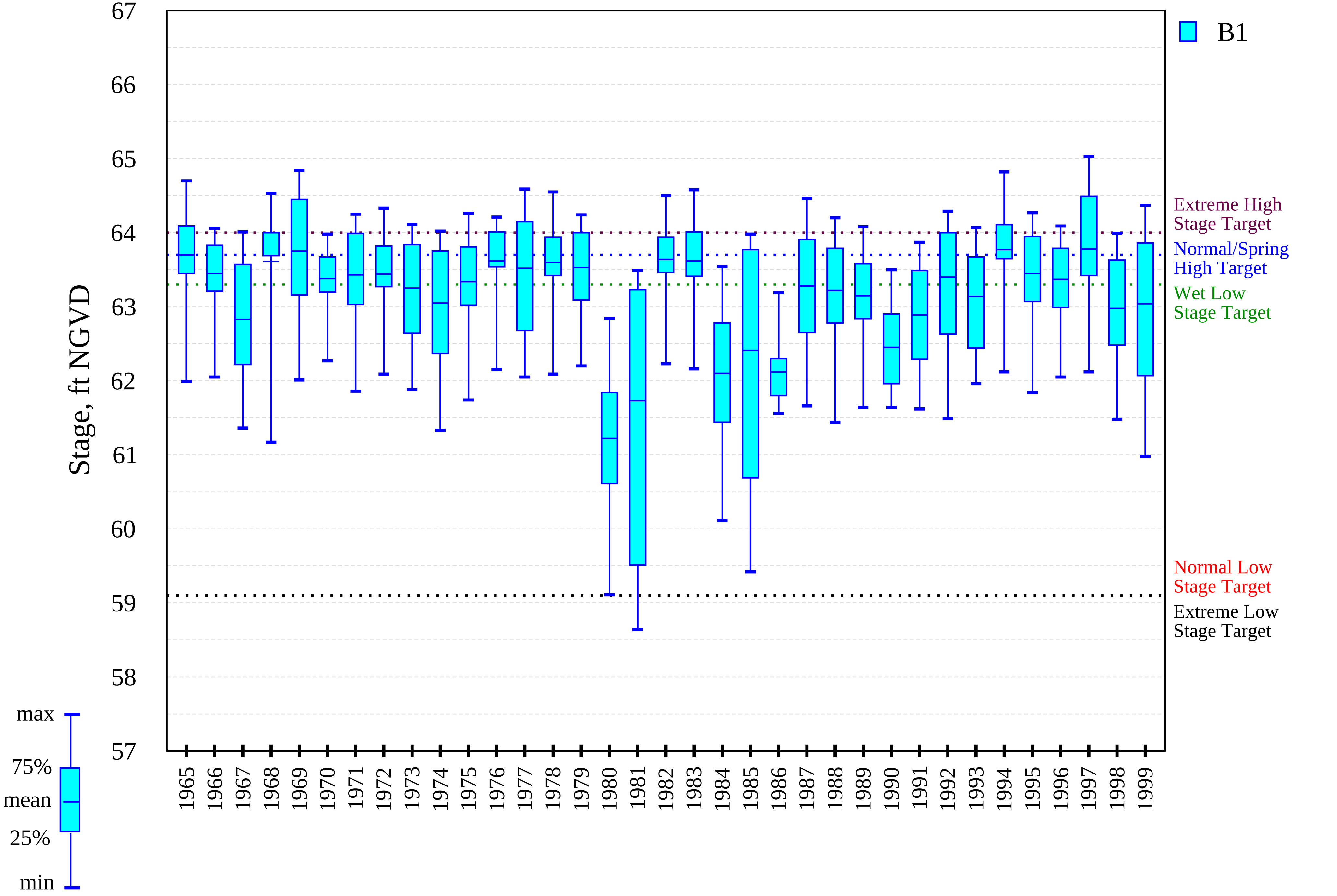
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

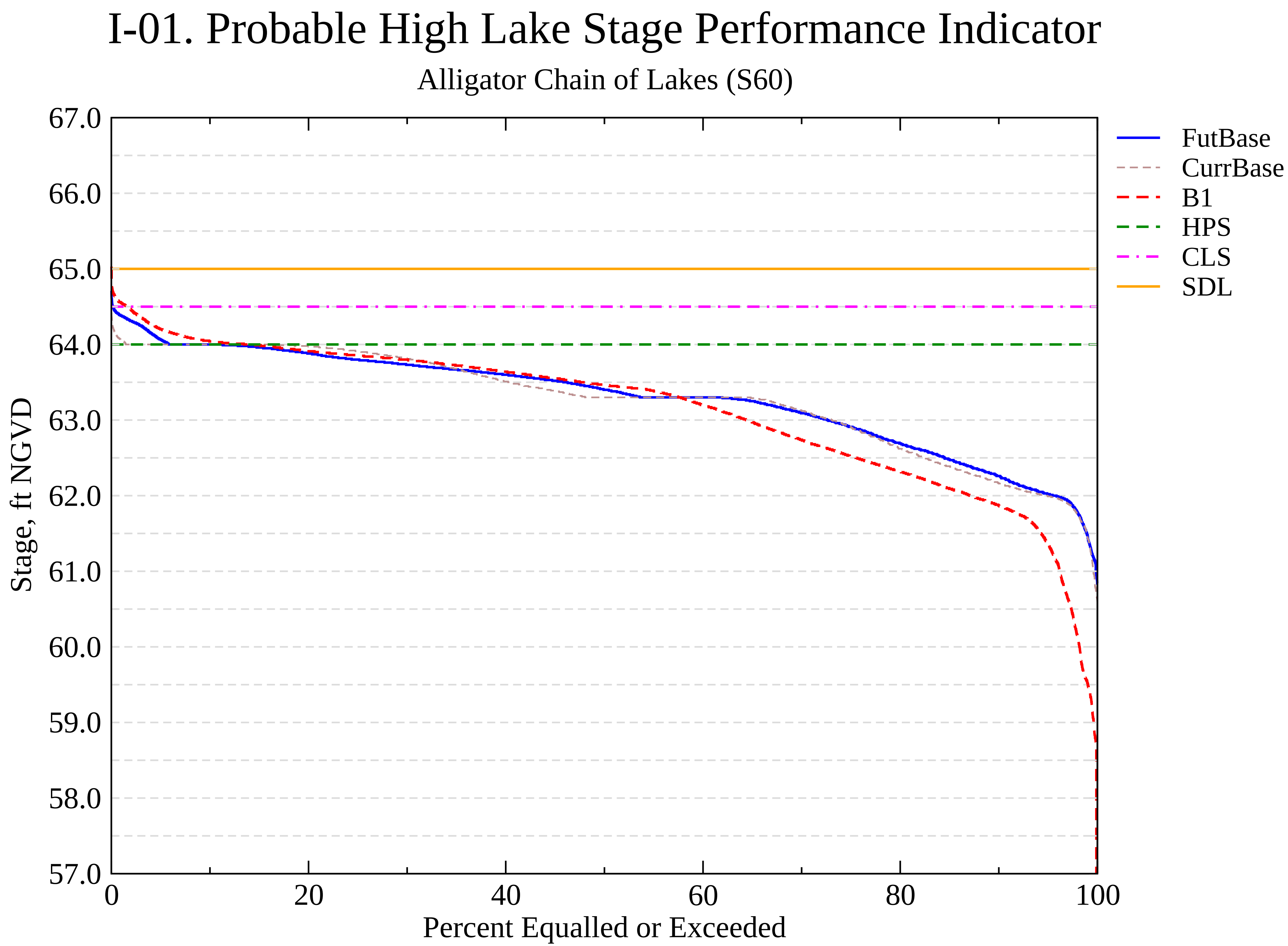




L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

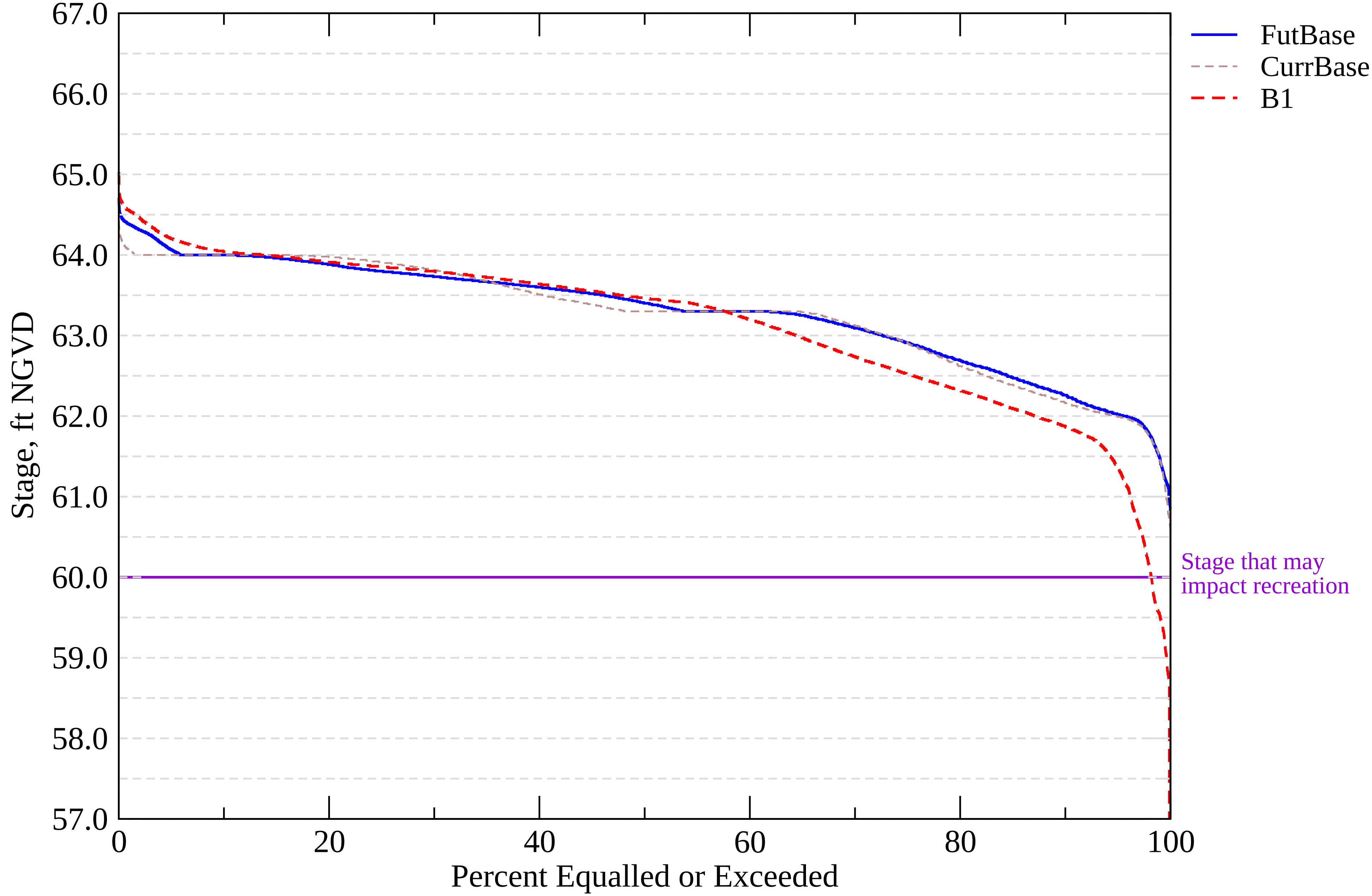
Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Alligator Chain of Lakes (S60)
Stage, ft NGVD
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Alligator Chain of Lakes (S60)



Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

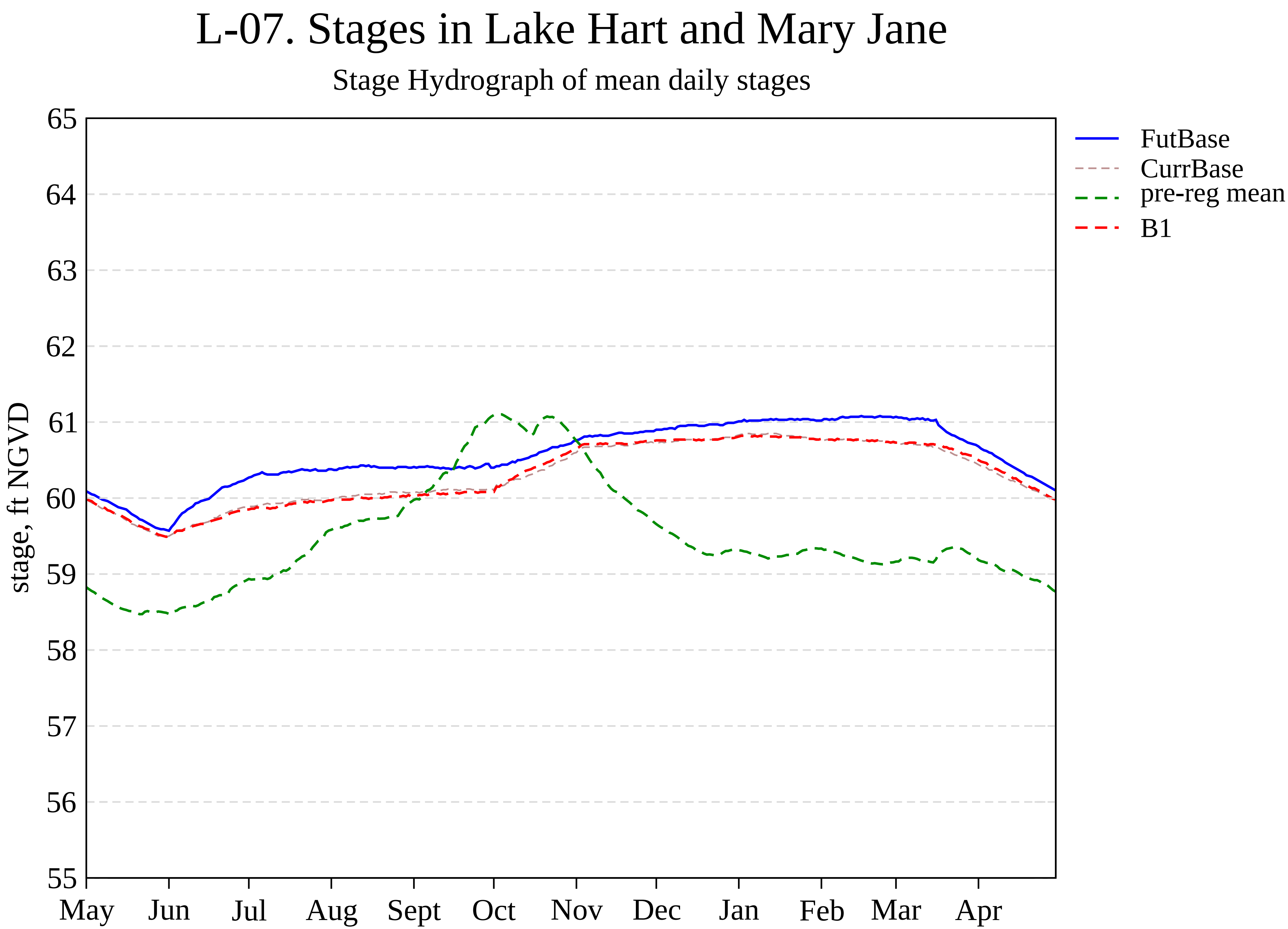
Alternative Description : Uncertainty Analysis - Simulation B1

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	71.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	71.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	49.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	28.6
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	3.5
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	60.0

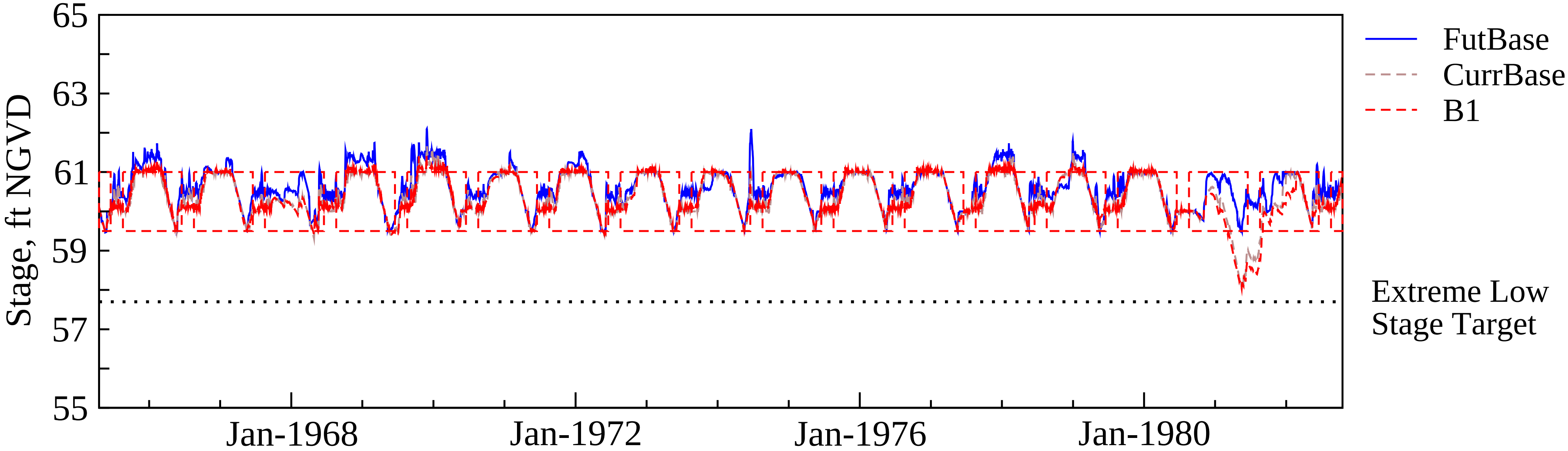
Tier 2 Report

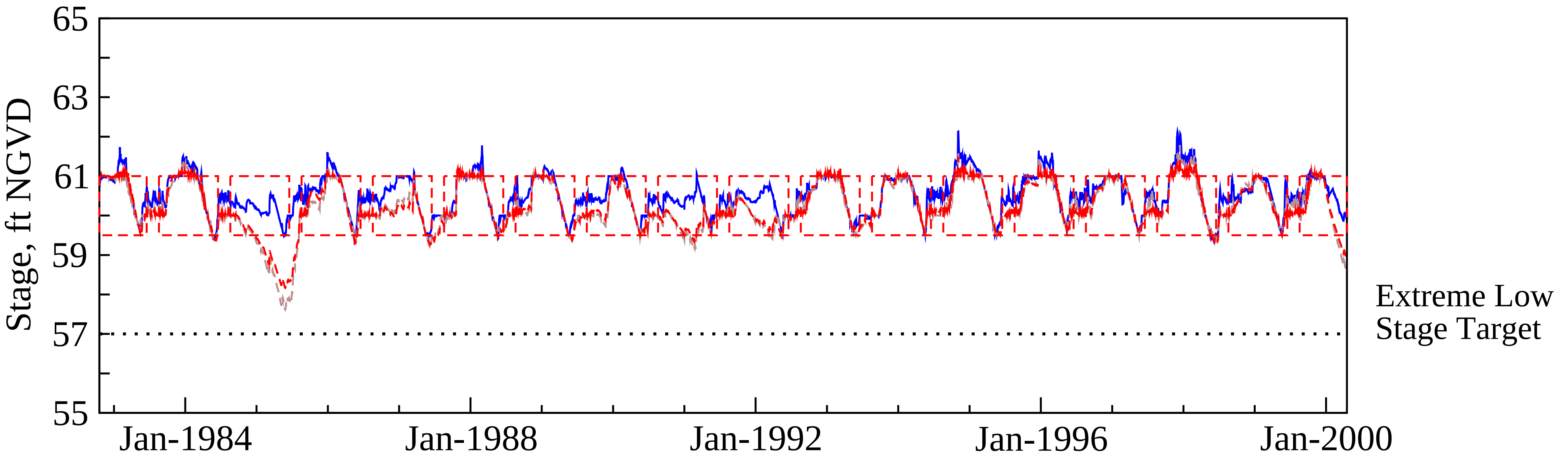
PDF Report for L07


L-07. Stages in Lake Hart and Mary Jane
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
B1

L-07. Stages in Lakes Hart and Mary Jane

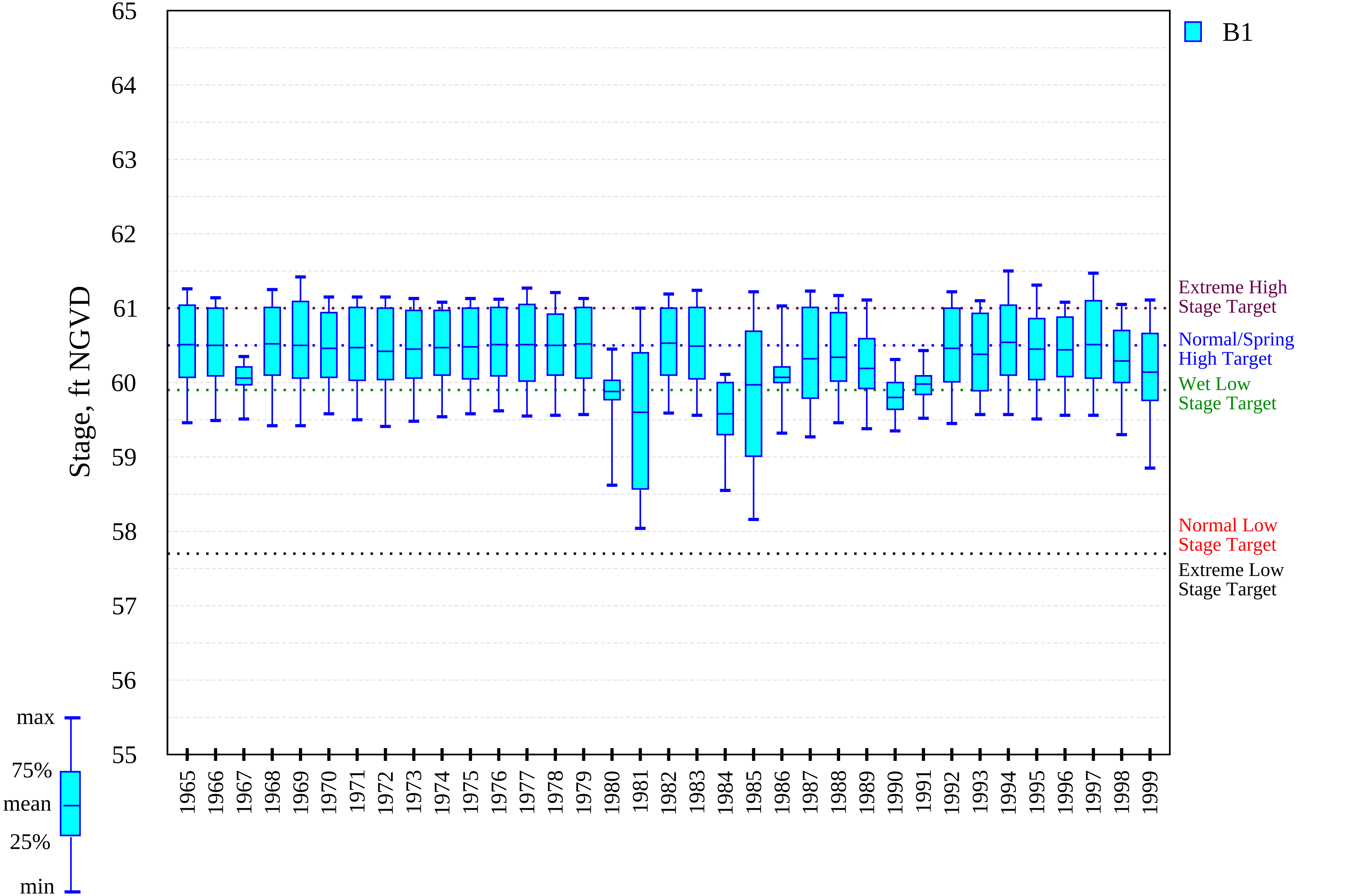
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

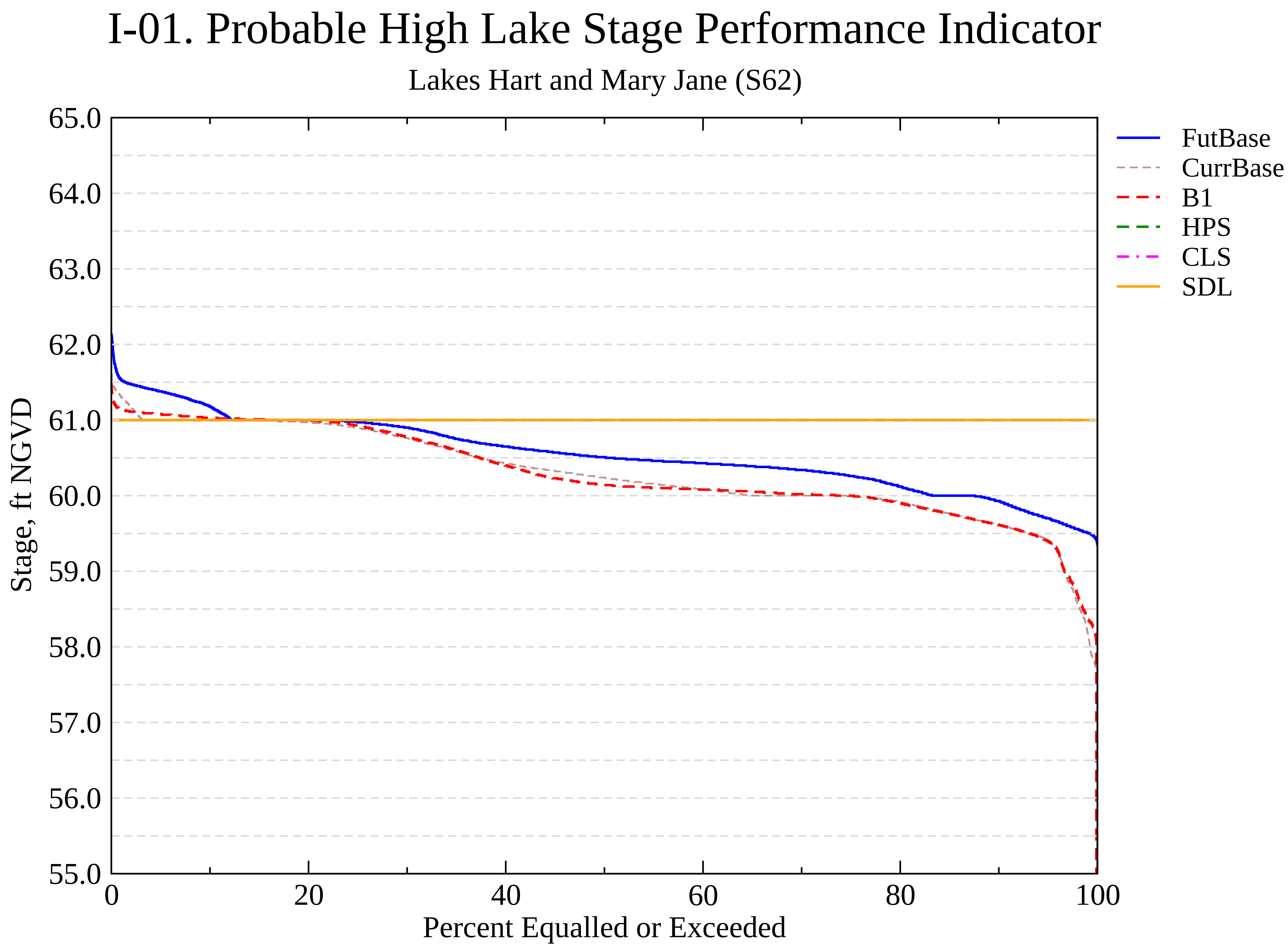




L-07. Stages in Lakes Hart and Mary Jane

Intra-annual lake stage variation (water year based)

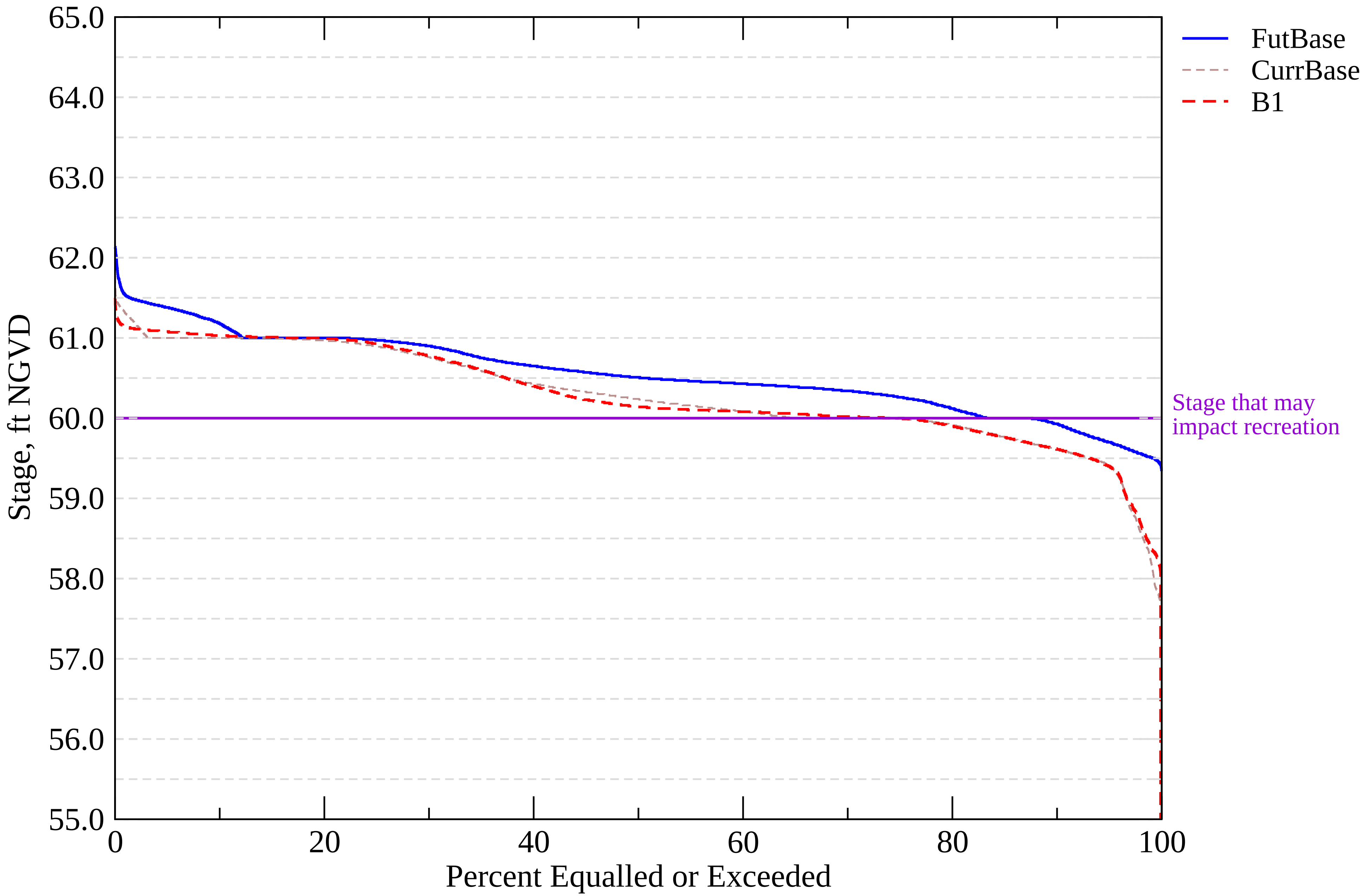




I-01. Probable High Lake Stage Performance Indicator
Lakes Hart and Mary Jane (S62)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lake Hart and Mary Jane (S62)



Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

Alternative Description : Uncertainty Analysis - Simulation B1

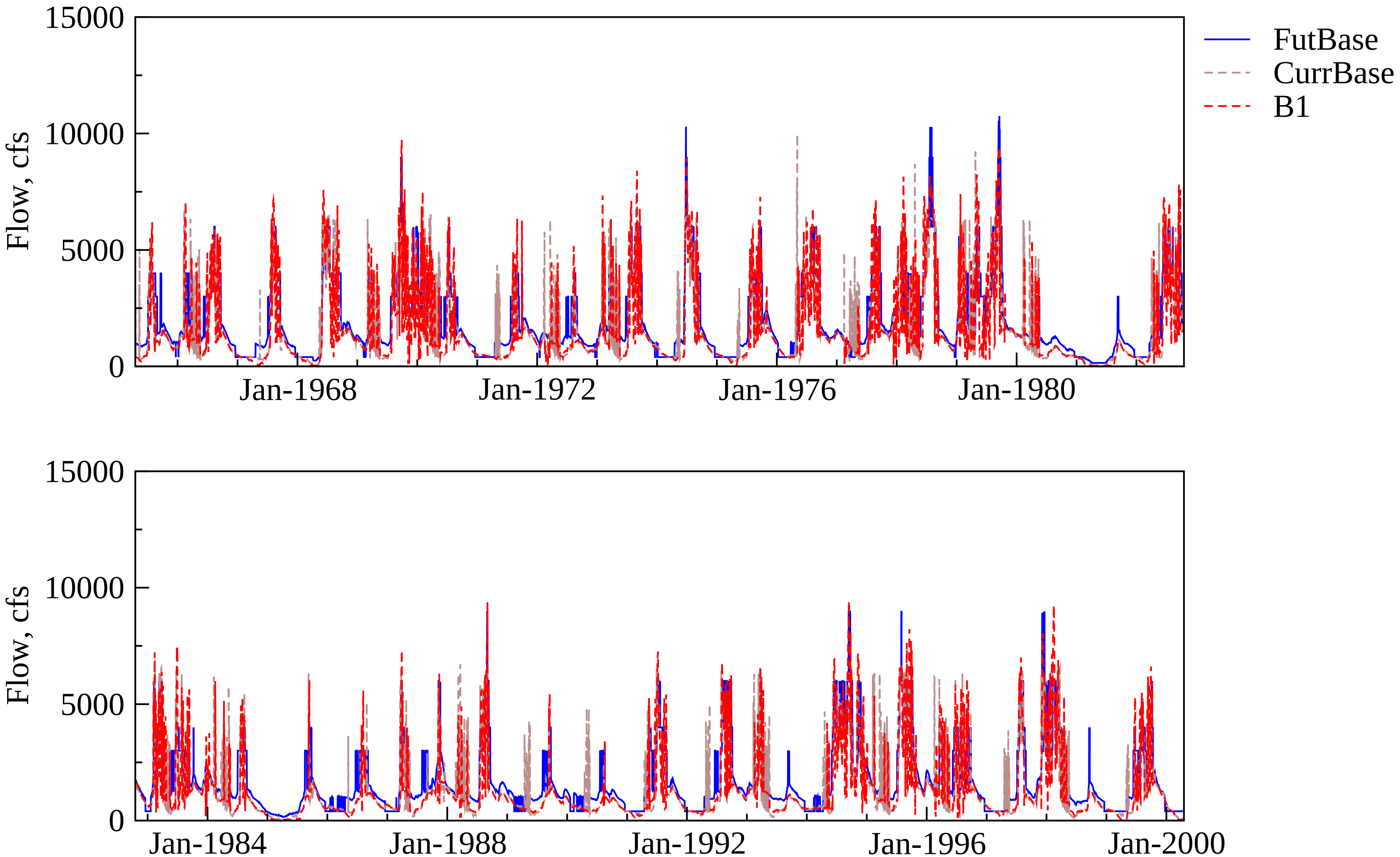
Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

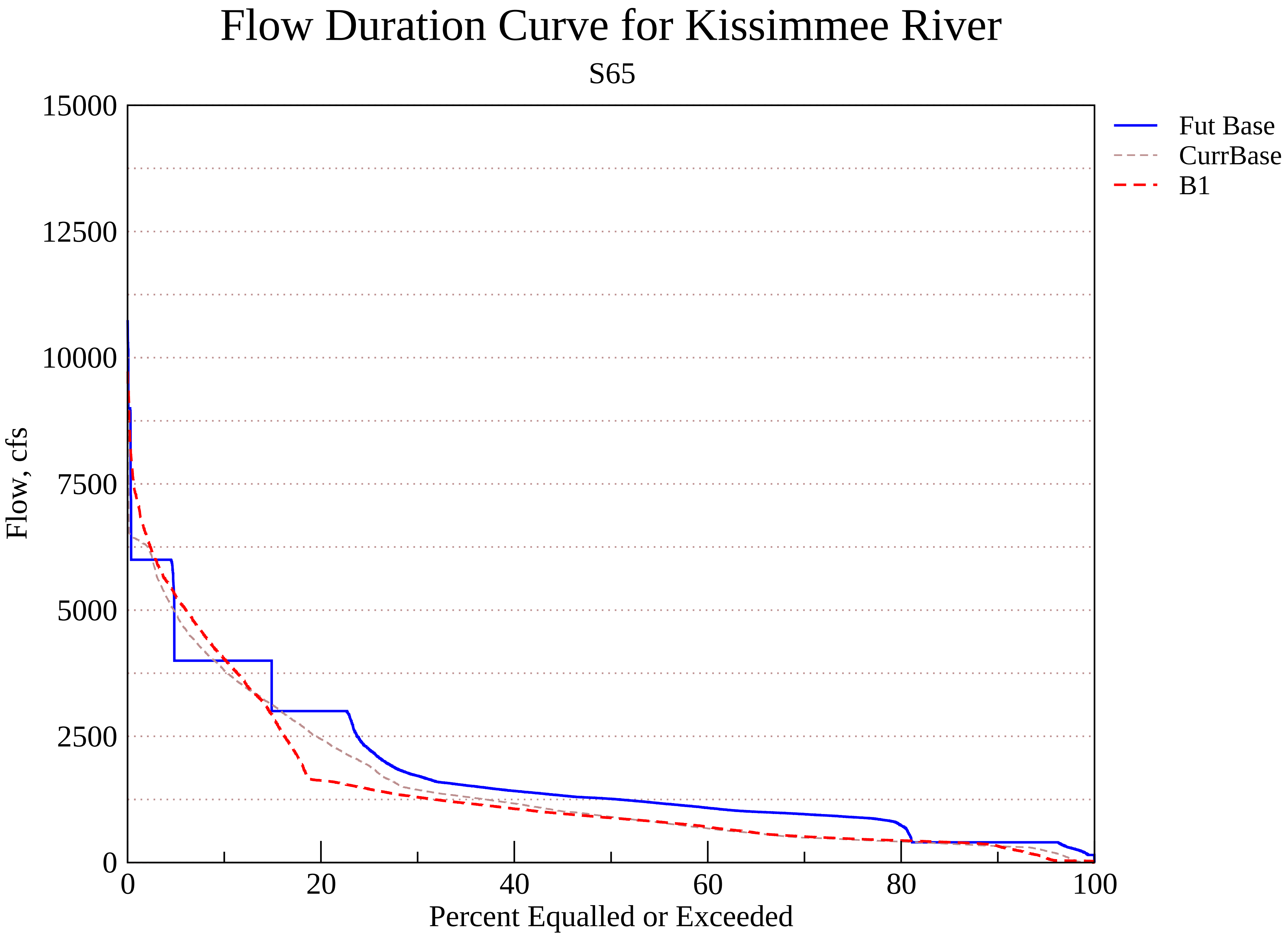
Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	25.7	40.0
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	57.1	54.3
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	88.6	80.0
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	5.7	11.4
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	200.0	260.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	429.0	558.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	2.1	3.0
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tier 2 Report

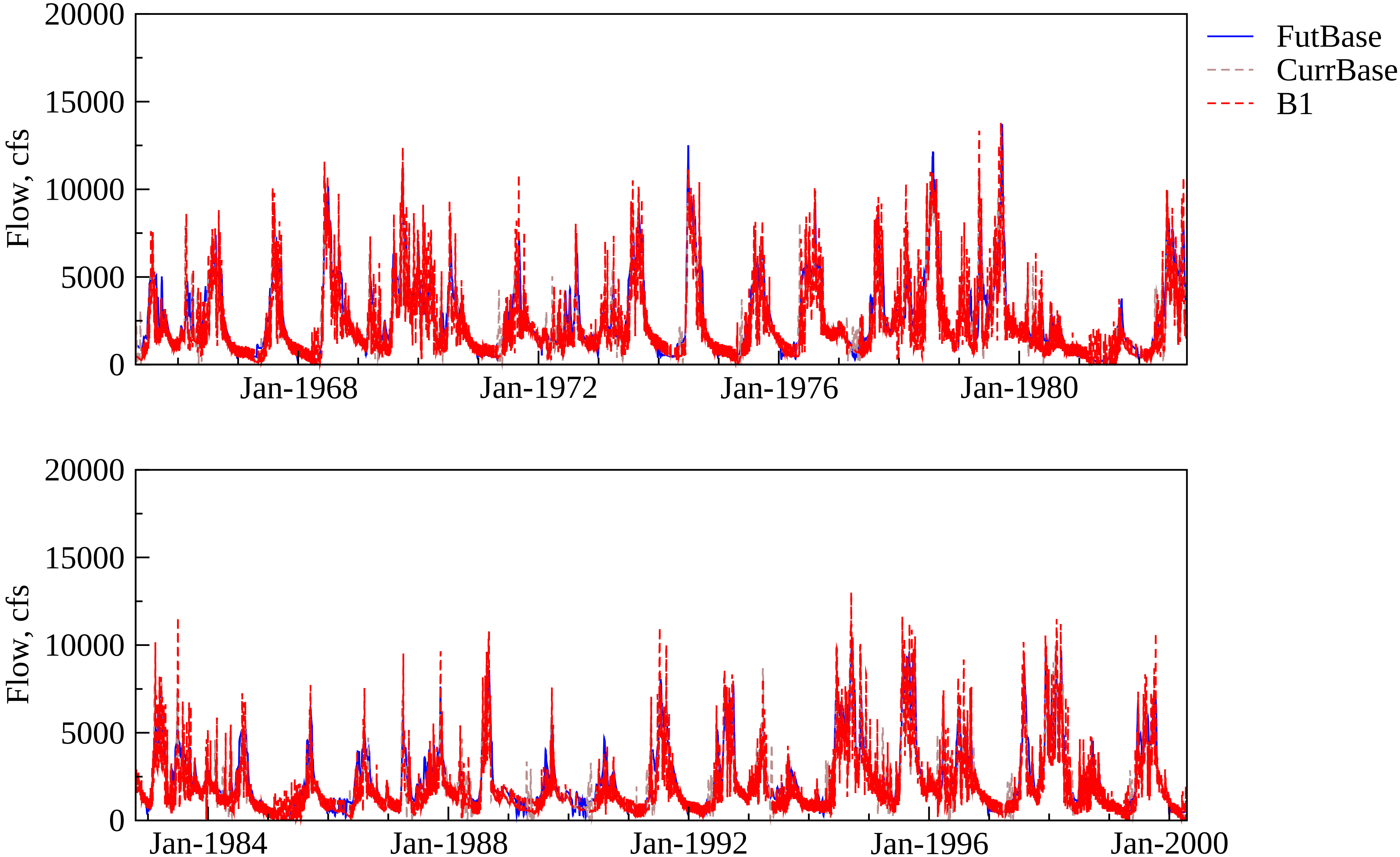
PDF Report for R01

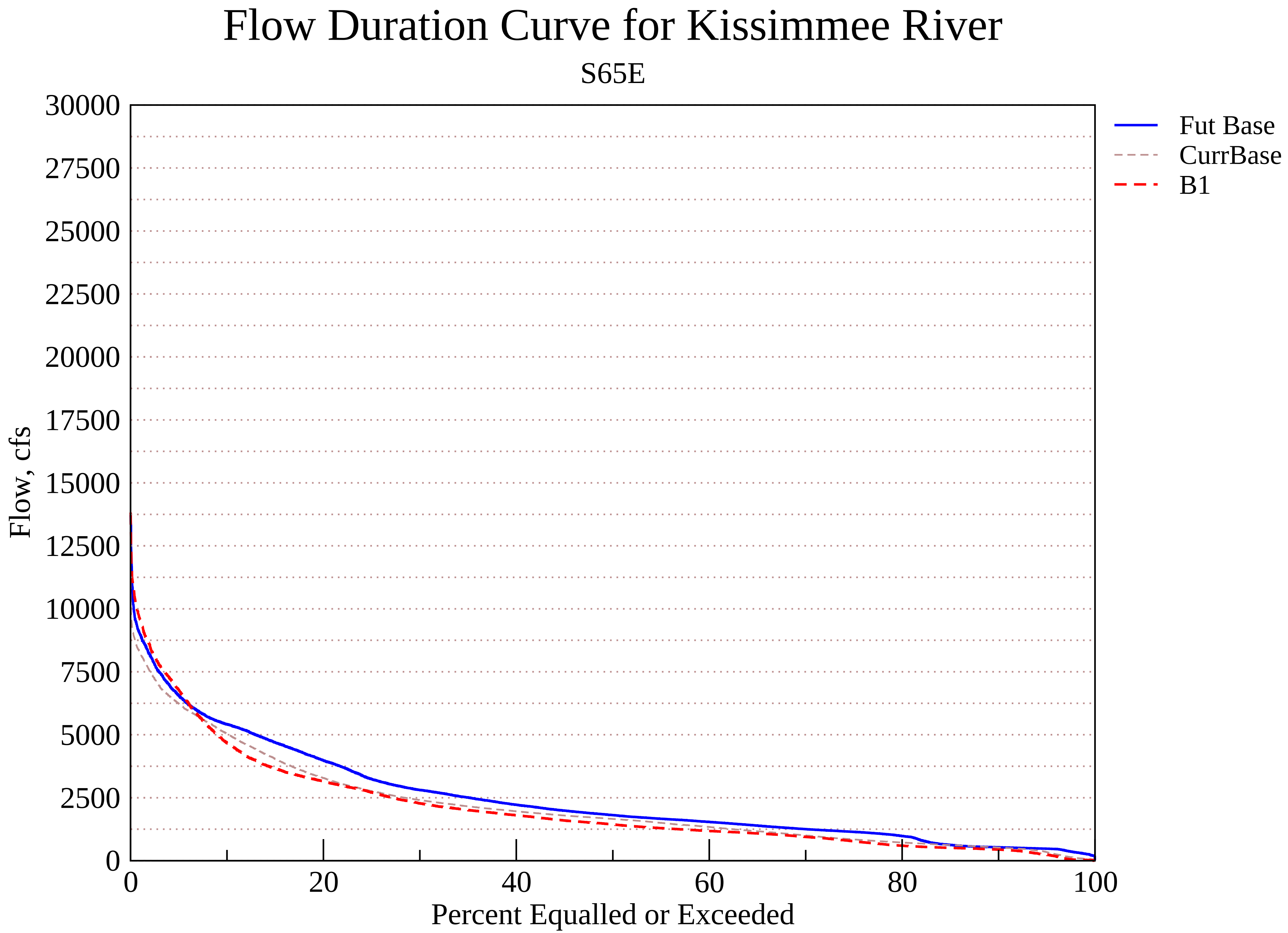
Flow Hydrograph at S65




Flow Duration Curve for Kissimmee River
S65
15000
12500
10000
7500
5000
2500
0
Flow, cfs
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
B1

Flow Hydrograph at S65E





Flow Duration Curve for Kissimmee River
S65E
Fut Base
CurrBase
B1
Flow, cfs
30000
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded

Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation B1

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Number of days per water year that river channel depth is greater than average floodplain ground elevation (average).	252.0	250.0	203.0	291.0
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	67.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	5.6
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	8.6

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

Alternative Description : Uncertainty Analysis - Simulation B1

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - LOW

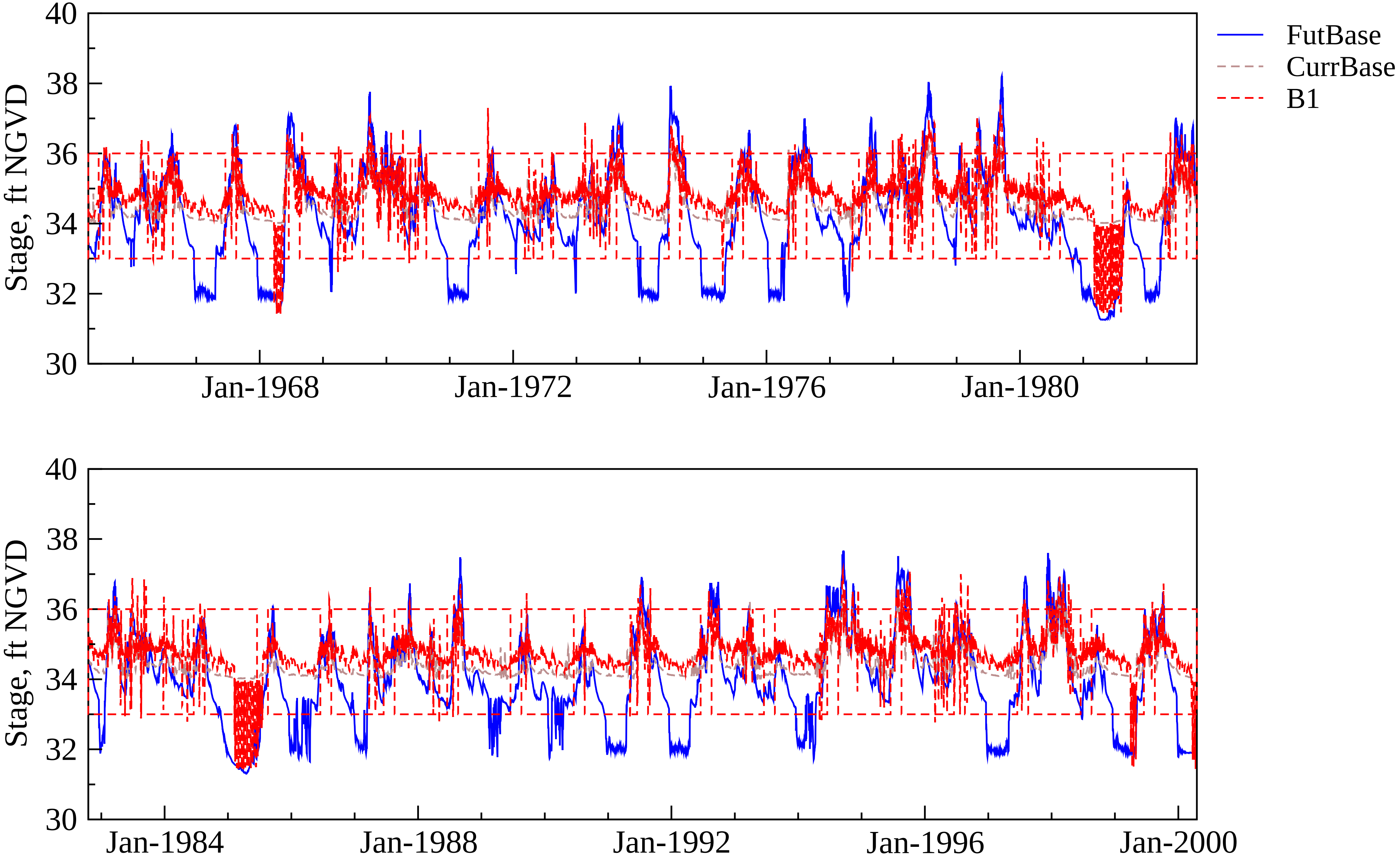
Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	45.7
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	77.1
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	28.6

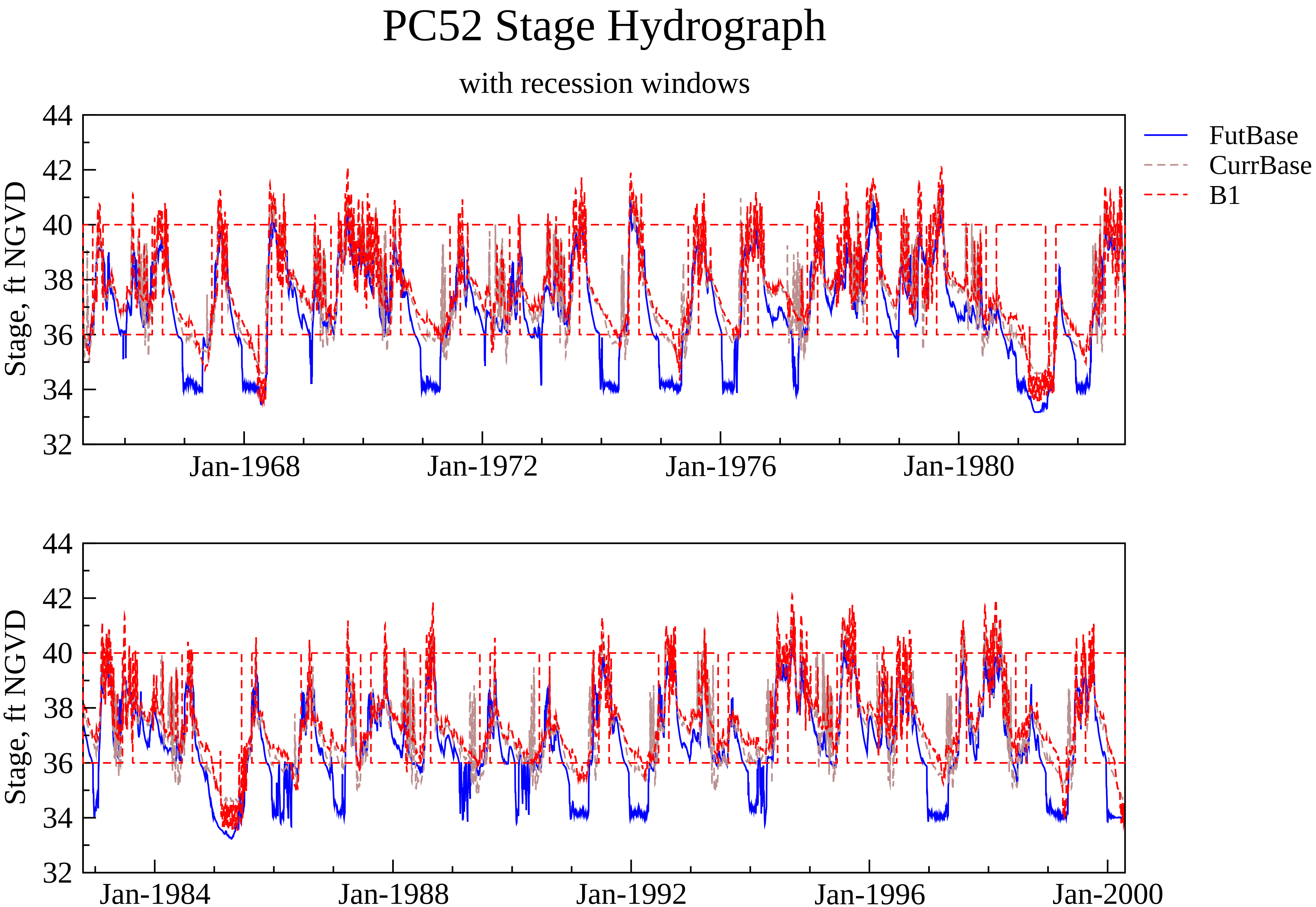
Tier 2 Report

PDF Report for R03

PC33 Stage Hydrograph

with recession windows





PC52 Stage Hydrograph
with recession windows
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
B1
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation B2

Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation B2

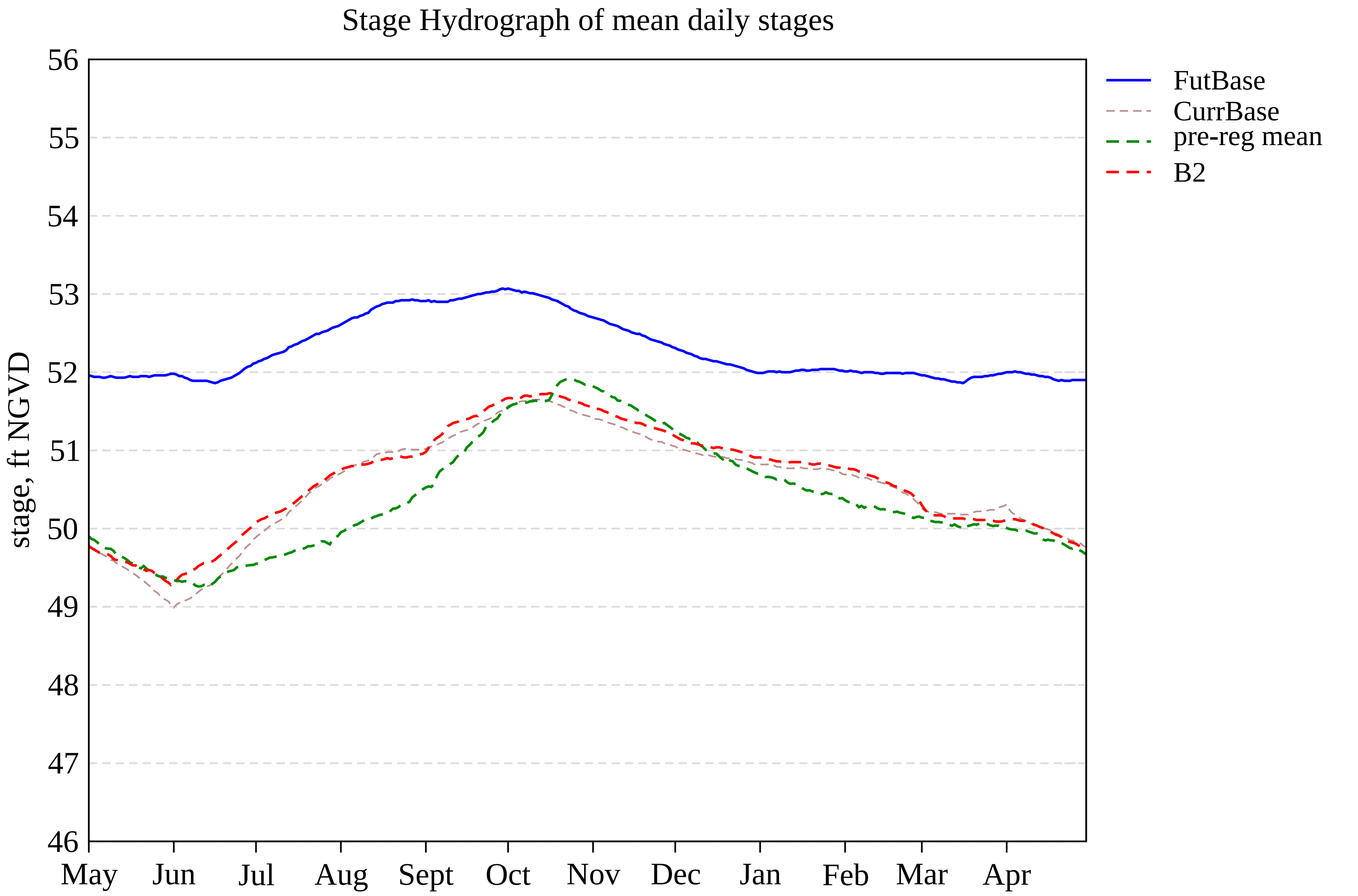
Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	86.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	11.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	71.4
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	17.1
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	91.4
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	2.6	3.3
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	5.5	6.1

Tier 2 Report

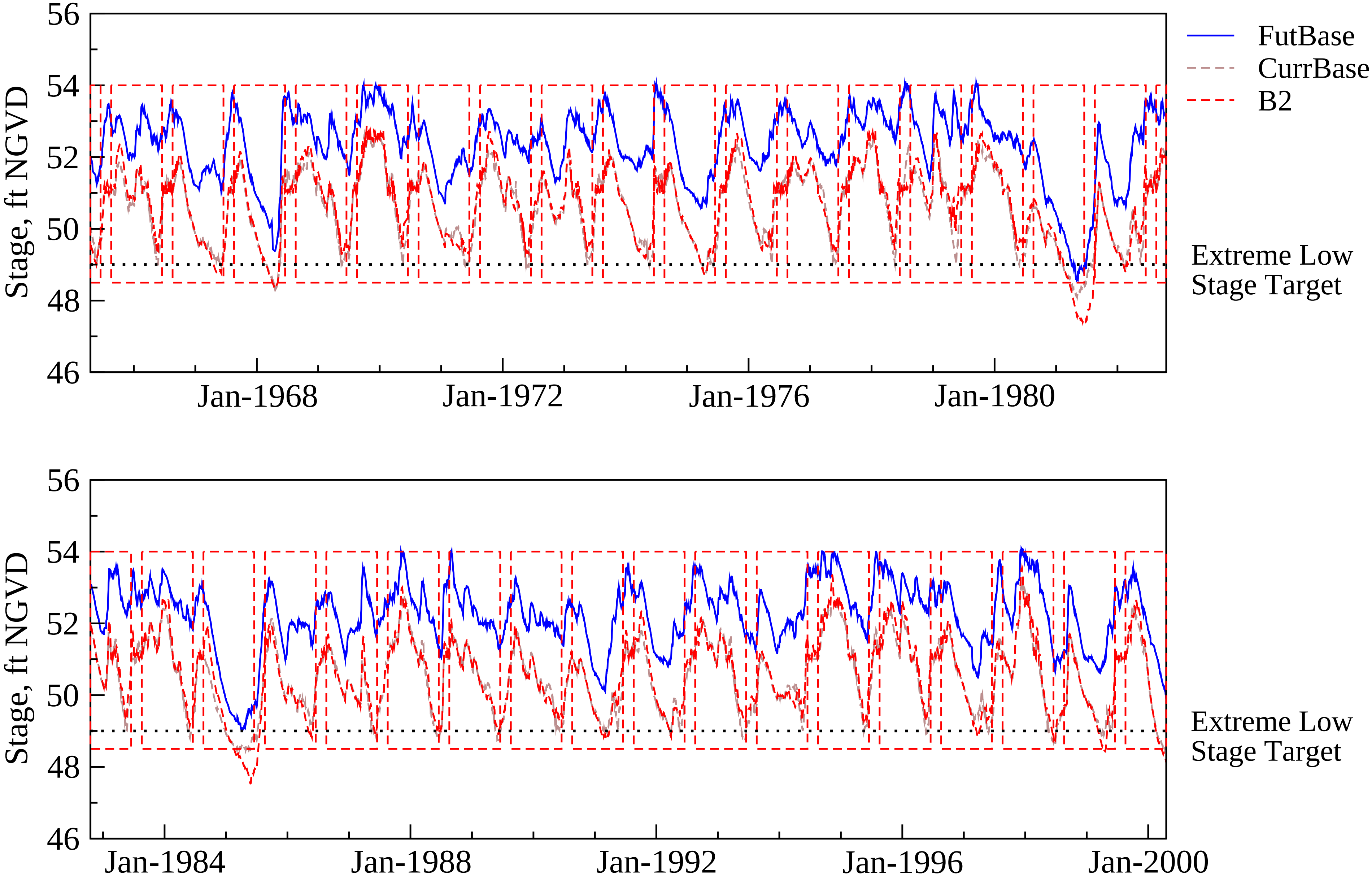
PDF Report for L01

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger



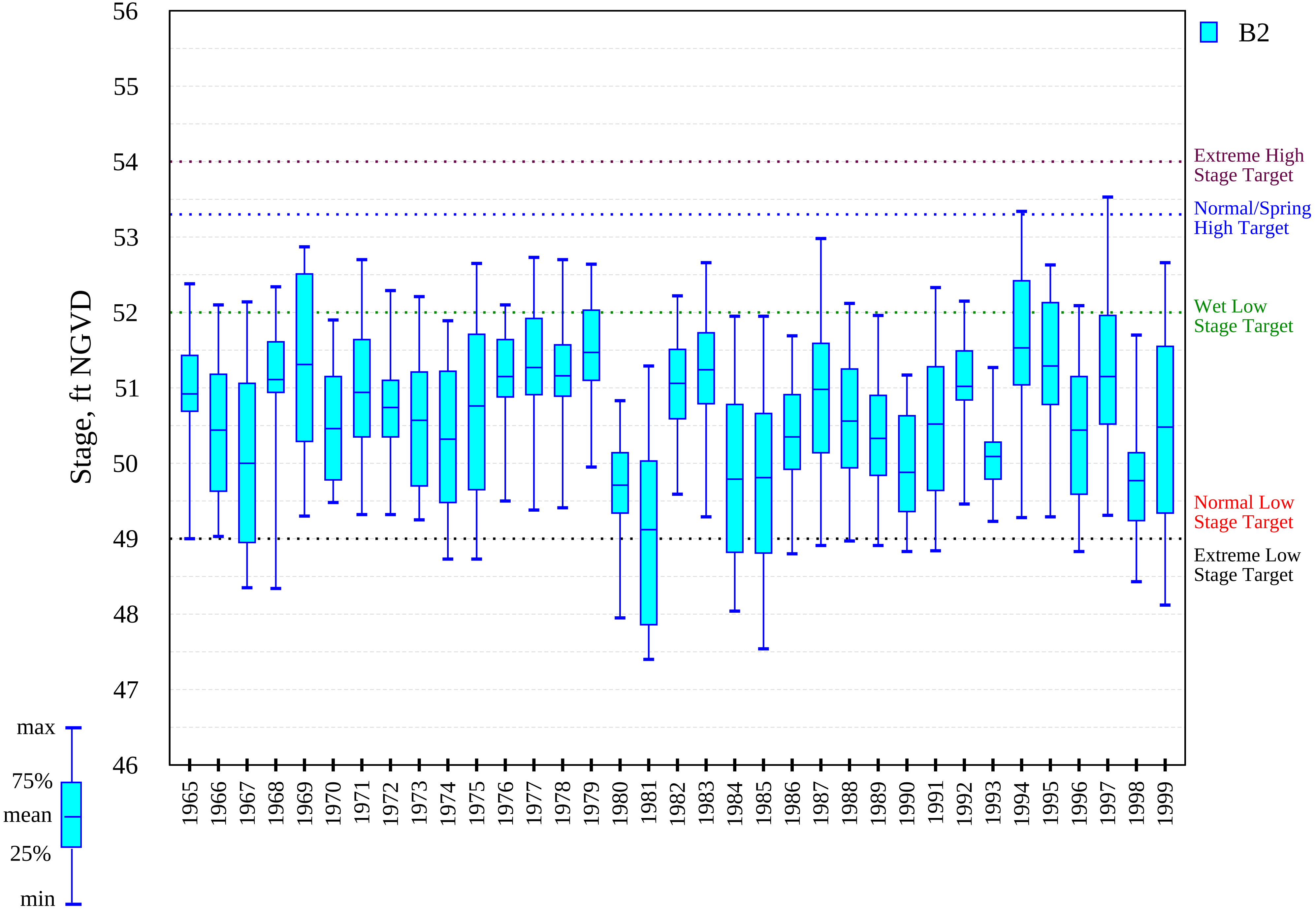
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

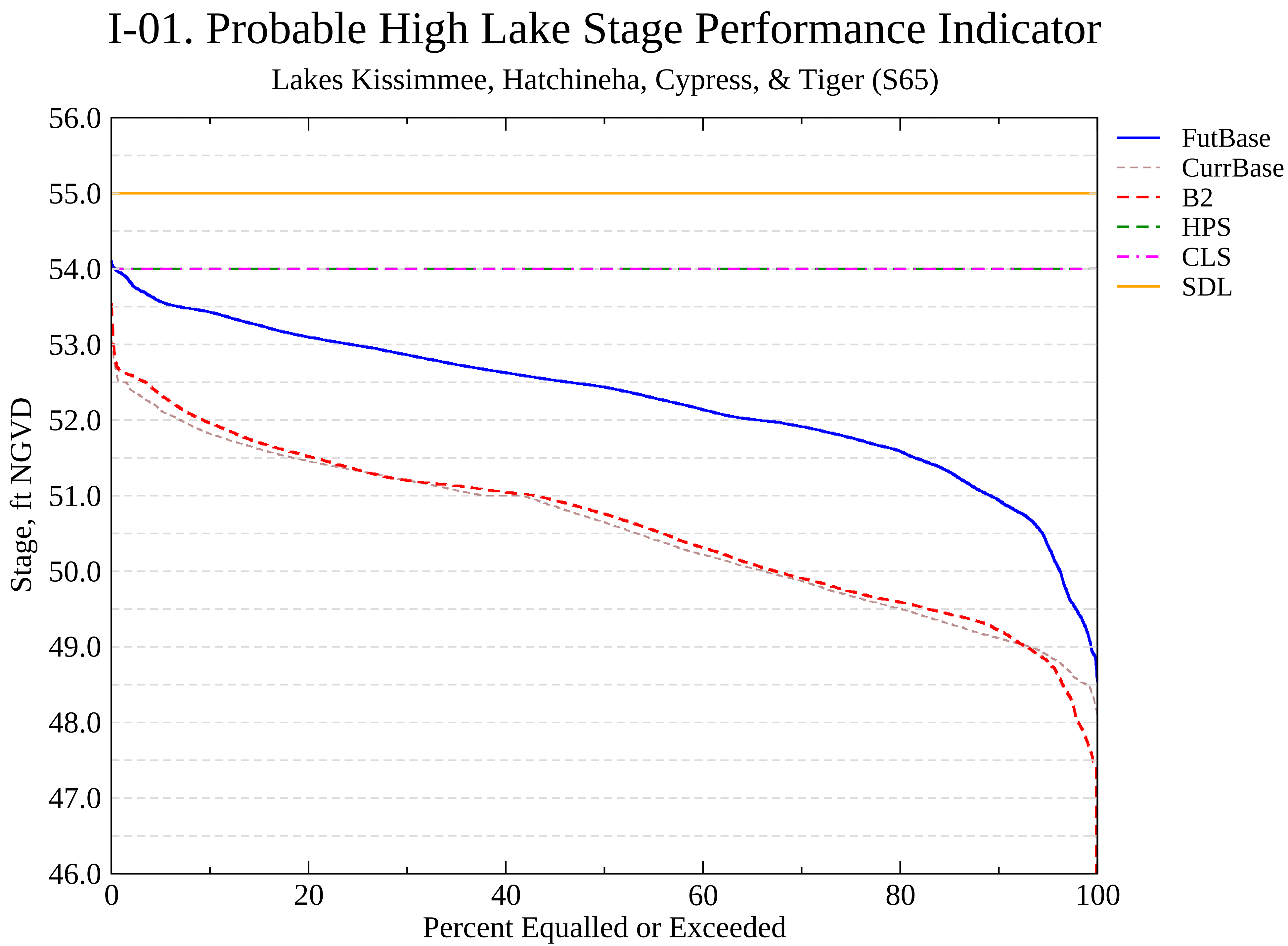
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Intra-annual lake stage variation (water year based)

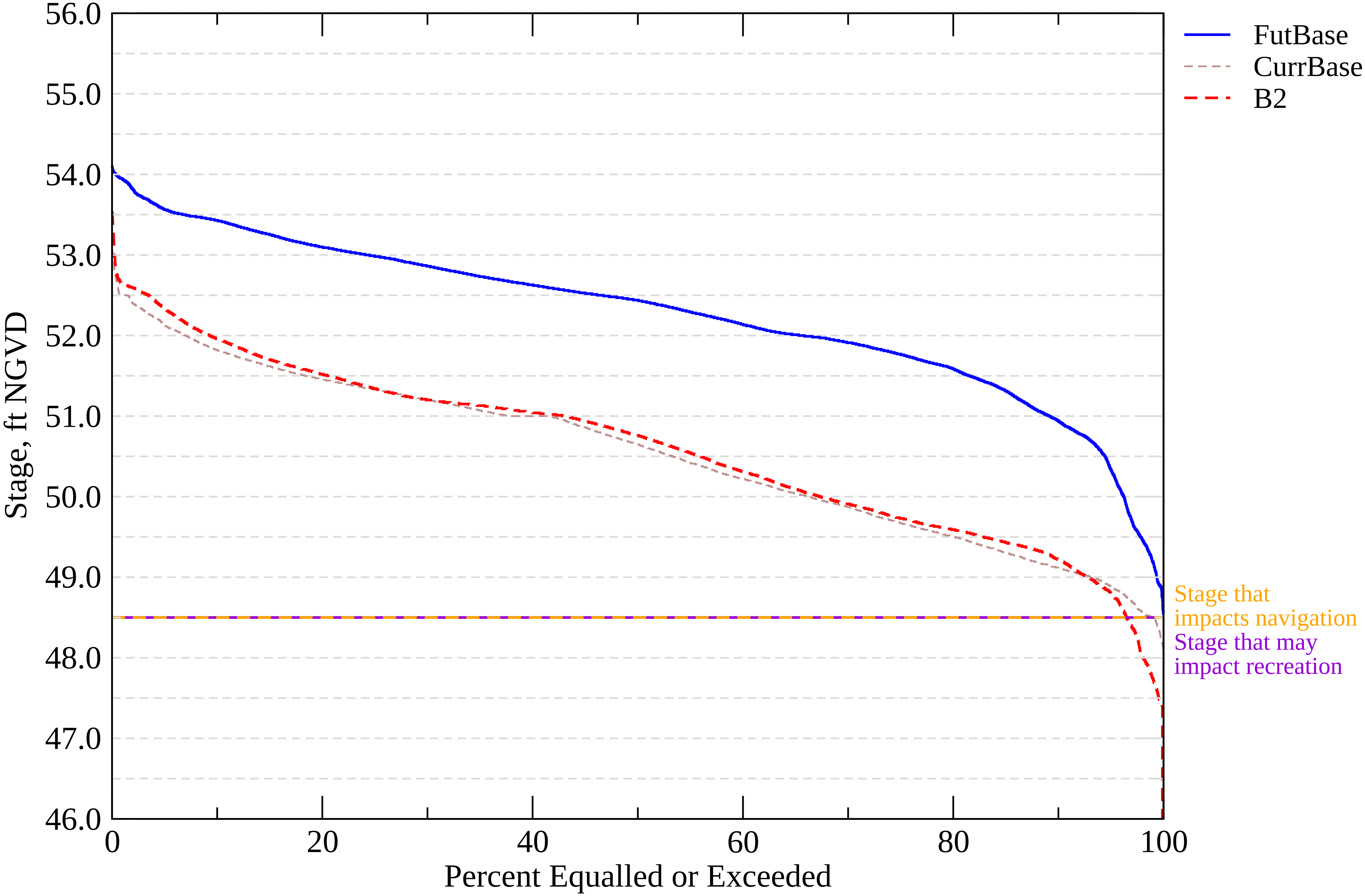




I-01. Probable High Lake Stage Performance Indicator
Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B2
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)



Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

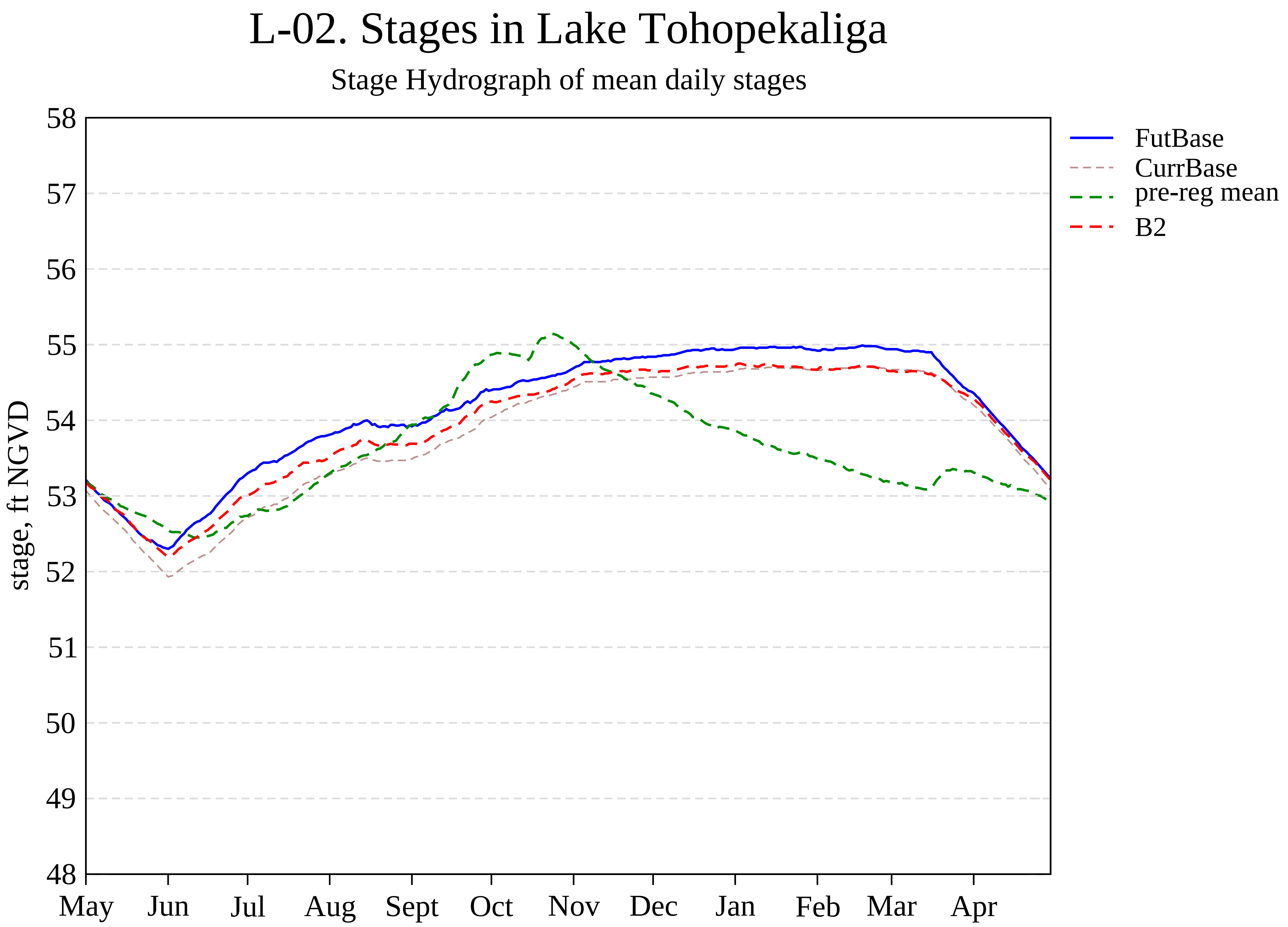
Alternative Description : Uncertainty Analysis - Simulation B2

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	57.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	34.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	3.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	40.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	8.6
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	80.0
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.2
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	5.8

Tier 2 Report

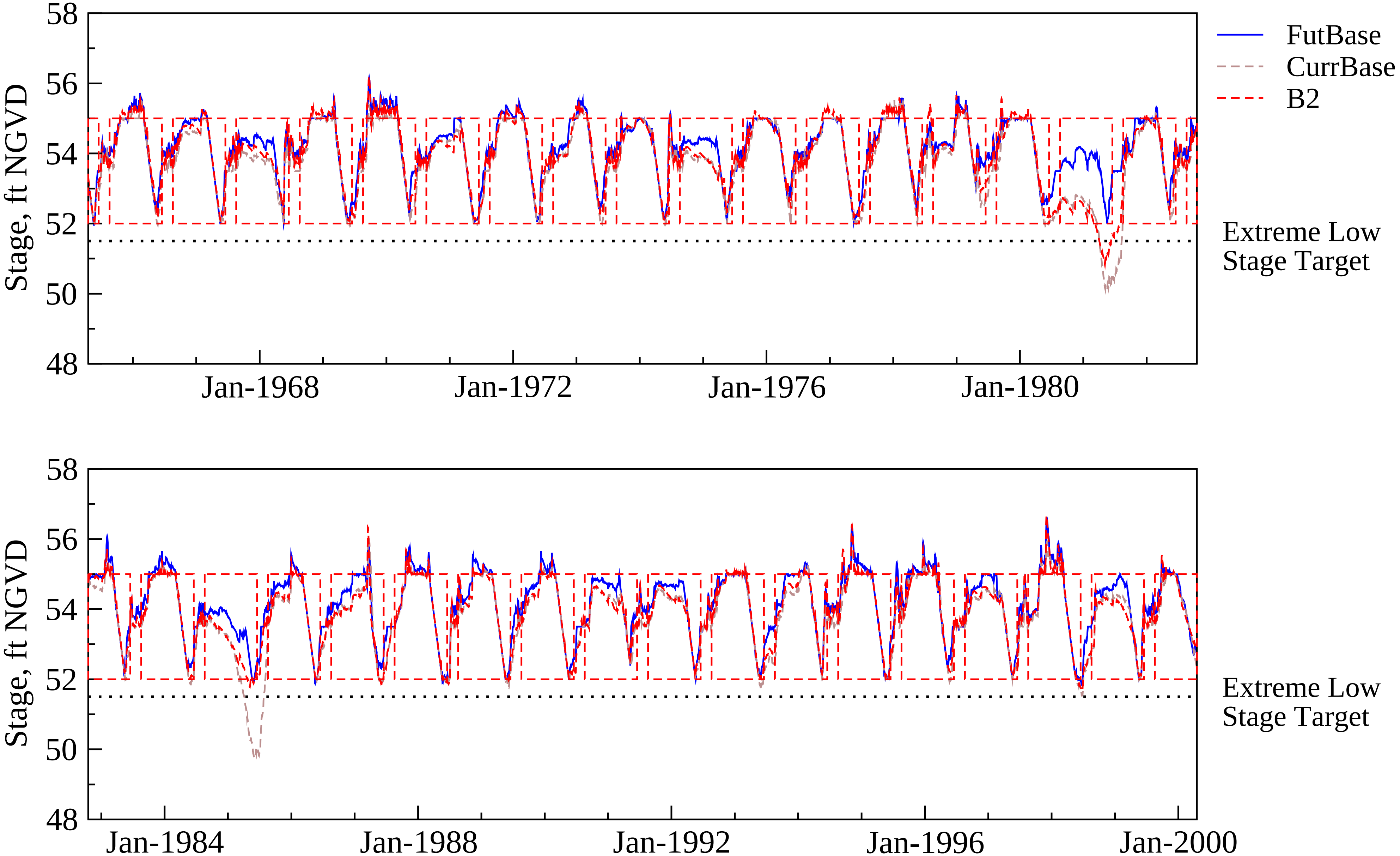
PDF Report for L02

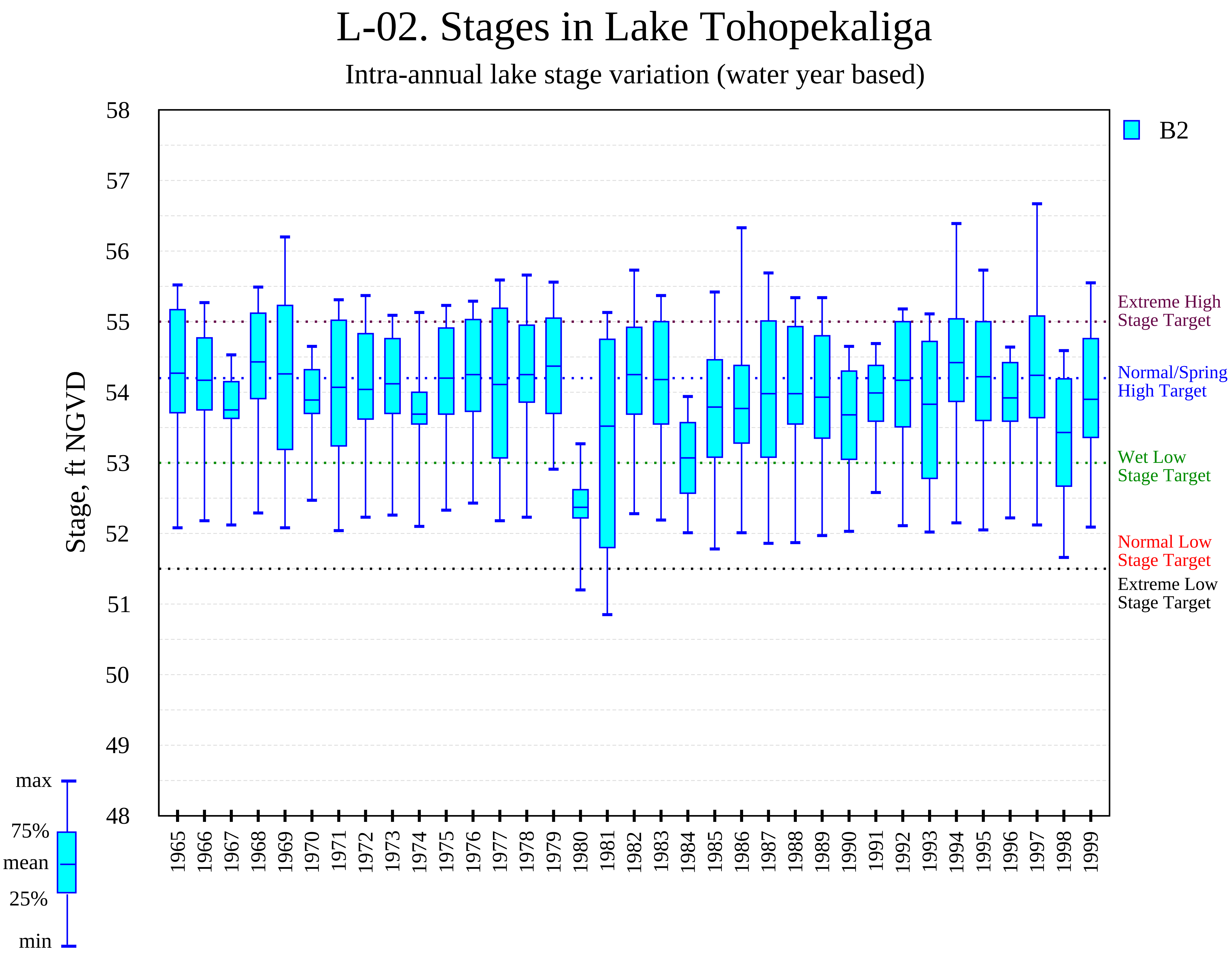


L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
B2

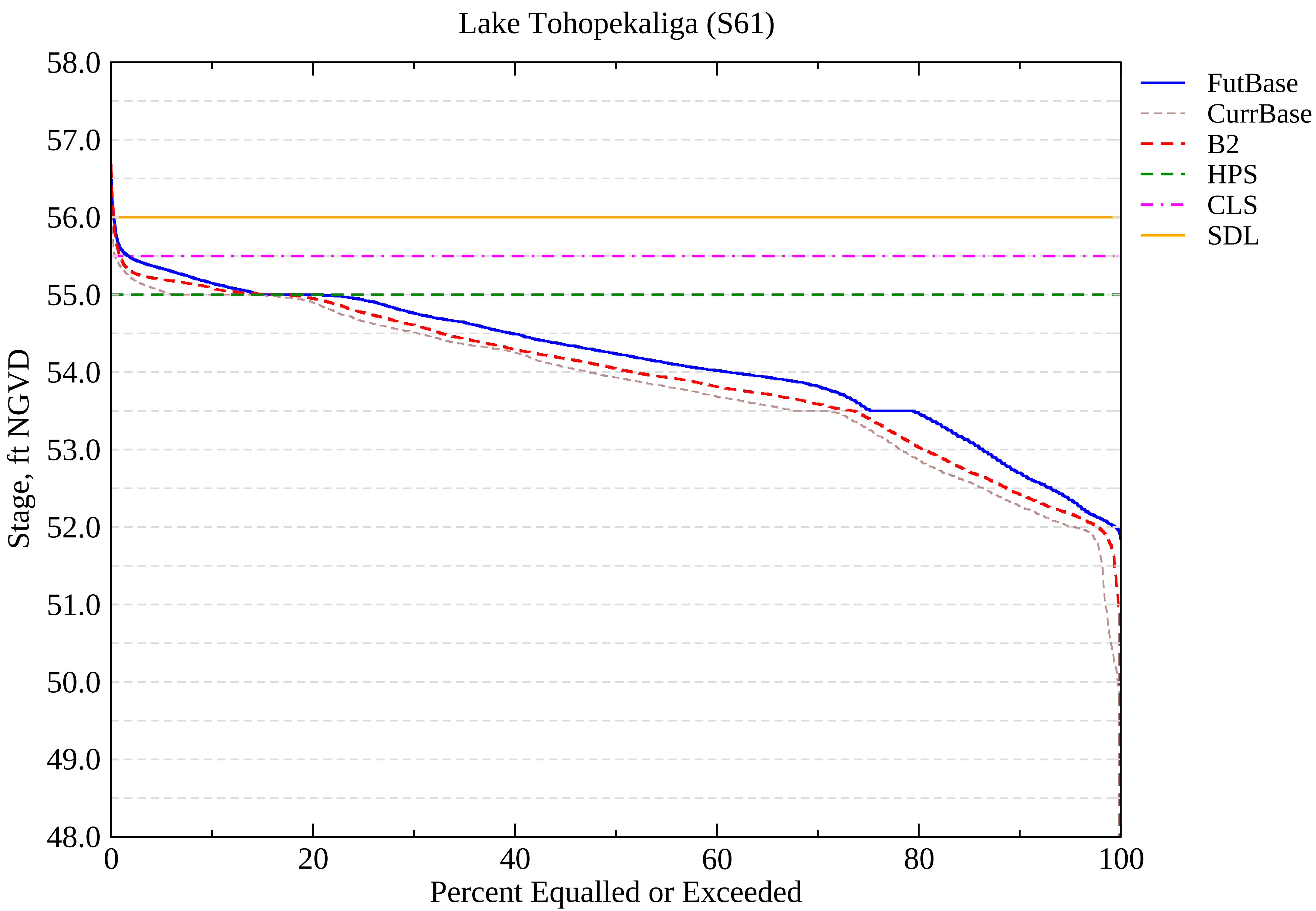
L-02. Stages in Lake Tohopekaliga

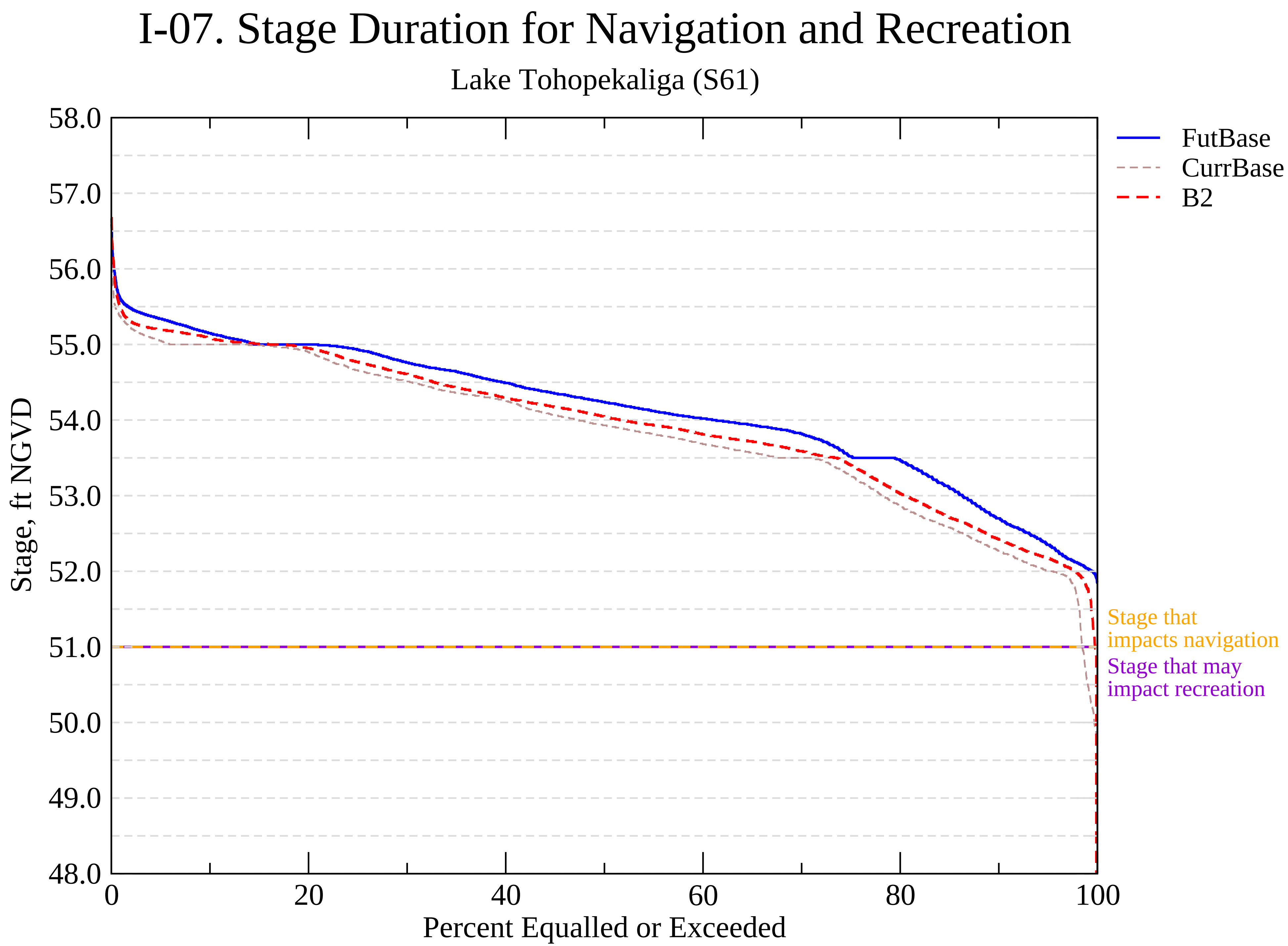
Daily Stage Hydrograph with Water Level recession windows (Sept-June)




L-02. Stages in Lake Tohopekaliga
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
B2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min

I-01. Probable High Lake Stage Performance Indicator




I-07. Stage Duration for Navigation and Recreation
Lake Tohopekaliga (S61)
Stage, ft NGVD
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B2
Stage that impacts navigation
Stage that may impact recreation

Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

Alternative Description : Uncertainty Analysis - Simulation B2

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

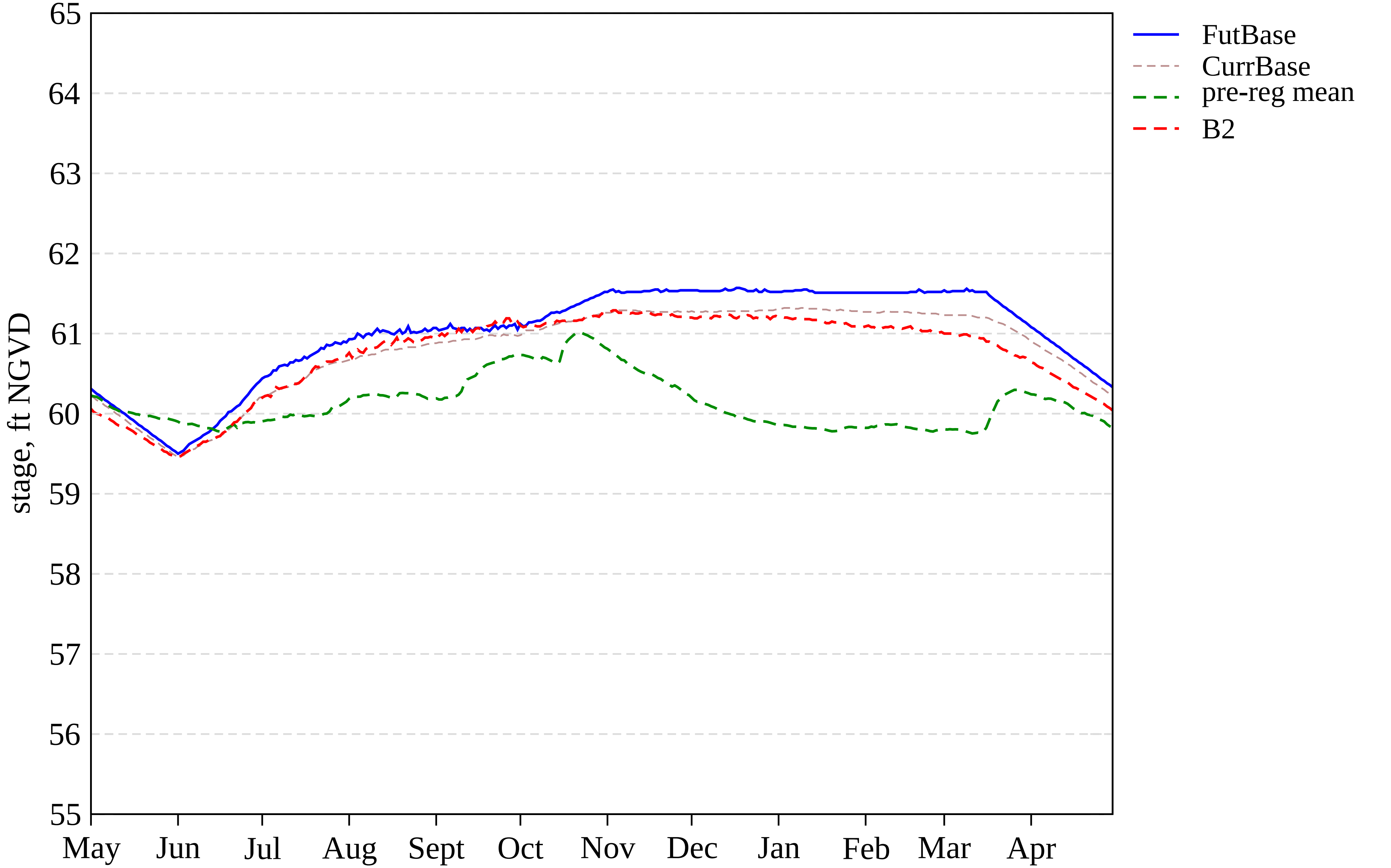
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	62.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	11.4
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	74.3
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.5

Tier 2 Report

PDF Report for L03

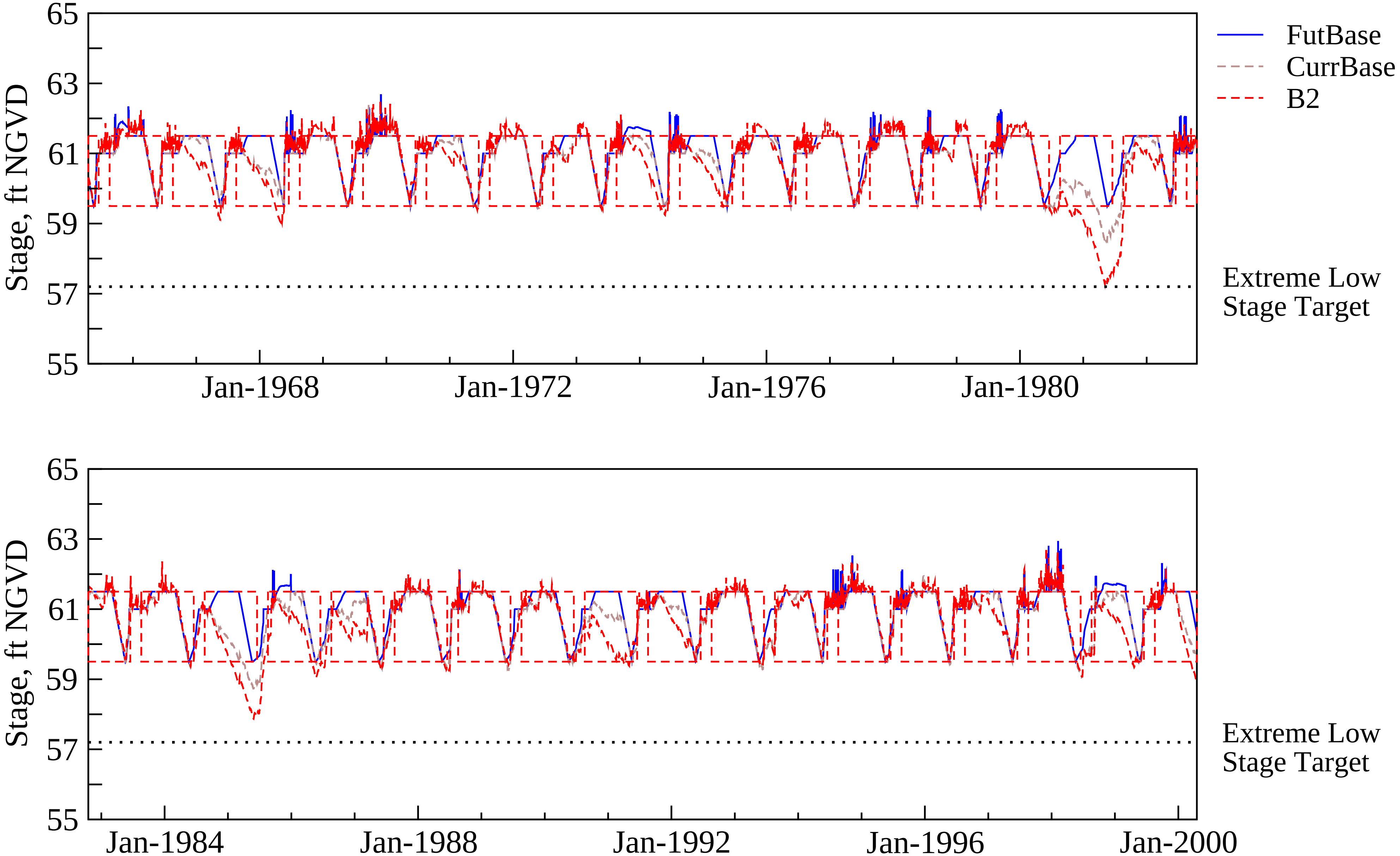
L-03. Stages in Lake Gentry

Stage Hydrograph of mean daily stages



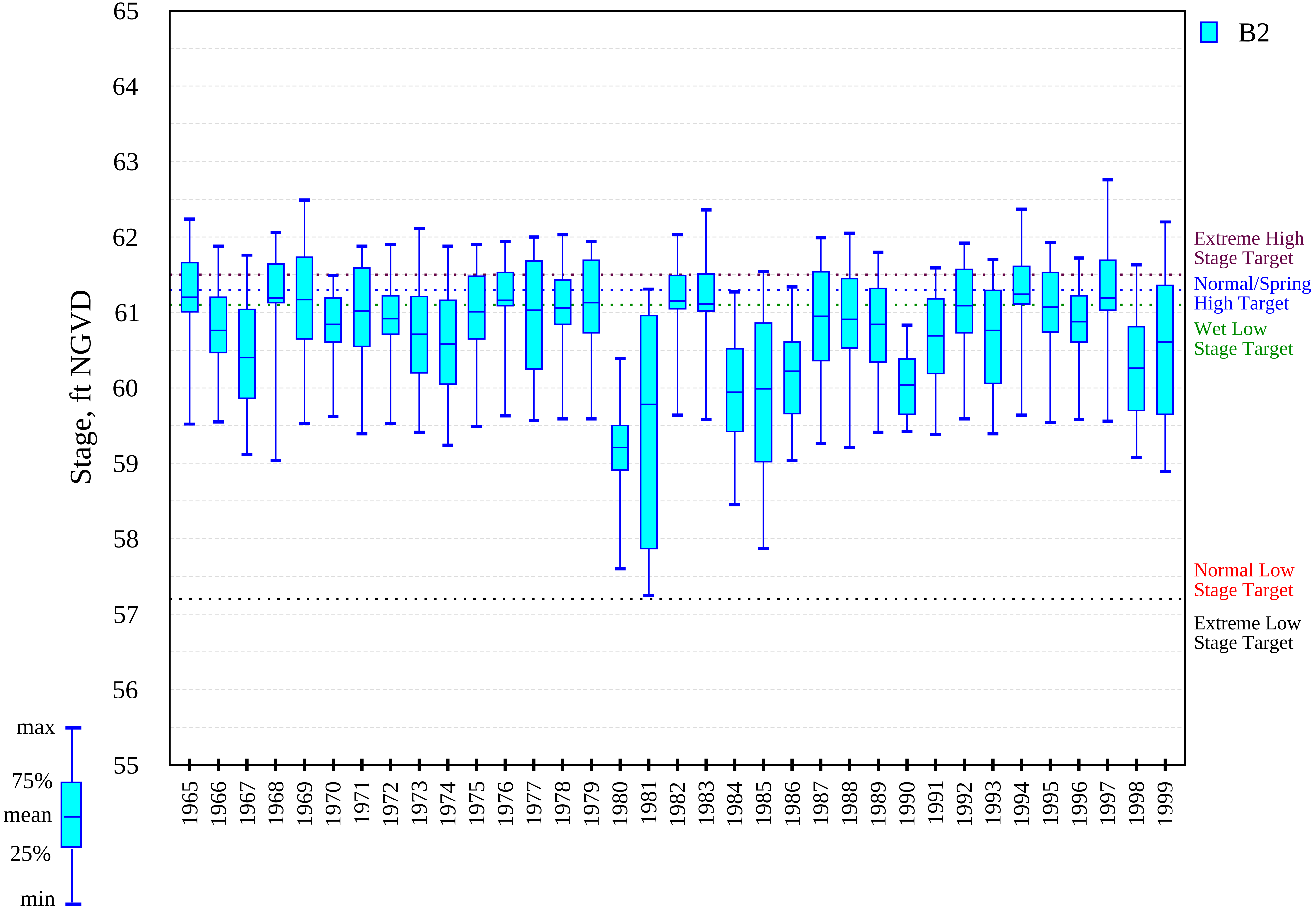
L-03. Stages in Lake Gentry

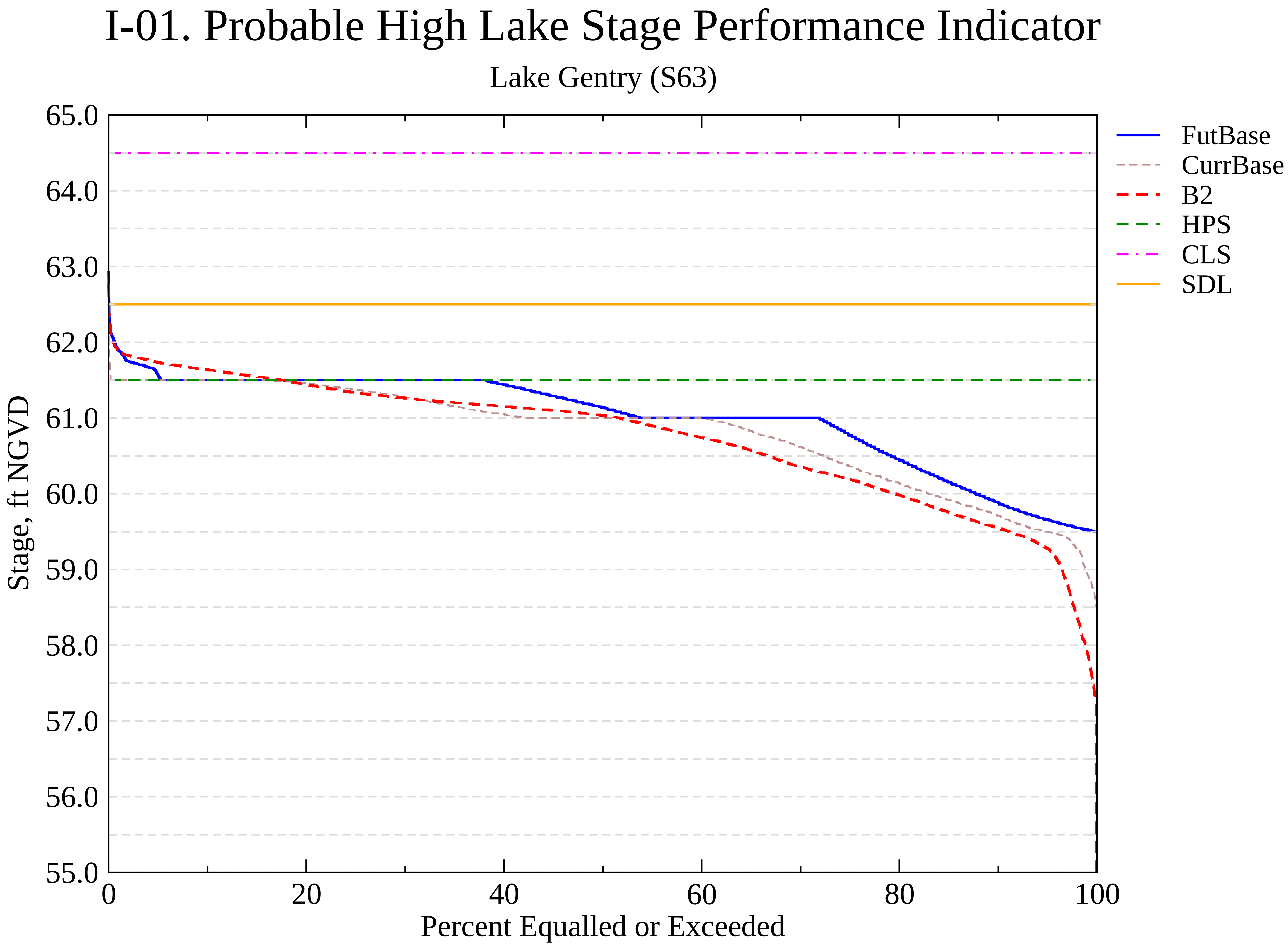
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



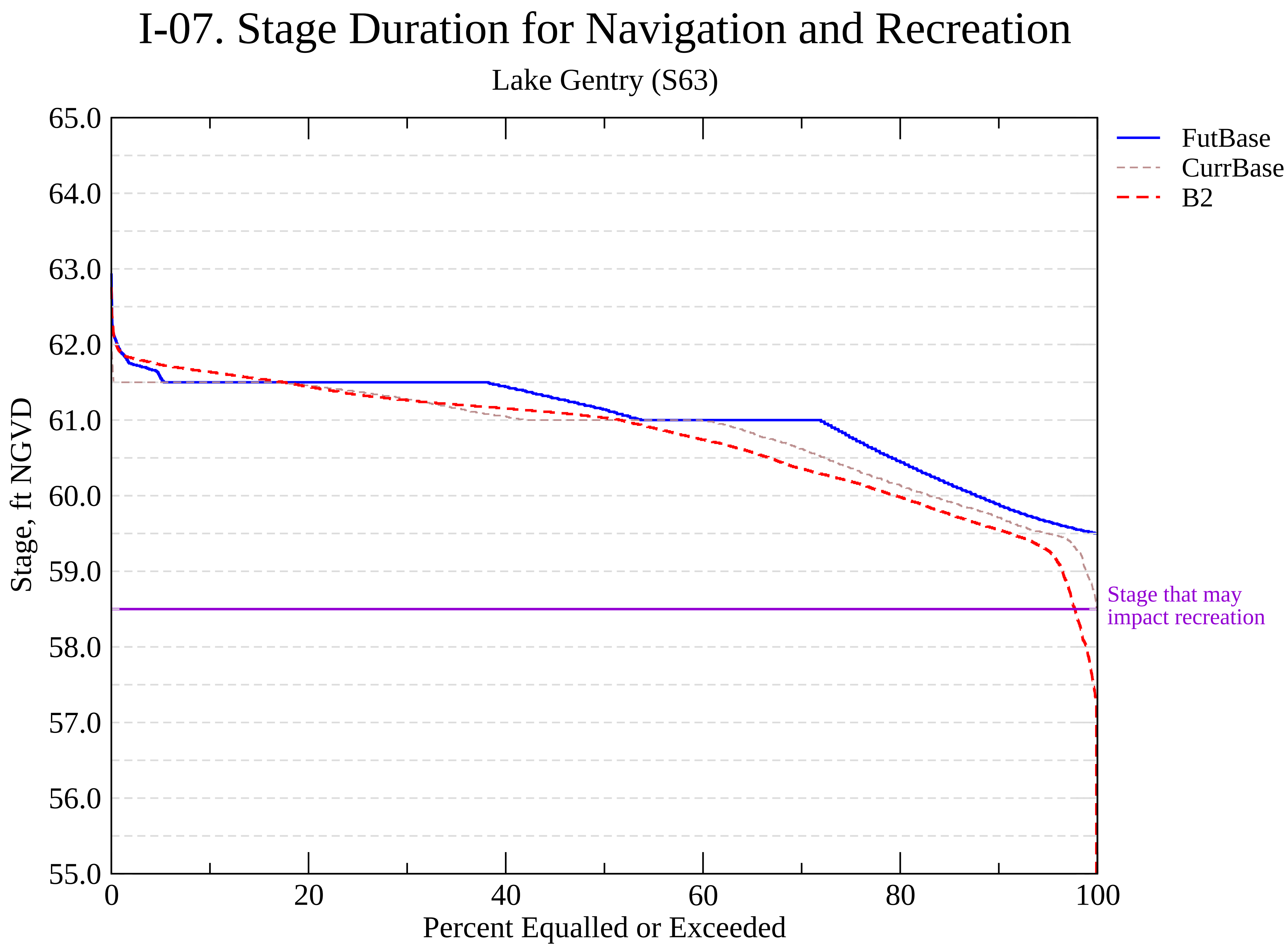
L-03. Stages in Lake Gentry

Intra-annual lake stage variation (water year based)





I-01. Probable High Lake Stage Performance Indicator
Lake Gentry (S63)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B2
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
Lake Gentry (S63)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B2
Stage that may
impact recreation

Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

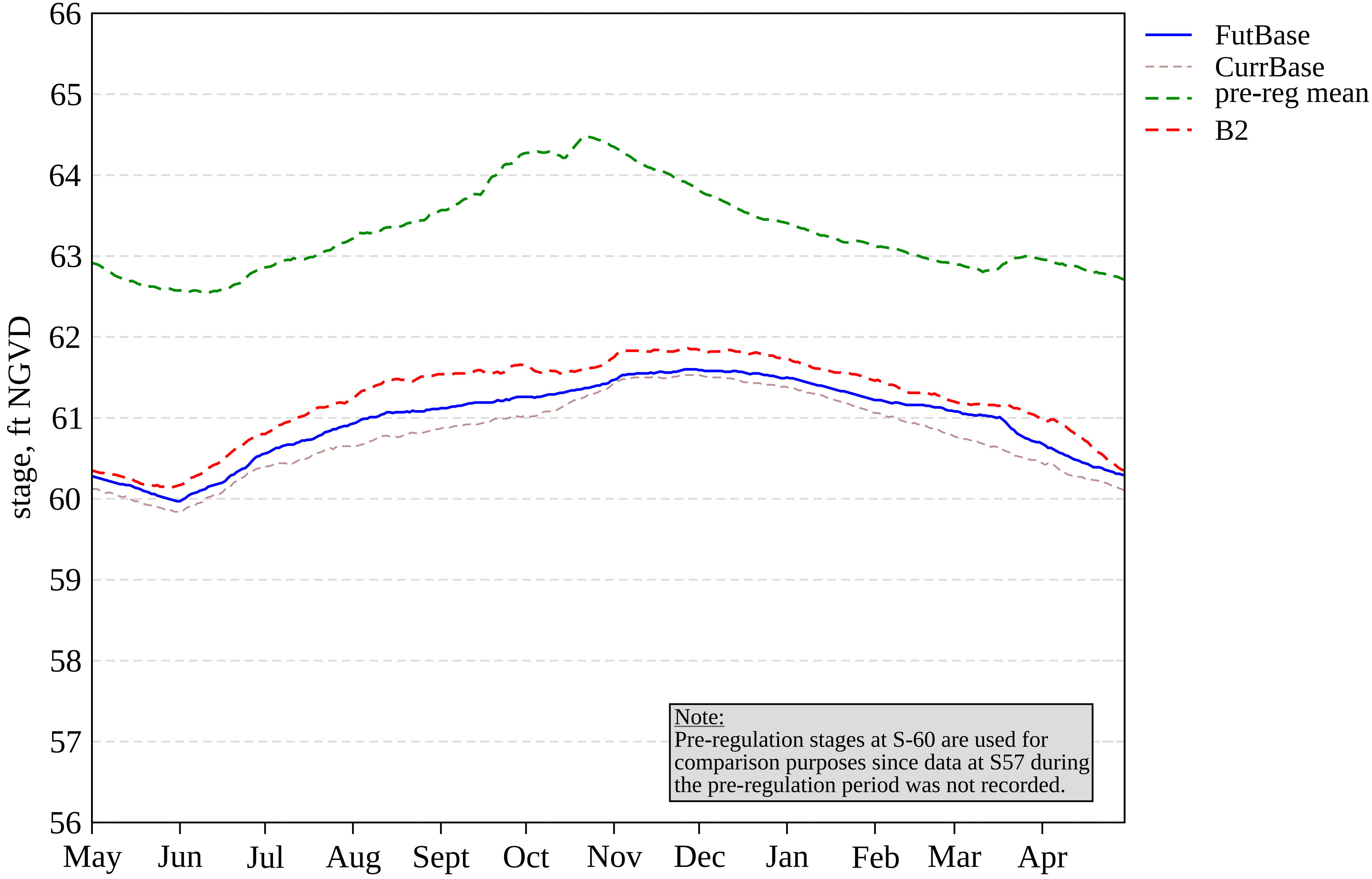
Alternative Description : Uncertainty Analysis - Simulation B2

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	94.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	23.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	63.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	62.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	17.1
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	77.1
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.4
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	5.3

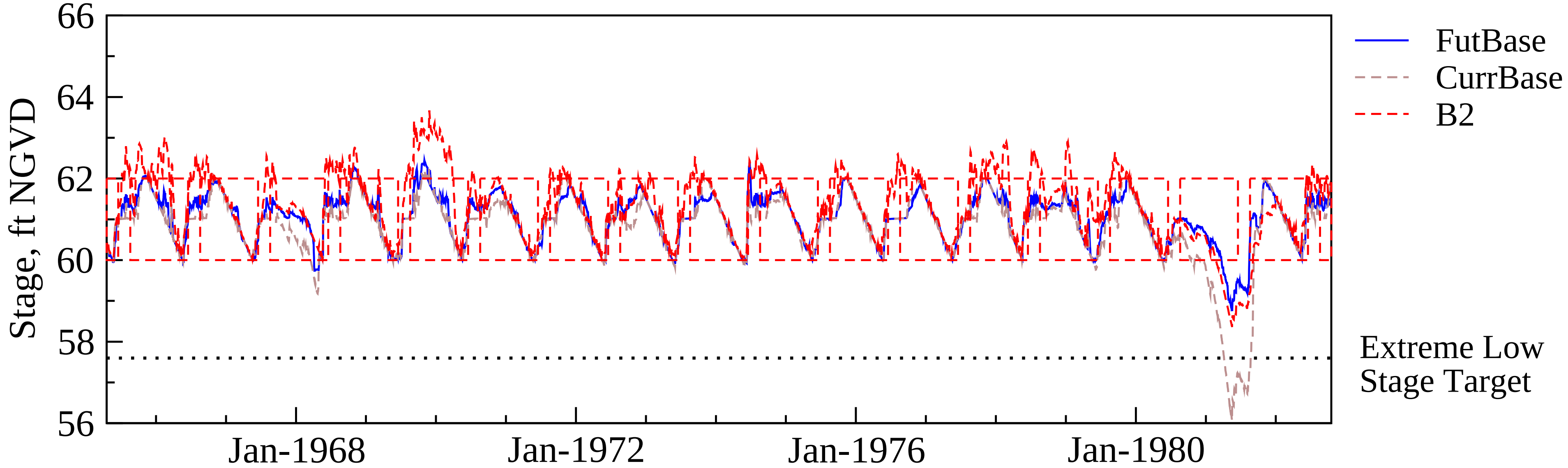
L-04. Stages in Lakes Joel, Myrtle, and Preston

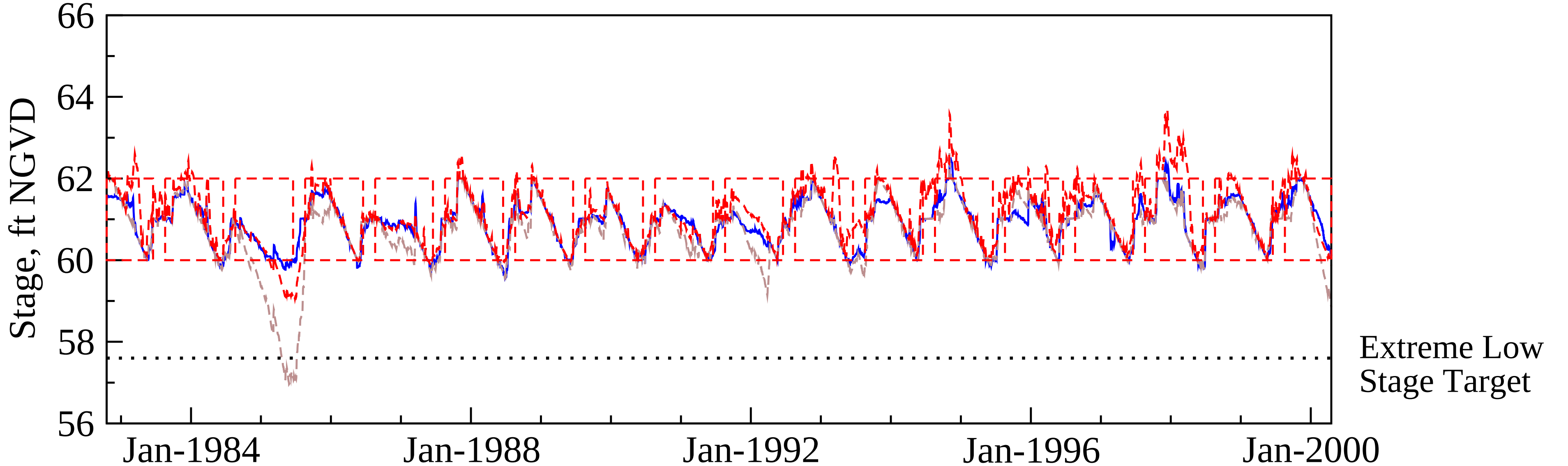
Stage Hydrograph of mean daily stages



L-04. Stages in Lakes Joel, Myrtle, and Preston

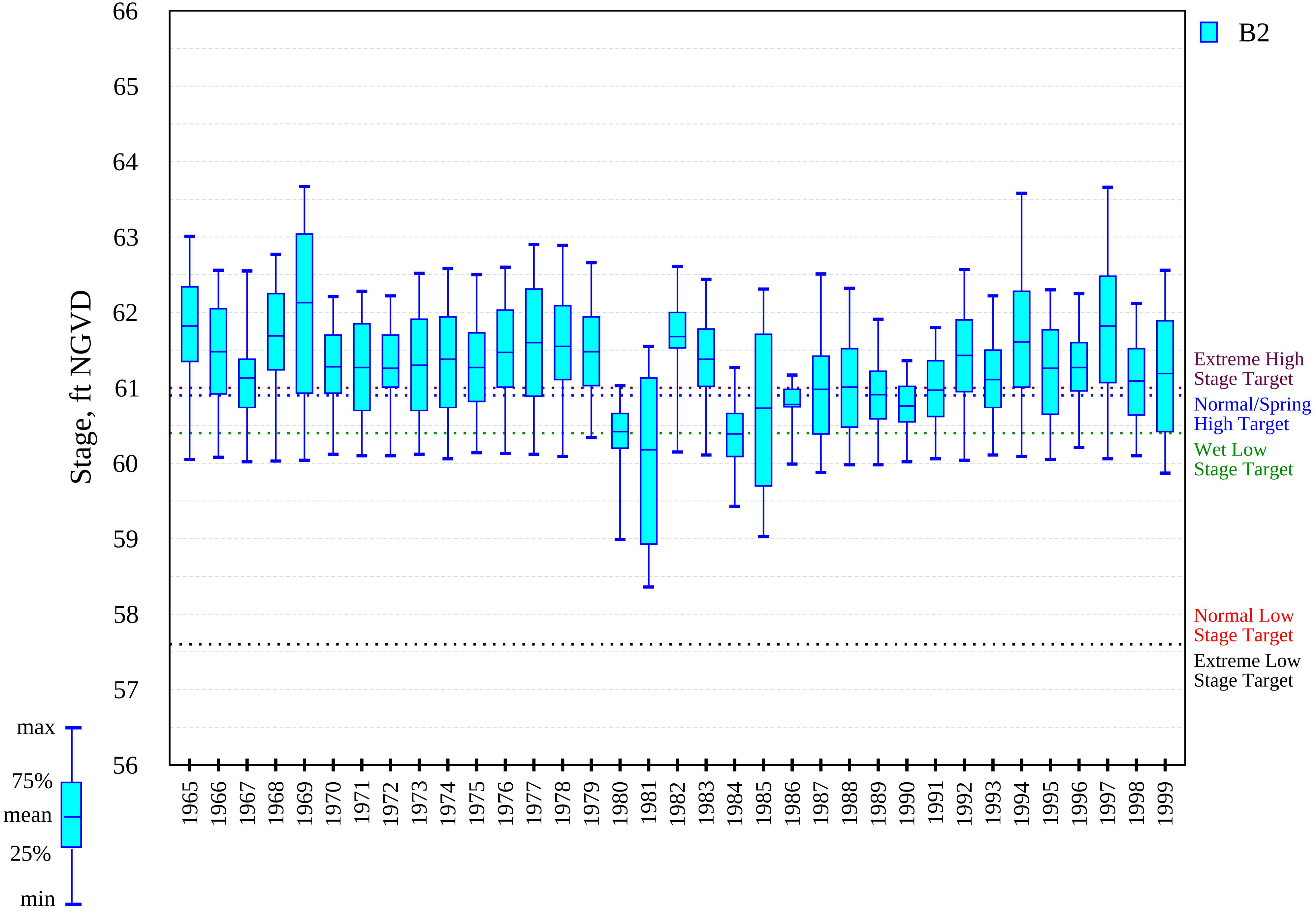
Daily Stage Hydrograph with Water Level recession windows (Sept-June)





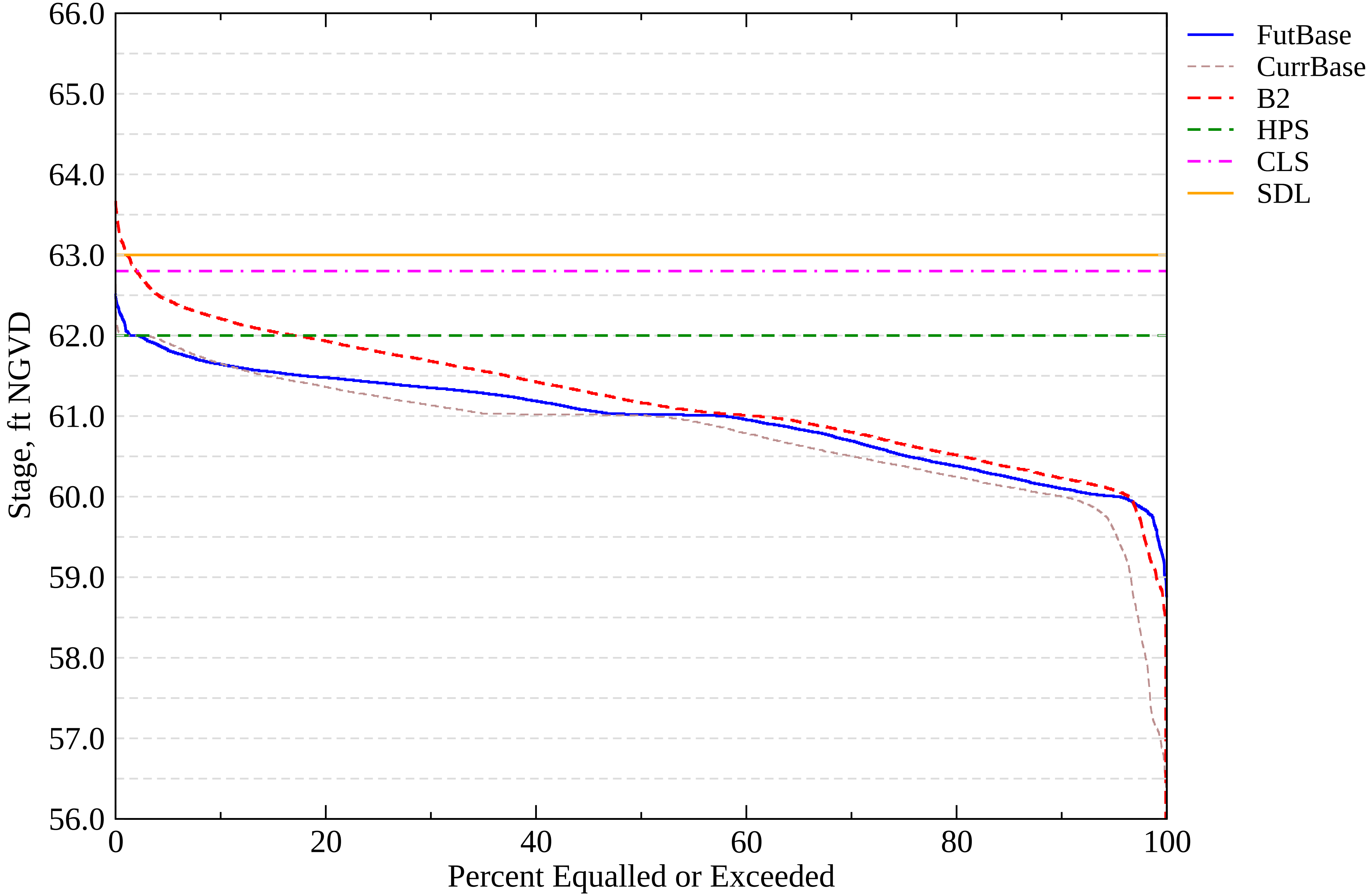
L-04. Stages in Lakes Joel, Myrtle, and Preston

Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Lake Myrtle, Joel, and Preston (S57)



Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation B2

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

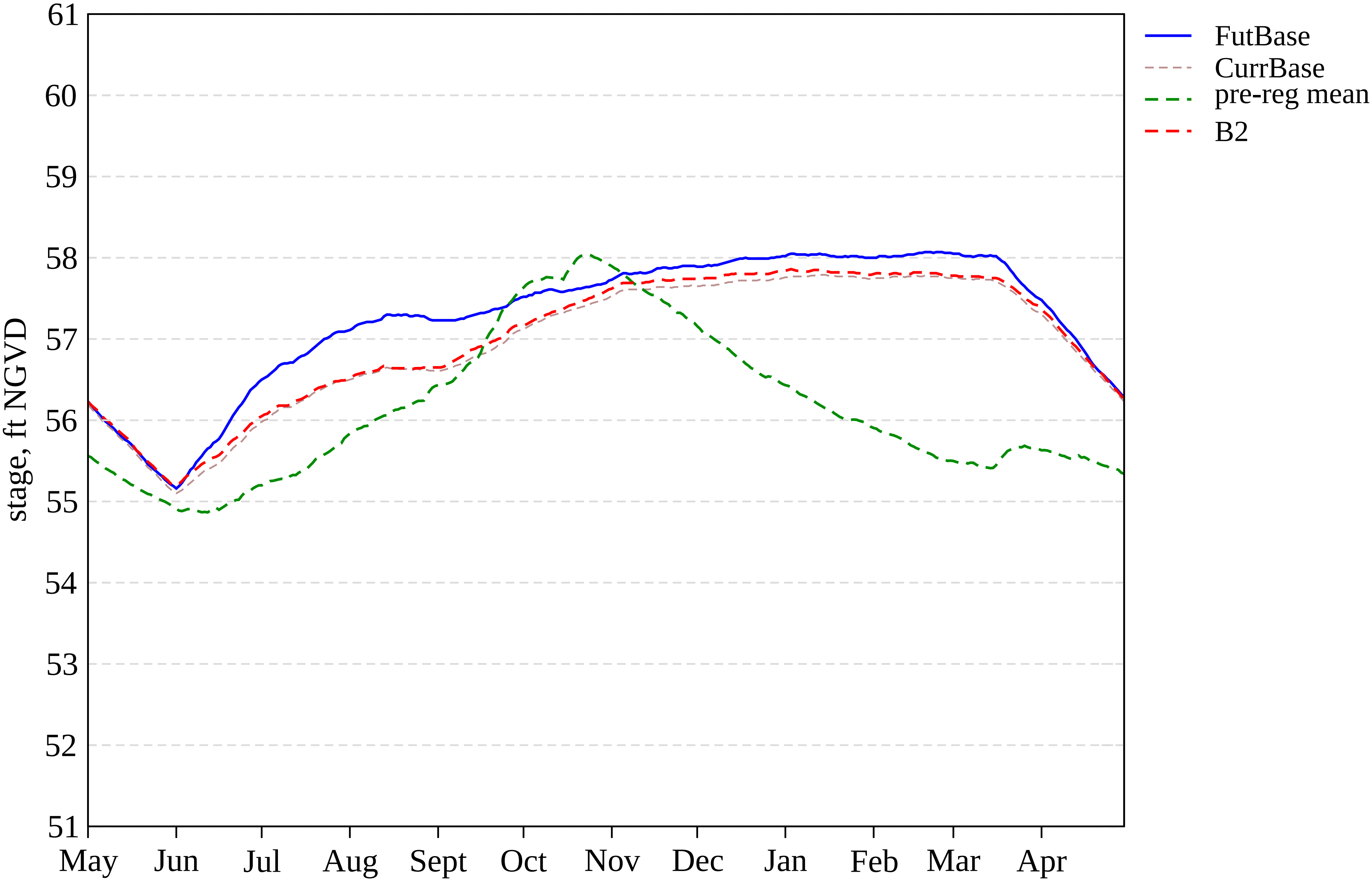
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	66.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	66.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	28.6
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	91.4
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.0
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.4

Tier 2 Report

PDF Report for L05

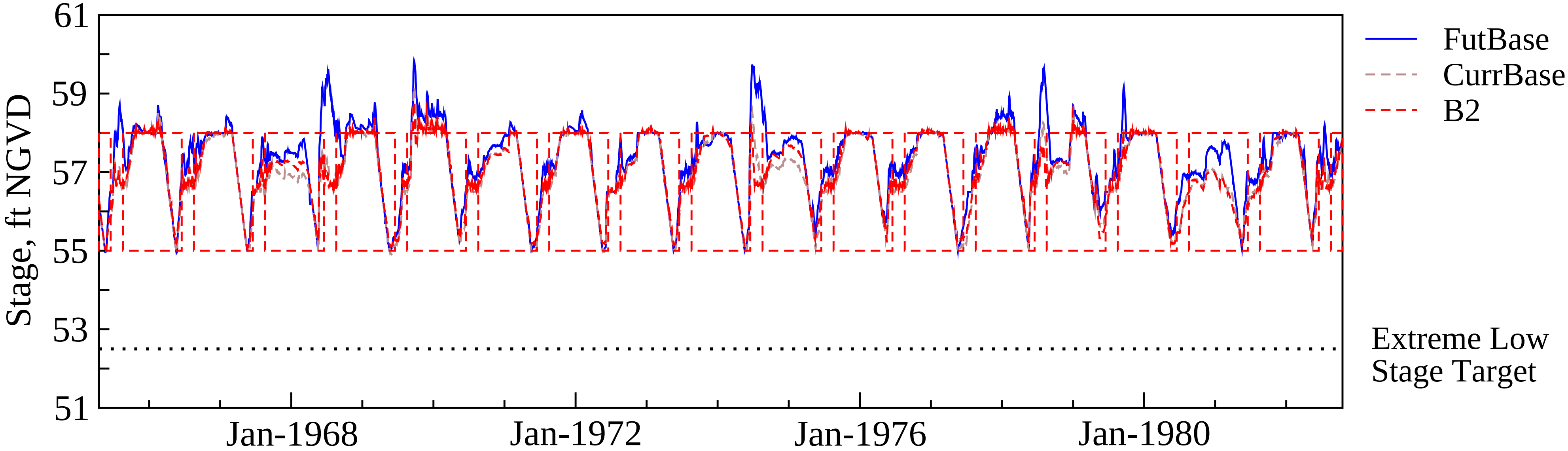
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

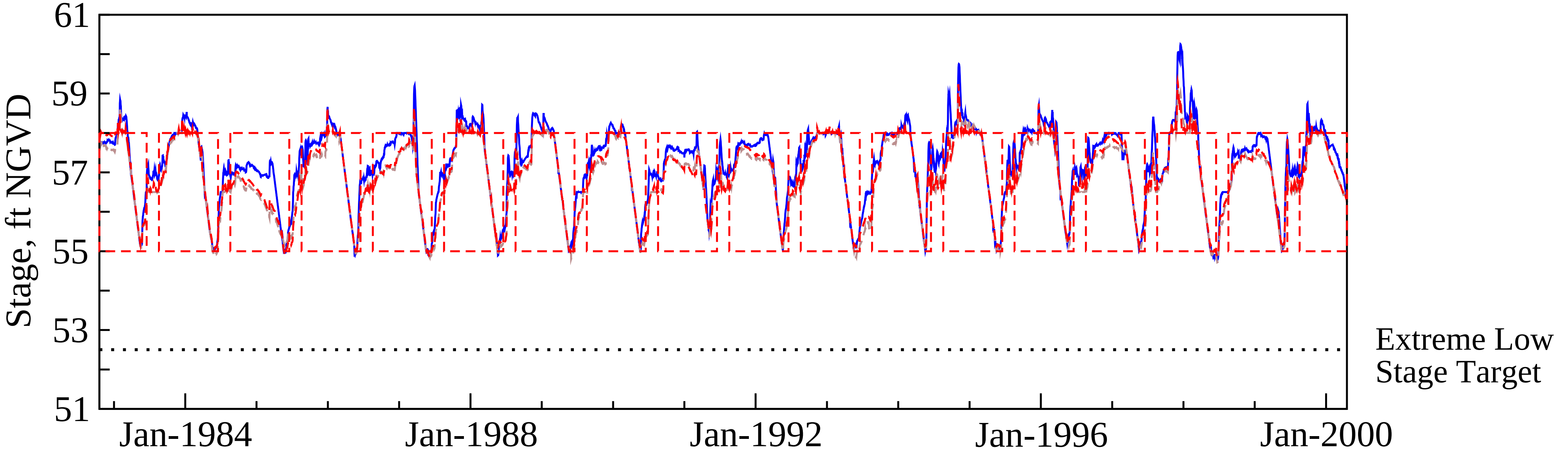
Stage Hydrograph of mean daily stages

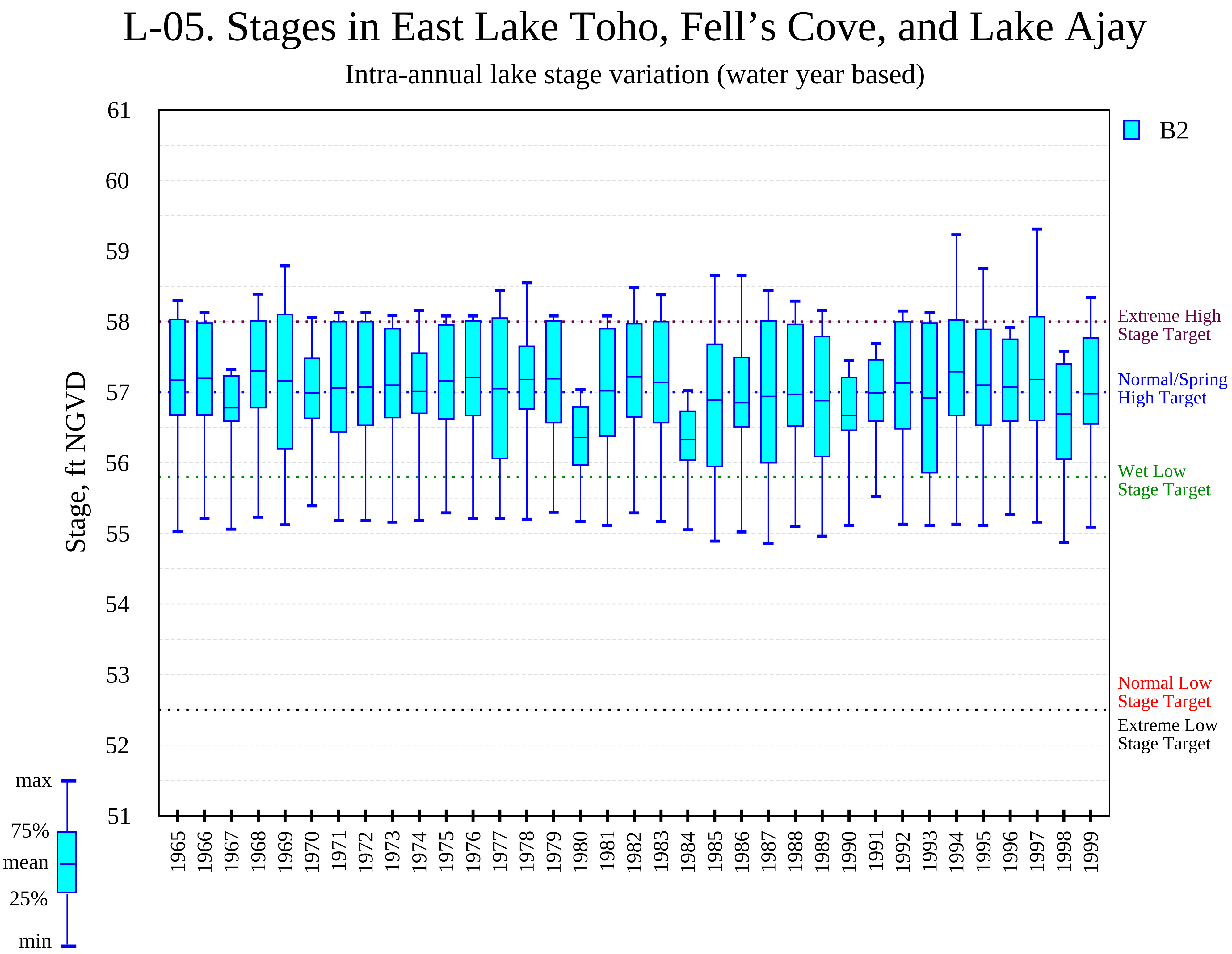


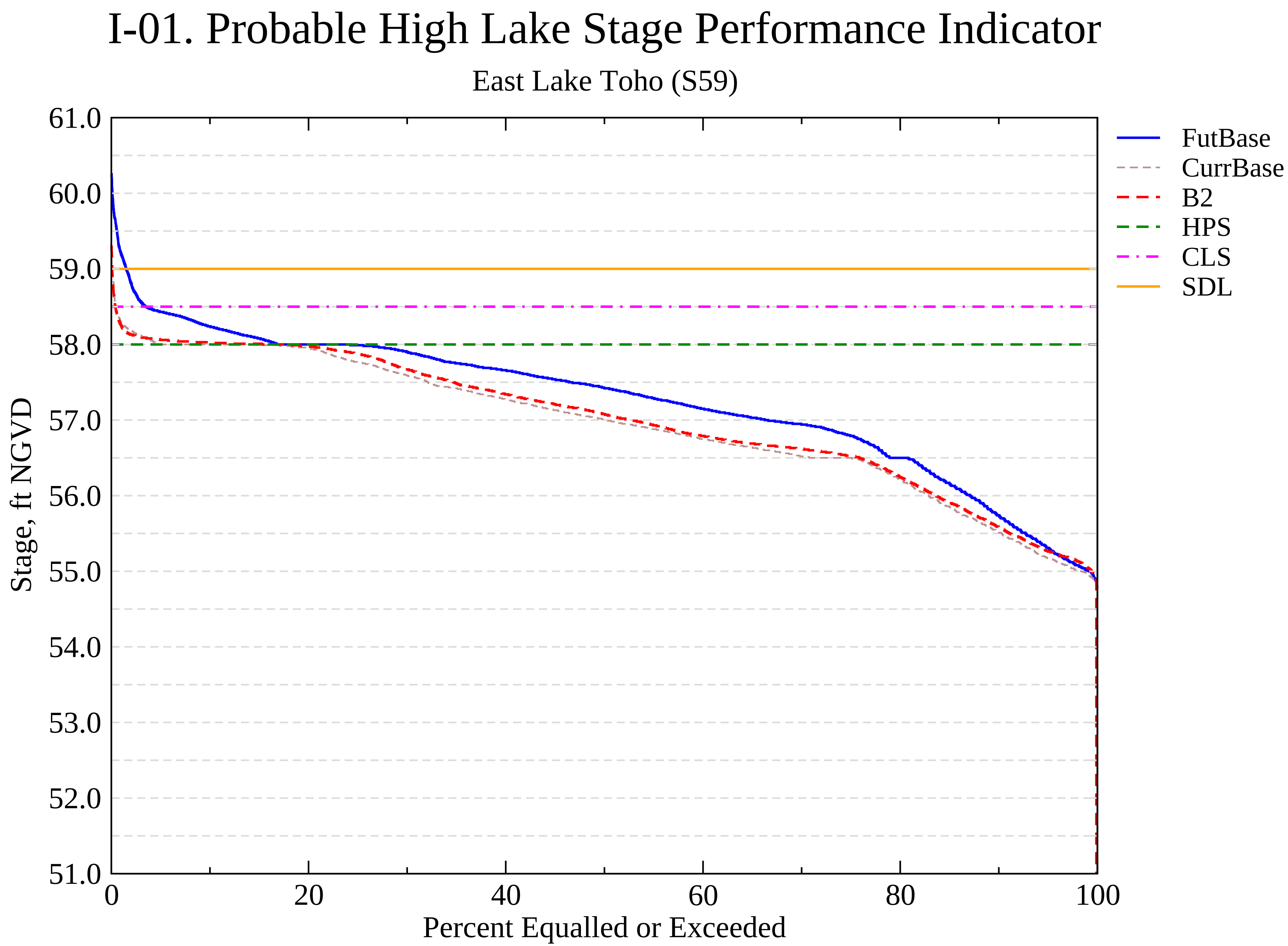
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Daily Stage Hydrograph with Water Level recession windows (Sept-June)





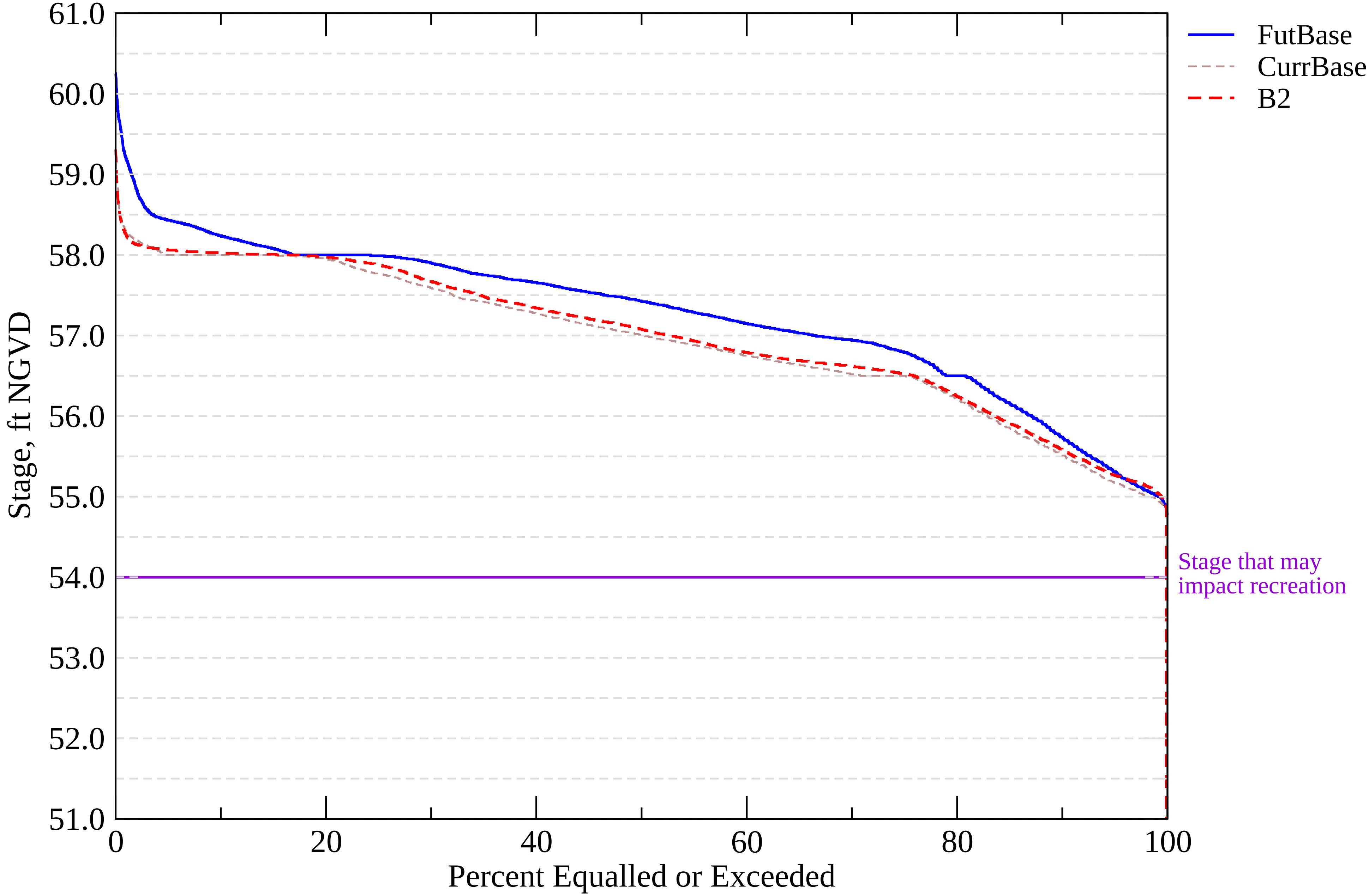

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
61
60
59
58
57
56
55
54
53
52
51
B2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min



I-01. Probable High Lake Stage Performance Indicator
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B2
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

East Lake Toho (S59)



Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Alternative Description : Uncertainty Analysis - Simulation B2

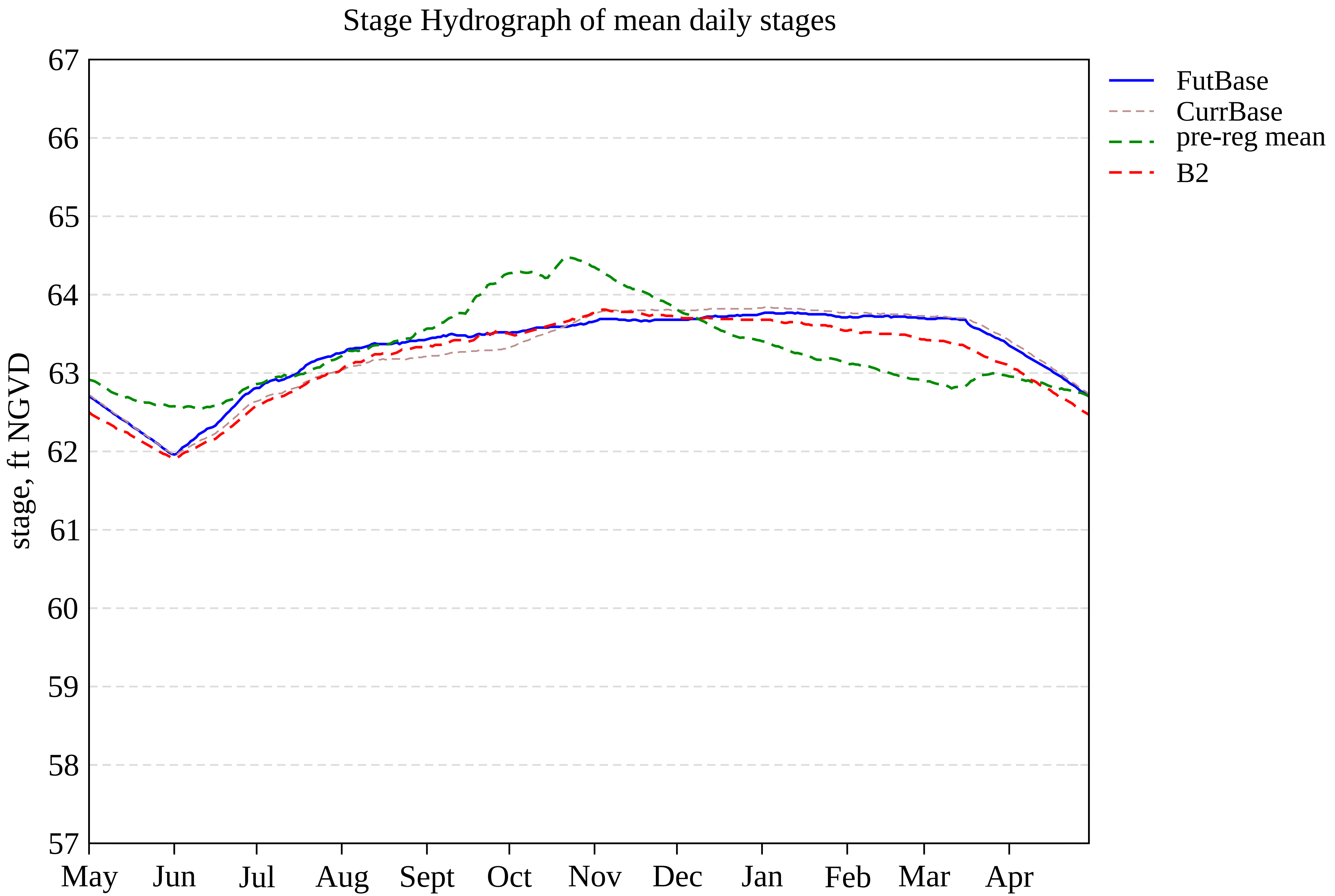
Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	51.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	62.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	0.0
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.5
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	6.2

Tier 2 Report

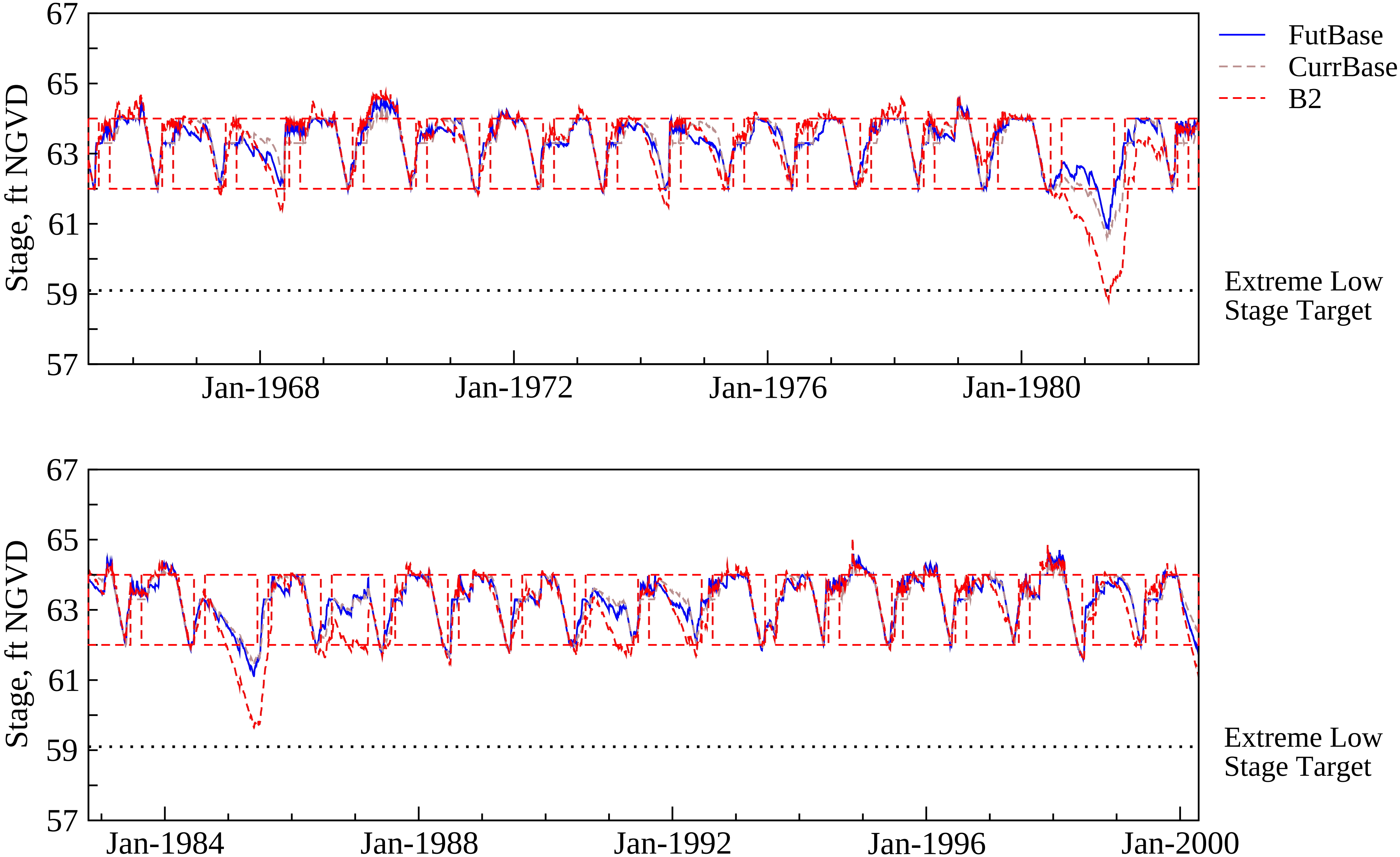
PDF Report for L06

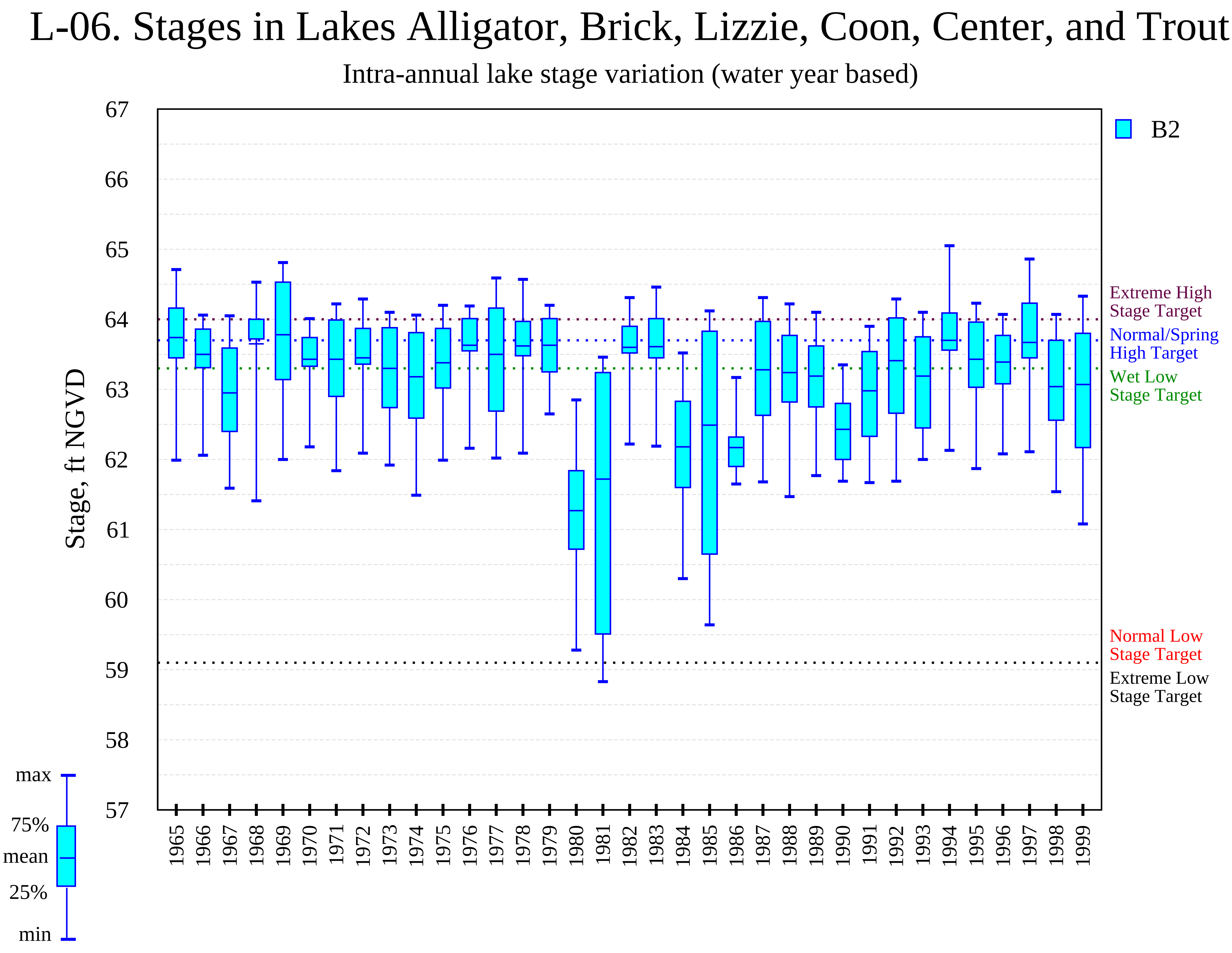
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout



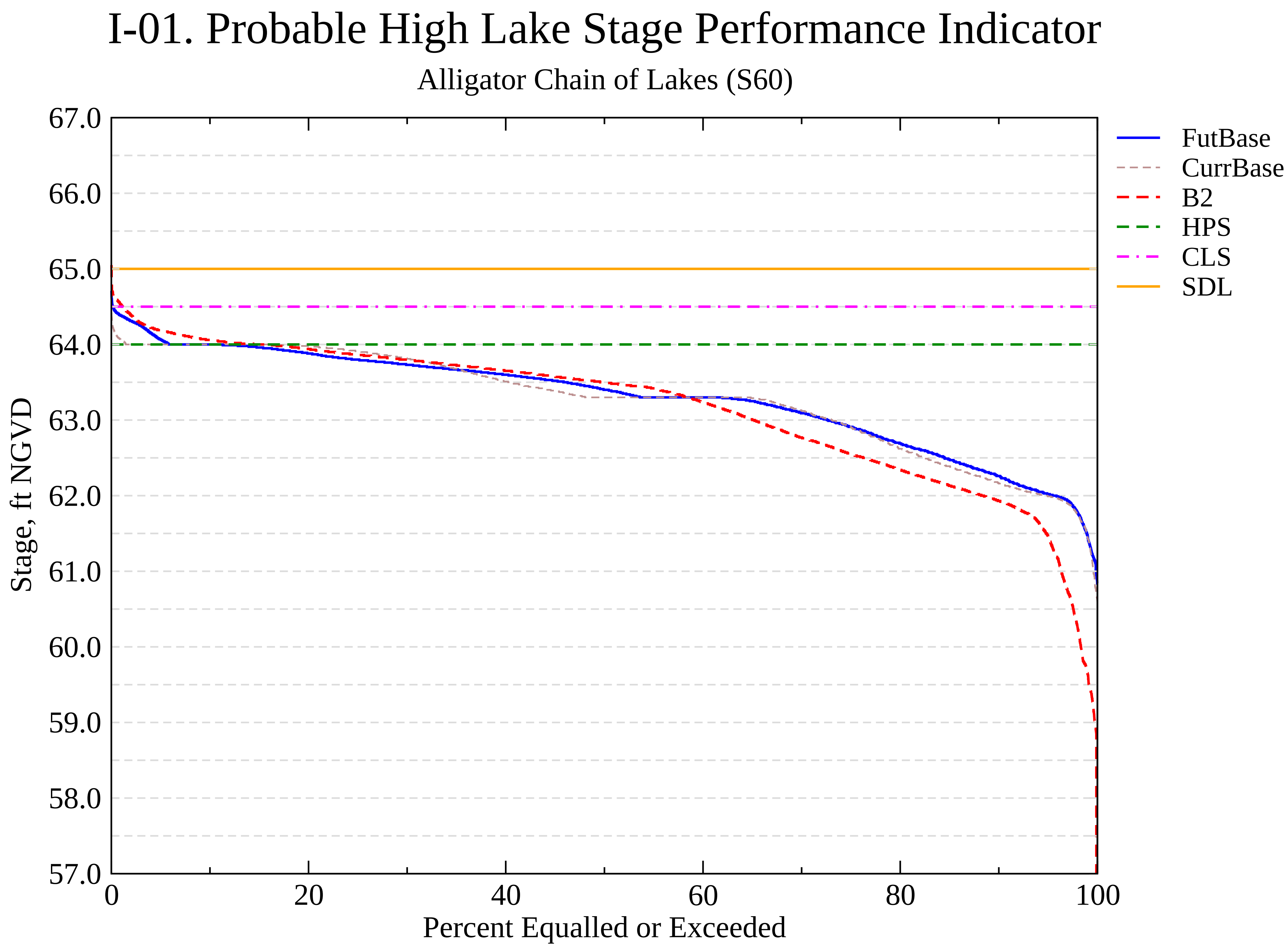
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

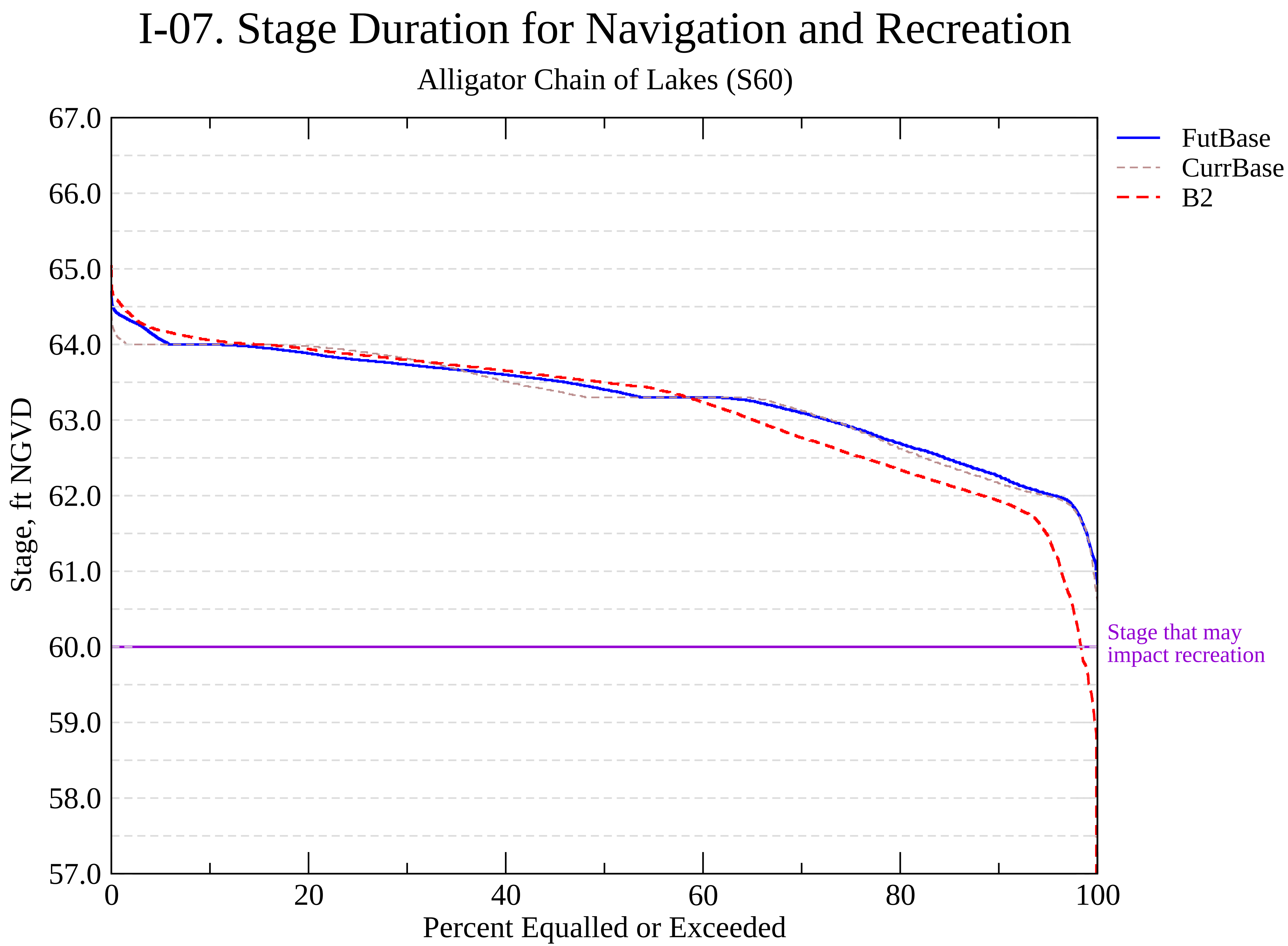
Daily Stage Hydrograph with Water Level recession windows (Sept-June)





L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
B2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min


I-01. Probable High Lake Stage Performance Indicator
Alligator Chain of Lakes (S60)
Stage, ft NGVD
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B2
HPS
CLS
SDL



I-07. Stage Duration for Navigation and Recreation
Alligator Chain of Lakes (S60)
Stage, ft NGVD
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B2
Stage that may
impact recreation

Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

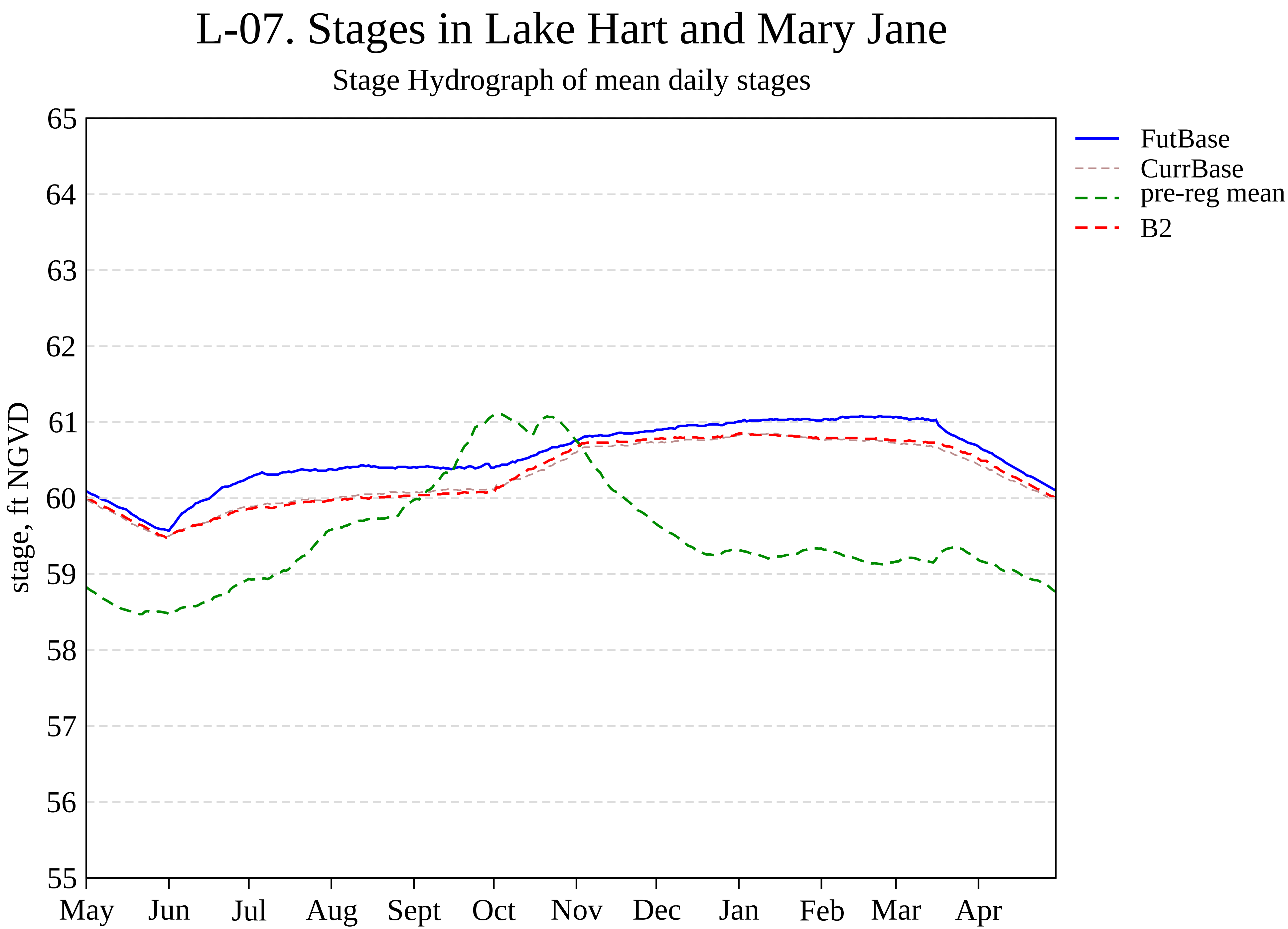
Alternative Description : Uncertainty Analysis - Simulation B2

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	74.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	71.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	43.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	25.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	5.7
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	3.4
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	66.0

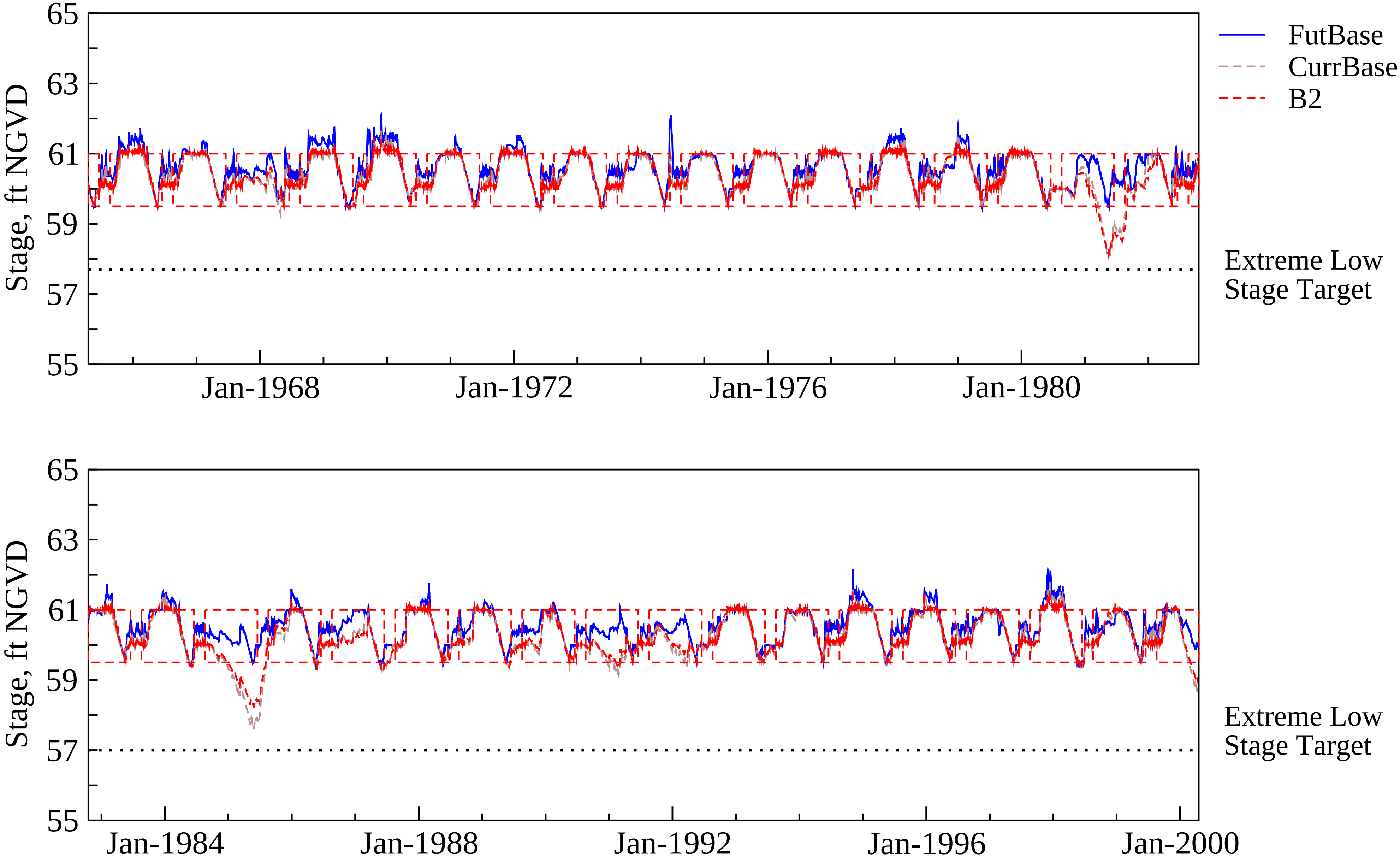
Tier 2 Report

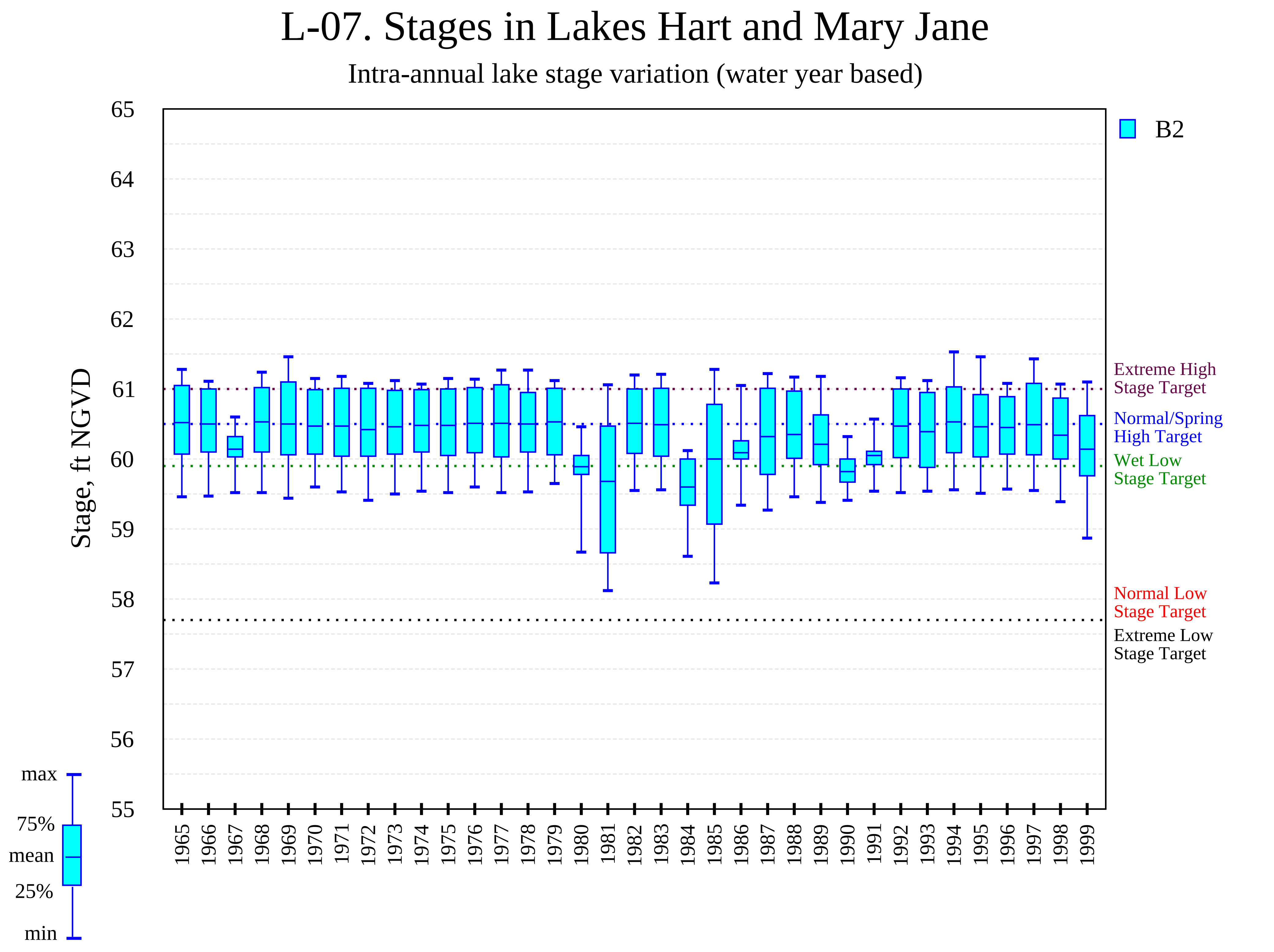
PDF Report for L07


L-07. Stages in Lake Hart and Mary Jane
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
B2

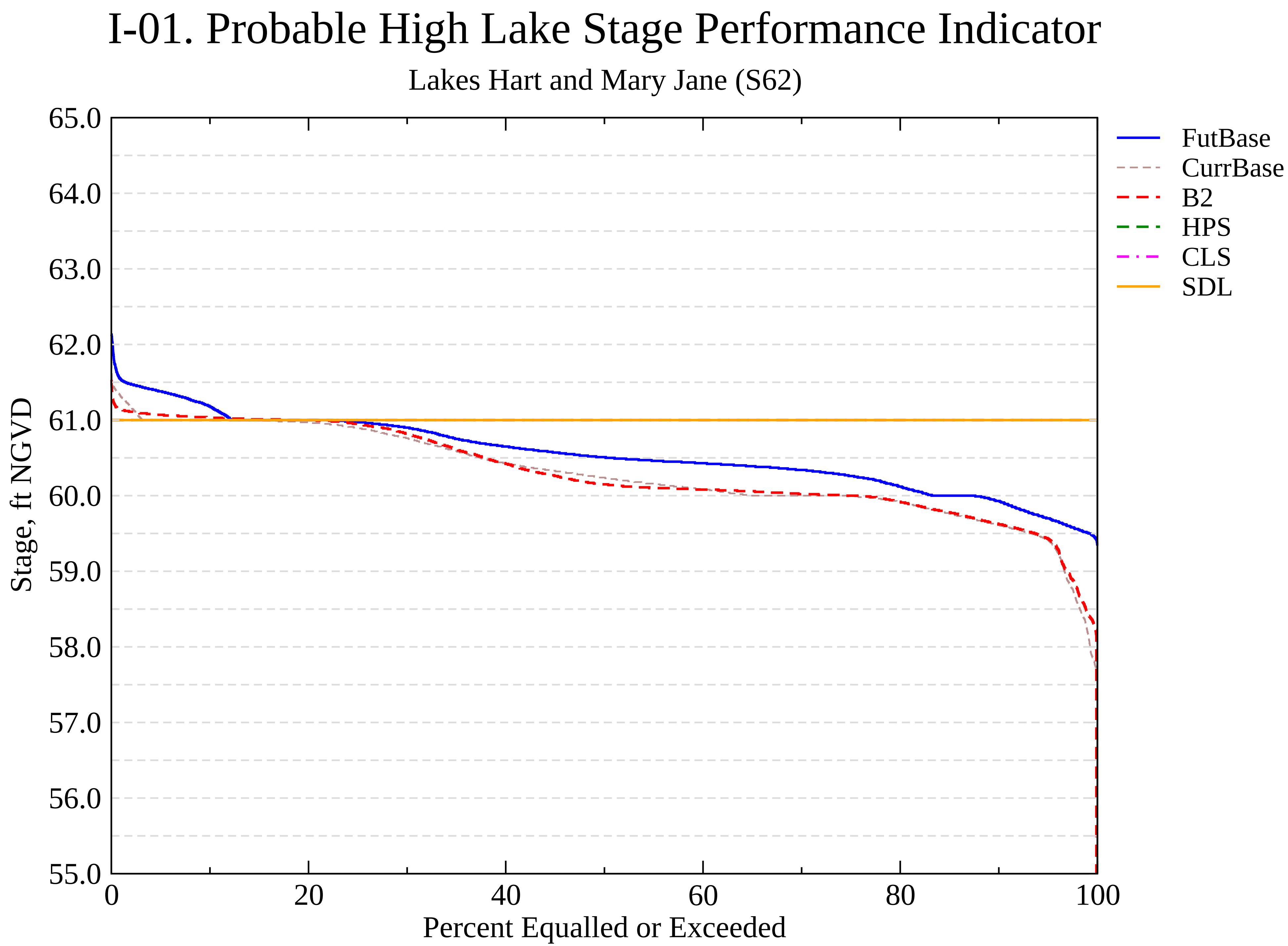
L-07. Stages in Lakes Hart and Mary Jane

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



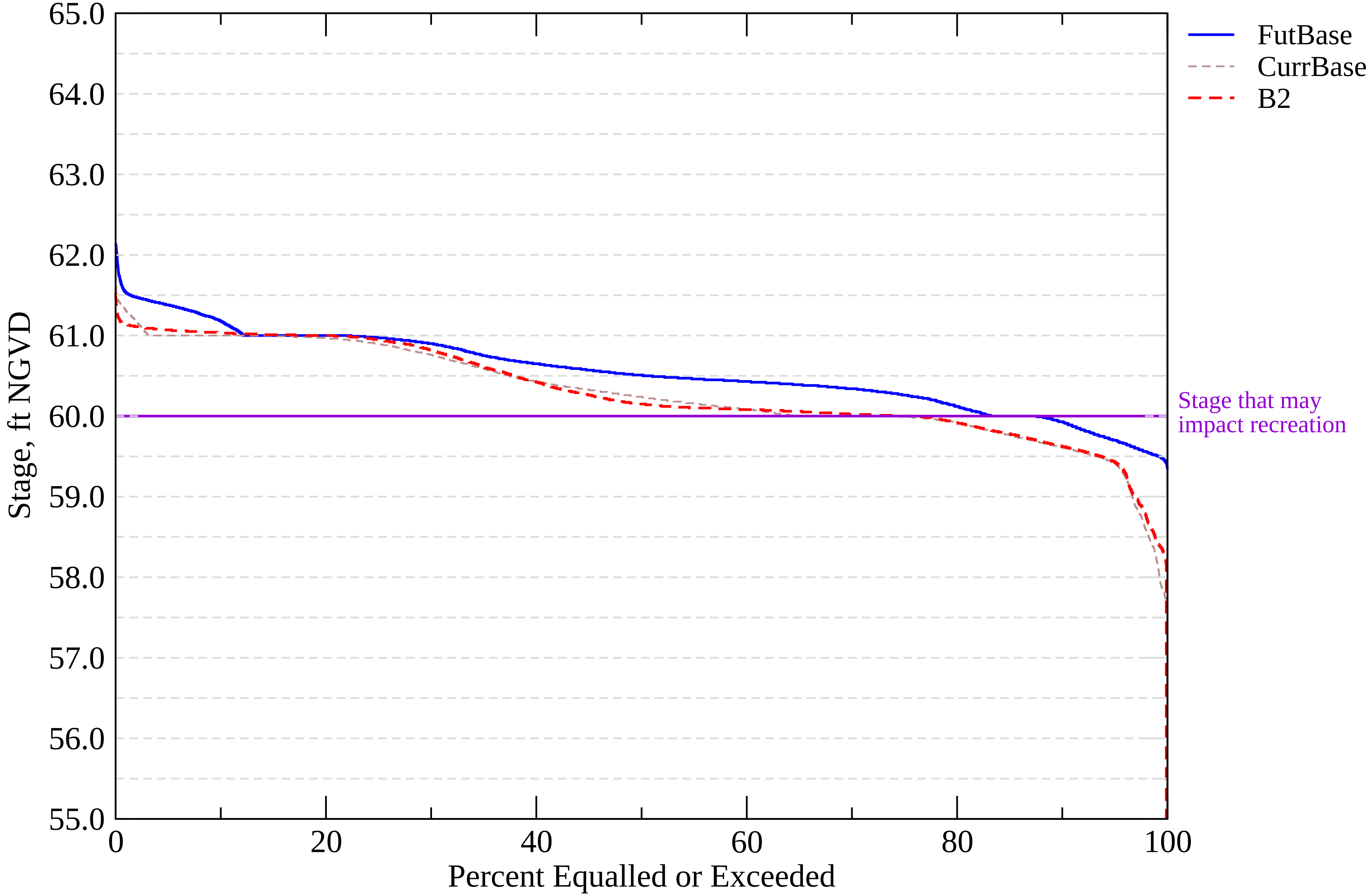


L-07. Stages in Lakes Hart and Mary Jane
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
B2
Extreme High
Stage Target
Normal/Spring
High Target
Wet Low
Stage Target
Normal Low
Stage Target
Extreme Low
Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min


I-01. Probable High Lake Stage Performance Indicator
Lakes Hart and Mary Jane (S62)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
B2
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lake Hart and Mary Jane (S62)



Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

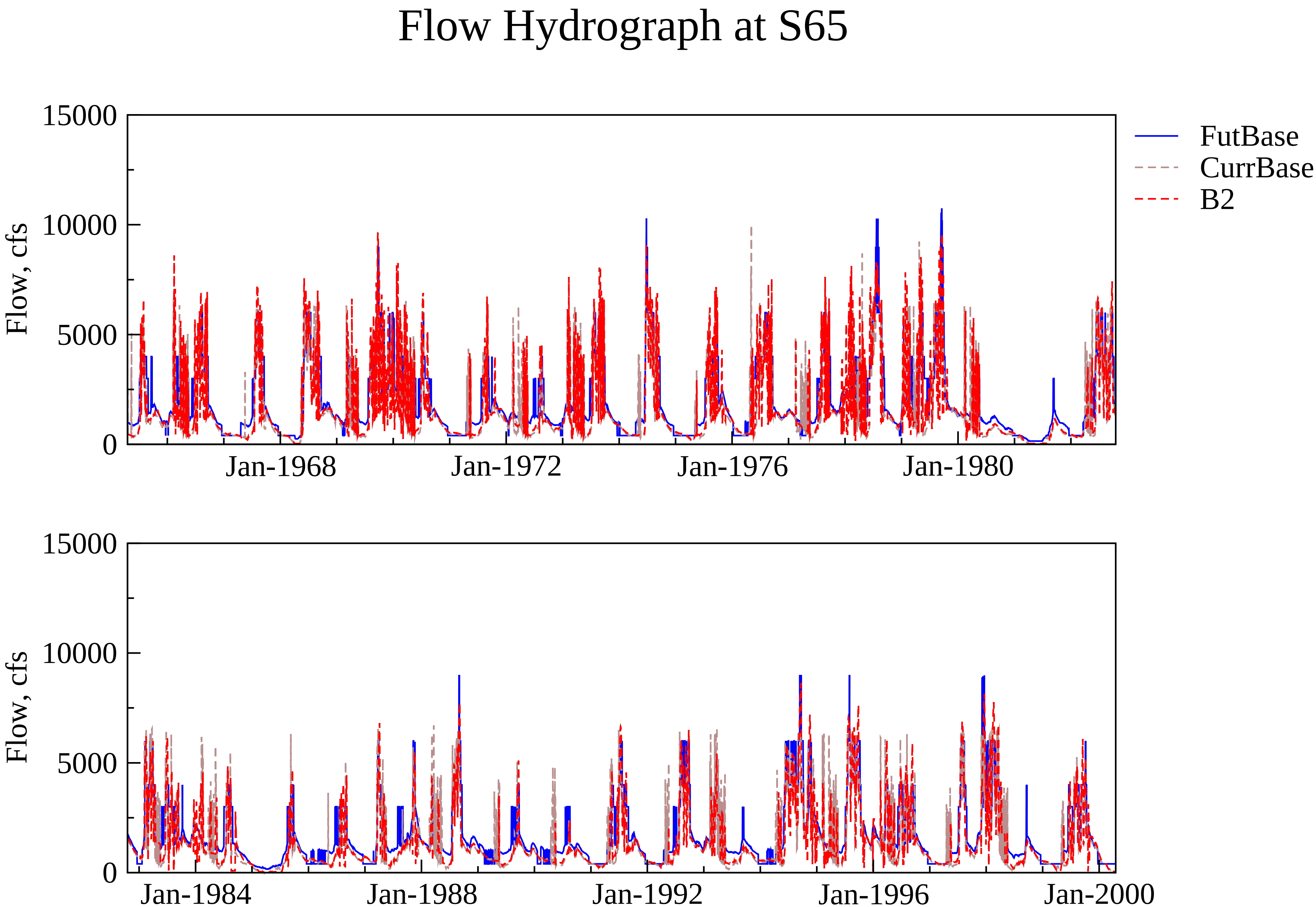
Alternative Description : Uncertainty Analysis - Simulation B2

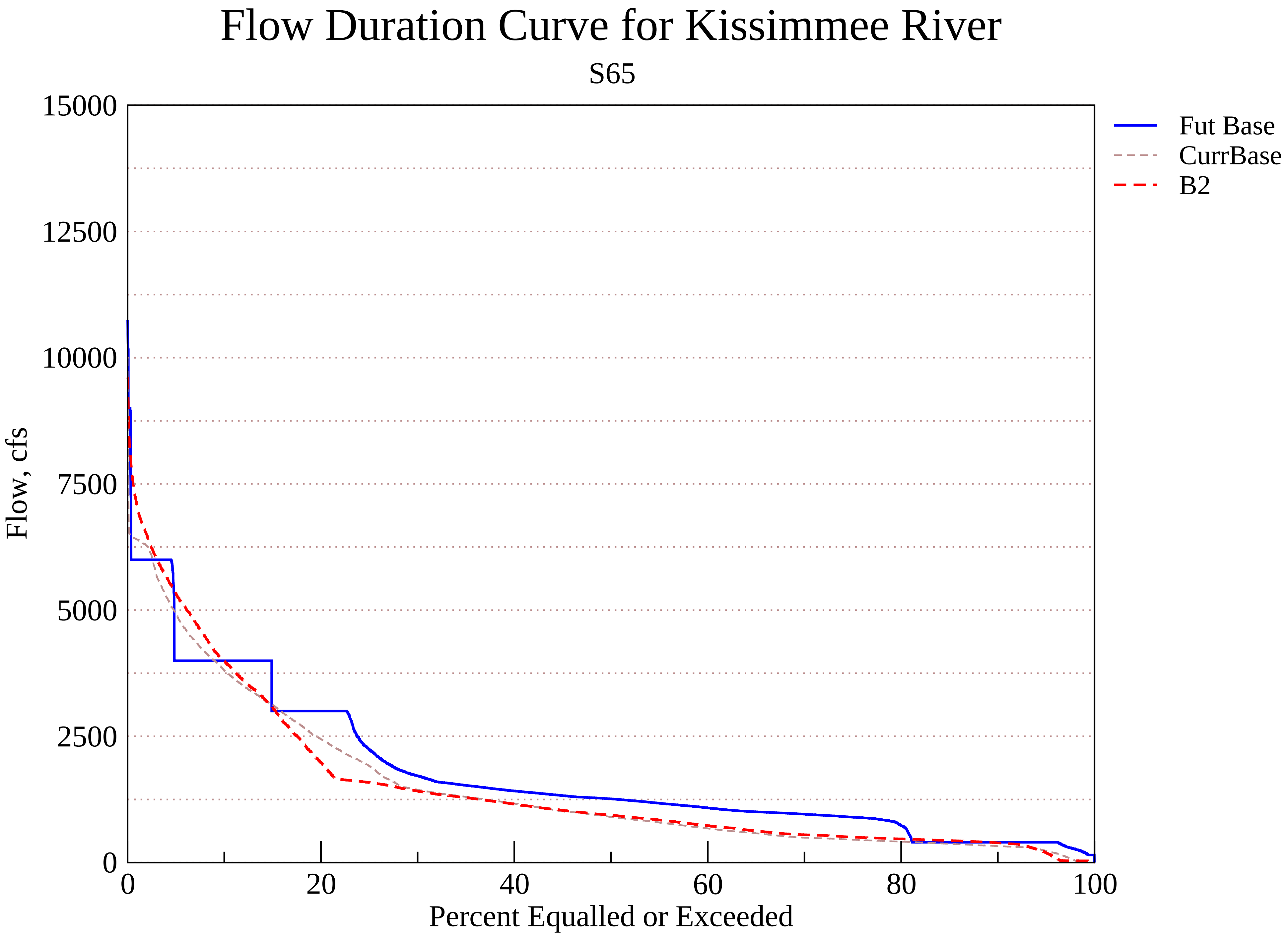
Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	28.6	40.0
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	62.9	54.3
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	88.6	80.0
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	5.7	11.4
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	200.0	260.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	417.0	557.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	3.2	8.1
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tier 2 Report

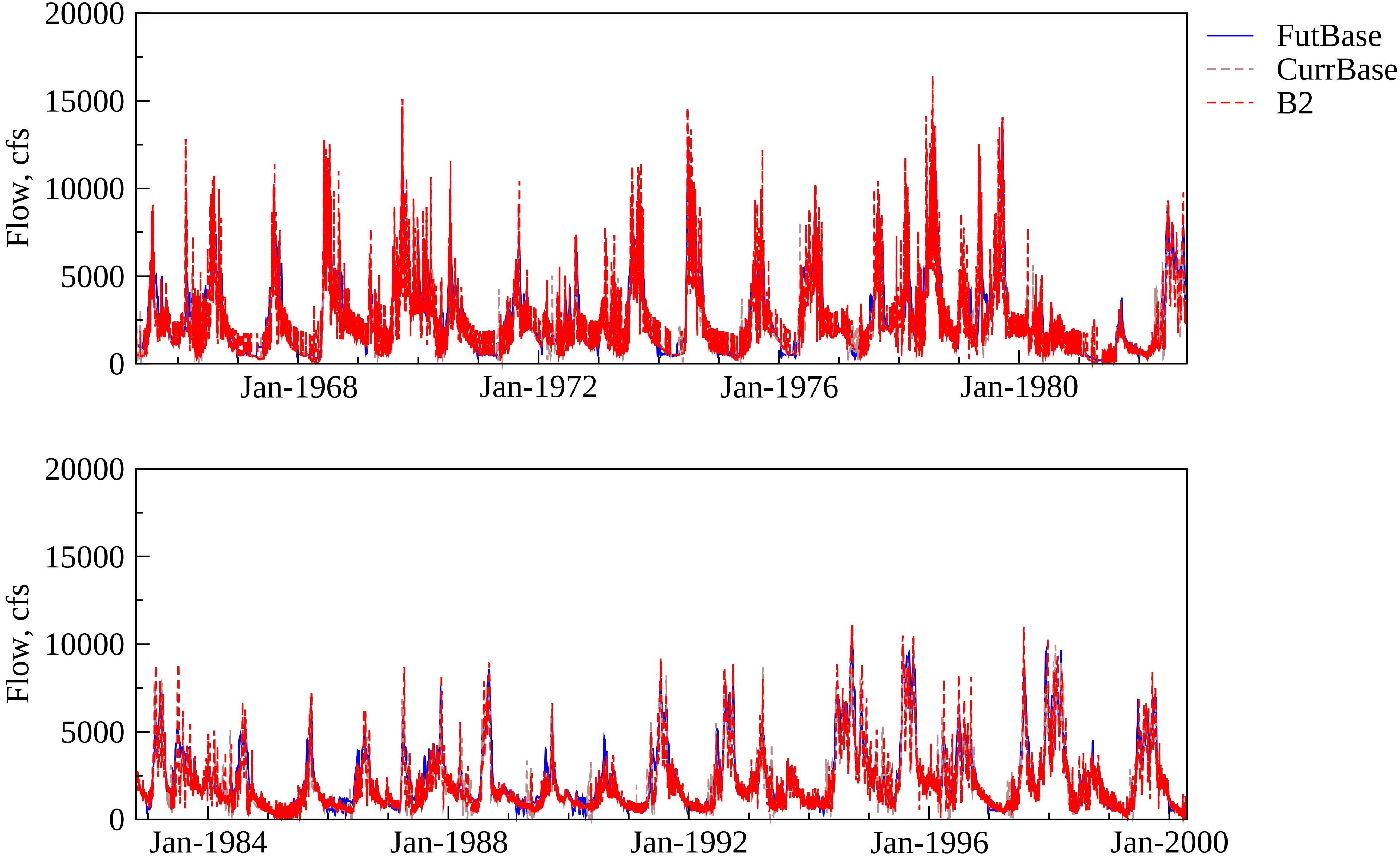
PDF Report for R01

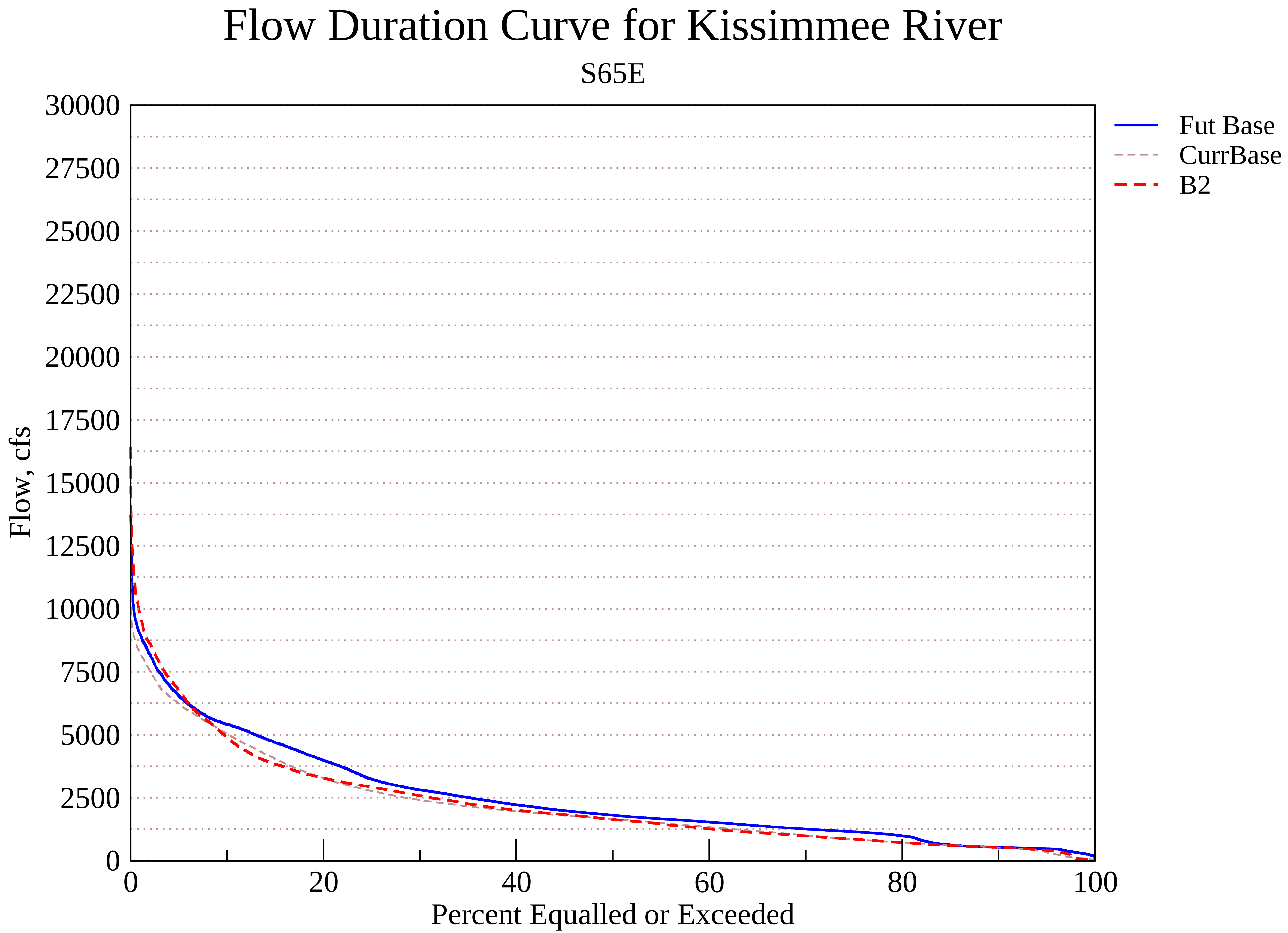

Flow Hydrograph at S65
Flow, cfs
15000
10000
5000
0
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
B2
Flow, cfs
15000
10000
5000
0
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000



Flow Duration Curve for Kissimmee River
S65
Flow, cfs
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
B2

Flow Hydrograph at S65E





Flow Duration Curve for Kissimmee River
S65E
Flow, cfs
30000
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
B2

Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation B2

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Number of days per water year that river channel depth is greater than average floodplain ground elelvation (average).	252.0	250.0	203.0	314.0
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	55.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	5.1
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	9.1

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

Alternative Description : Uncertainty Analysis - Simulation B2

Run ID : Variation of Kh_SAS, Kh - horizontal conductivity - HIGH

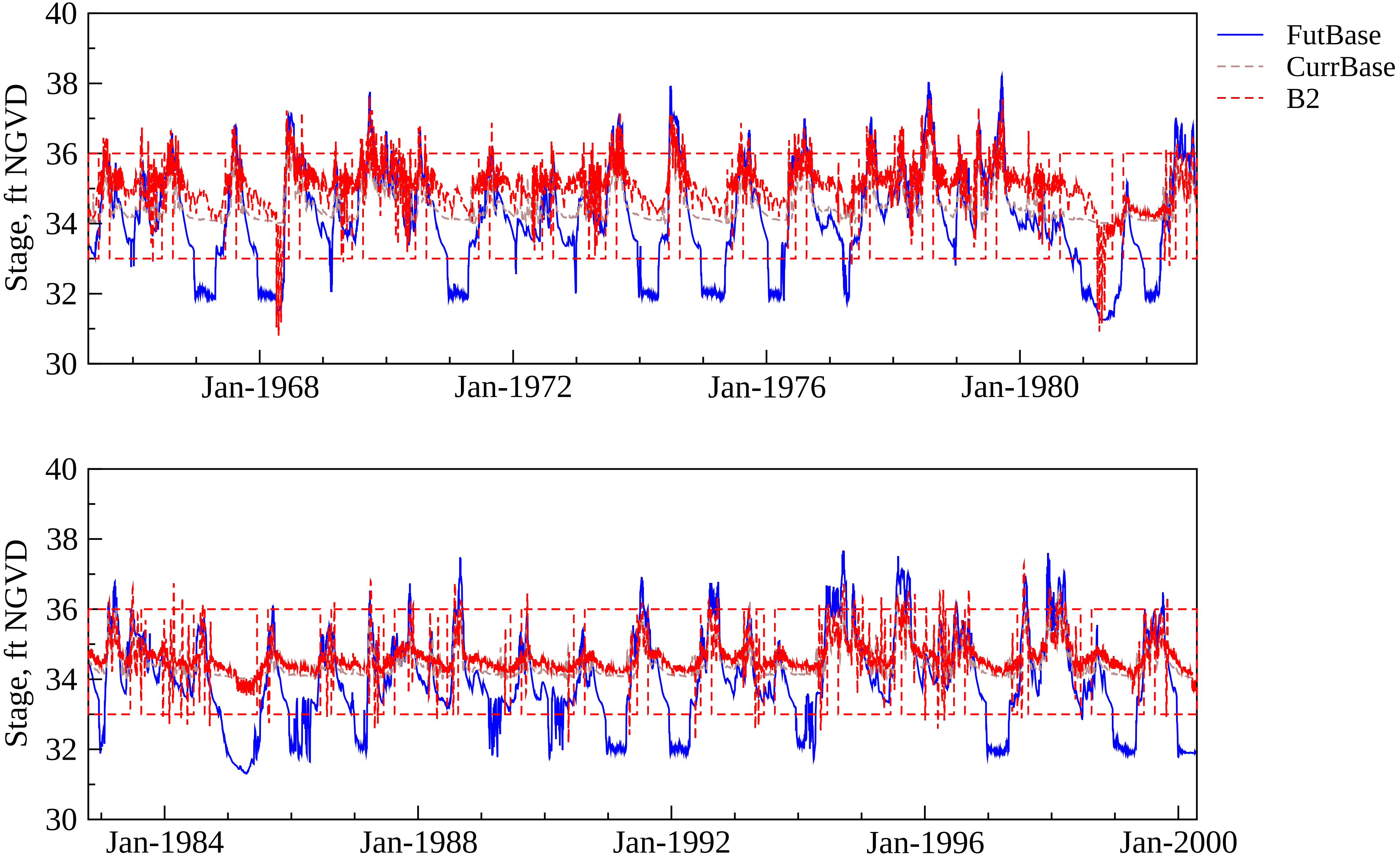
Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	42.9
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	88.6
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	37.1

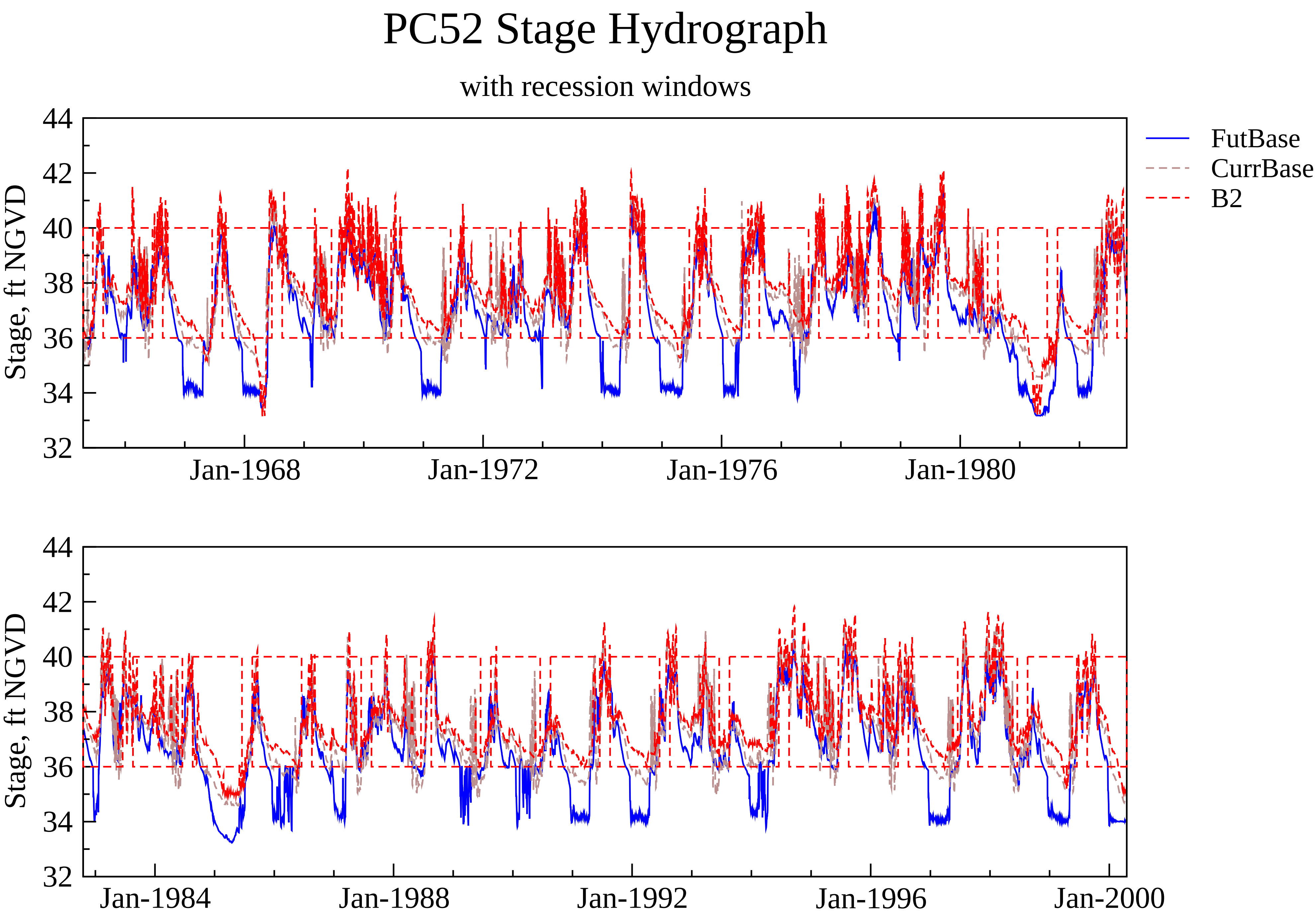
Tier 2 Report

PDF Report for R03

PC33 Stage Hydrograph

with recession windows




PC52 Stage Hydrograph
with recession windows
FutBase
CurrBase
B2
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation C1

Variation of drainage constant, k - LOW

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

EarthTech
A tyco International Ltd. Company

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation C1

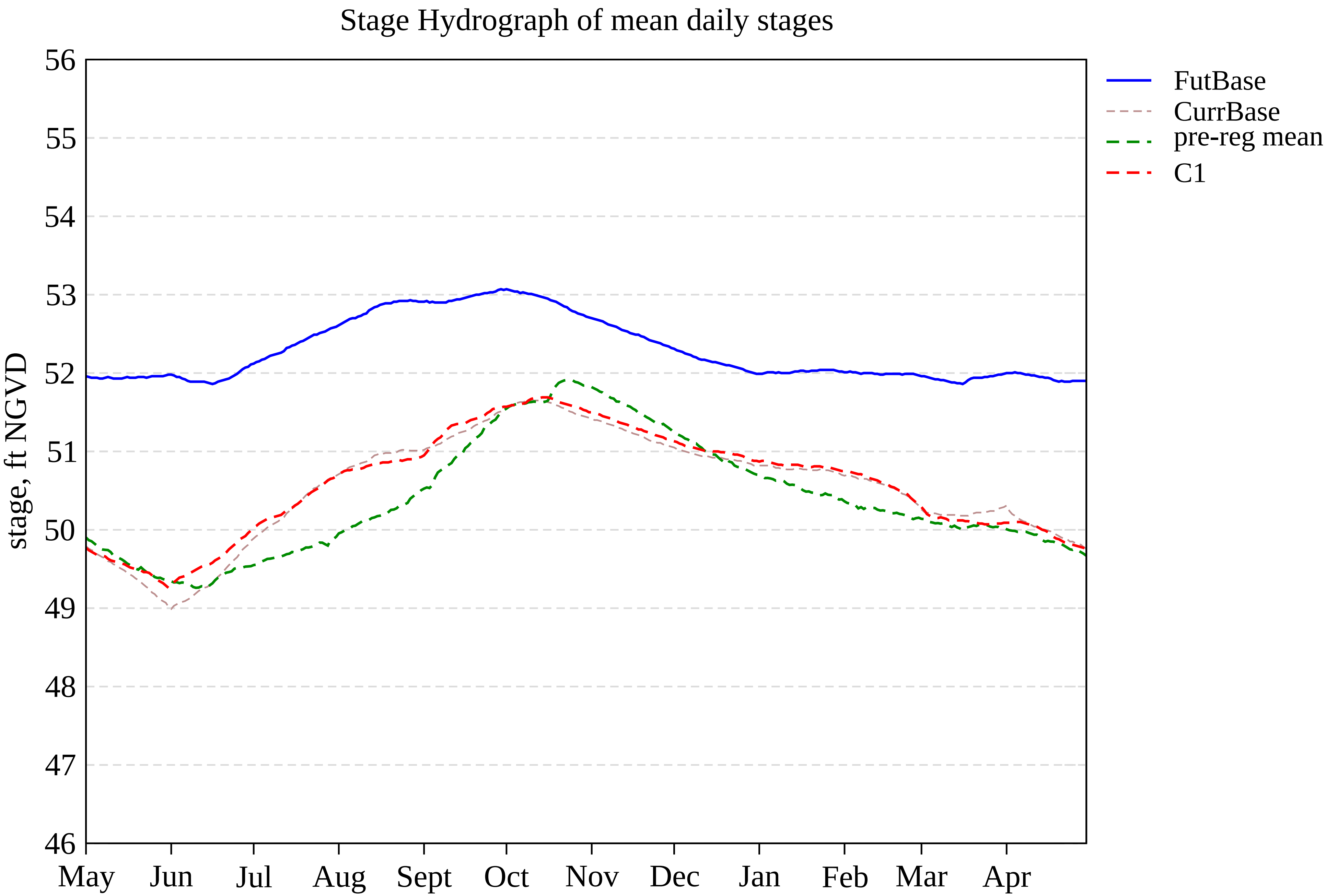
Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	86.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	14.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	68.6
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	11.4
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	88.6
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	2.6	3.2
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	5.5	6.0

Tier 2 Report

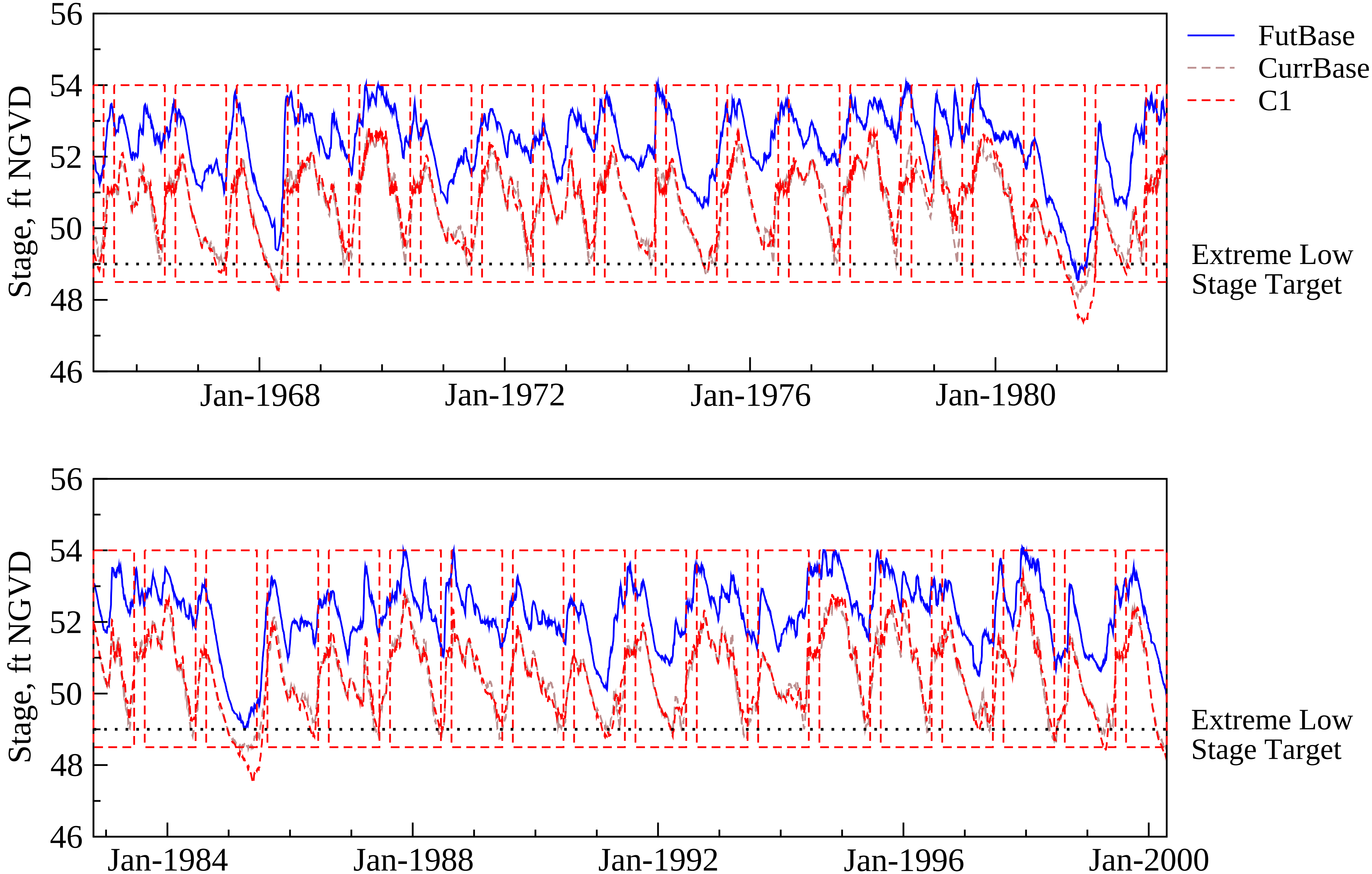
PDF Report for L01

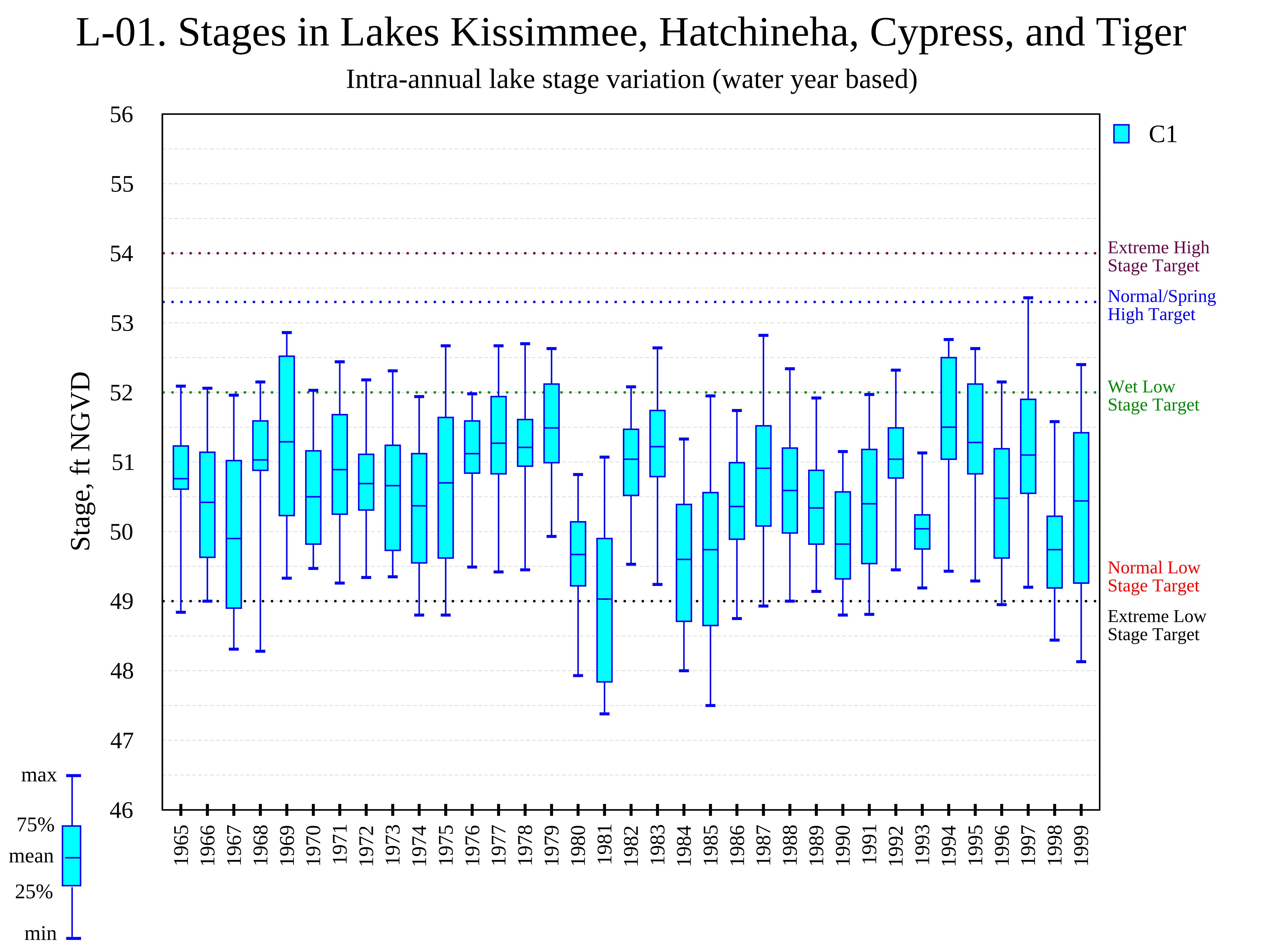
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger



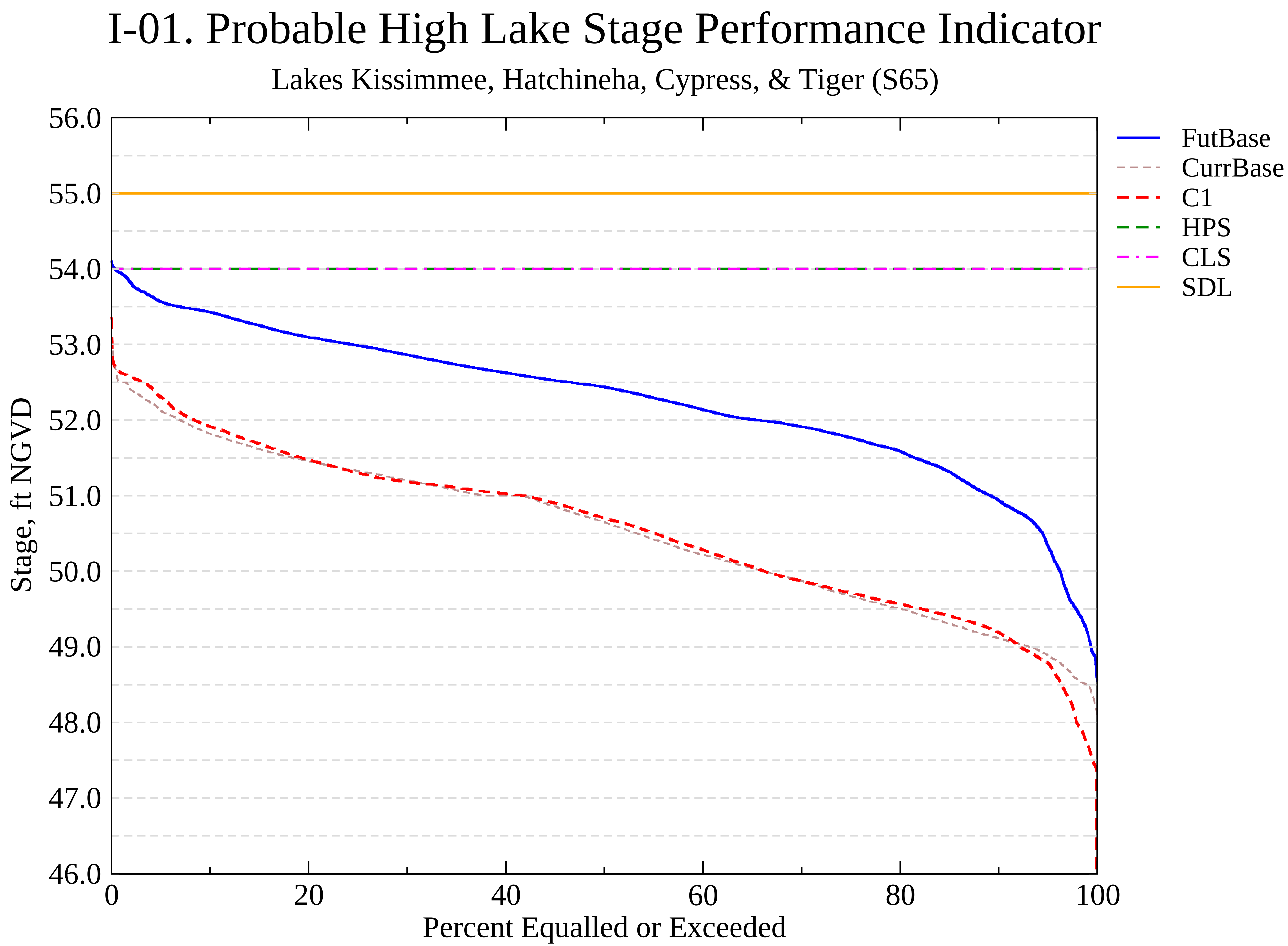
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

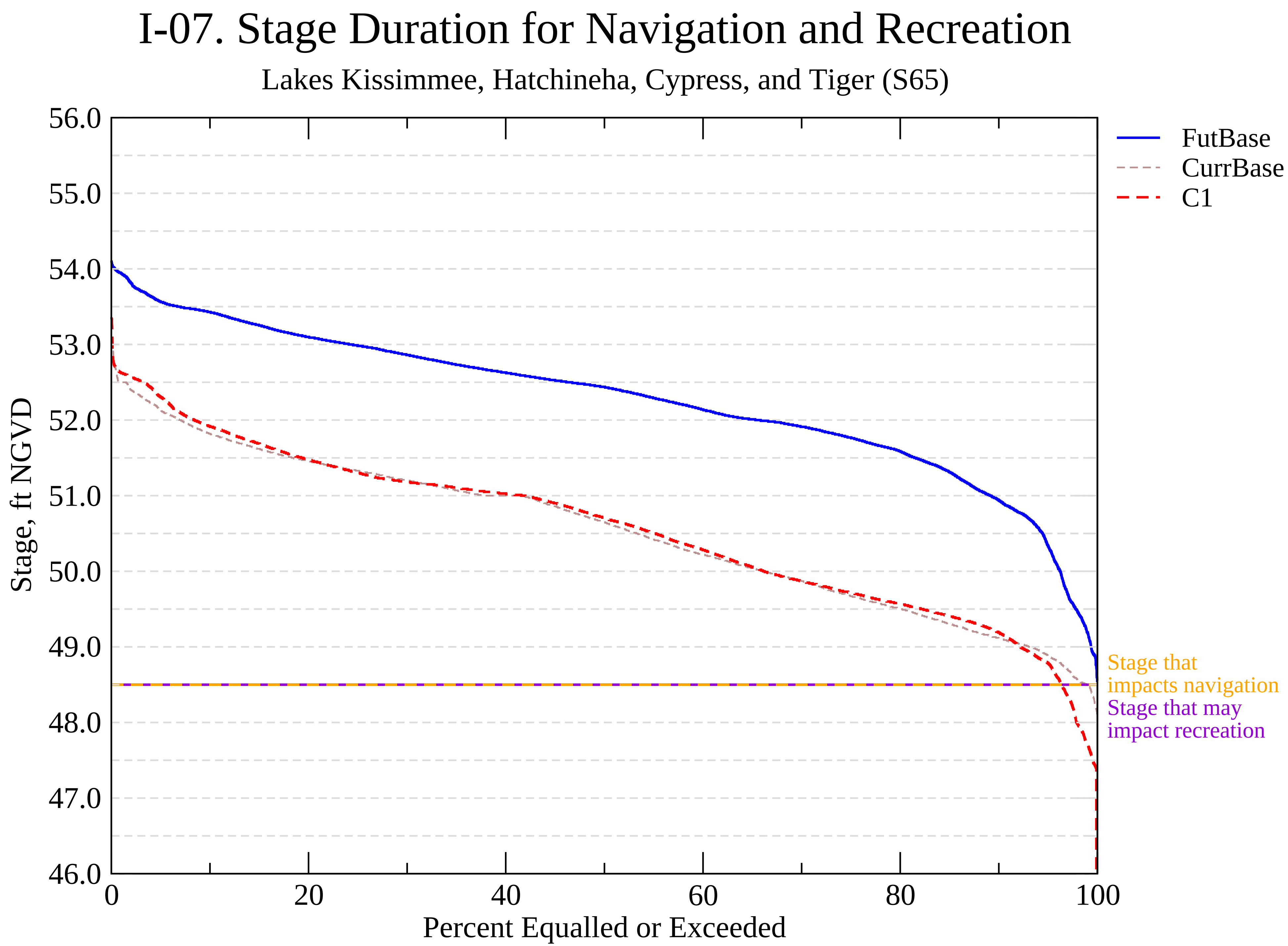
Daily Stage Hydrograph with Water Level recession windows (Sept-June)





L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
56
55
54
53
52
51
50
49
48
47
46
C1
Extreme High
Stage Target
Normal/Spring
High Target
Wet Low
Stage Target
Normal Low
Stage Target
Extreme Low
Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999


I-01. Probable High Lake Stage Performance Indicator
Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)
Stage, ft NGVD
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
C1
HPS
CLS
SDL



I-07. Stage Duration for Navigation and Recreation
Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)
Stage, ft NGVD
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
C1
Stage that impacts navigation
Stage that may impact recreation

Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

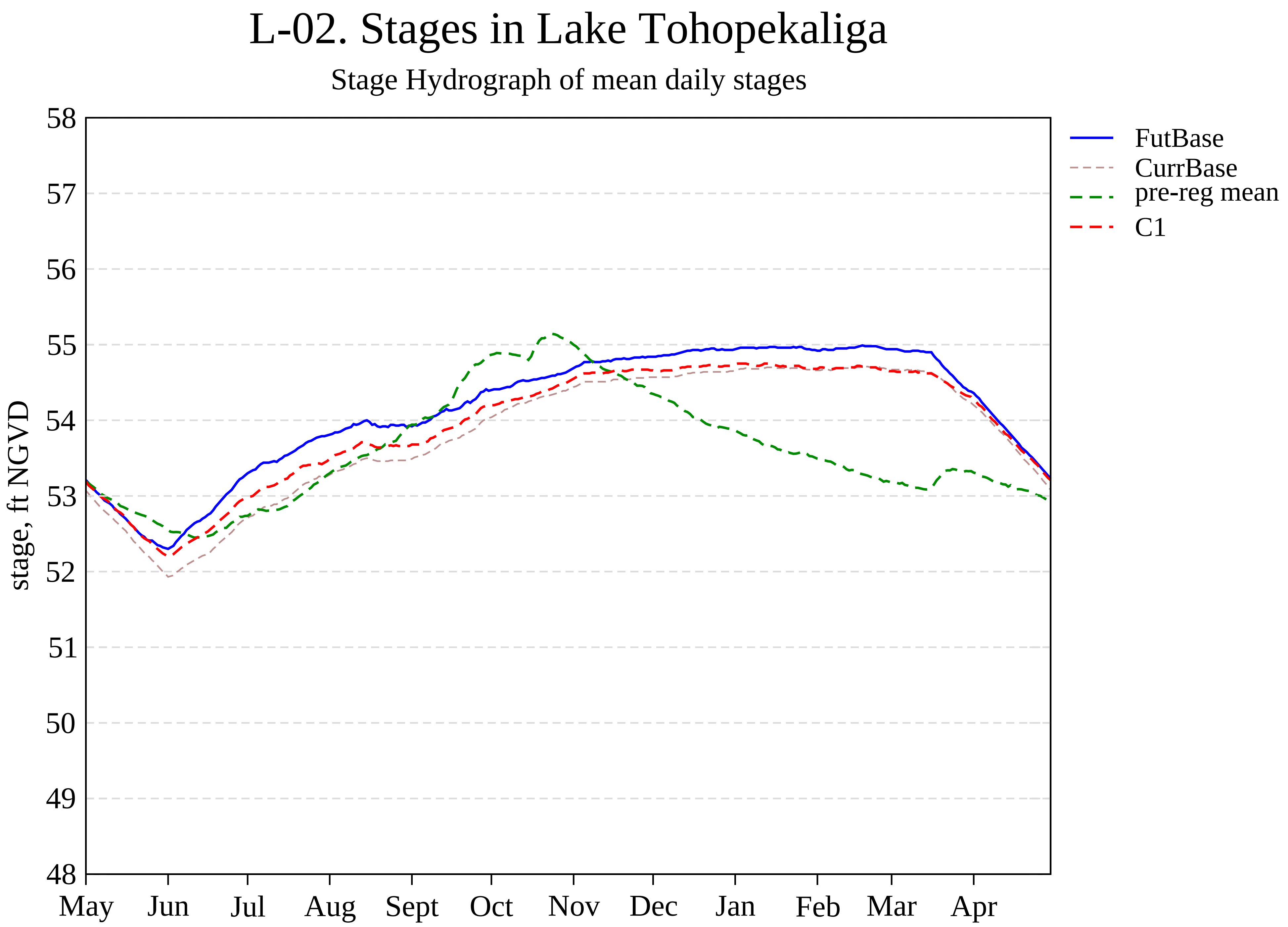
Alternative Description : Uncertainty Analysis - Simulation C1

Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	31.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	3.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	37.1
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	5.7
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.1
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	5.6

Tier 2 Report

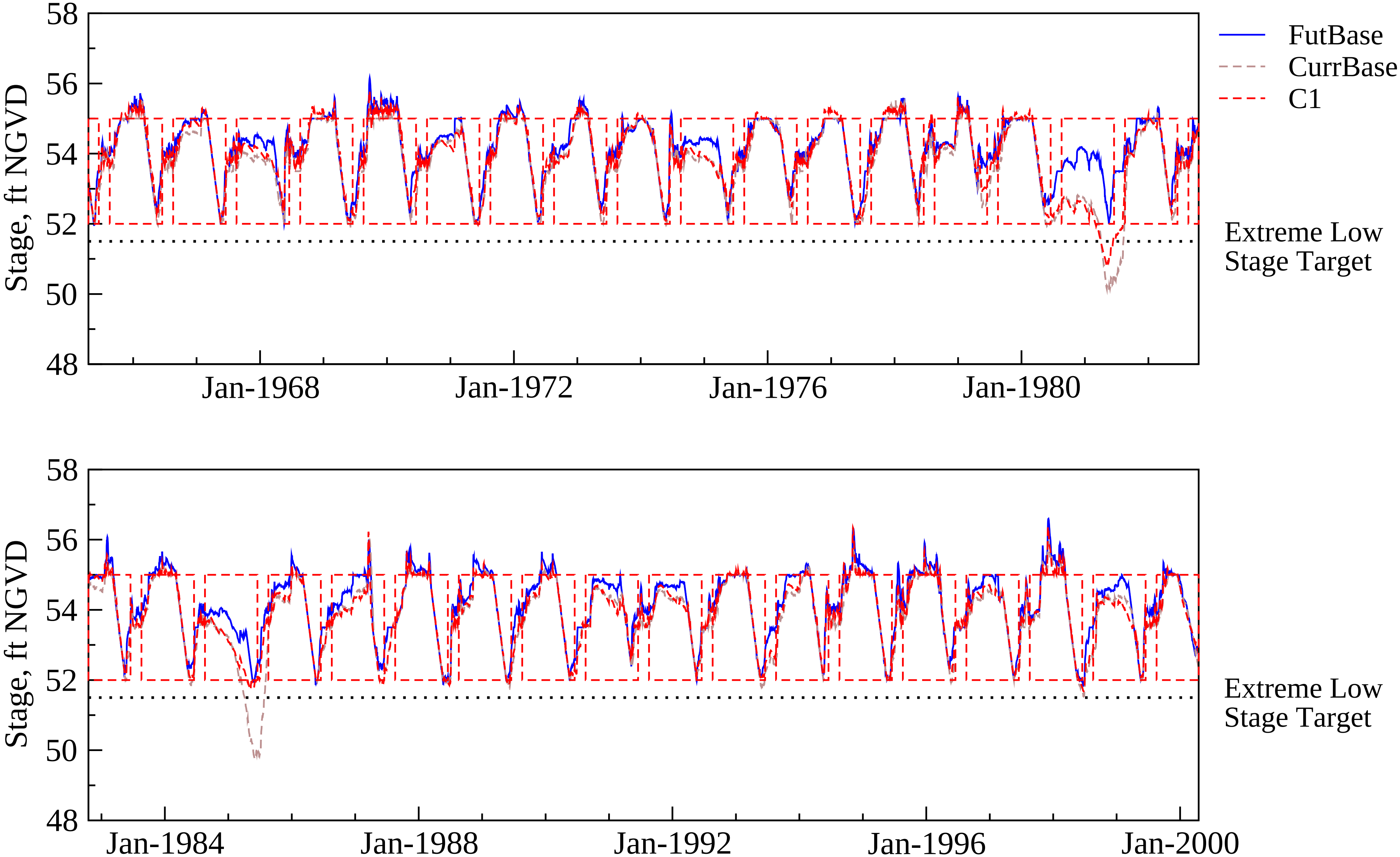
PDF Report for L02

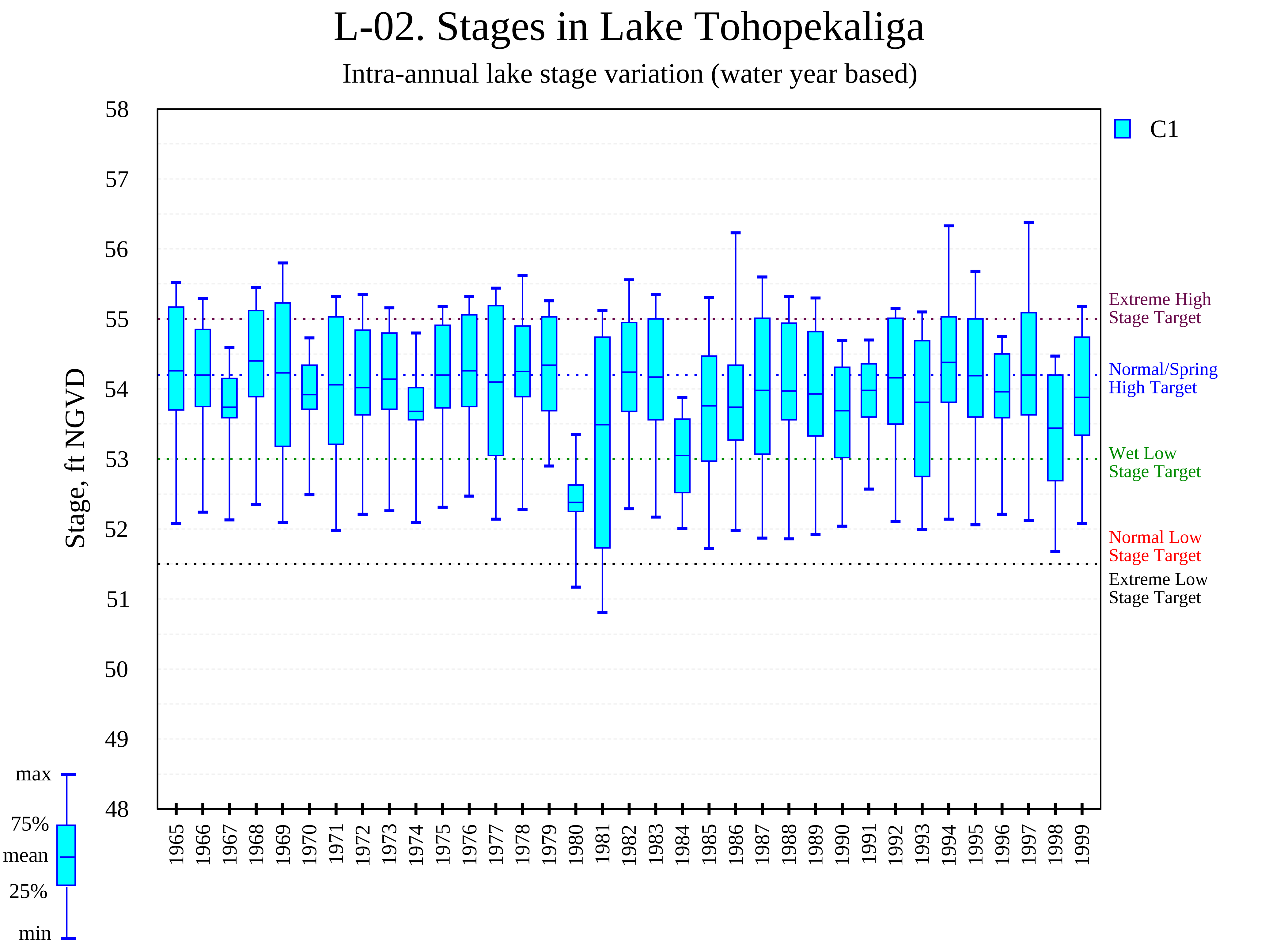


L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
C1

L-02. Stages in Lake Tohopekaliga

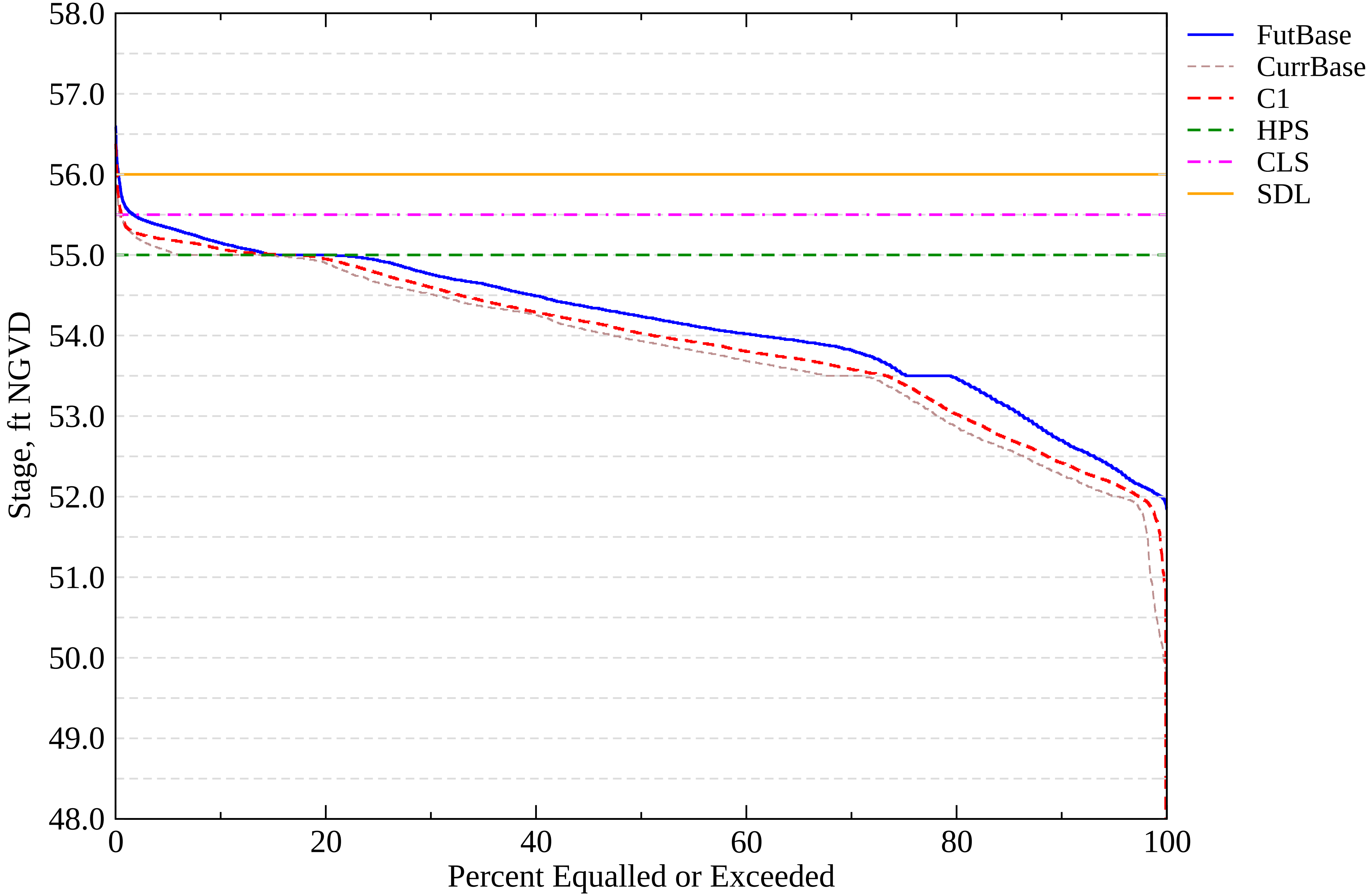
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

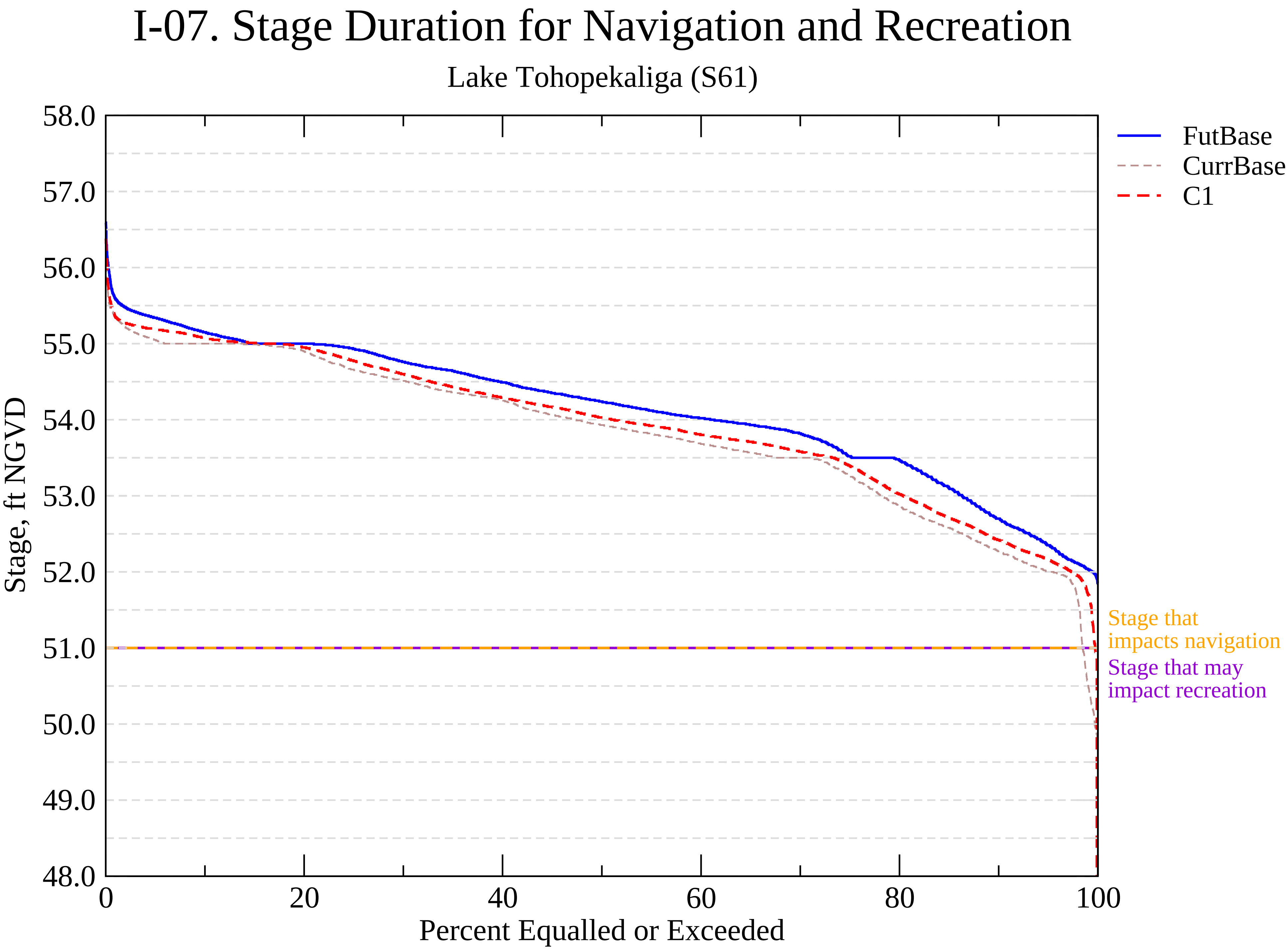



L-02. Stages in Lake Tohopekaliga
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
C1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min

I-01. Probable High Lake Stage Performance Indicator

Lake Tohopekaliga (S61)




I-07. Stage Duration for Navigation and Recreation
Lake Tohopekaliga (S61)
Stage, ft NGVD
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
C1
Stage that impacts navigation
Stage that may impact recreation

Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

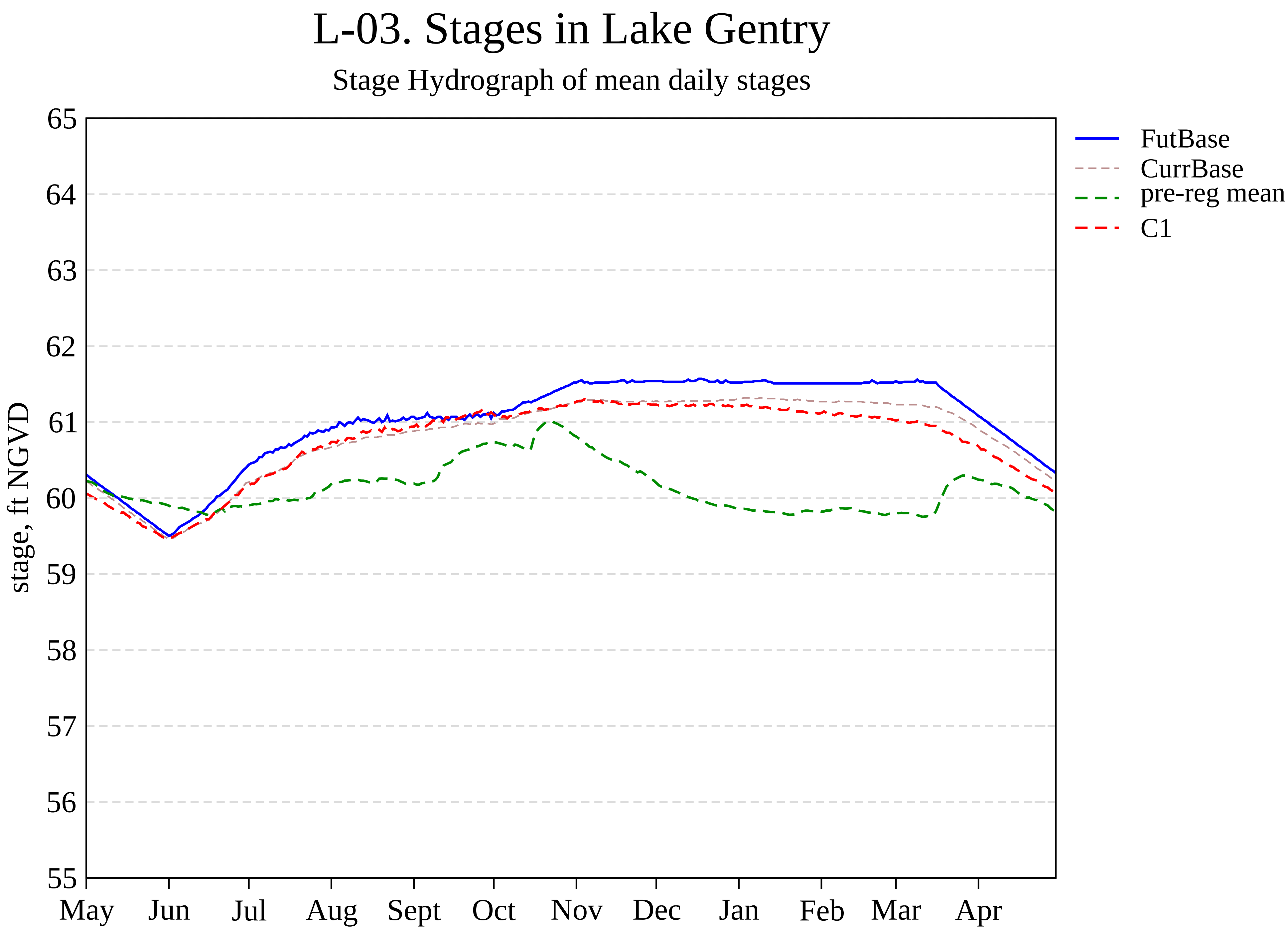
Alternative Description : Uncertainty Analysis - Simulation C1

Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	62.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	11.4
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	80.0
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.5
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.2

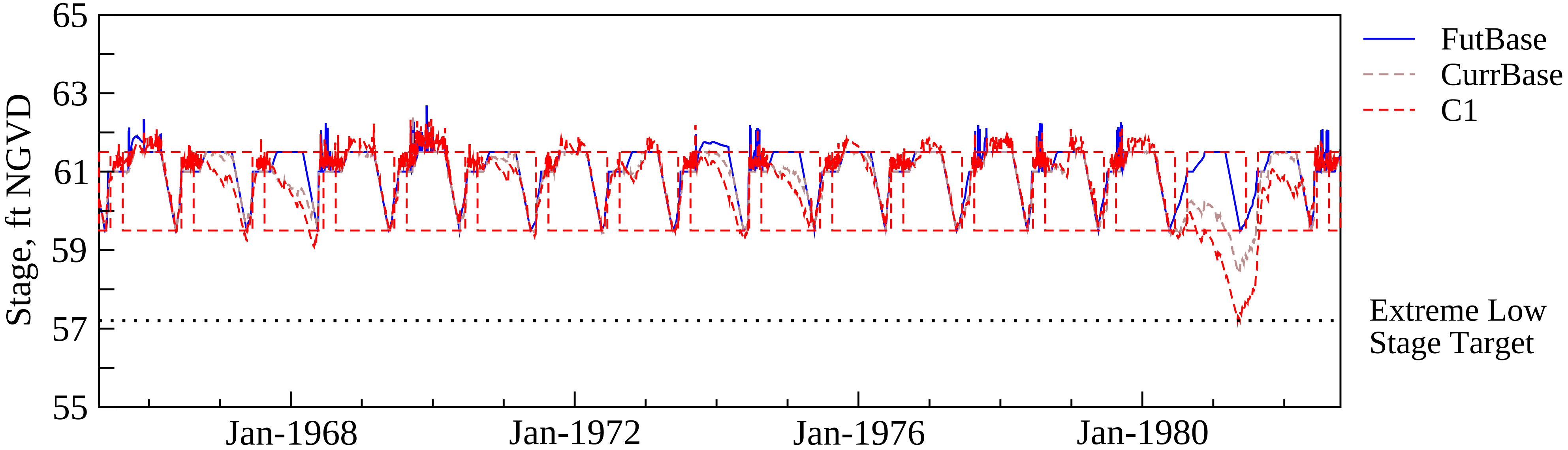
Tier 2 Report

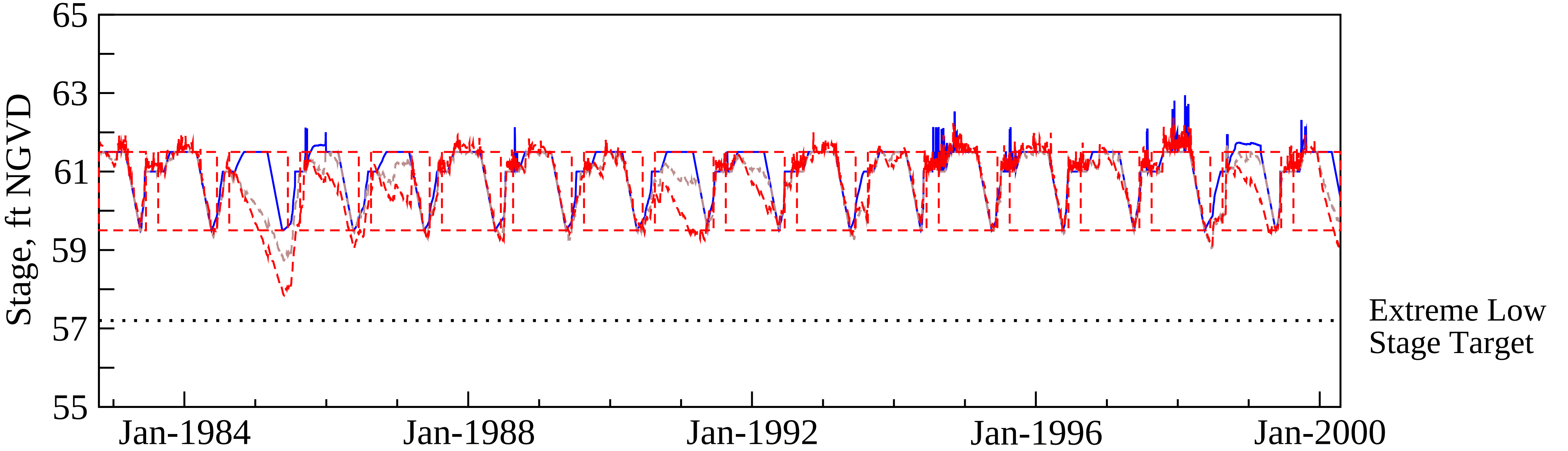
PDF Report for L03


L-03. Stages in Lake Gentry
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
C1

L-03. Stages in Lake Gentry

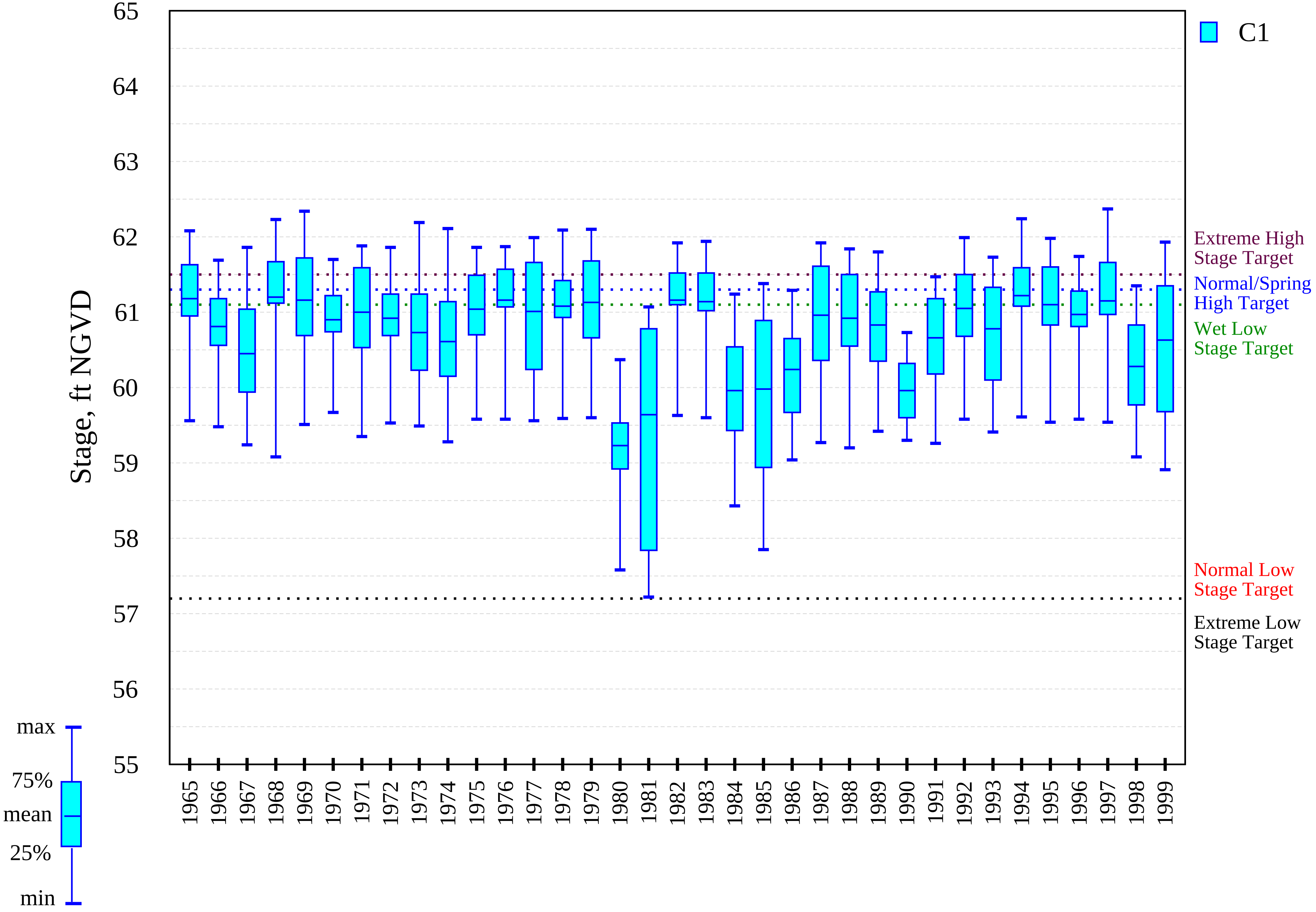
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

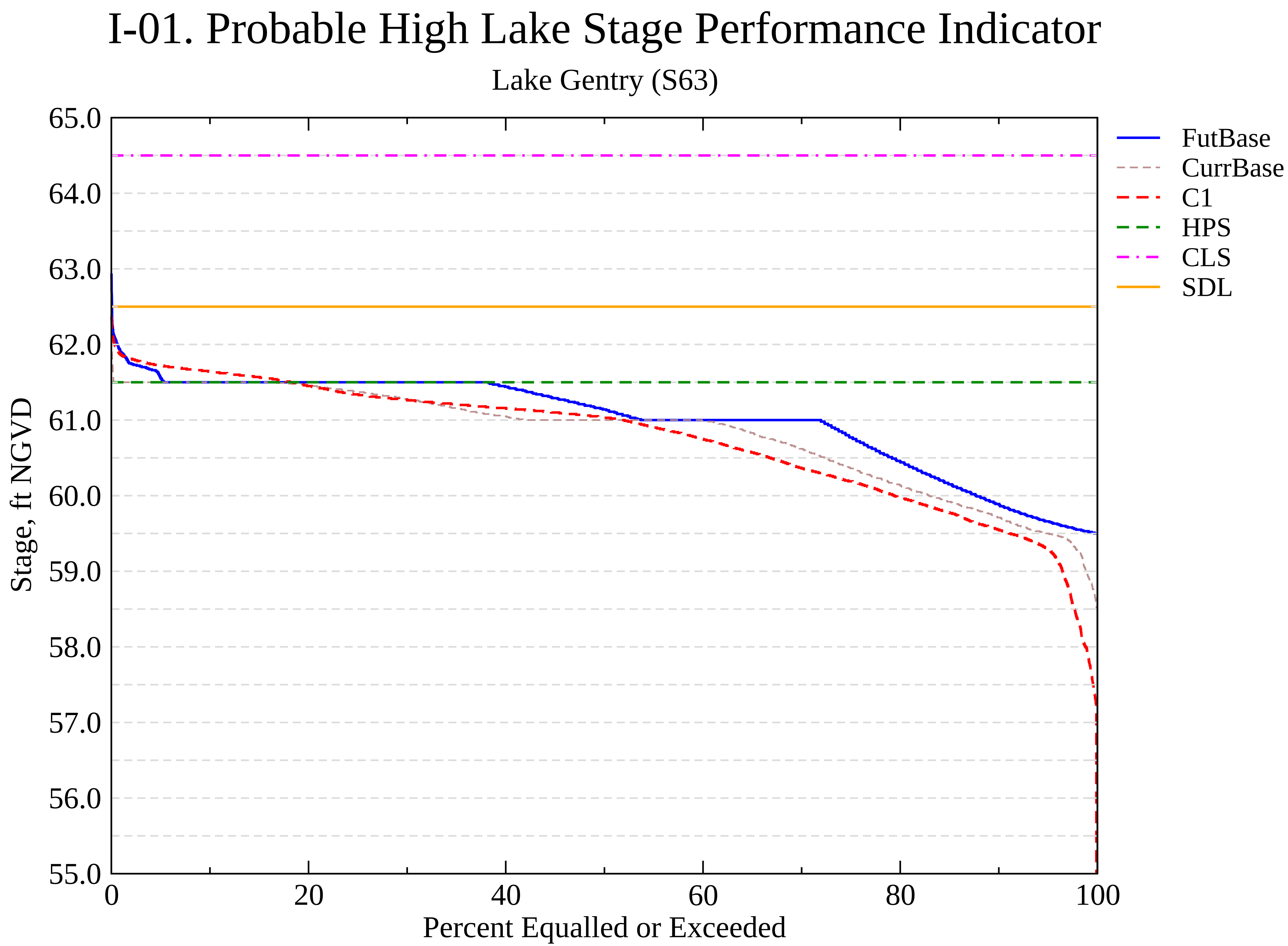




L-03. Stages in Lake Gentry

Intra-annual lake stage variation (water year based)

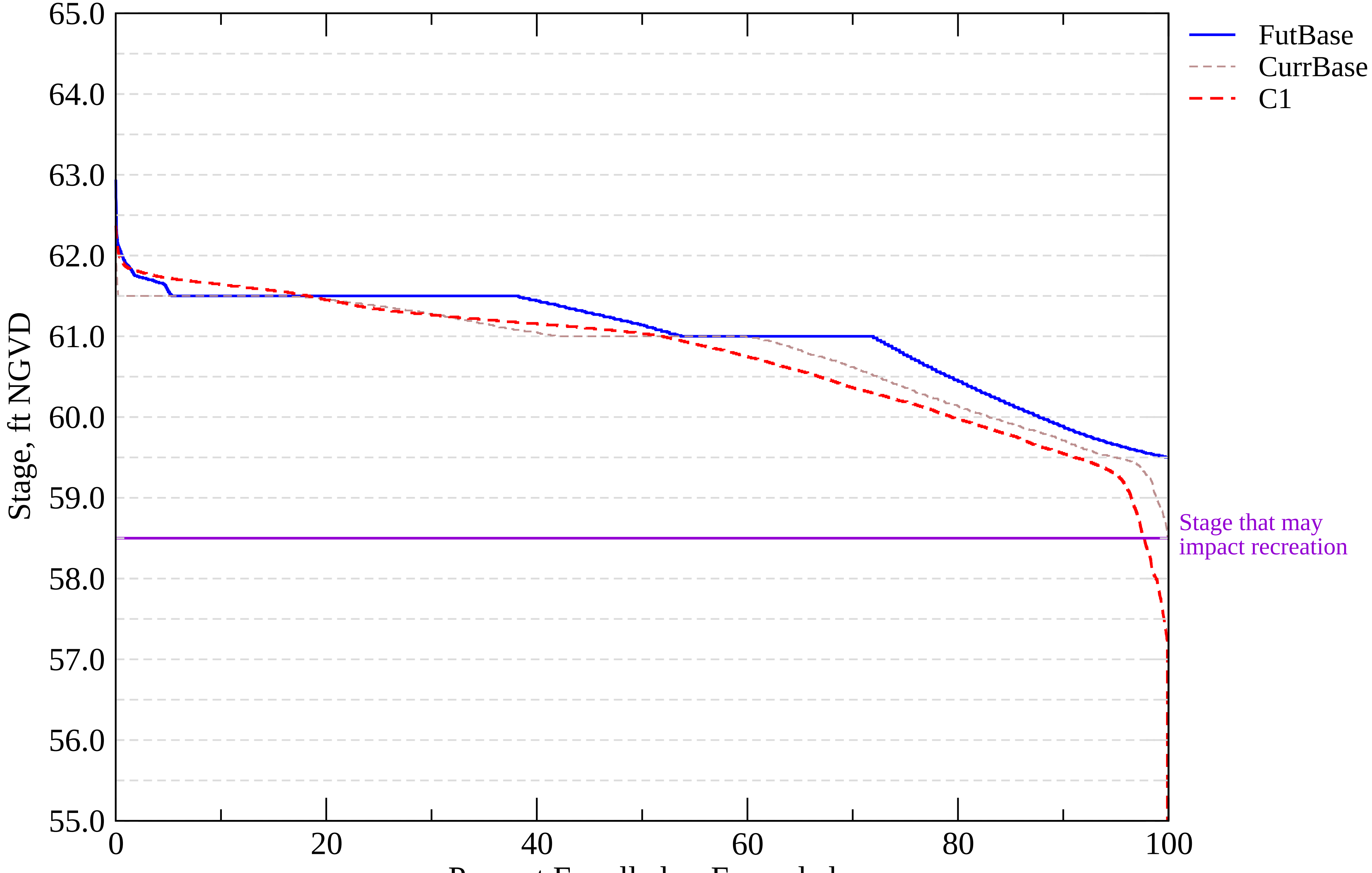




I-01. Probable High Lake Stage Performance Indicator
Lake Gentry (S63)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
C1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lake Gentry (S63)



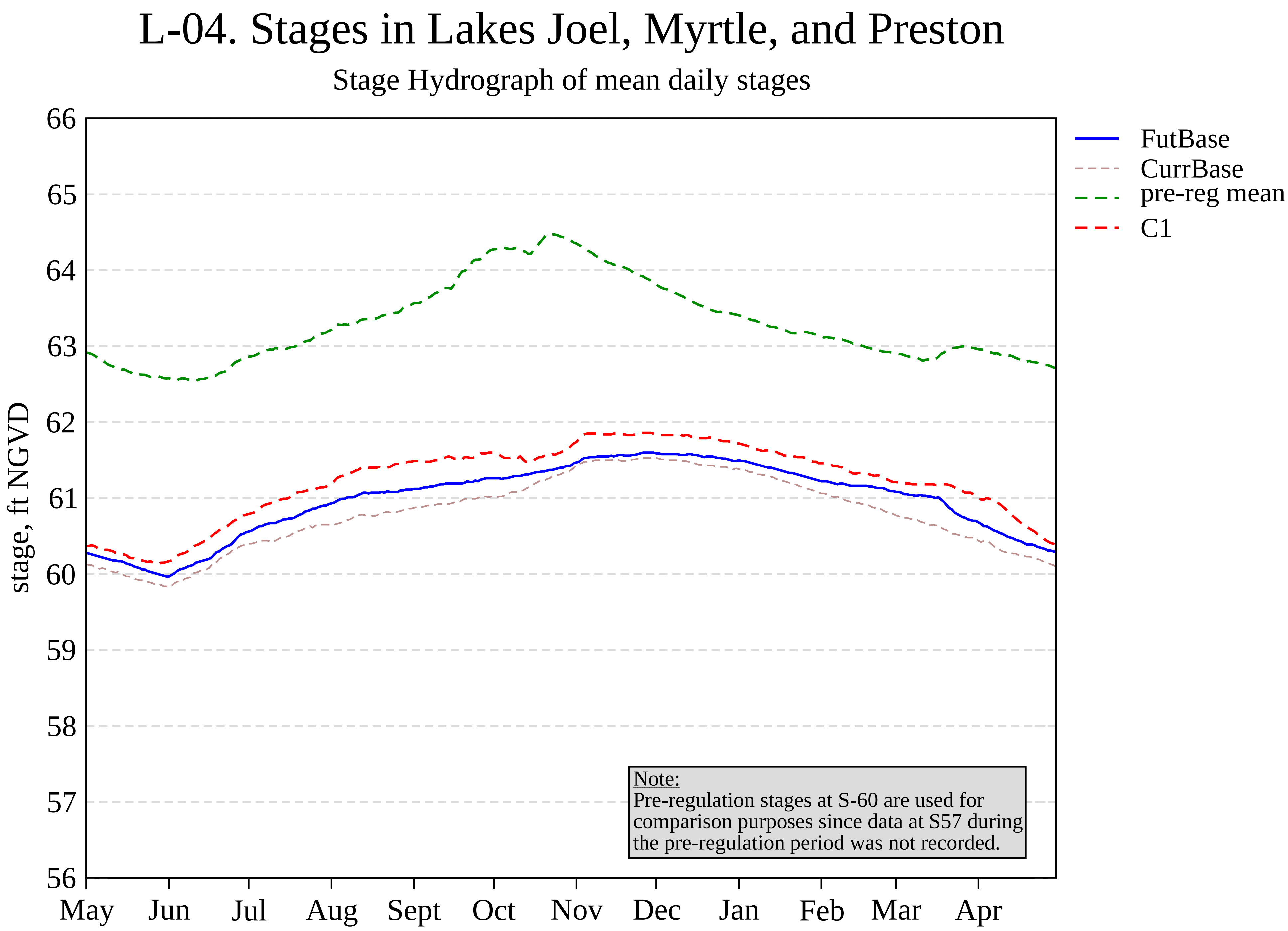
Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

Alternative Description : Uncertainty Analysis - Simulation C1

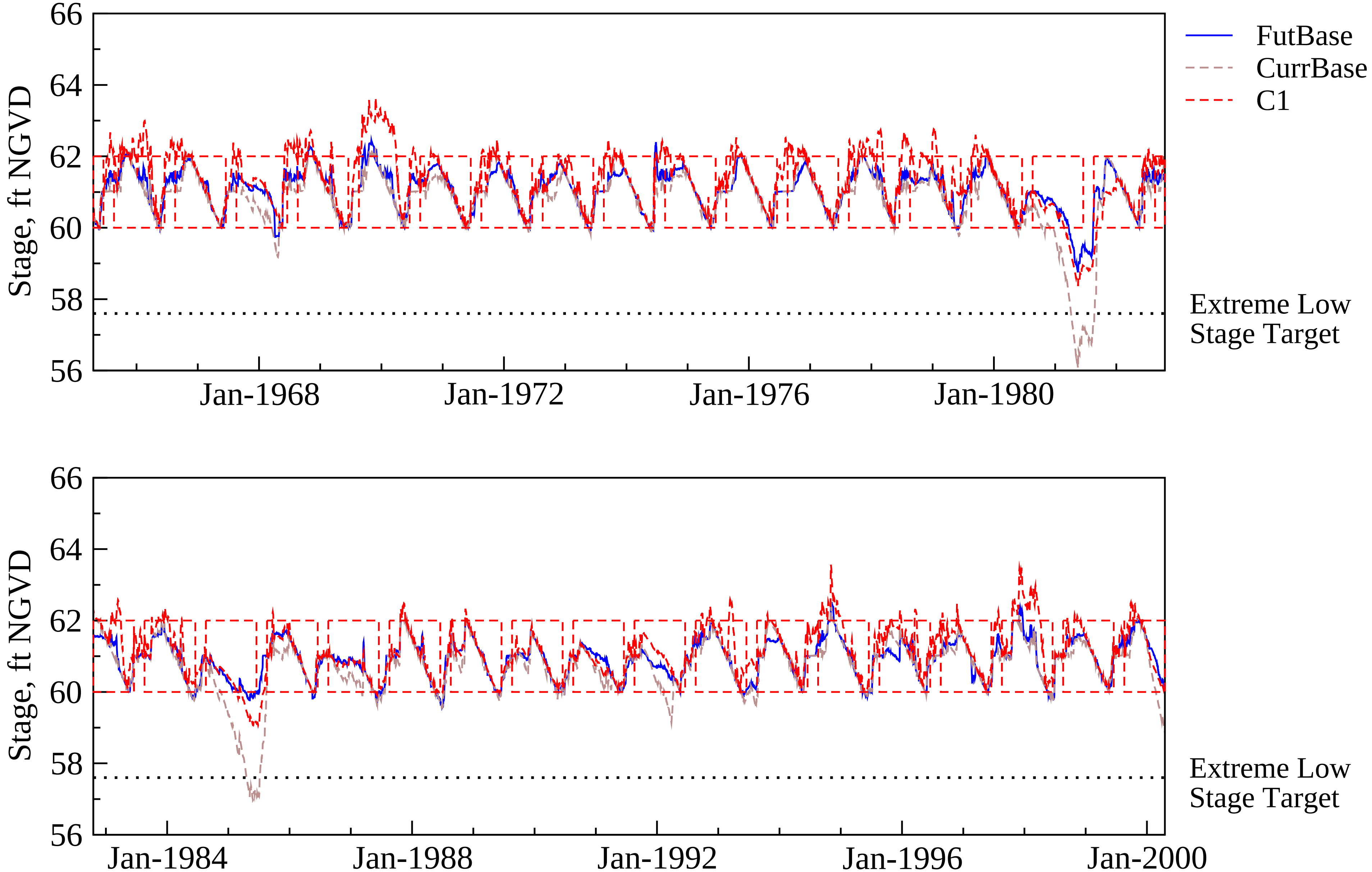
Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	97.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	29.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	54.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	54.3
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	17.1
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	80.0
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.4
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	5.3


L-04. Stages in Lakes Joel, Myrtle, and Preston
Stage Hydrograph of mean daily stages
stage, ft NGVD
66
65
64
63
62
61
60
59
58
57
56
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
C1
Note:
Pre-regulation stages at S-60 are used for comparison purposes since data at S57 during the pre-regulation period was not recorded.

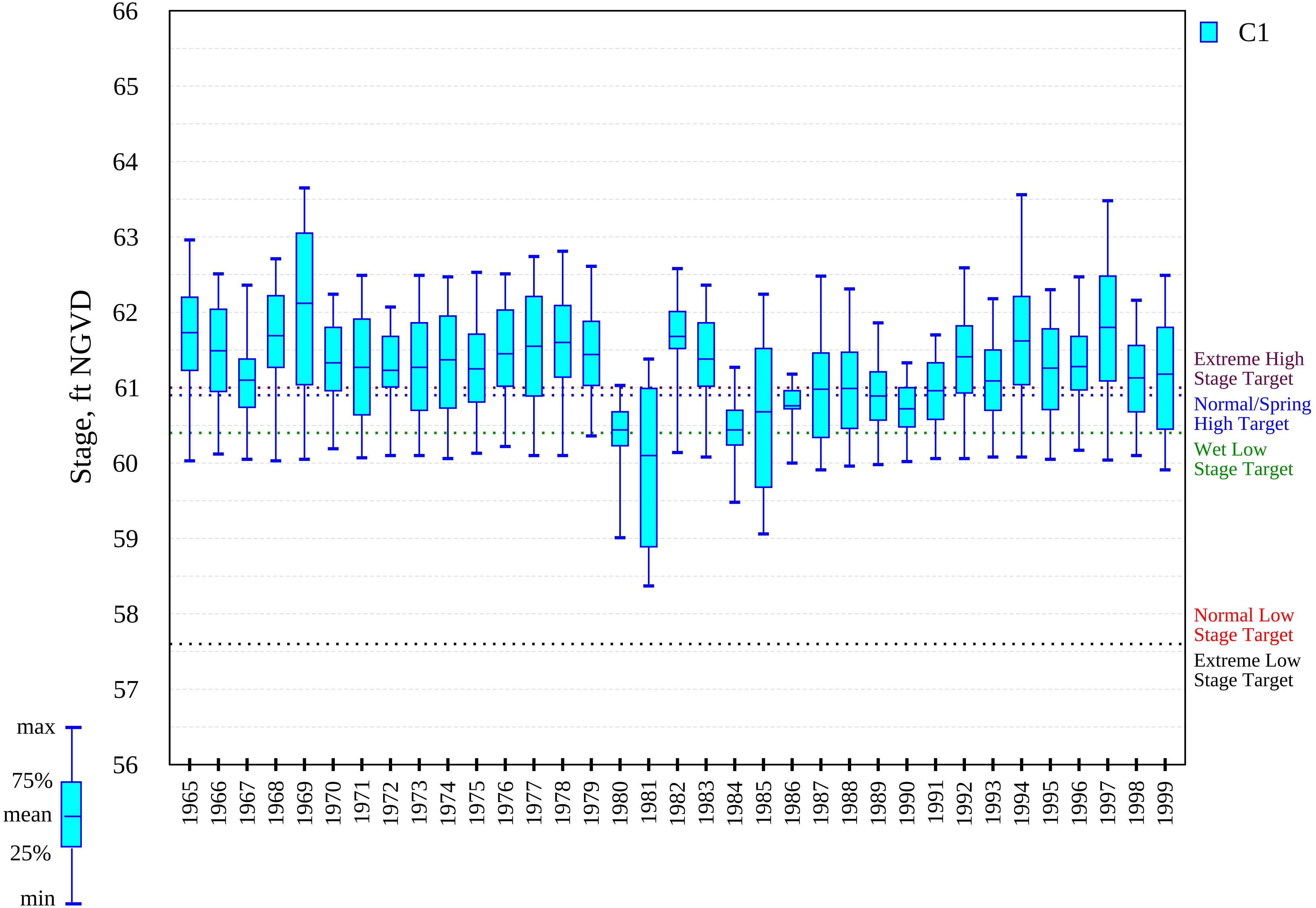
L-04. Stages in Lakes Joel, Myrtle, and Preston

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



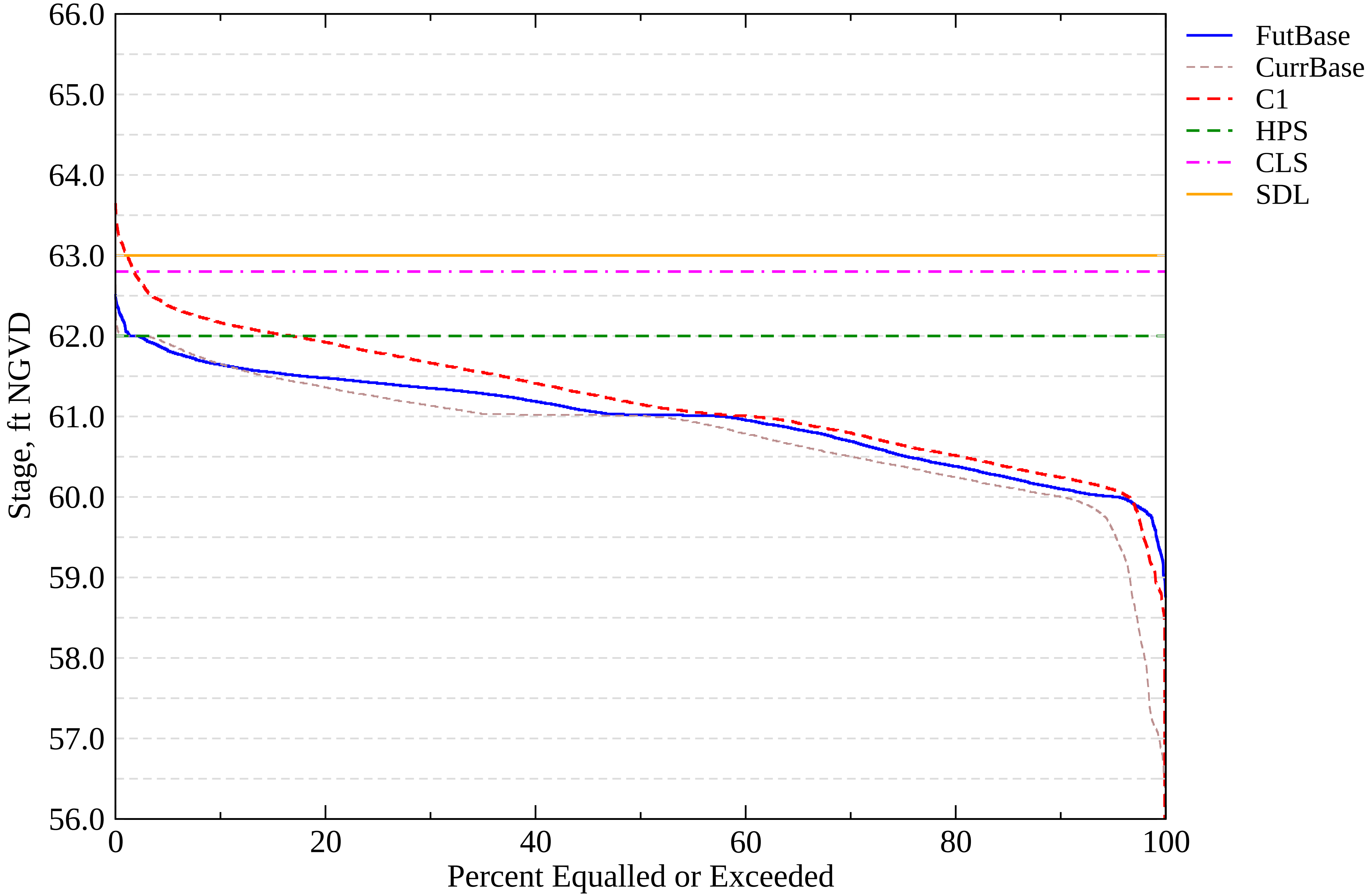
L-04. Stages in Lakes Joel, Myrtle, and Preston

Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Lake Myrtle, Joel, and Preston (S57)



Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation C1

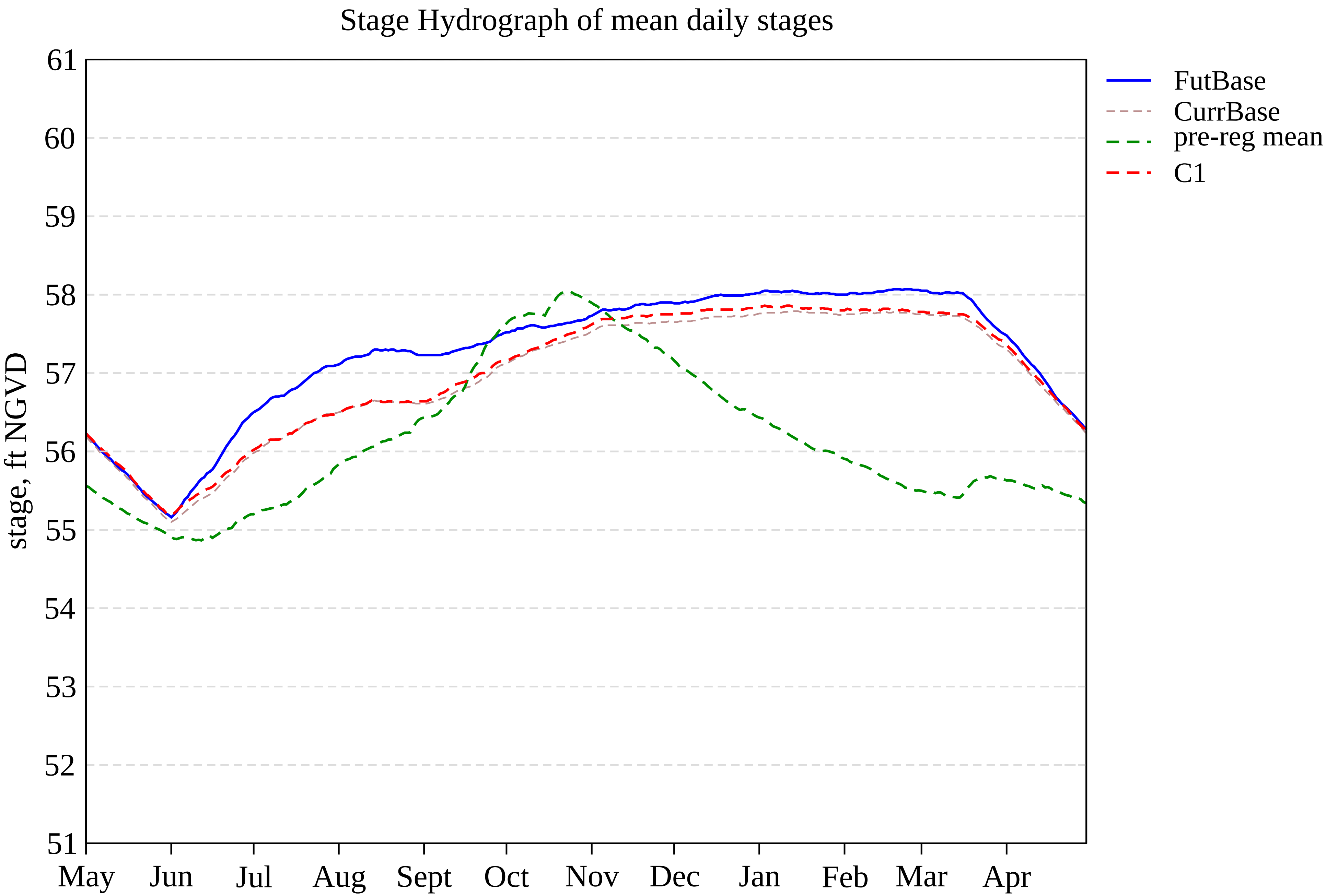
Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	69.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	66.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	20.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	97.1
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.0
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.3

Tier 2 Report

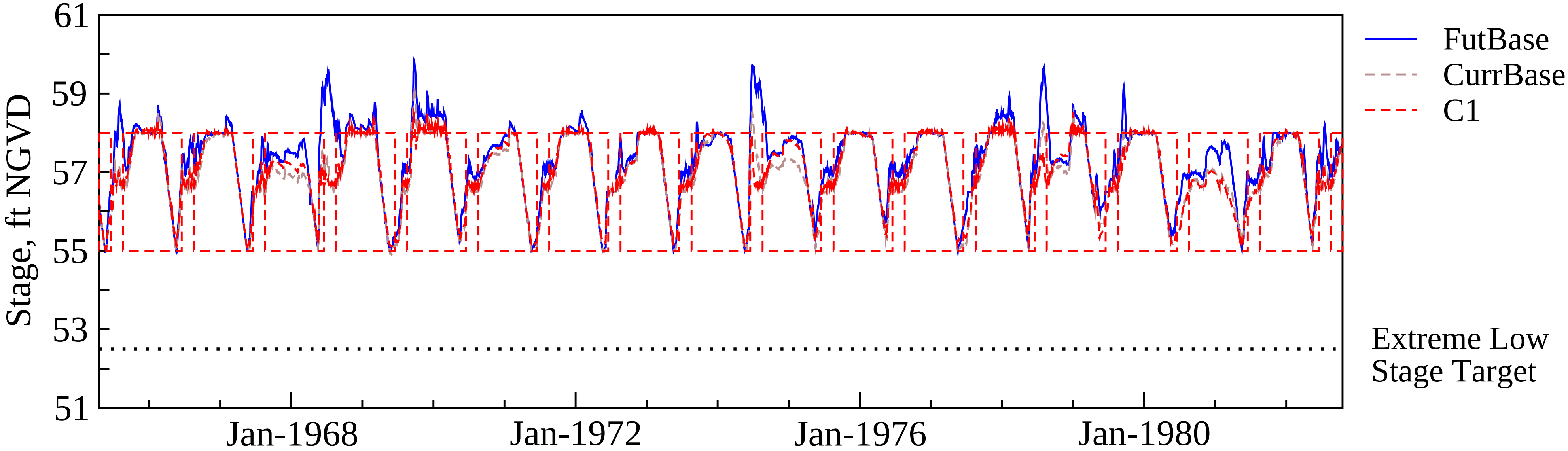
PDF Report for L05

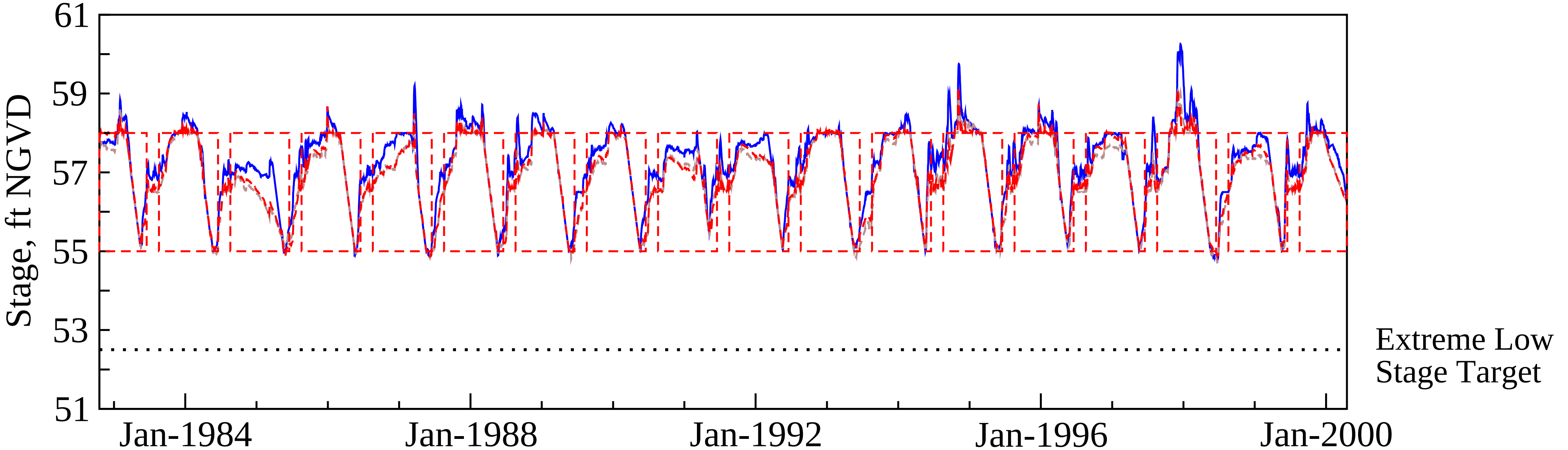
L-05. Stages in East Lake Toho, Fell’s Cove, and Lake Ajay



L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

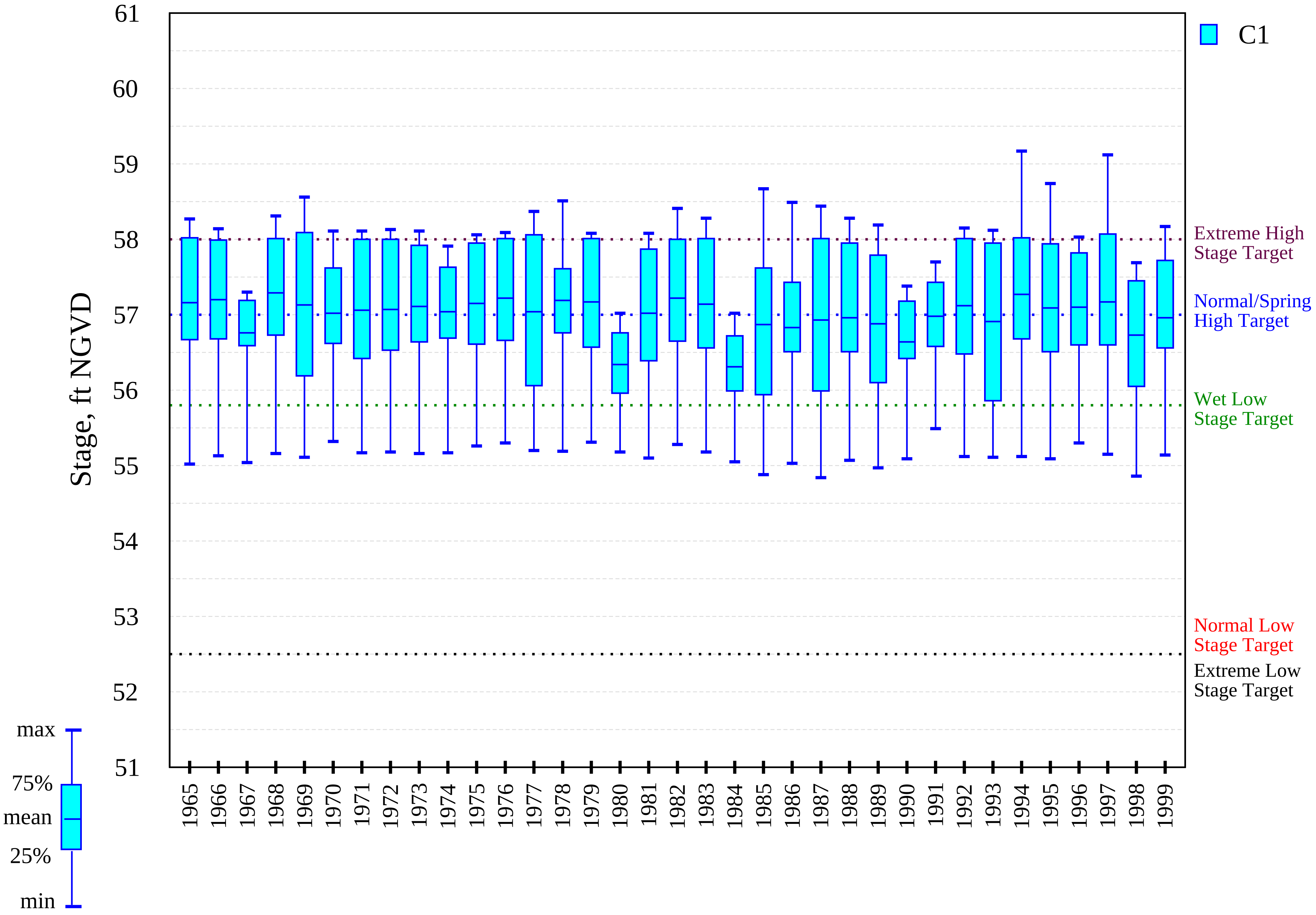
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

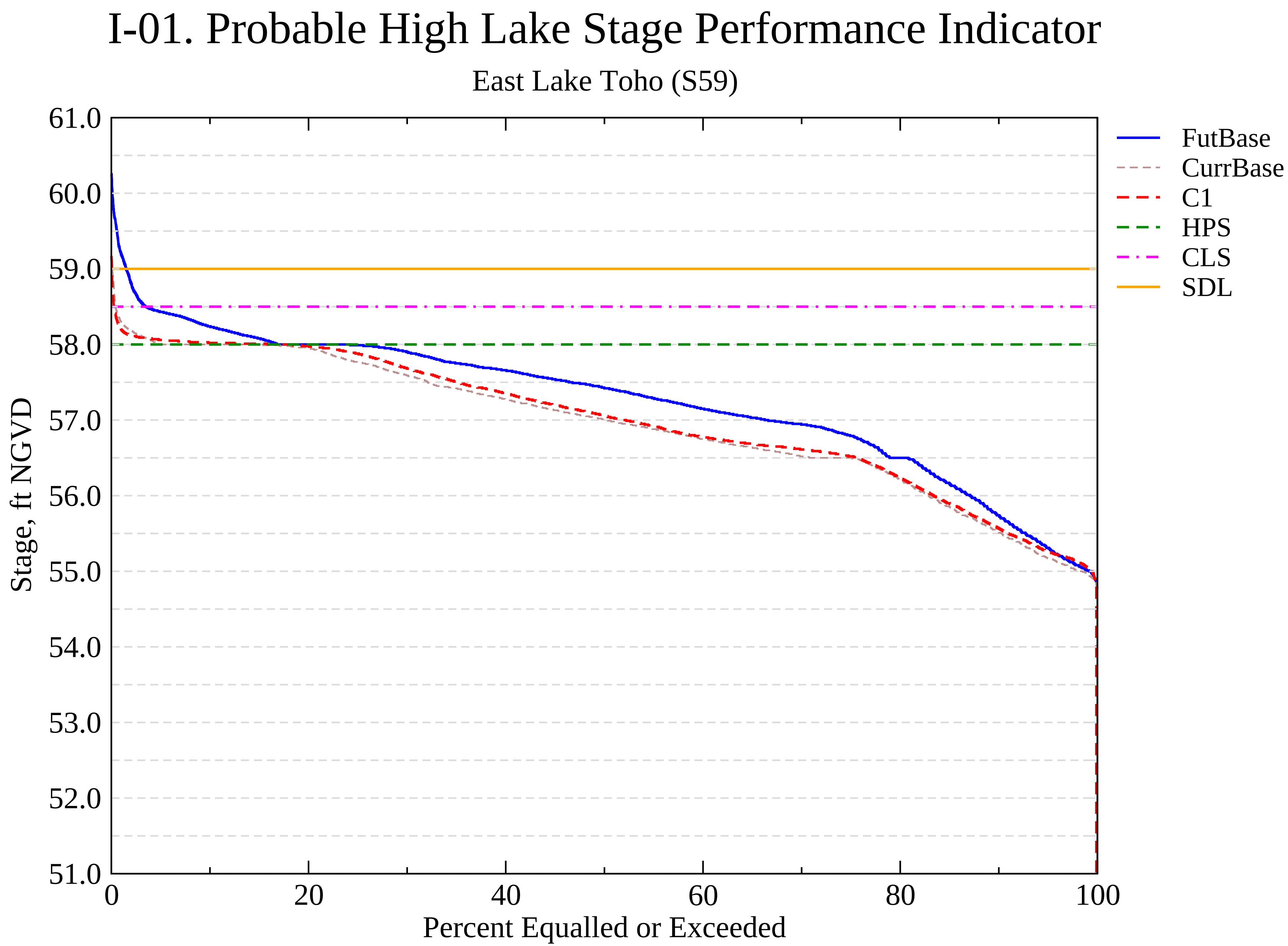




L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

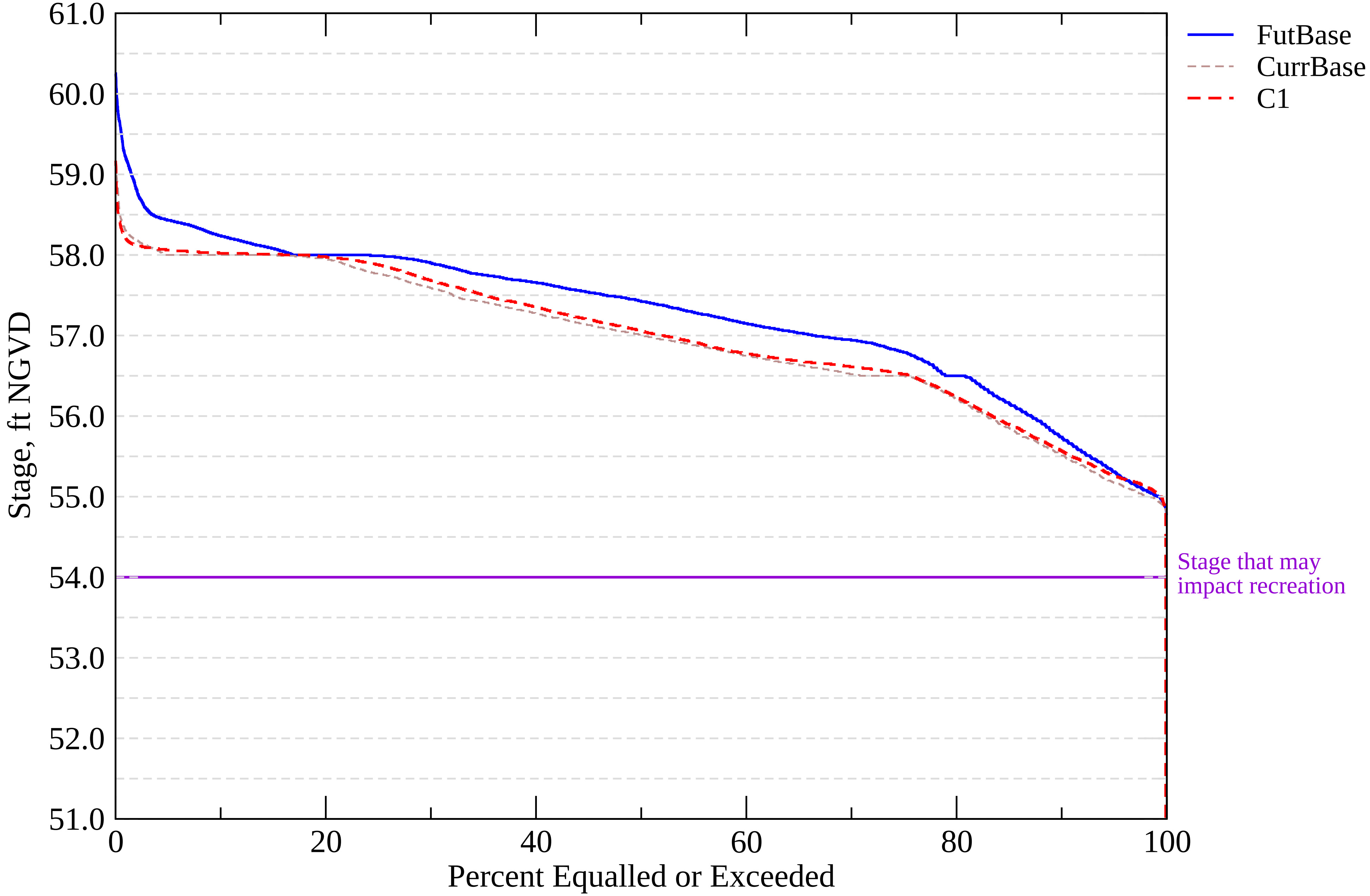
Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
C1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

East Lake Toho (S59)



Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

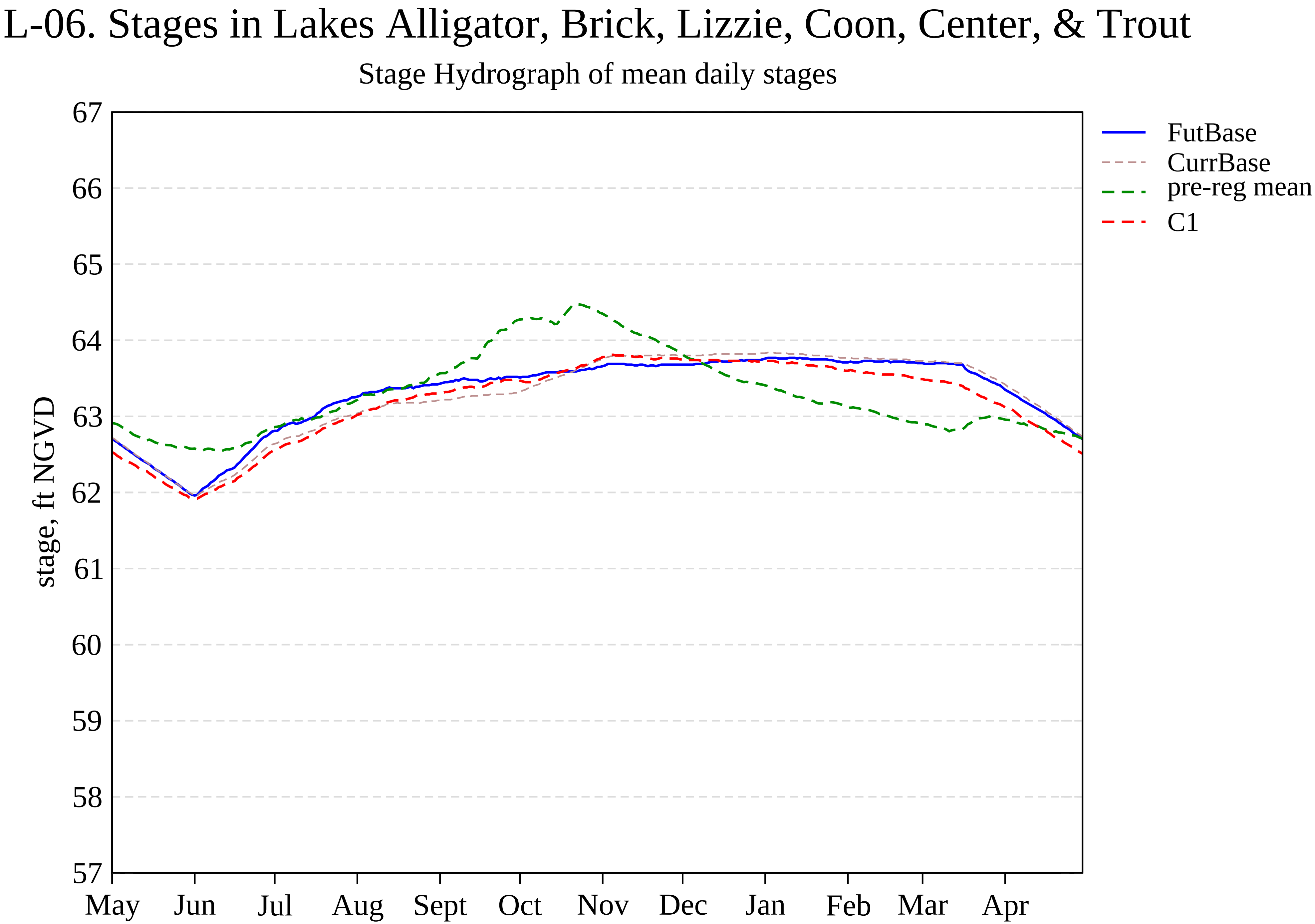
Alternative Description : Uncertainty Analysis - Simulation C1

Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	77.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	57.1
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.5
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	6.2

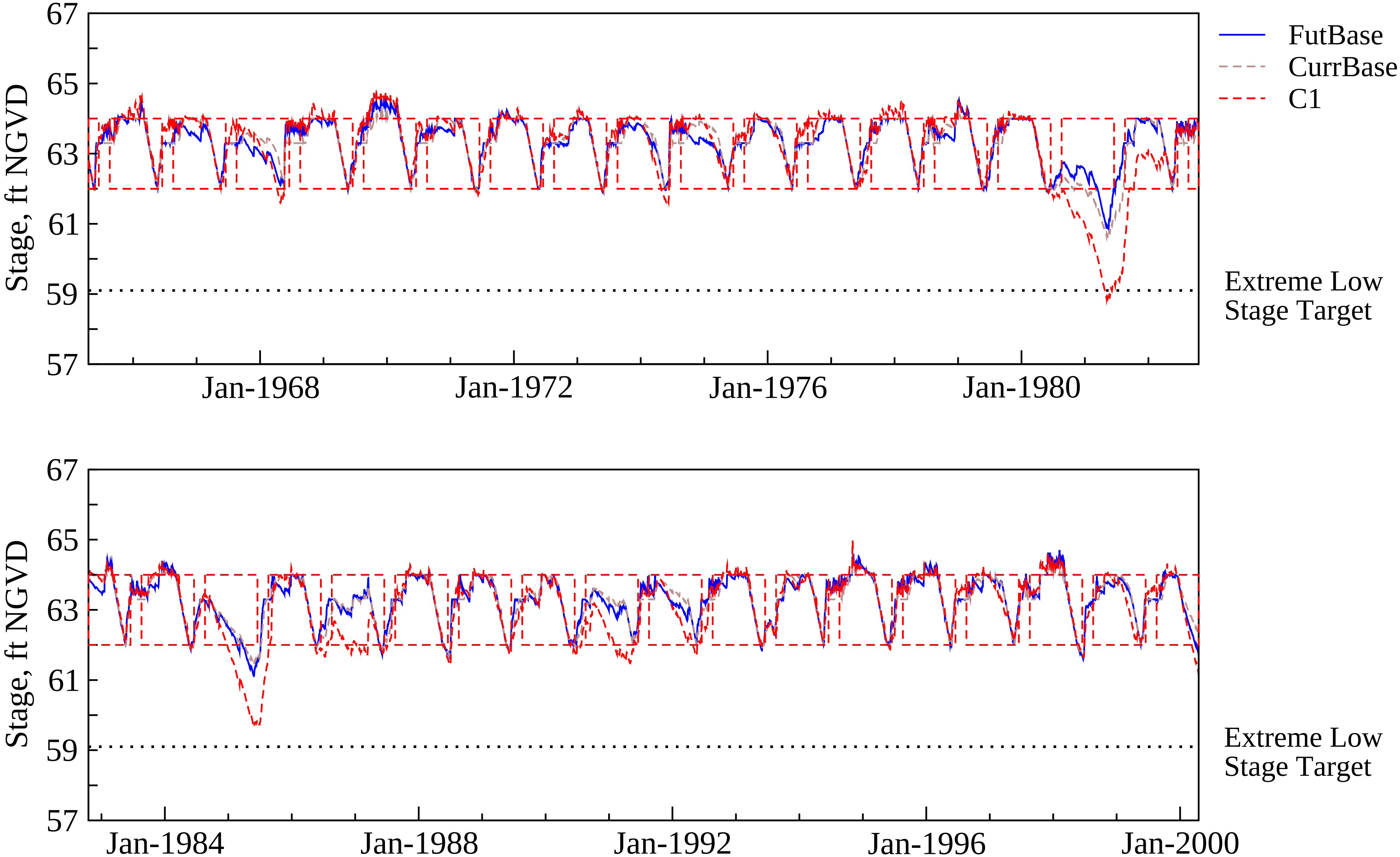
Tier 2 Report

PDF Report for L06


L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout
Stage Hydrograph of mean daily stages
stage, ft NGVD
67
66
65
64
63
62
61
60
59
58
57
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
C1

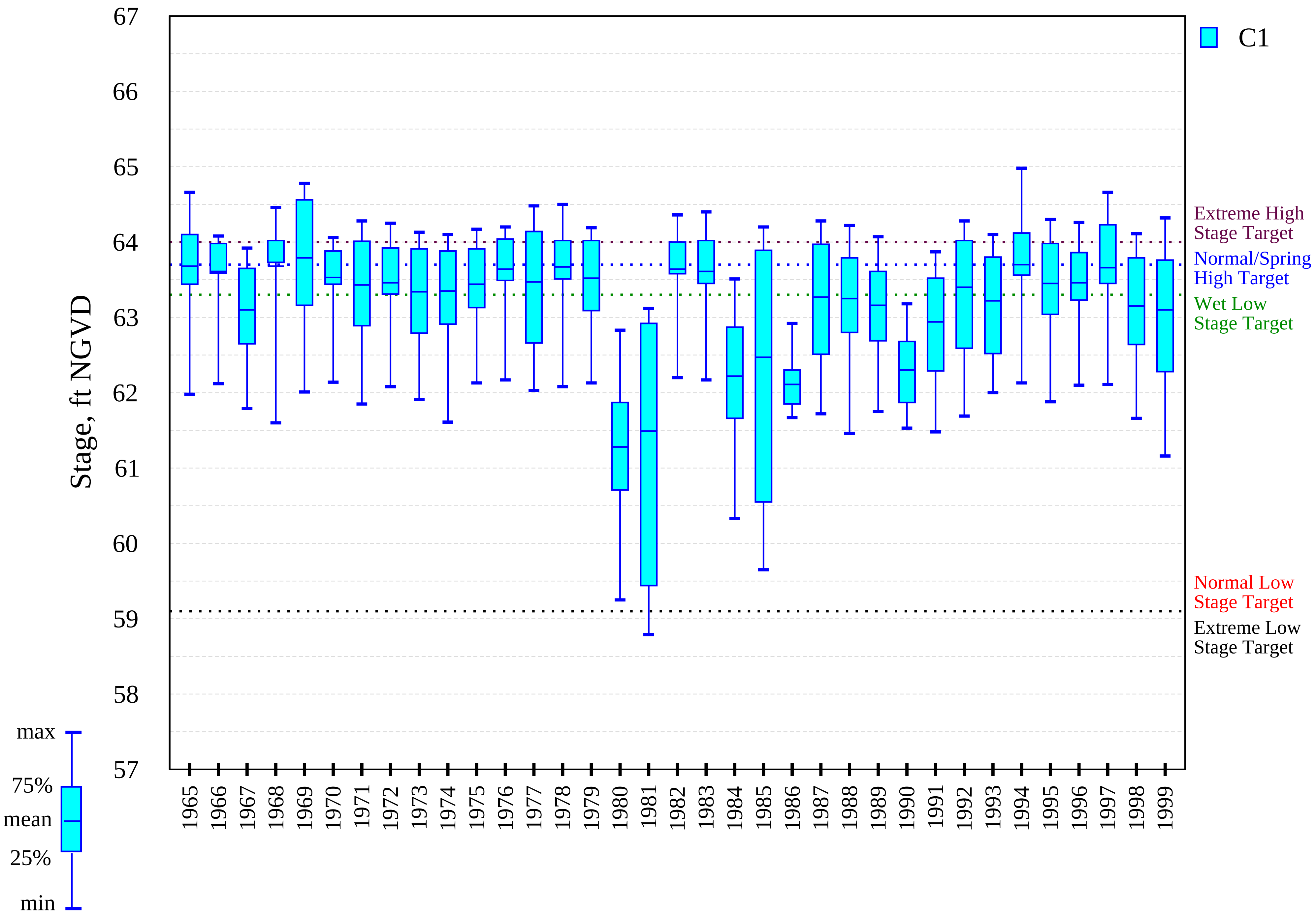
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



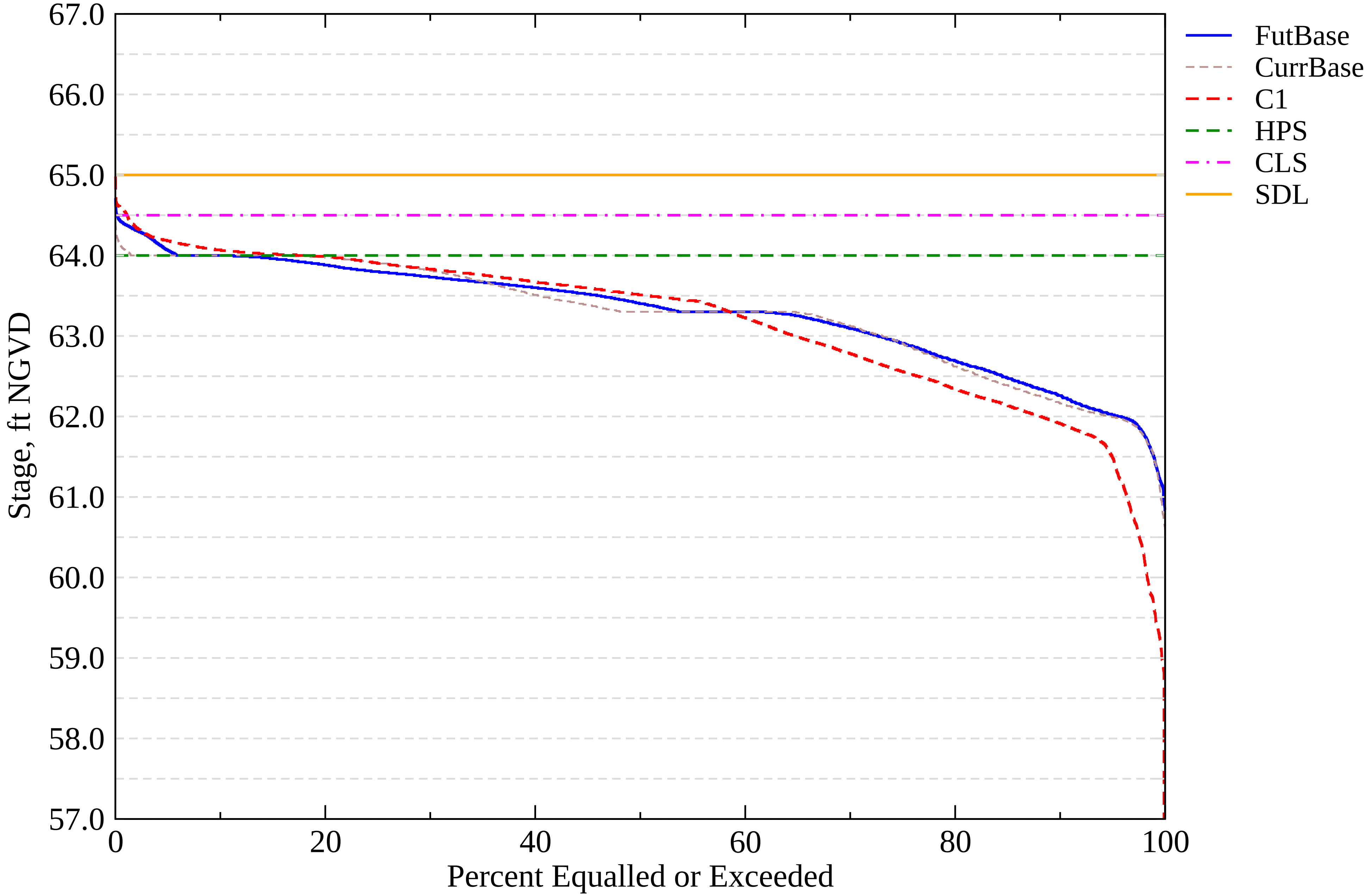
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

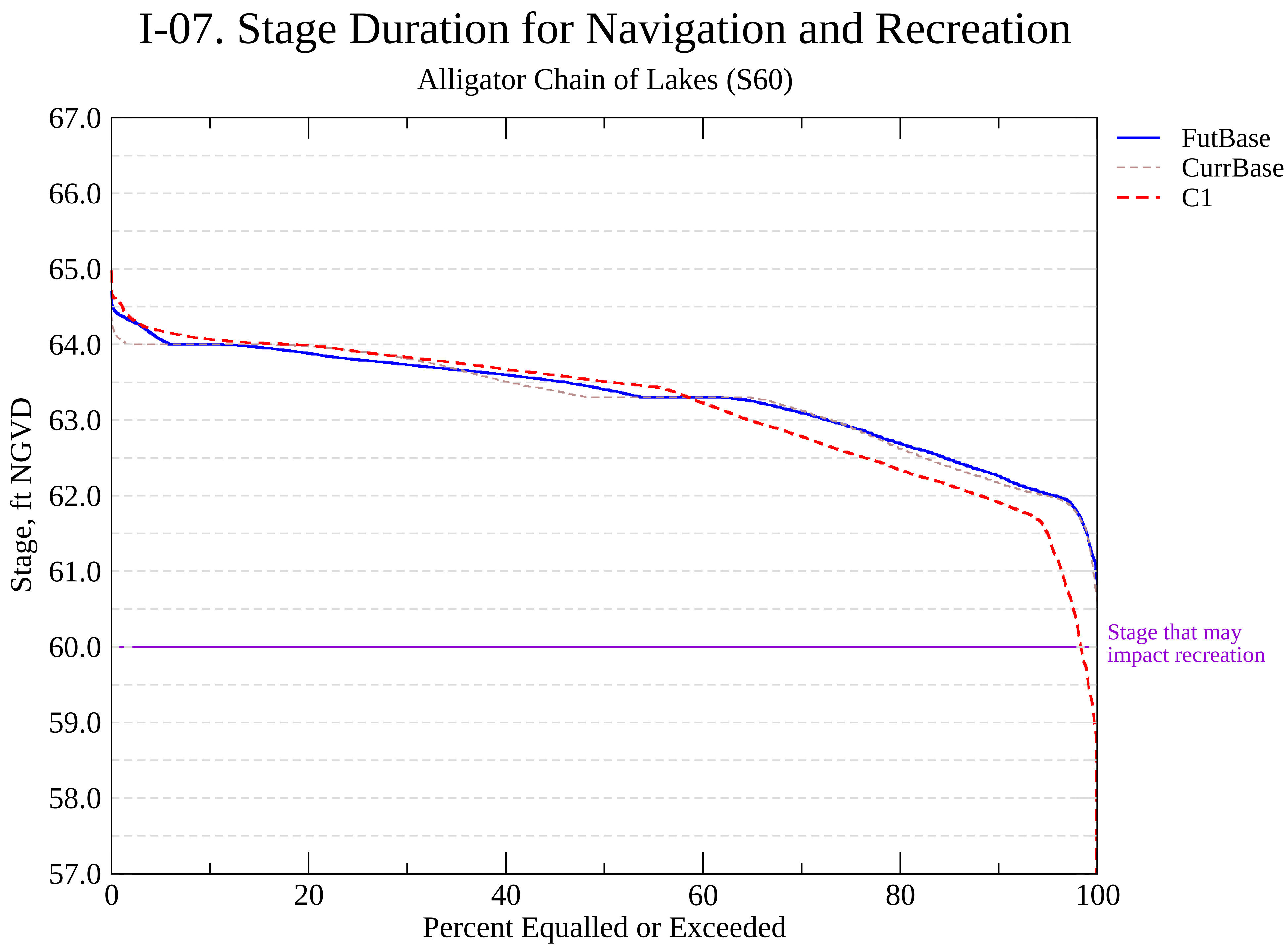
Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Alligator Chain of Lakes (S60)





I-07. Stage Duration for Navigation and Recreation
Alligator Chain of Lakes (S60)
Stage, ft NGVD
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
C1
Stage that may
impact recreation

Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

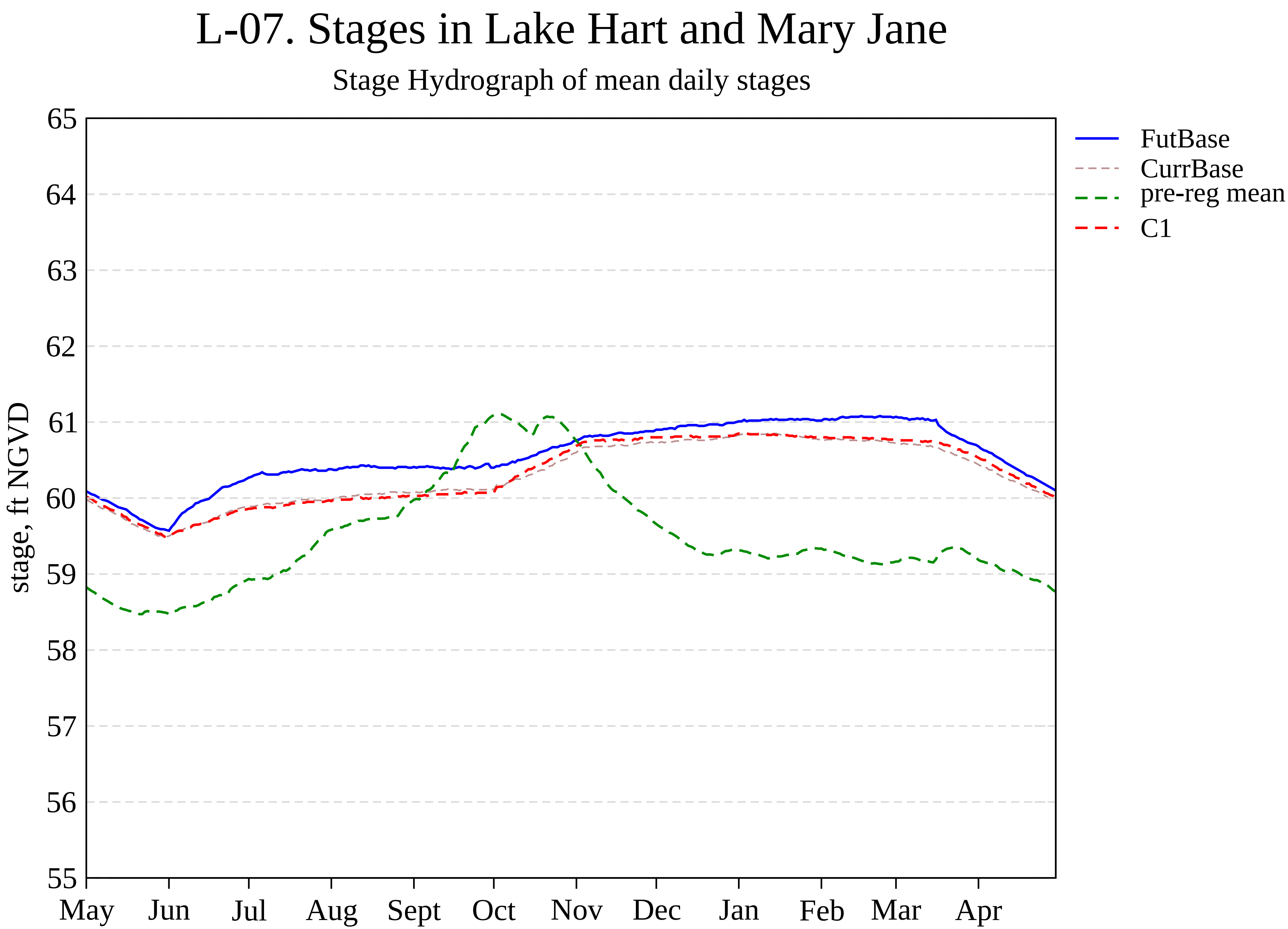
Alternative Description : Uncertainty Analysis - Simulation C1

Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	71.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	74.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	46.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	20.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	3.3
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	66.0

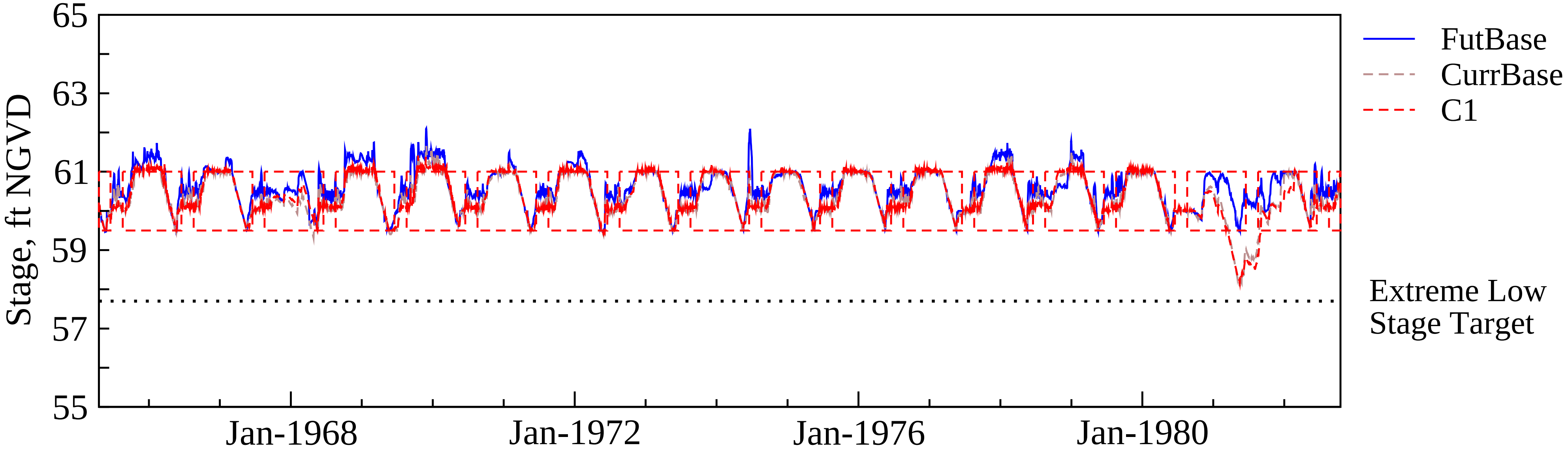
Tier 2 Report

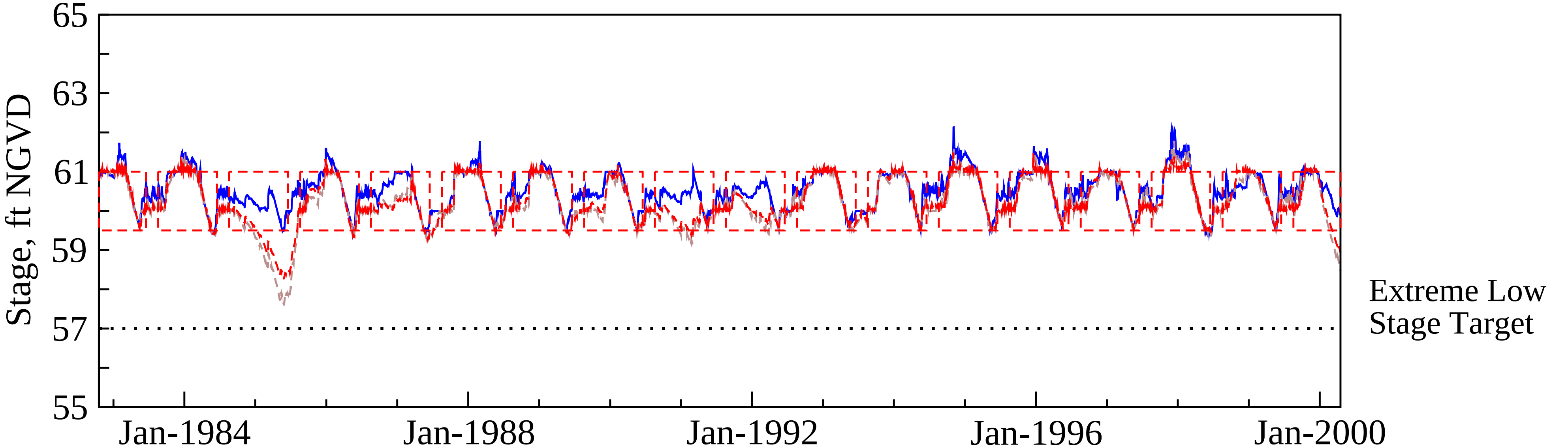
PDF Report for L07


L-07. Stages in Lake Hart and Mary Jane
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
C1

L-07. Stages in Lakes Hart and Mary Jane

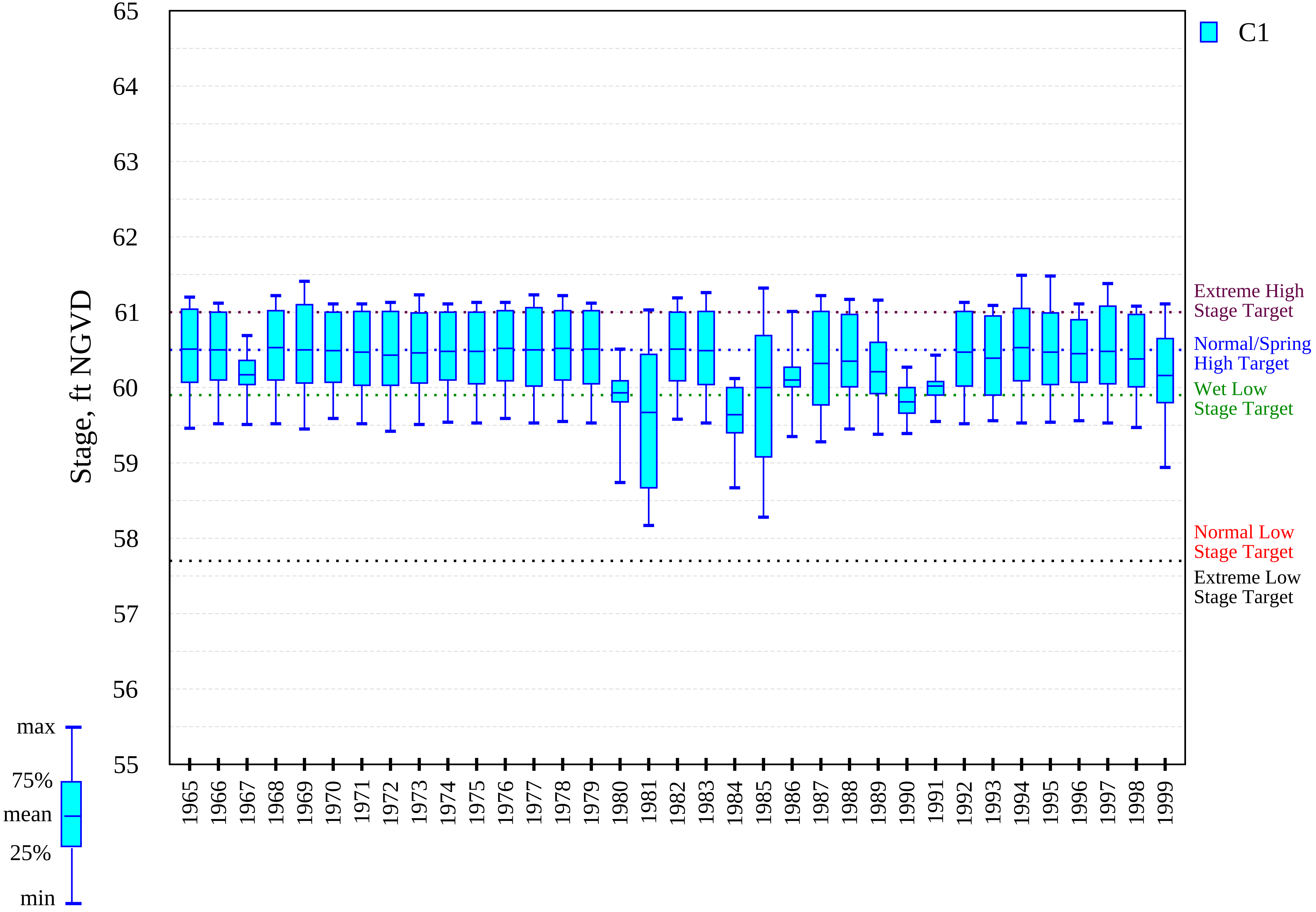
Daily Stage Hydrograph with Water Level recession windows (Sept-June)





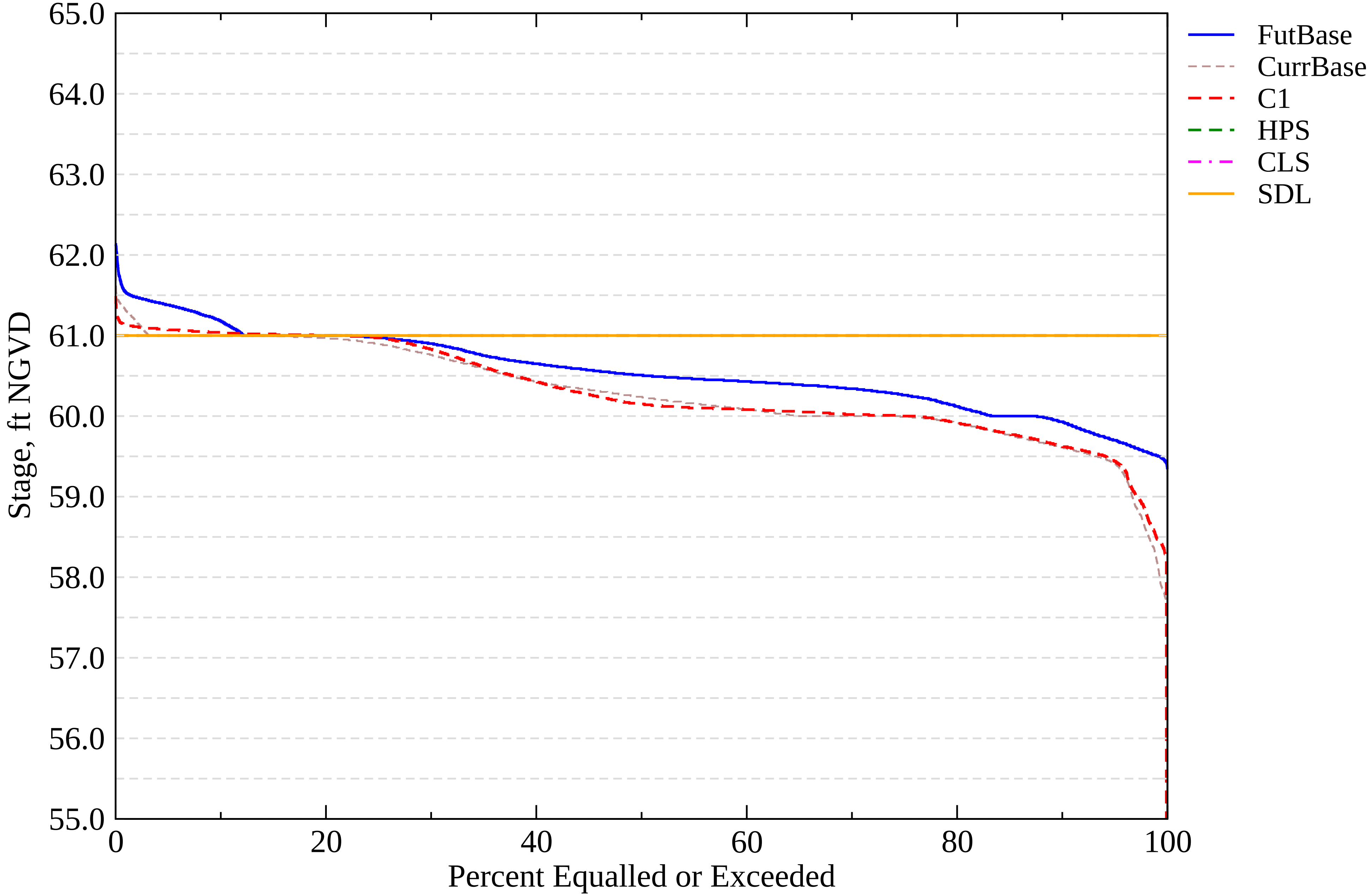
L-07. Stages in Lakes Hart and Mary Jane

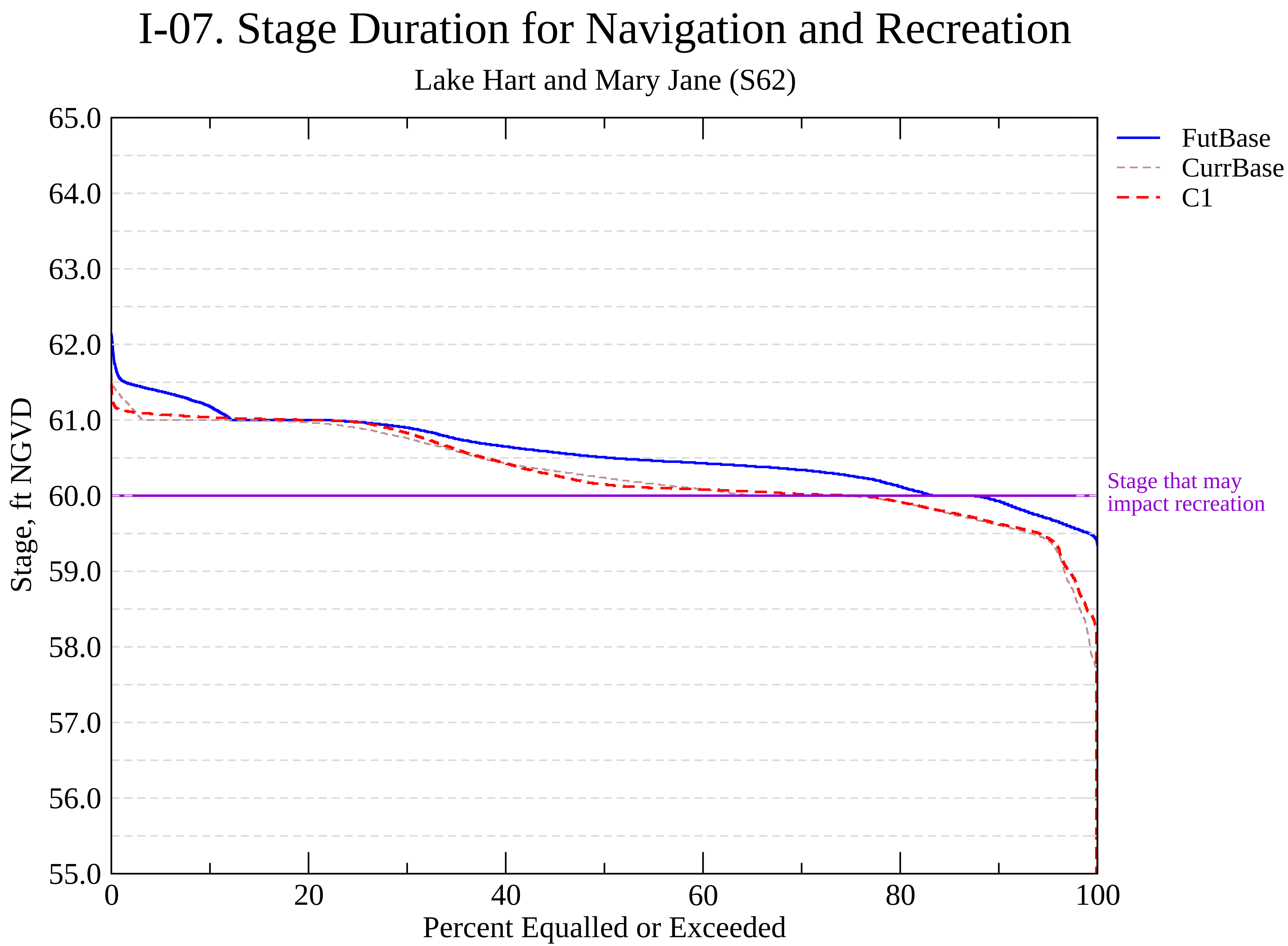
Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Lakes Hart and Mary Jane (S62)





I-07. Stage Duration for Navigation and Recreation
Lake Hart and Mary Jane (S62)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
C1
Stage that may
impact recreation

Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

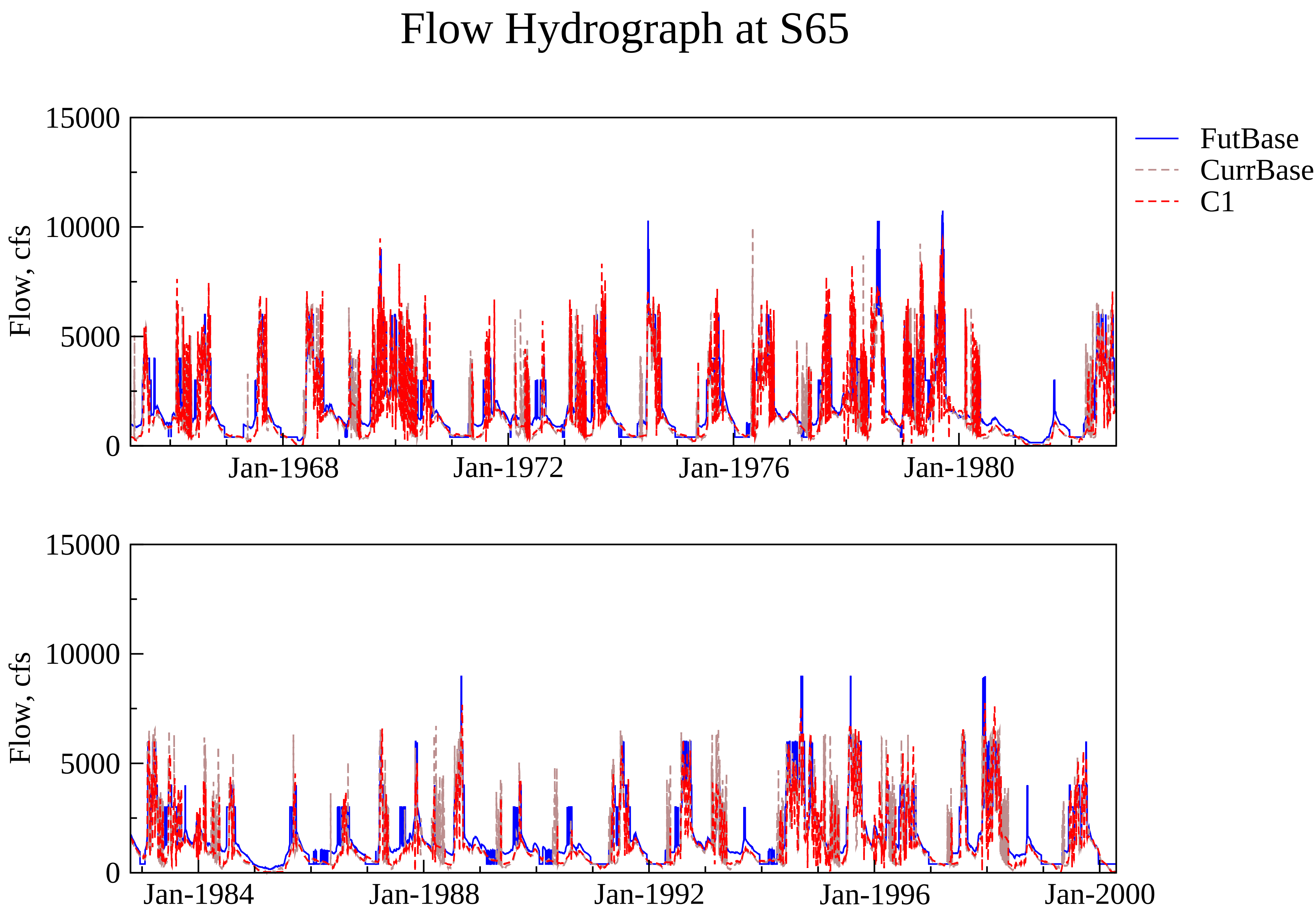
Alternative Description : Uncertainty Analysis - Simulation C1

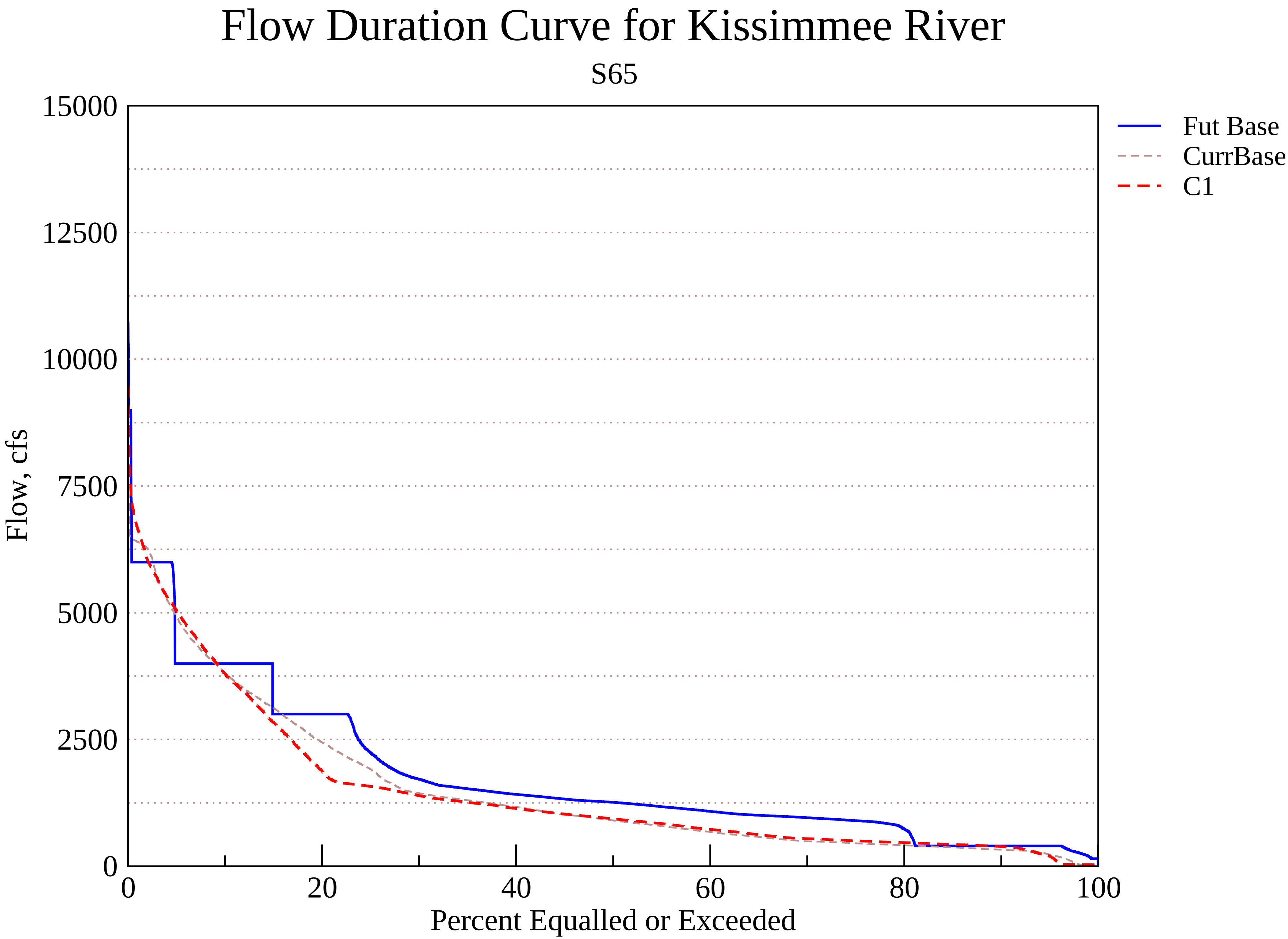
Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	31.4	34.3
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	48.6	54.3
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	88.6	85.7
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	5.7	8.6
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	188.0	236.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	401.0	526.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	2.8	5.2
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

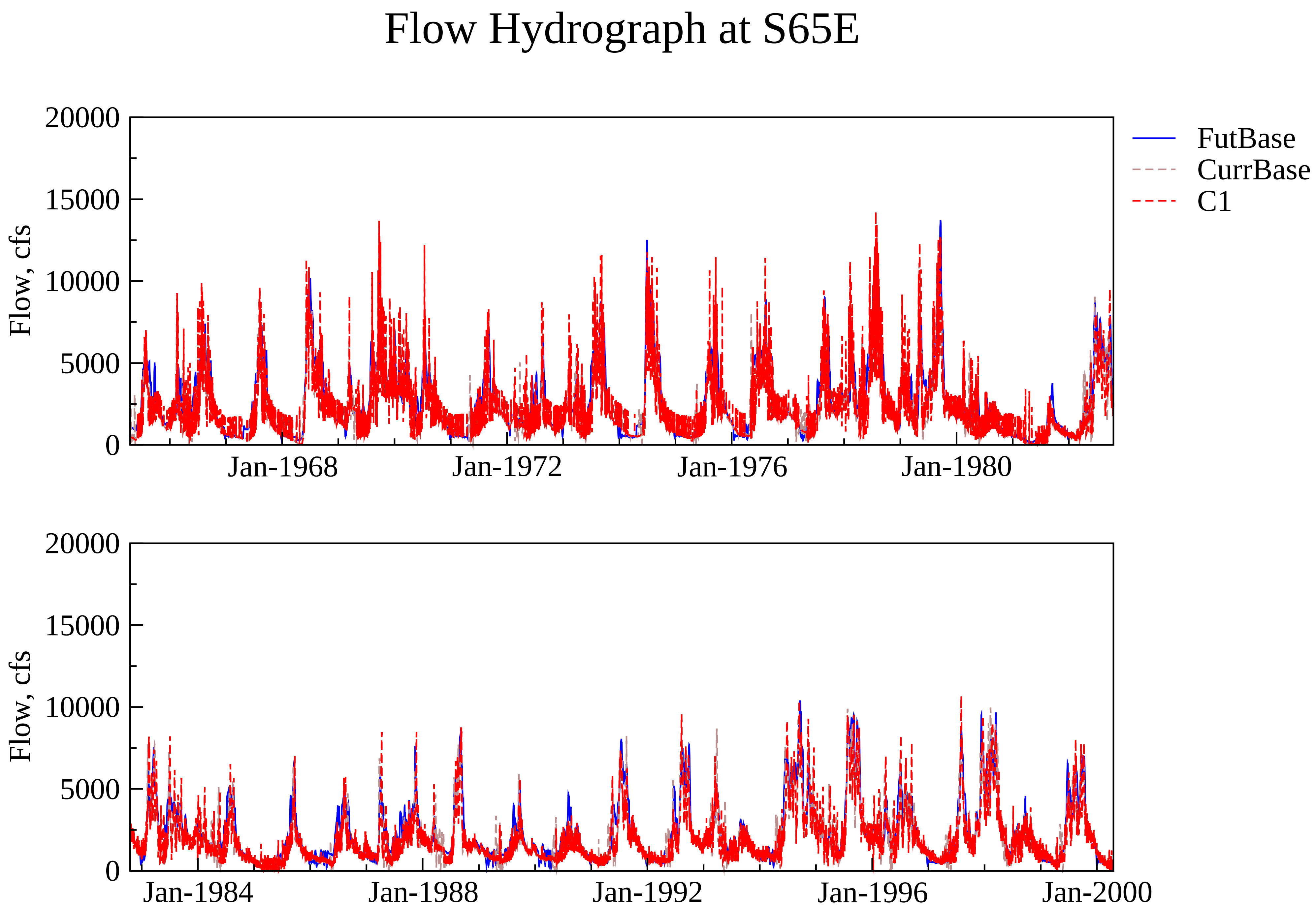
Tier 2 Report

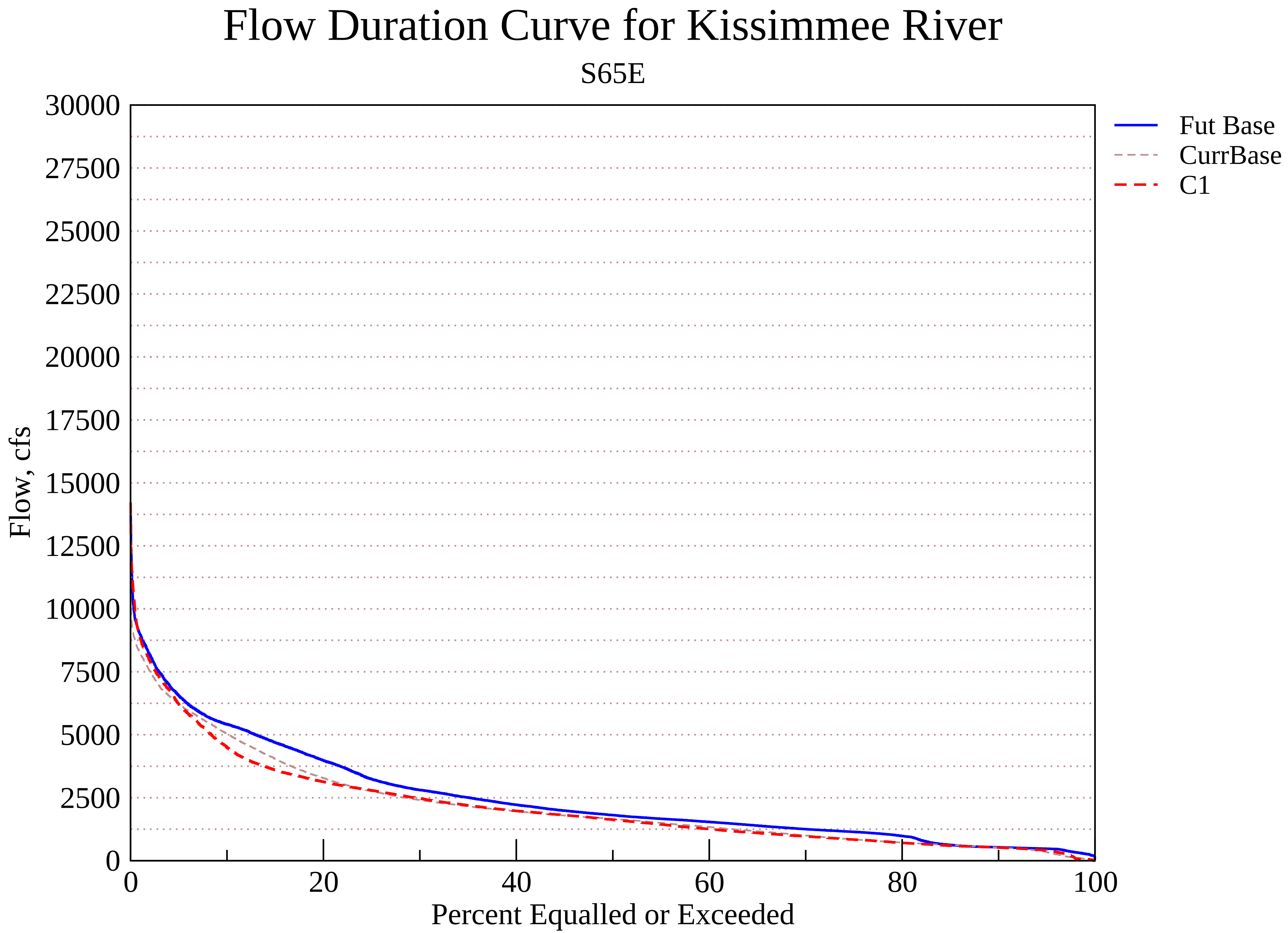
PDF Report for R01


Flow Hydrograph at S65
15000
10000
5000
0
Flow, cfs
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
C1
15000
10000
5000
0
Flow, cfs
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000



Flow Duration Curve for Kissimmee River
S65
Flow, cfs
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
C1


Flow Hydrograph at S65E
Flow, cfs
20000
15000
10000
5000
0
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
C1
Flow, cfs
20000
15000
10000
5000
0
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000



Flow Duration Curve for Kissimmee River
S65E
Flow, cfs
30000
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
C1

Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation C1

Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Number of days per water year that river channel depth is greater than average floodplain ground elelvation (average).	252.0	250.0	203.0	314.0
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	56.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	4.9
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	9.0

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

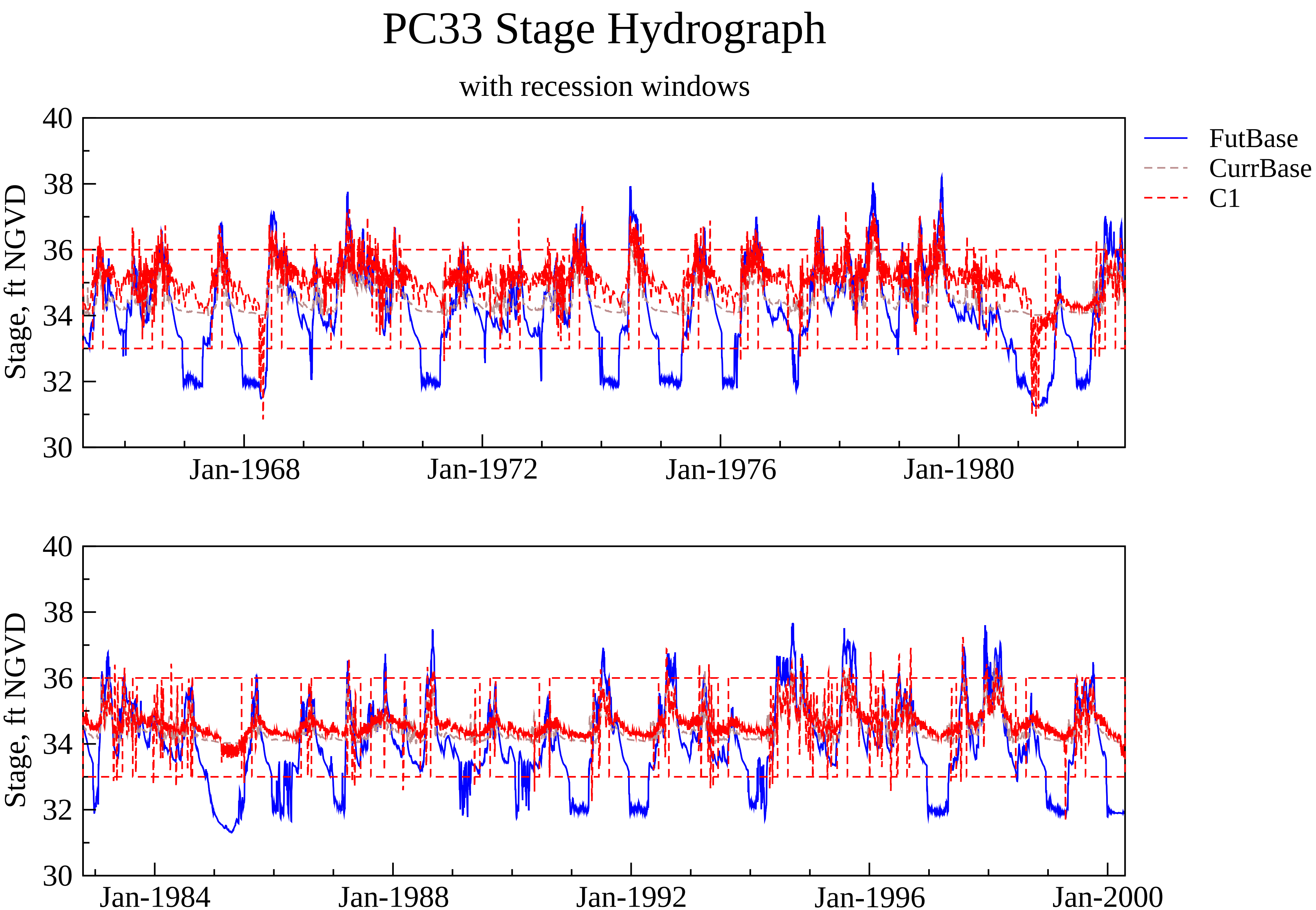
Alternative Description : Uncertainty Analysis - Simulation C1

Run ID : Variation of drainage constant, k - LOW

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	48.6
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	85.7
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	25.7

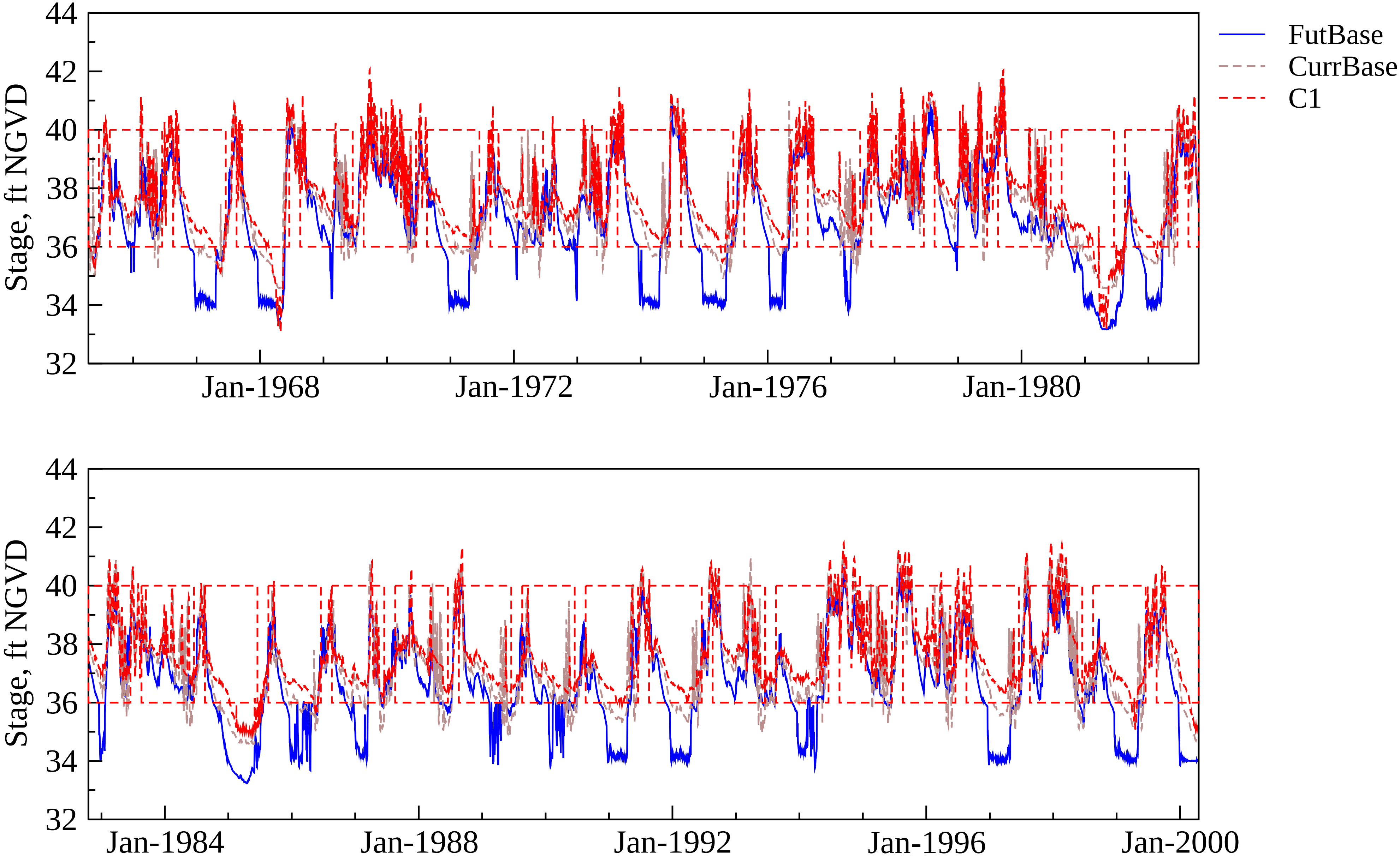
Tier 2 Report

PDF Report for R03


PC33 Stage Hydrograph
with recession windows
FutBase
CurrBase
C1
Stage, ft NGVD
40
38
36
34
32
30
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

PC52 Stage Hydrograph

with recession windows



KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation C2

Variation of drainage constant, k - HIGH

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation C2

Run ID : Variation of drainage constant, k - HIGH

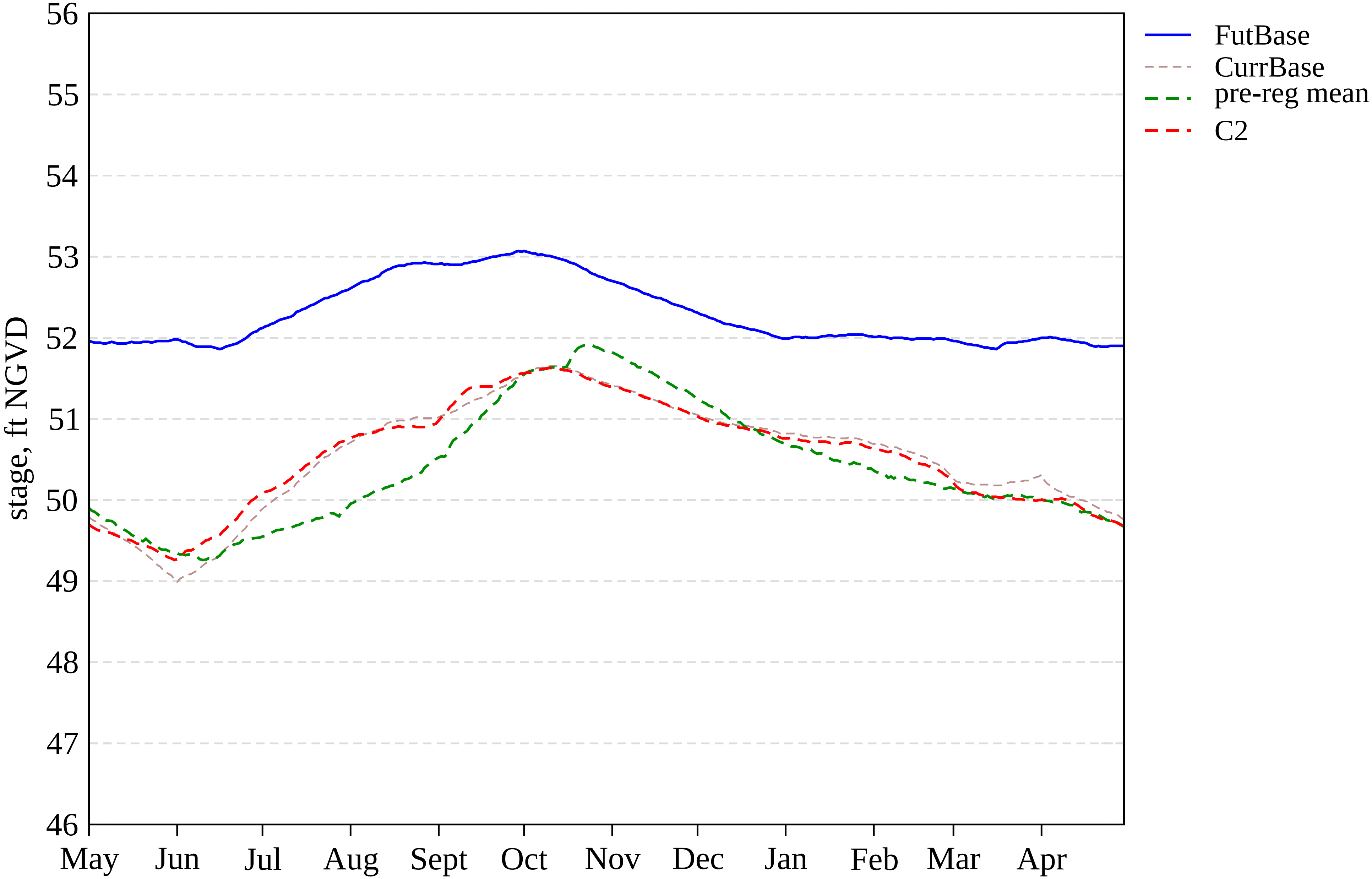
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	83.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	20.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	77.1
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	17.1
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	80.0
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	2.6	3.3
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	5.5	6.2

Tier 2 Report

PDF Report for L01

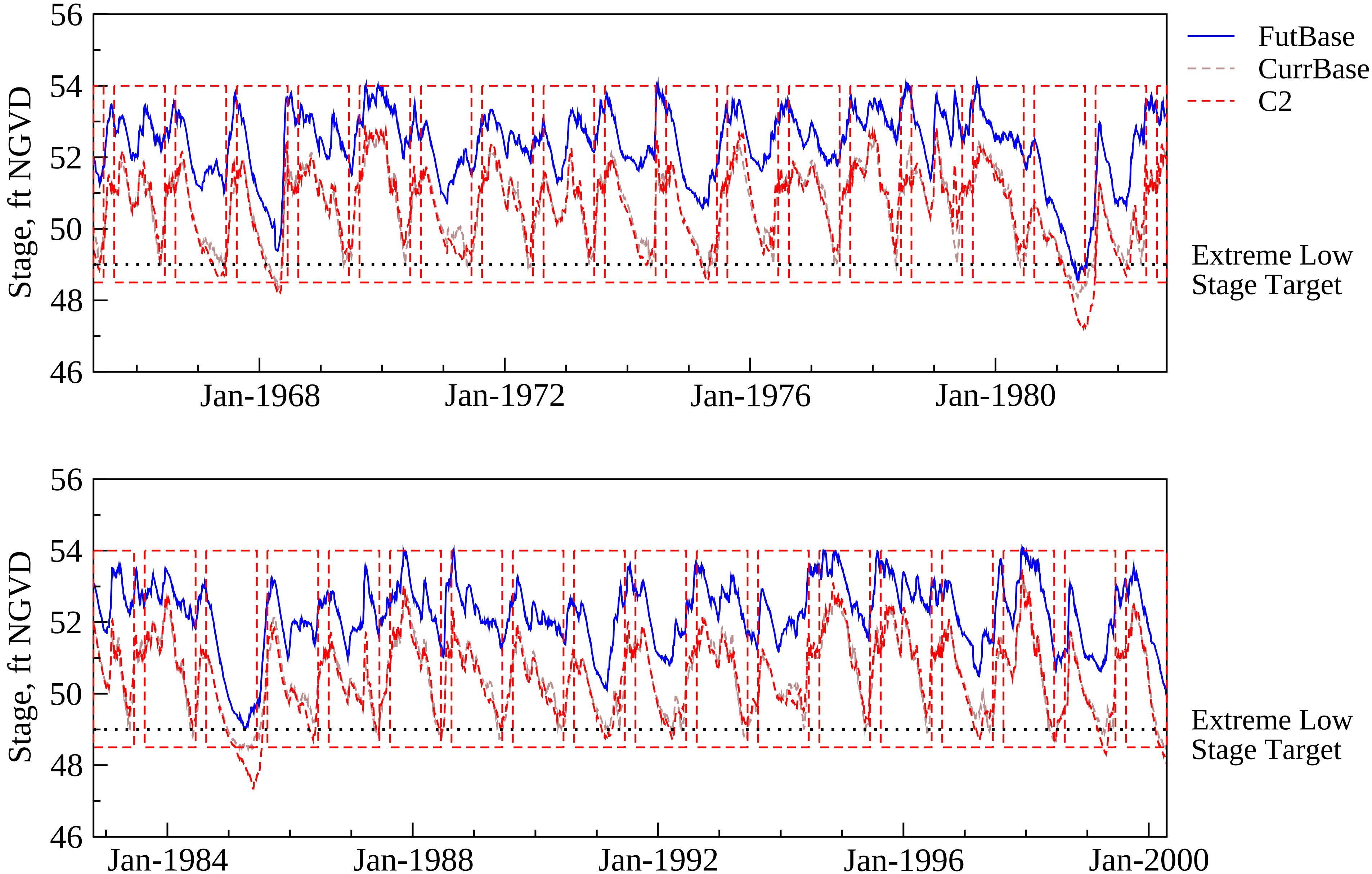
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Stage Hydrograph of mean daily stages



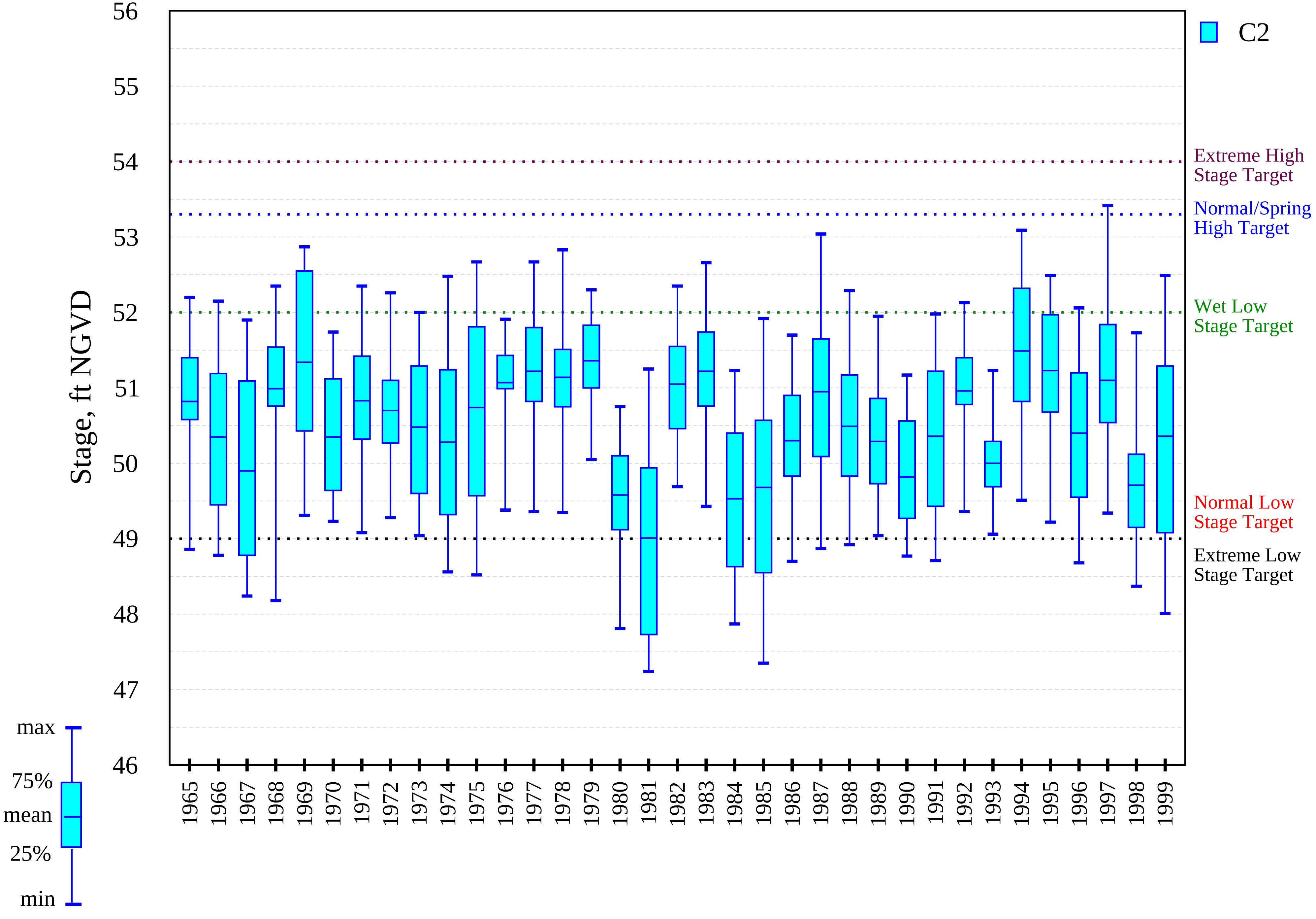
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



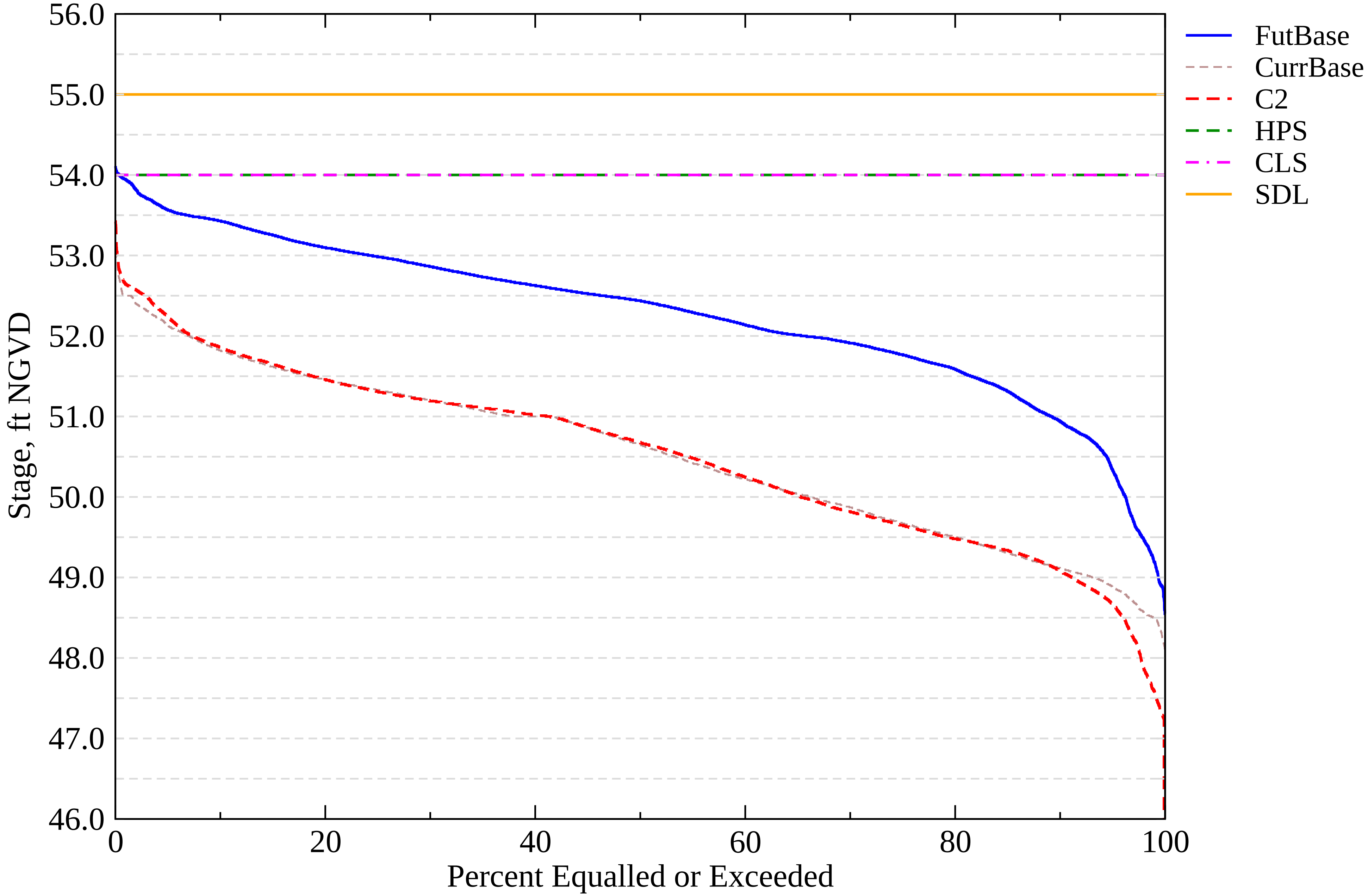
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Intra-annual lake stage variation (water year based)



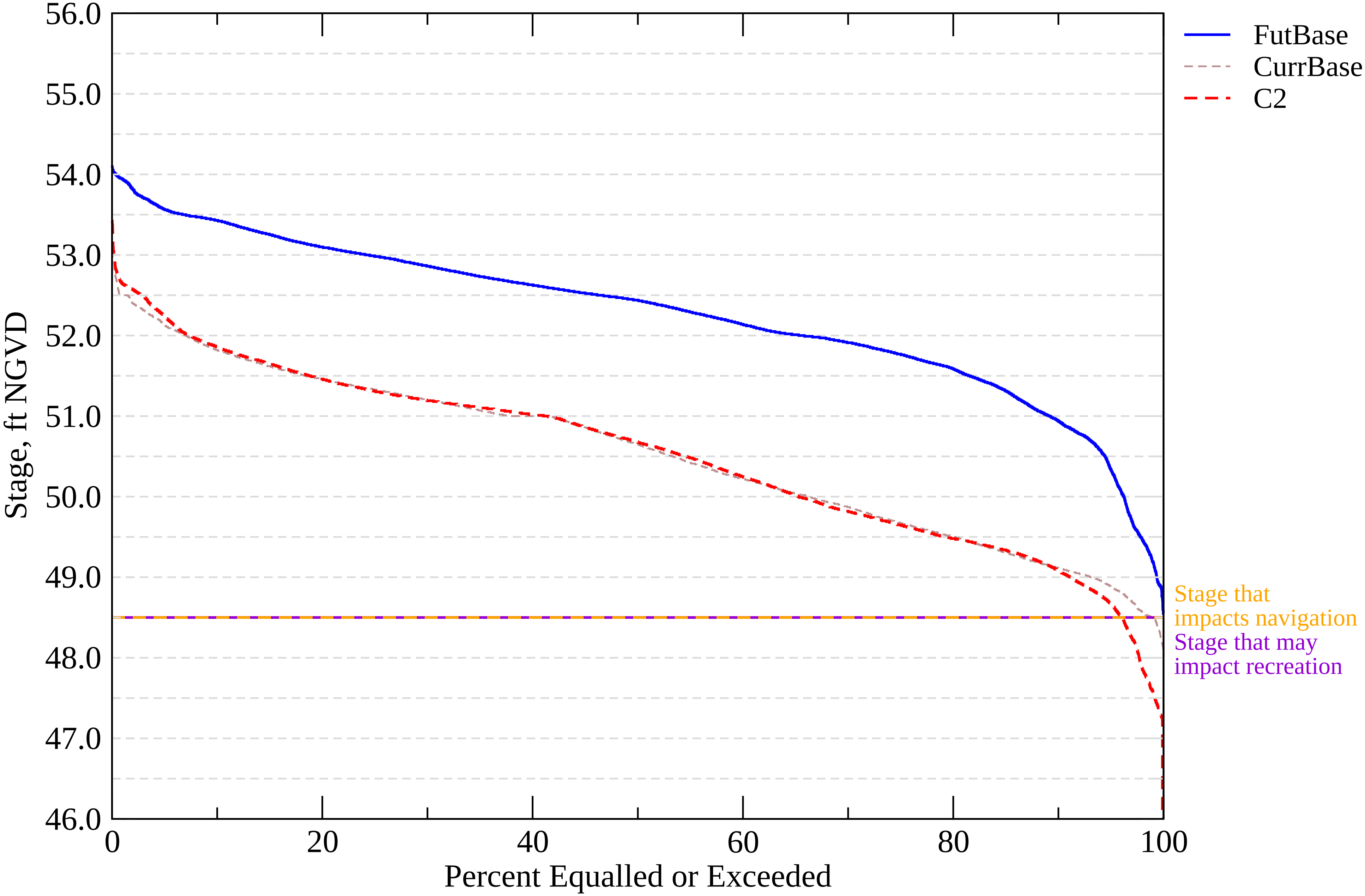
I-01. Probable High Lake Stage Performance Indicator

Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)



I-07. Stage Duration for Navigation and Recreation

Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)



Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

Alternative Description : Uncertainty Analysis - Simulation C2

Run ID : Variation of drainage constant, k - HIGH

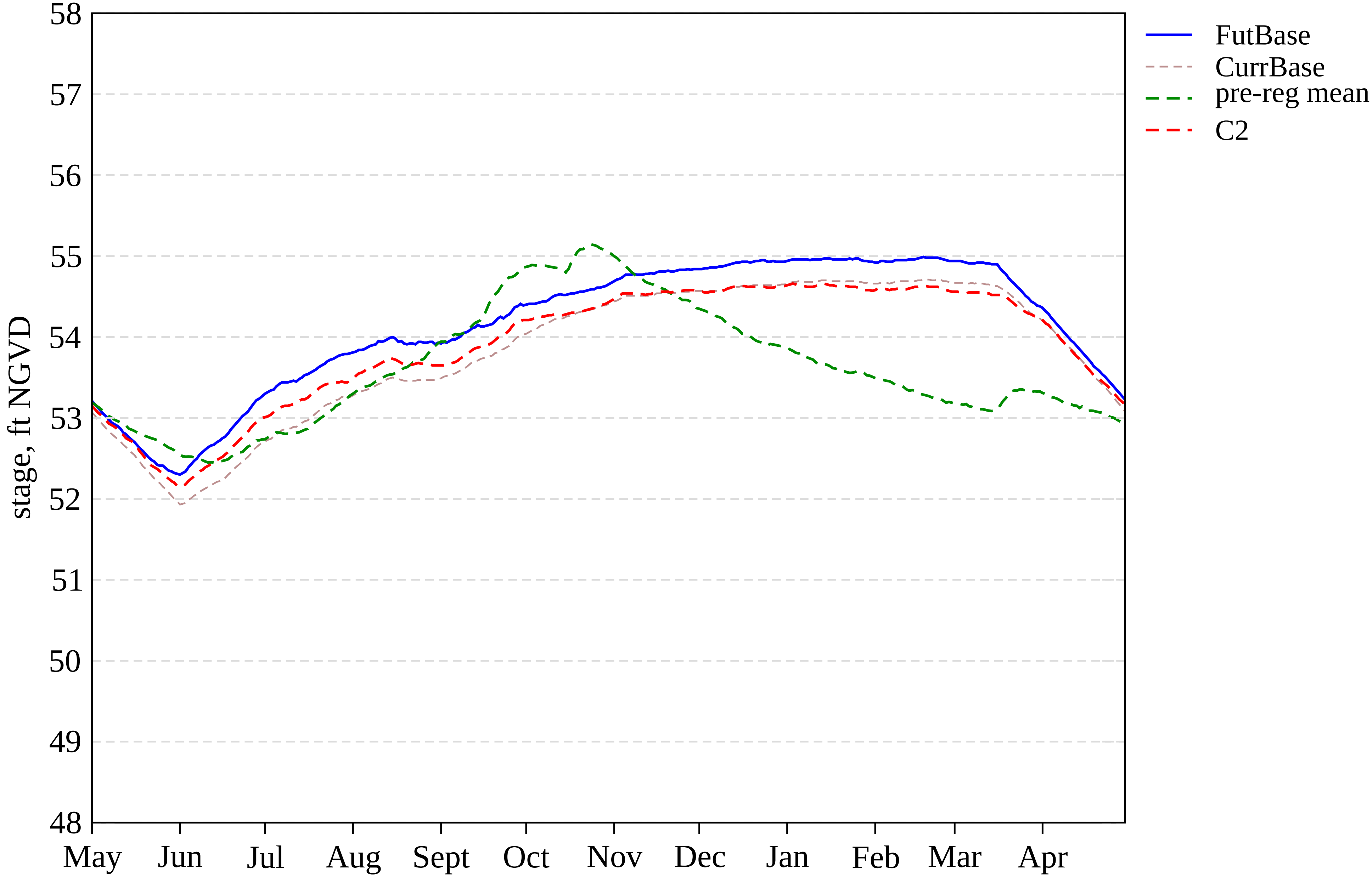
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	11.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	71.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	3.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	42.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	5.7
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	77.1
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.3
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	6.2

Tier 2 Report

PDF Report for L02

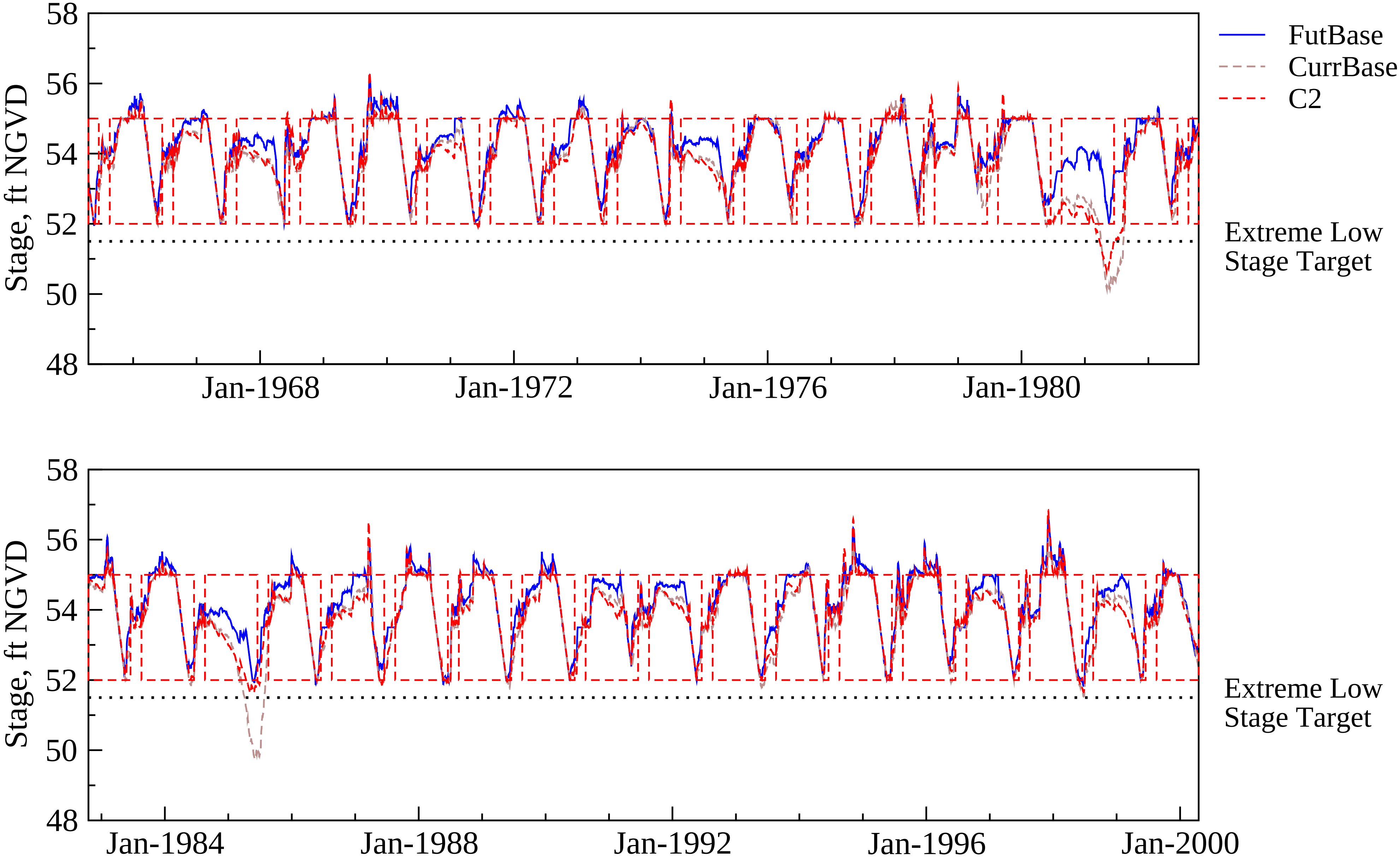
L-02. Stages in Lake Tohopekaliga

Stage Hydrograph of mean daily stages



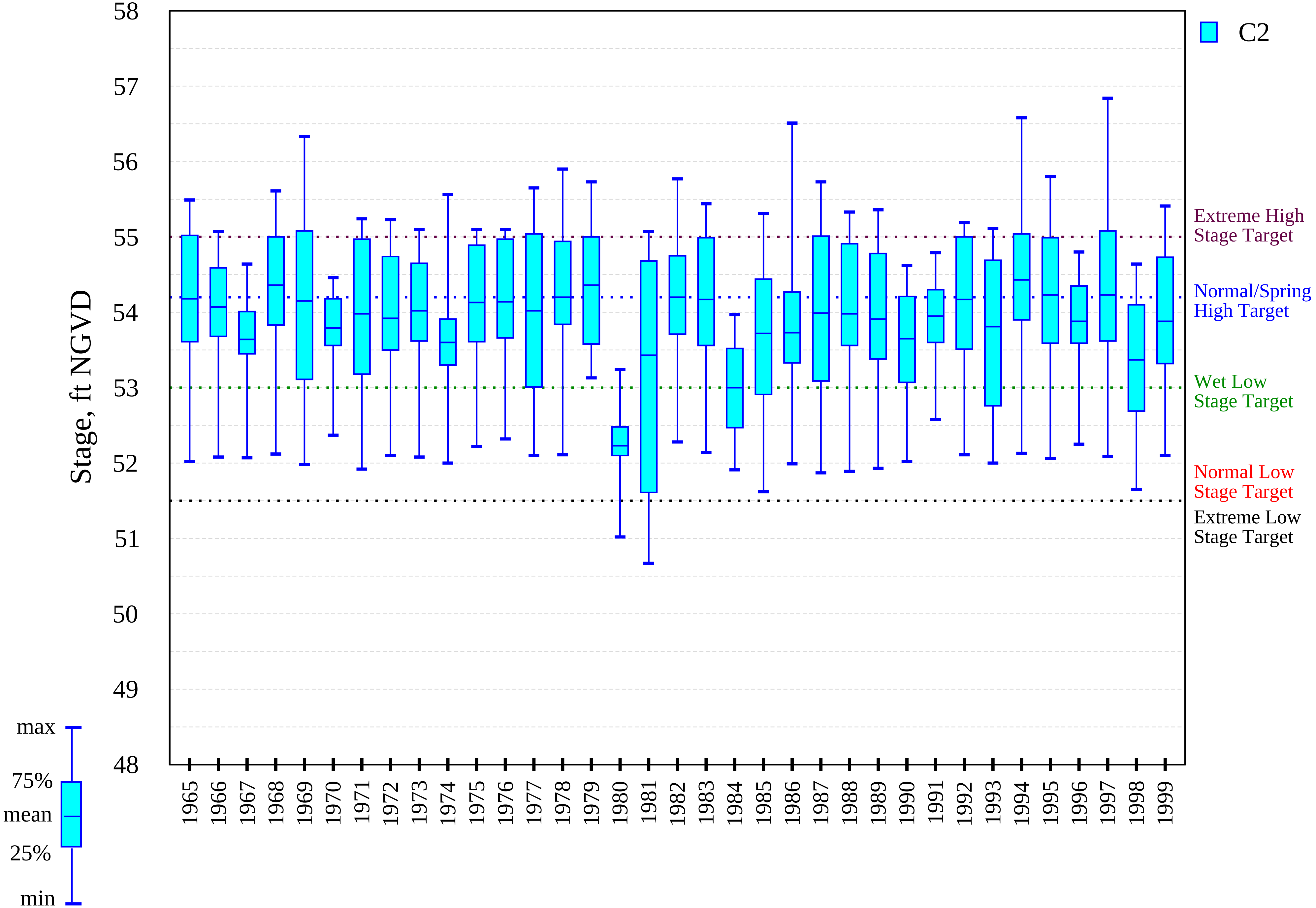
L-02. Stages in Lake Tohopekaliga

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



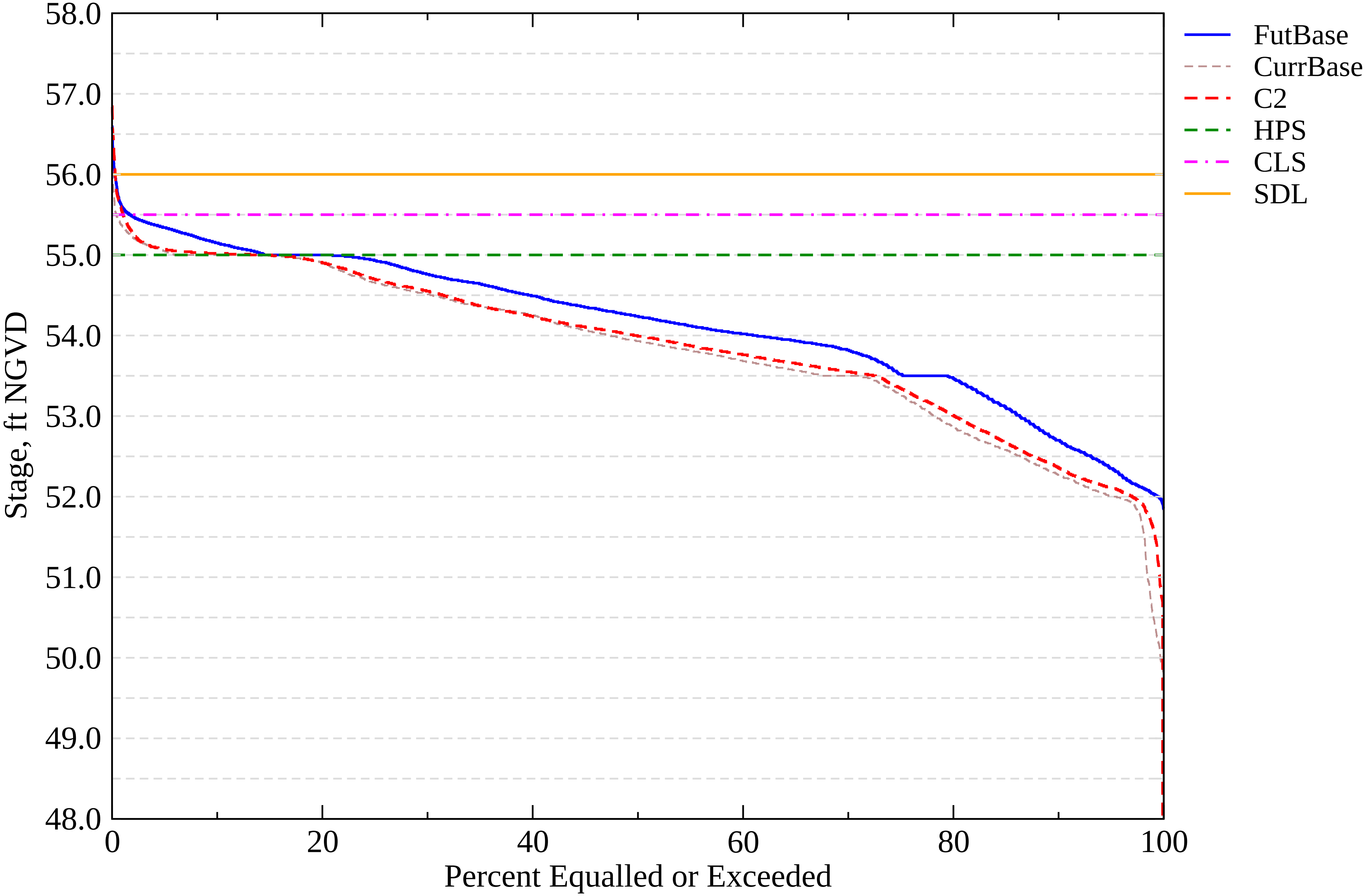
L-02. Stages in Lake Tohopekaliga

Intra-annual lake stage variation (water year based)



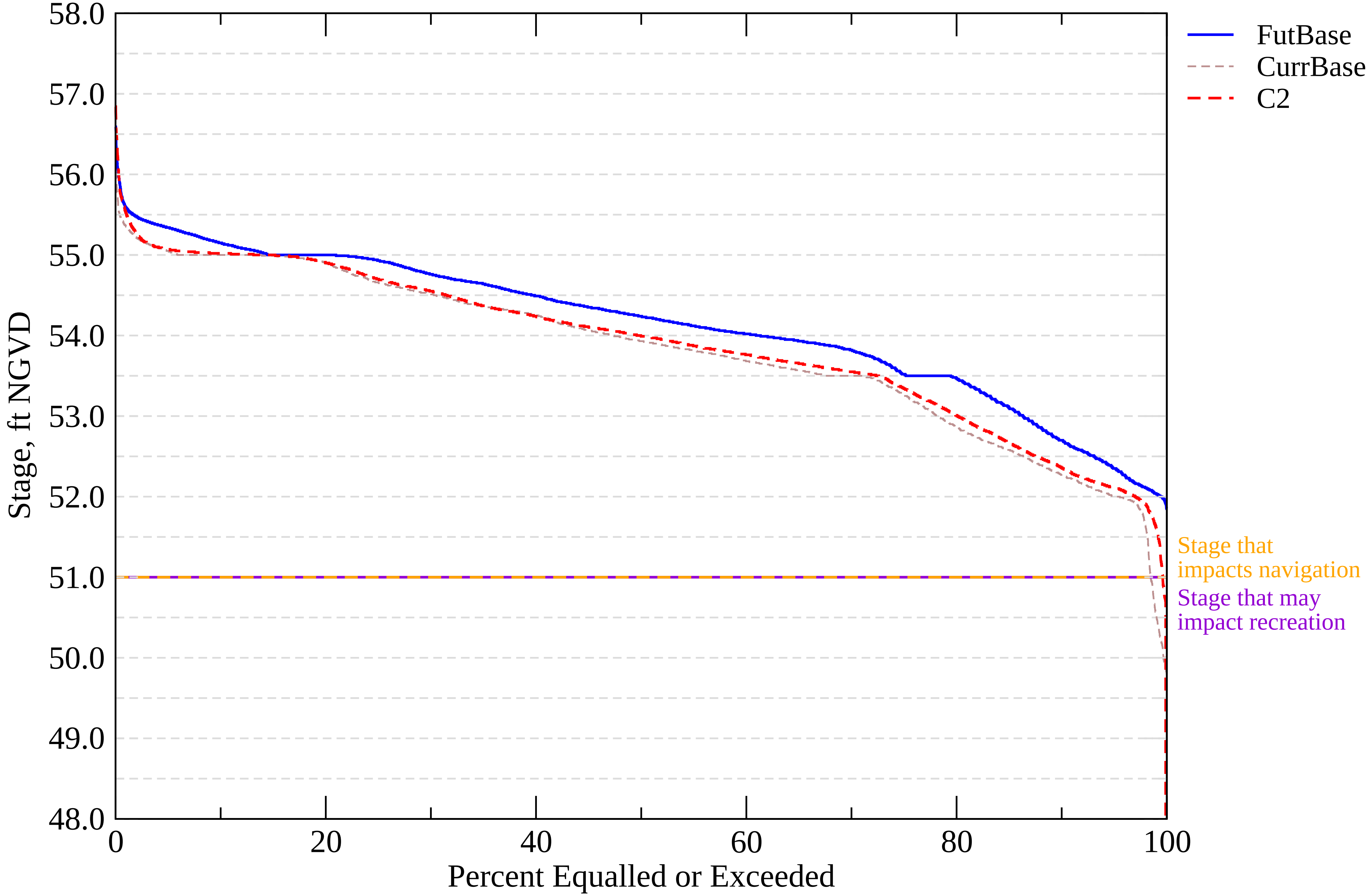
I-01. Probable High Lake Stage Performance Indicator

Lake Tohopekaliga (S61)



I-07. Stage Duration for Navigation and Recreation

Lake Tohopekaliga (S61)



Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

Alternative Description : Uncertainty Analysis - Simulation C2

Run ID : Variation of drainage constant, k - HIGH

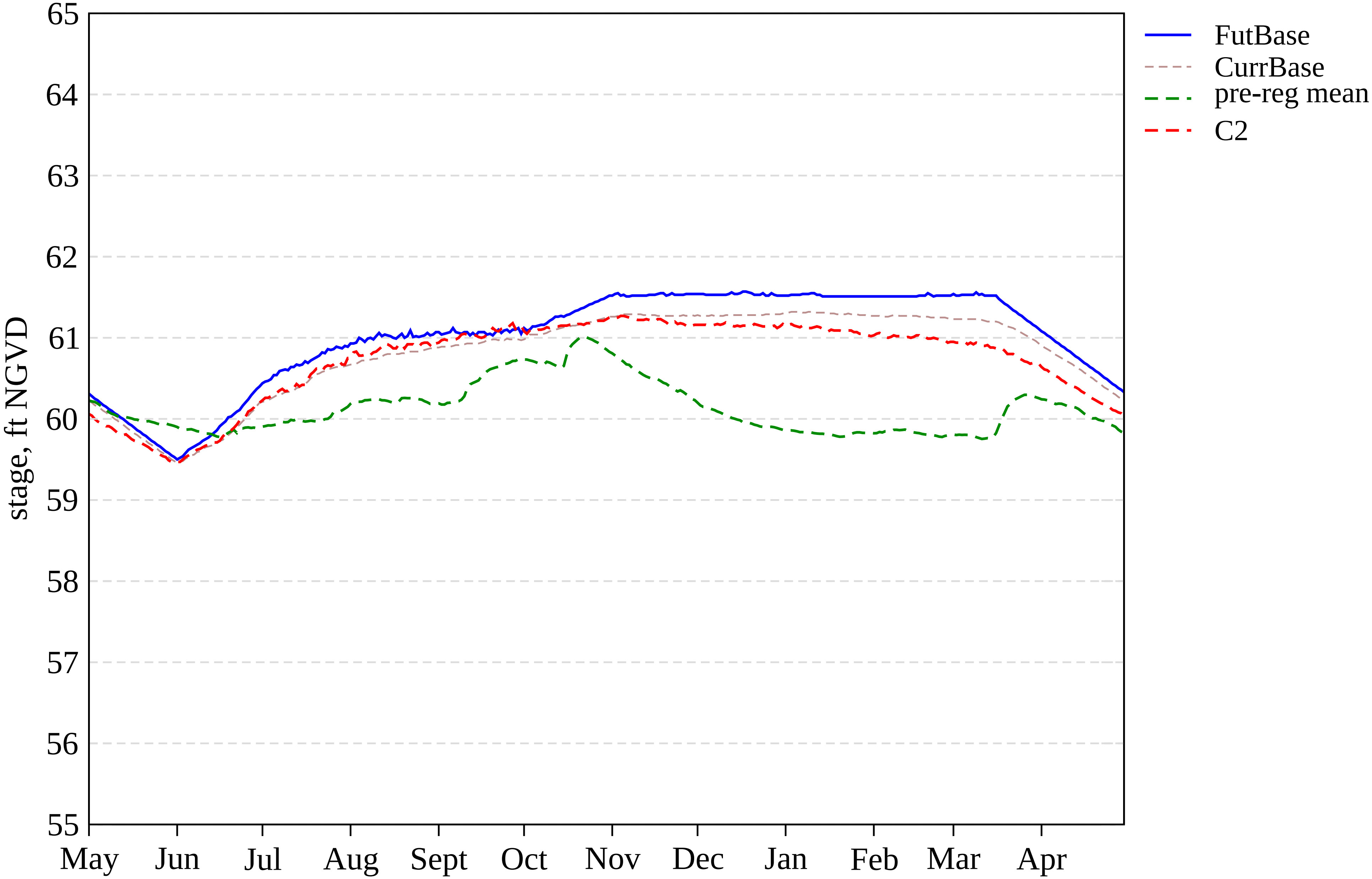
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	57.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	14.3
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	71.4
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.7

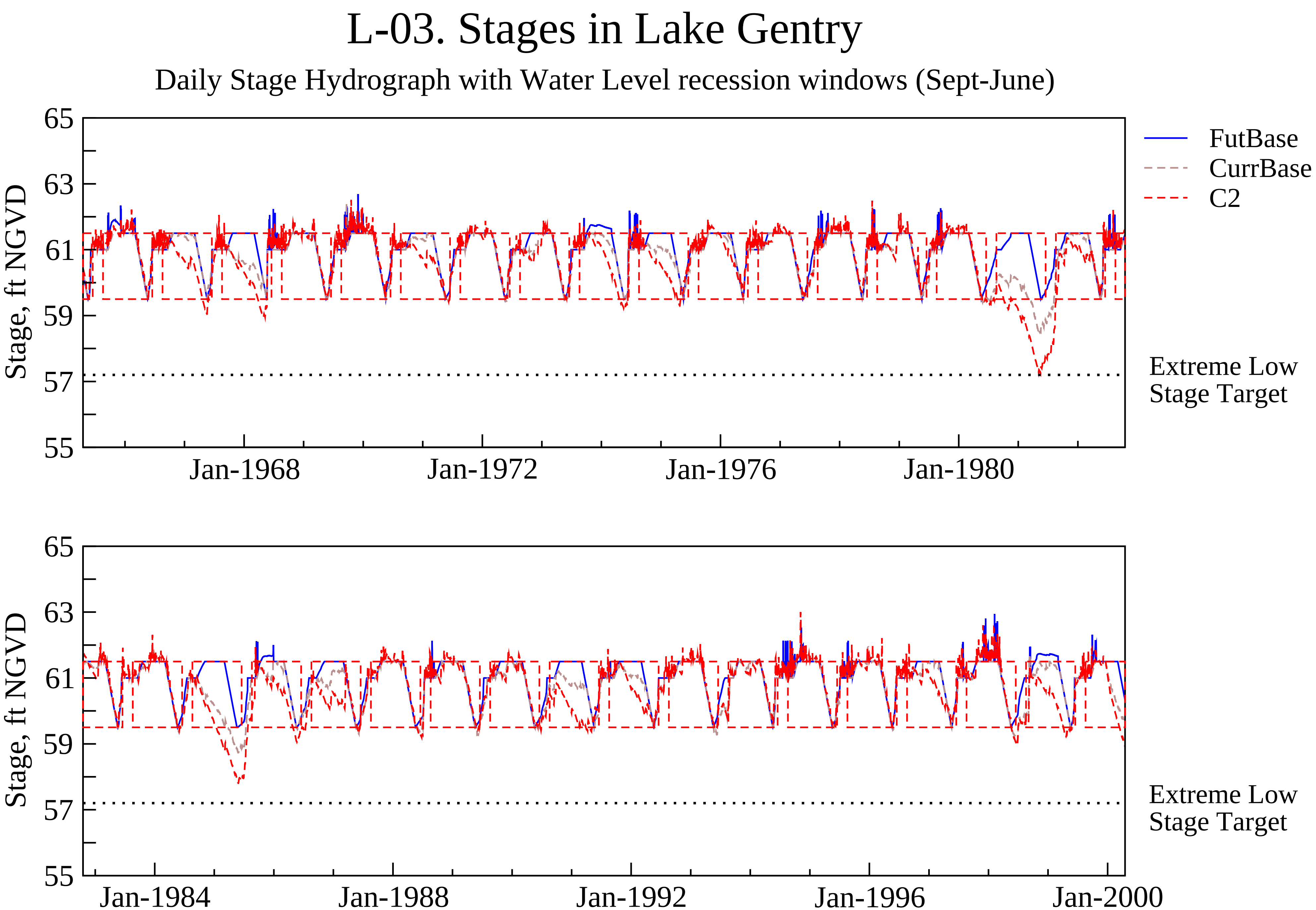
Tier 2 Report

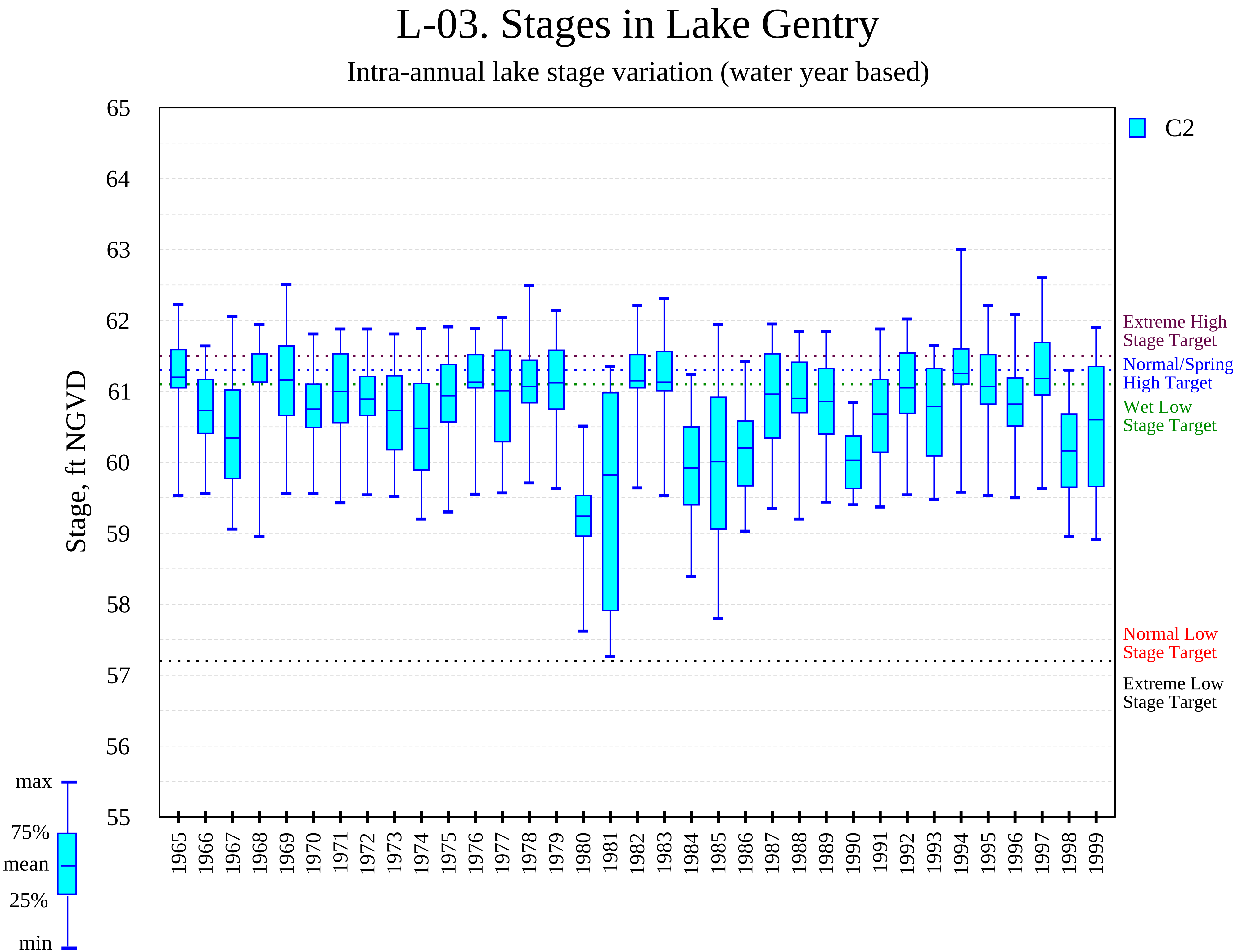
PDF Report for L03

L-03. Stages in Lake Gentry

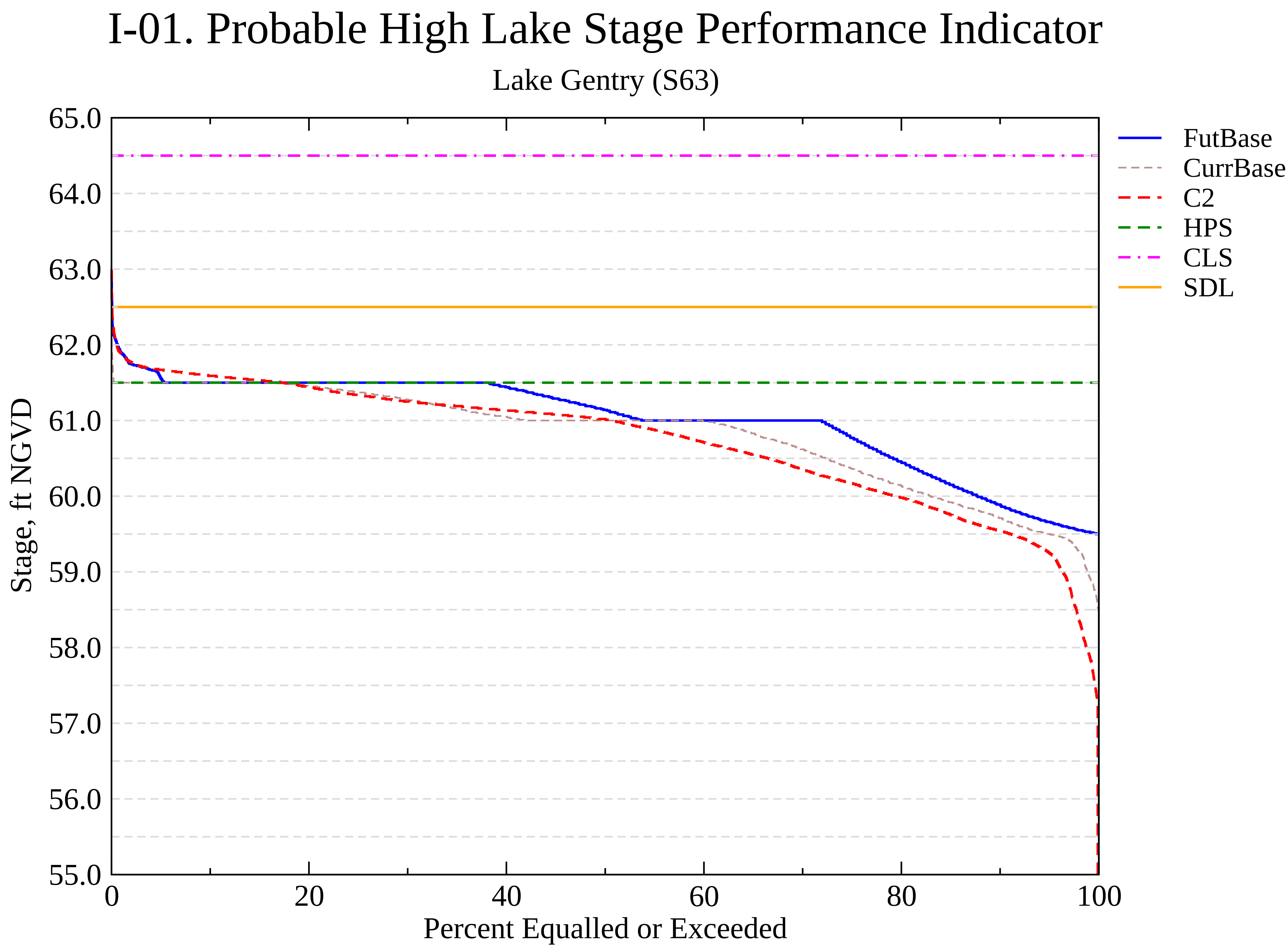
Stage Hydrograph of mean daily stages




L-03. Stages in Lake Gentry
Daily Stage Hydrograph with Water Level recession windows (Sept-June)
FutBase
CurrBase
C2
Extreme Low
Stage Target
Stage, ft NGVD
65
63
61
59
57
55
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Extreme Low
Stage Target
Stage, ft NGVD
65
63
61
59
57
55
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

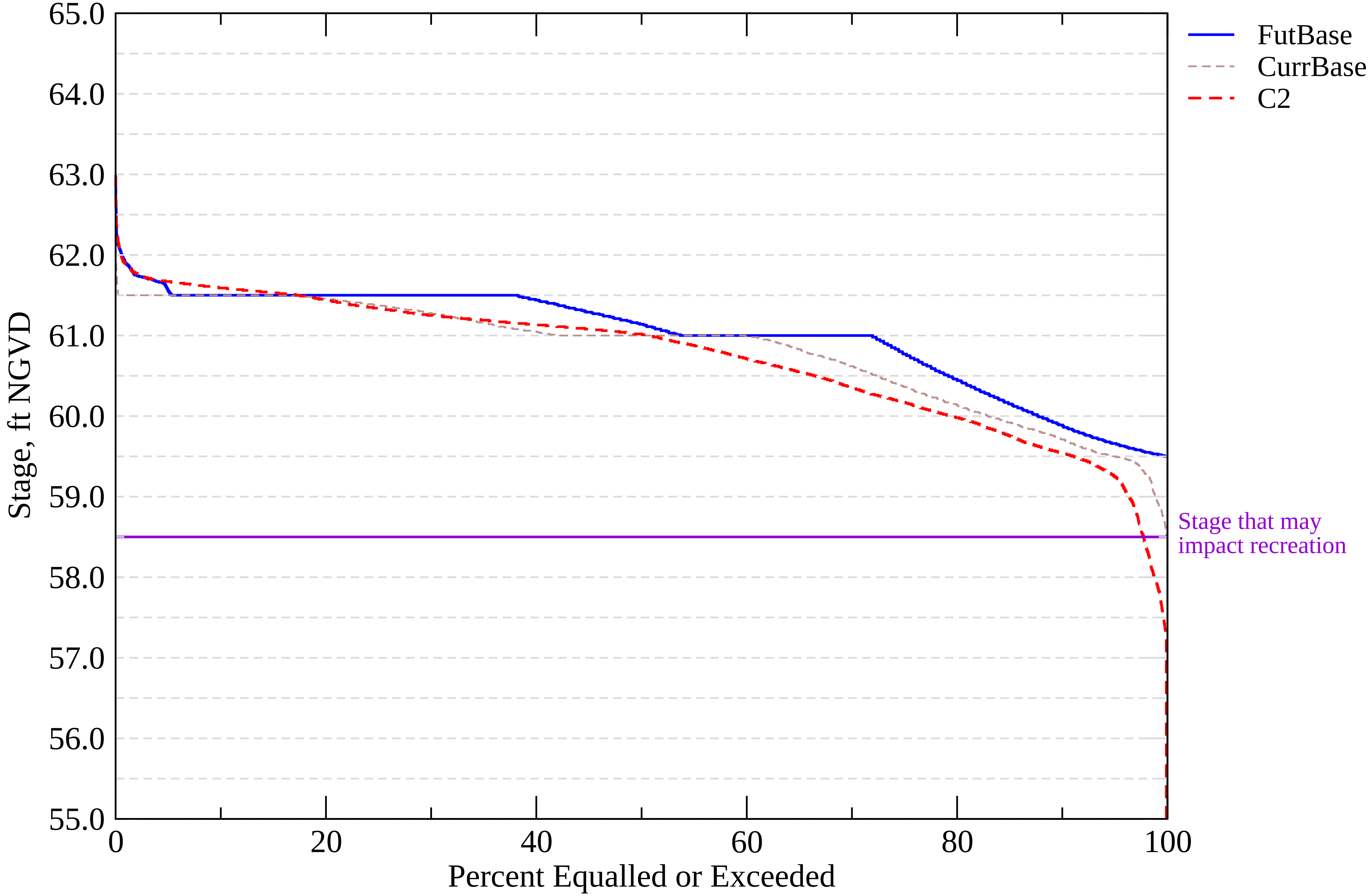


L-03. Stages in Lake Gentry
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
C2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999


I-01. Probable High Lake Stage Performance Indicator
Lake Gentry (S63)
Stage, ft NGVD
Percent Equalled or Exceeded
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
FutBase
CurrBase
C2
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lake Gentry (S63)



Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

Alternative Description : Uncertainty Analysis - Simulation C2

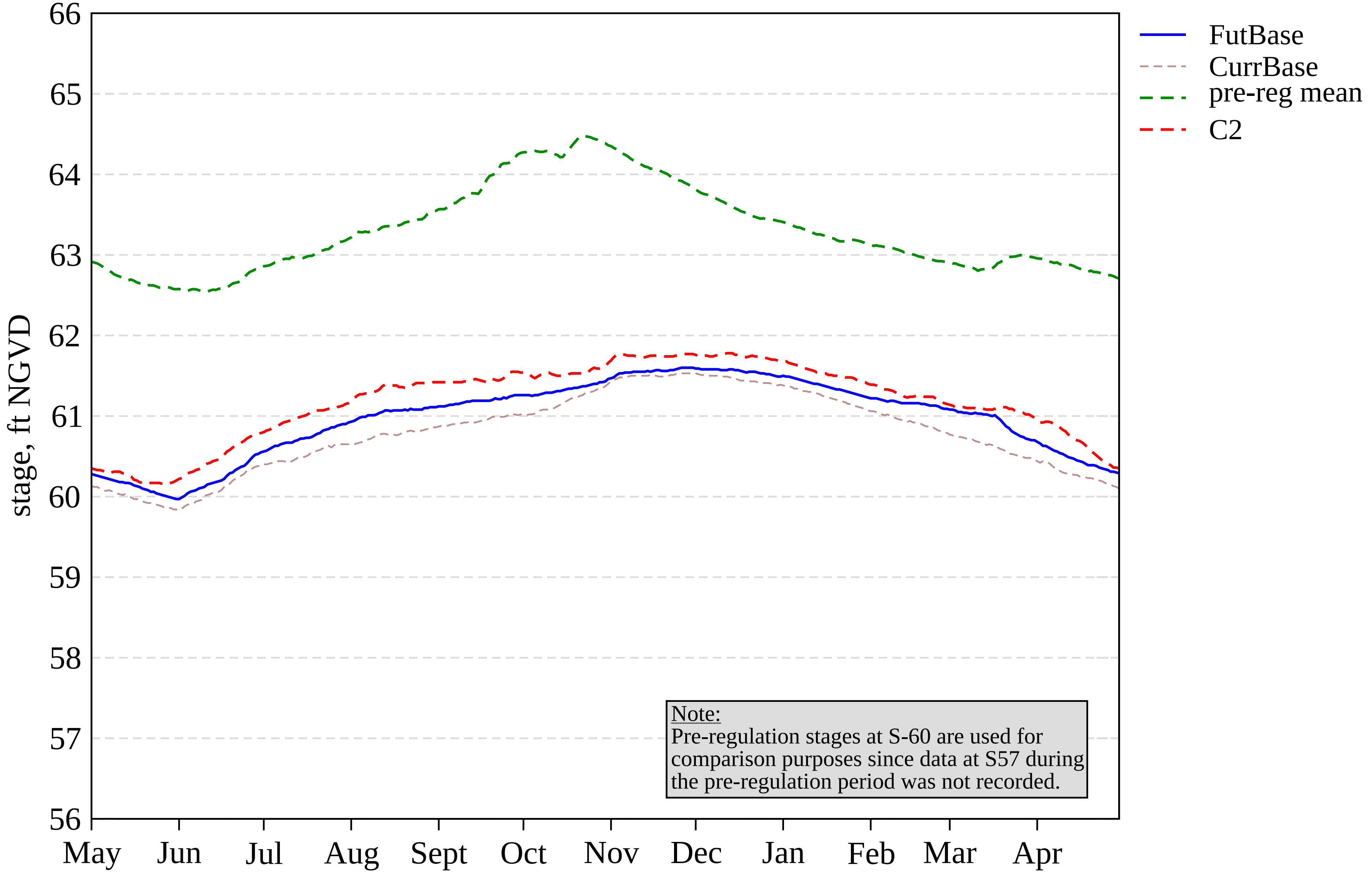
Run ID : Variation of drainage constant, k - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	97.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	20.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	51.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	60.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	28.6
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.4
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	5.4

Tier 2 Report

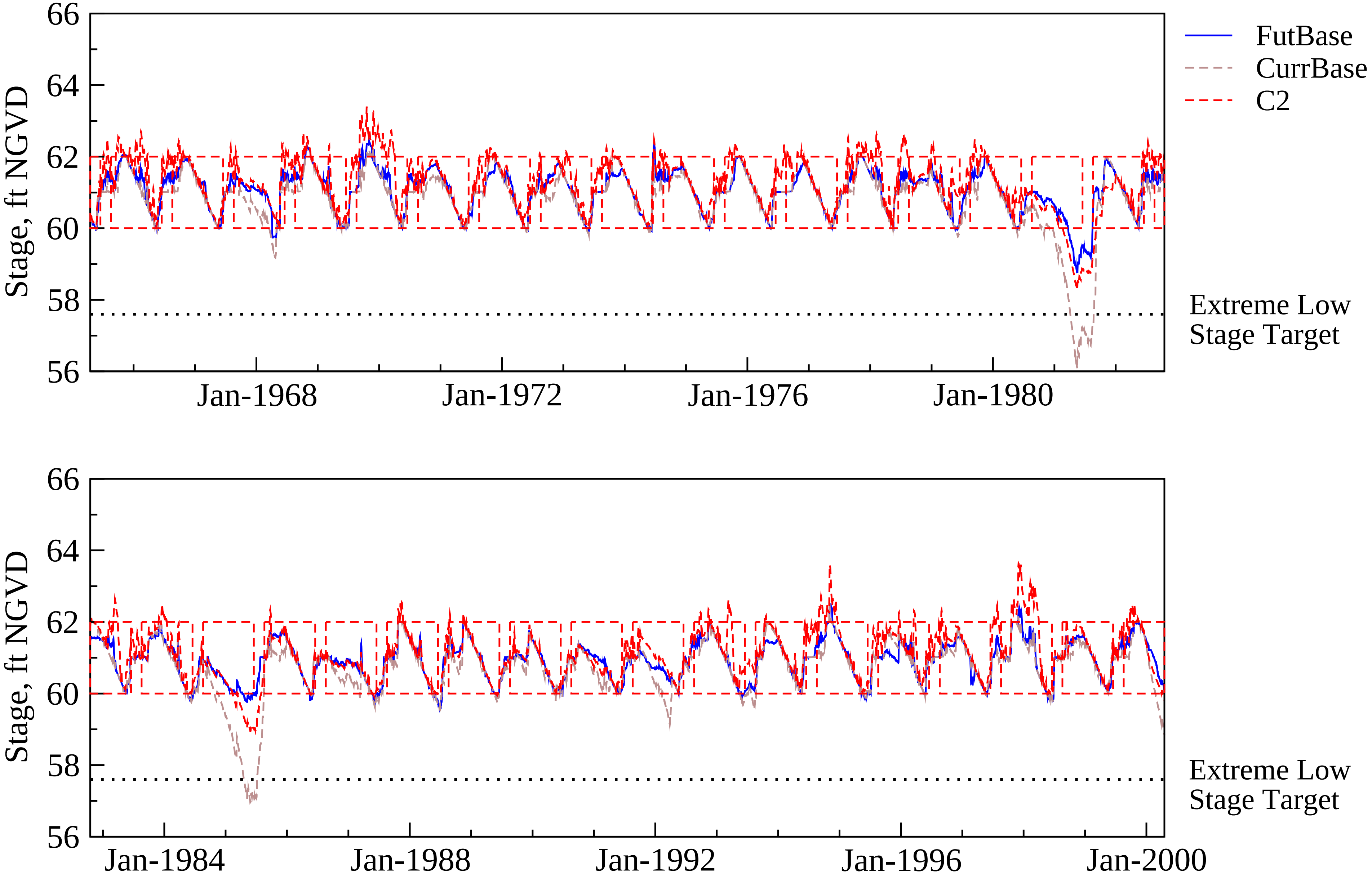
L-04. Stages in Lakes Joel, Myrtle, and Preston

Stage Hydrograph of mean daily stages



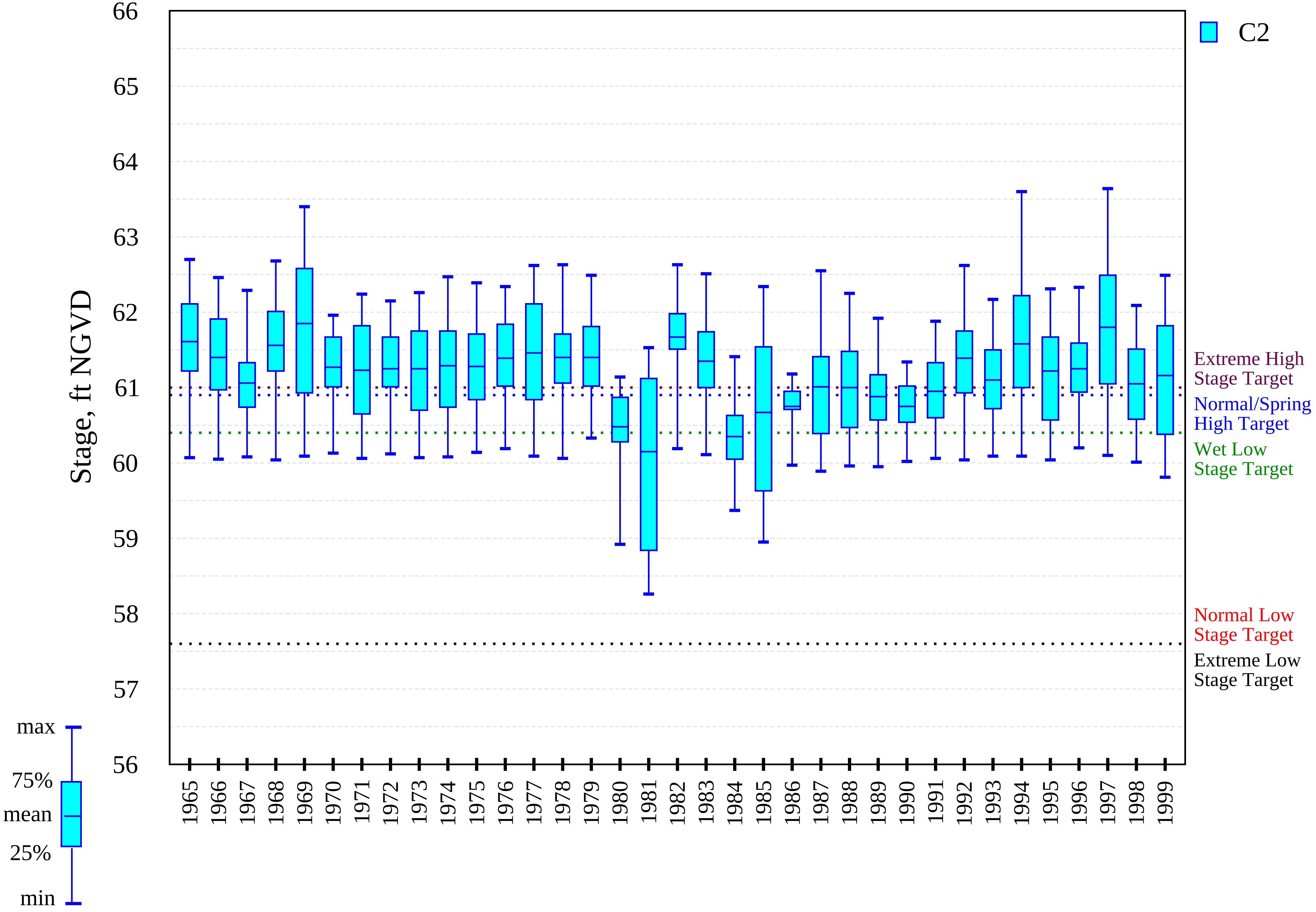
L-04. Stages in Lakes Joel, Myrtle, and Preston

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



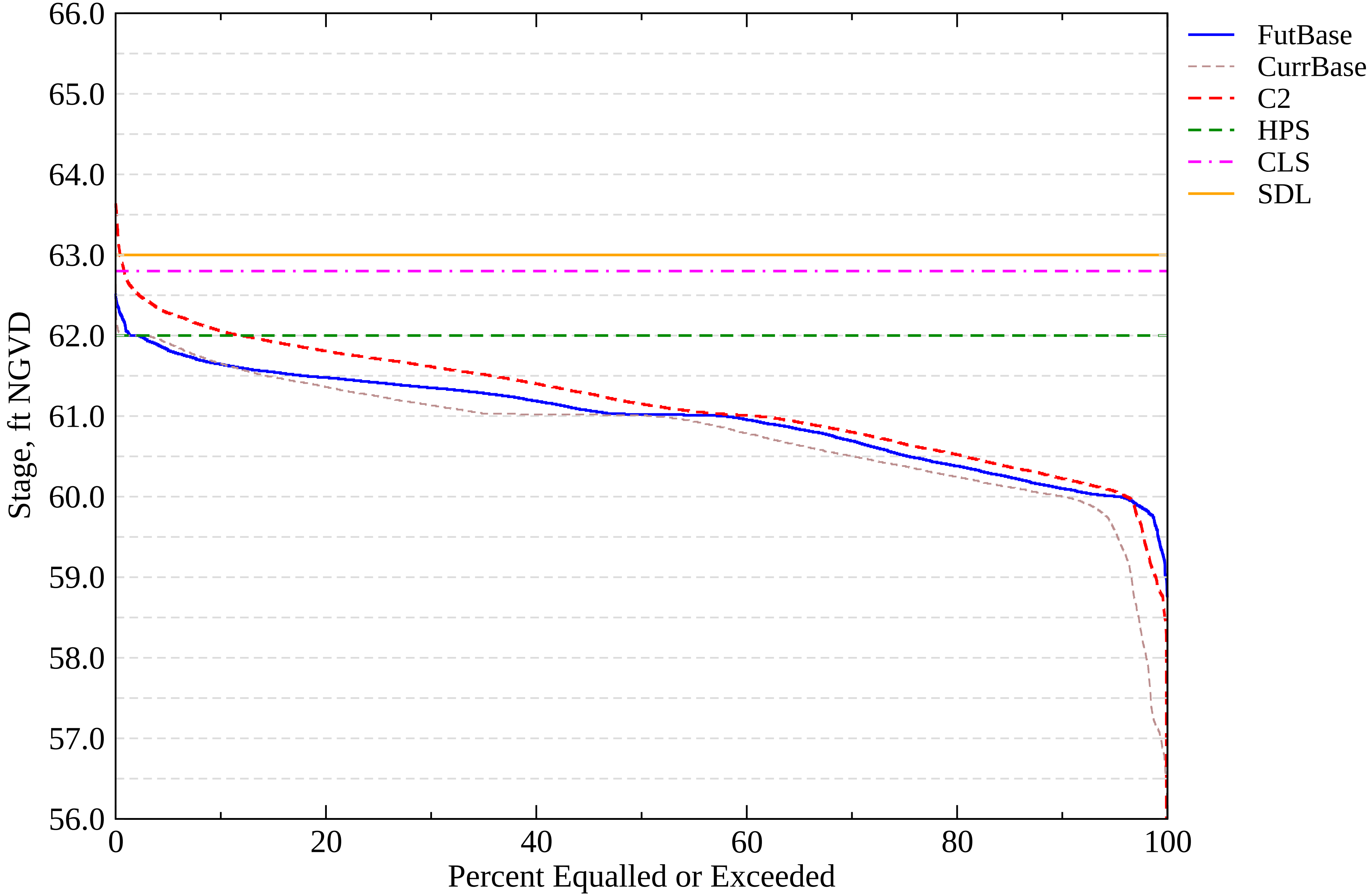
L-04. Stages in Lakes Joel, Myrtle, and Preston

Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Lake Myrtle, Joel, and Preston (S57)



Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation C2

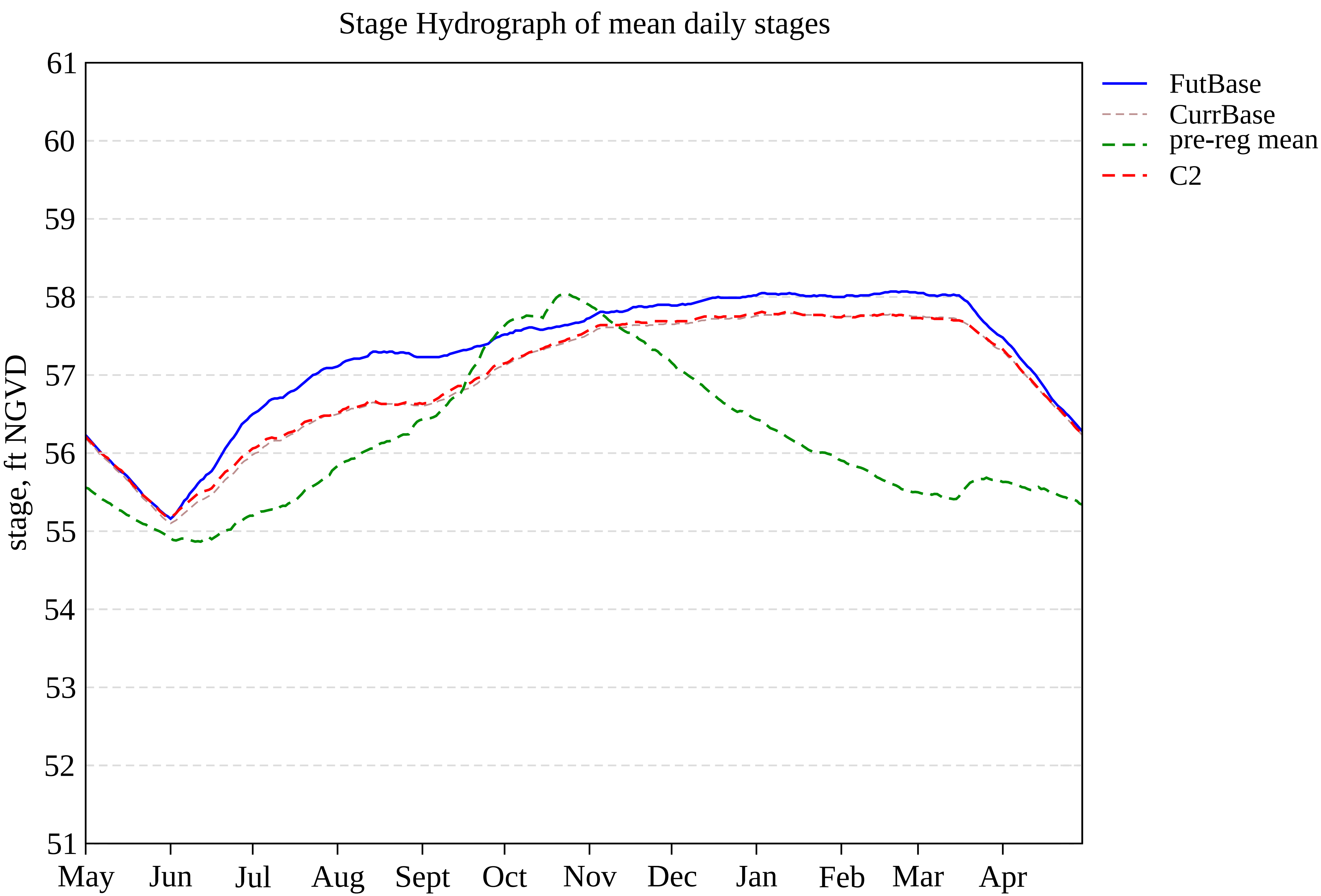
Run ID : Variation of drainage constant, k - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	51.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	28.6
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	91.4
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.1
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.6

Tier 2 Report

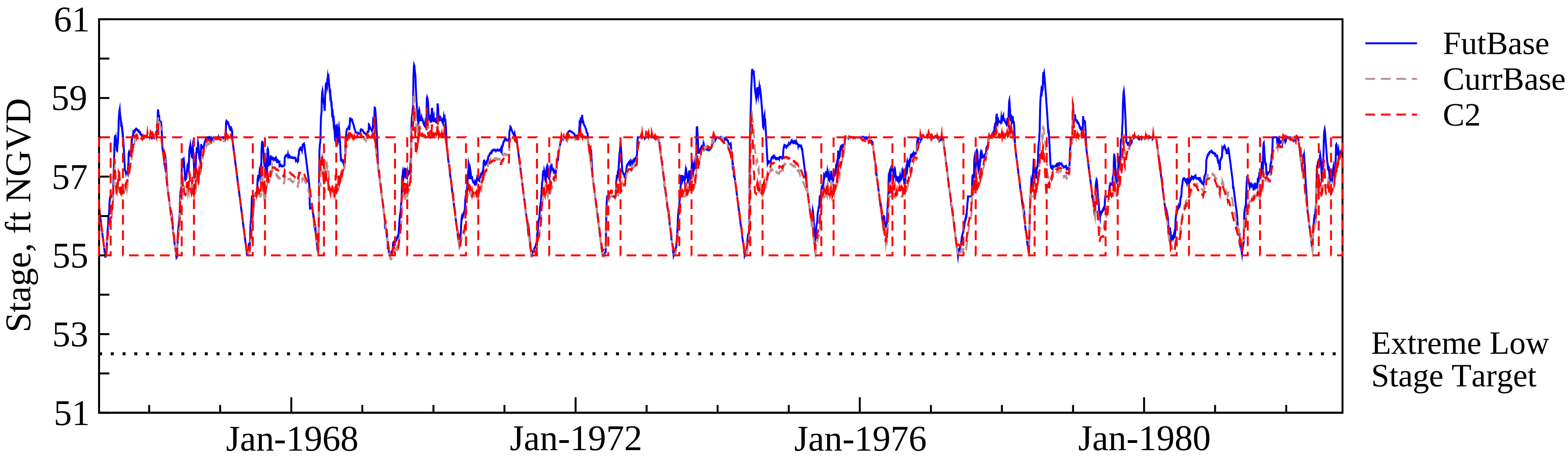
PDF Report for L05

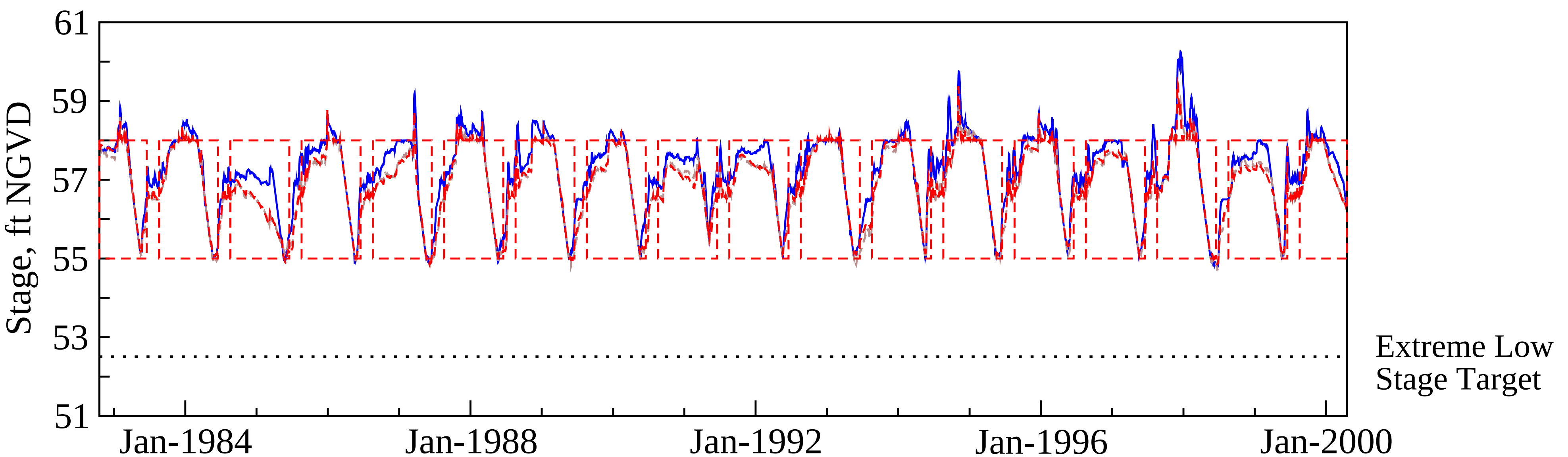
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay



L-05. Stages in East Lake Toho, Fell’s Cove, and Lake Ajay

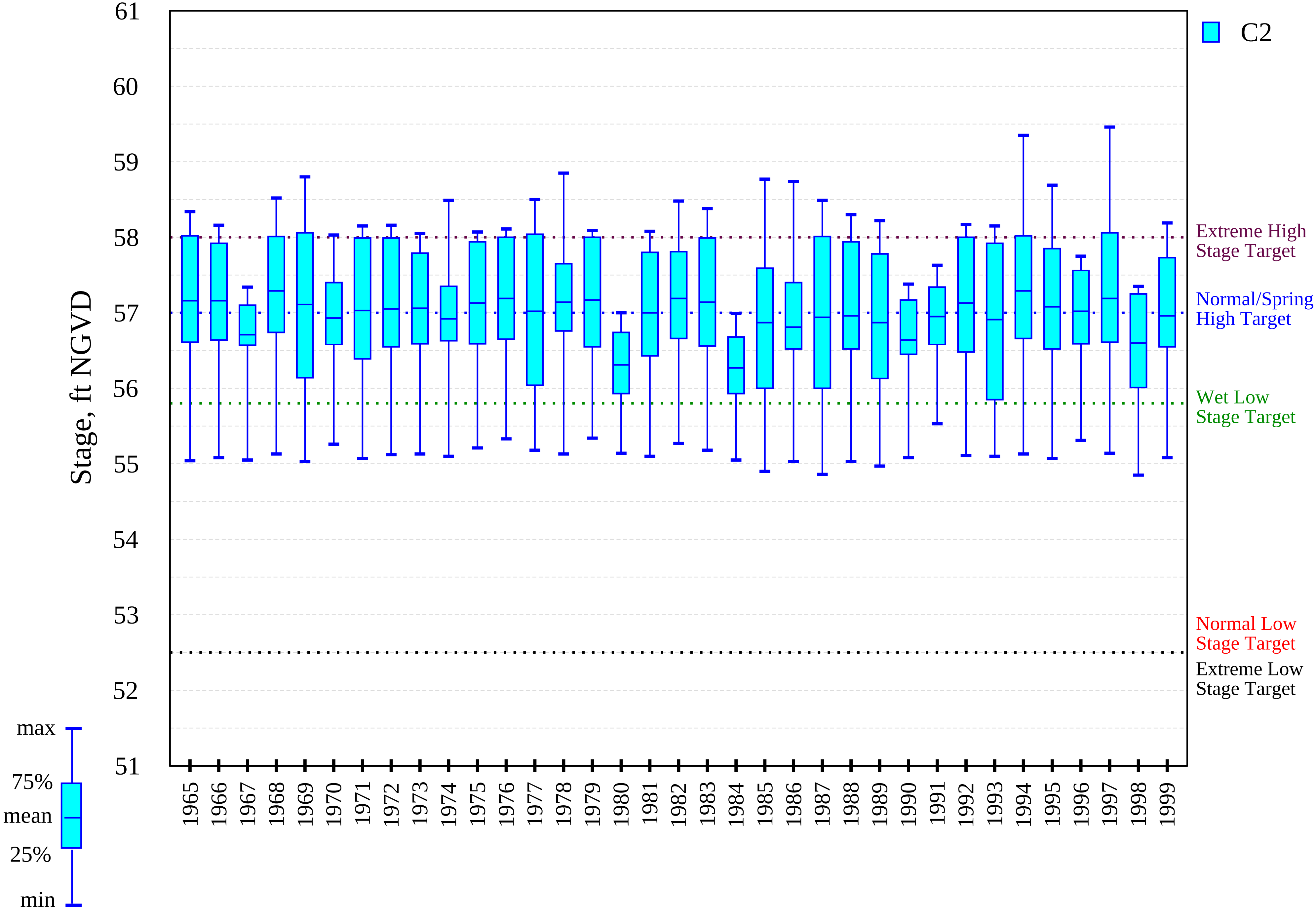
Daily Stage Hydrograph with Water Level recession windows (Sept-June)





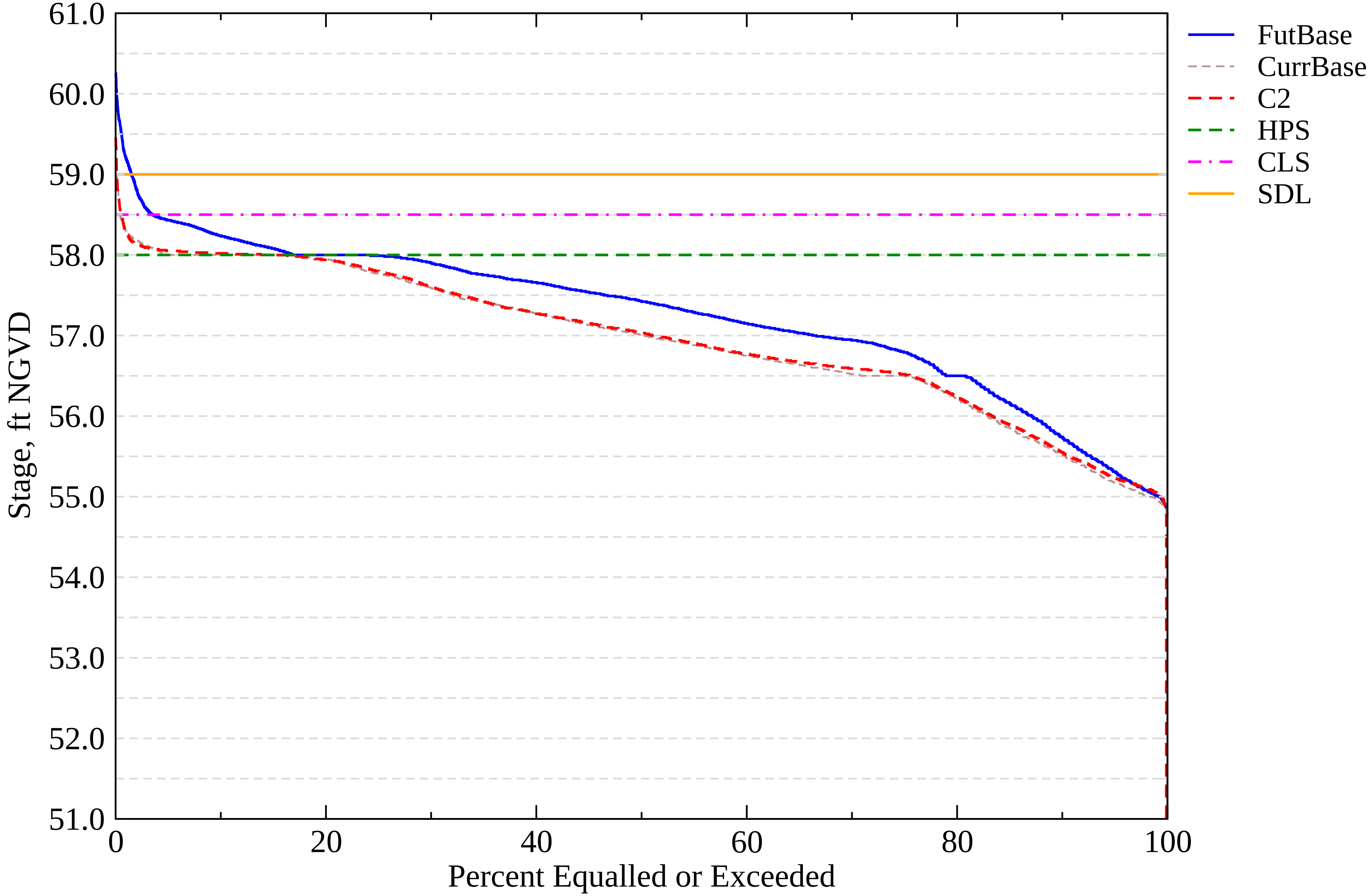
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Intra-annual lake stage variation (water year based)



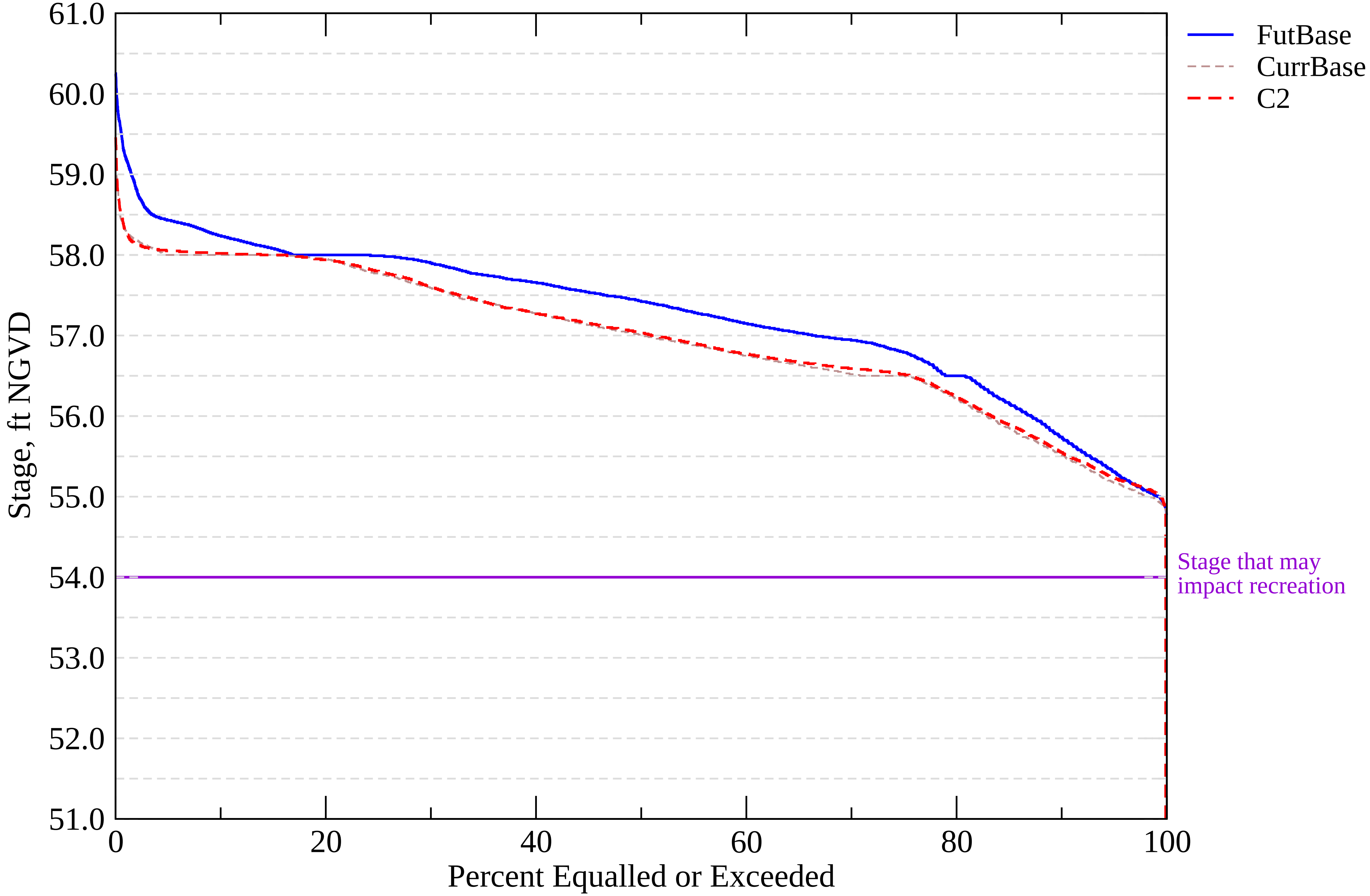
I-01. Probable High Lake Stage Performance Indicator

East Lake Toho (S59)



I-07. Stage Duration for Navigation and Recreation

East Lake Toho (S59)



Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Alternative Description : Uncertainty Analysis - Simulation C2

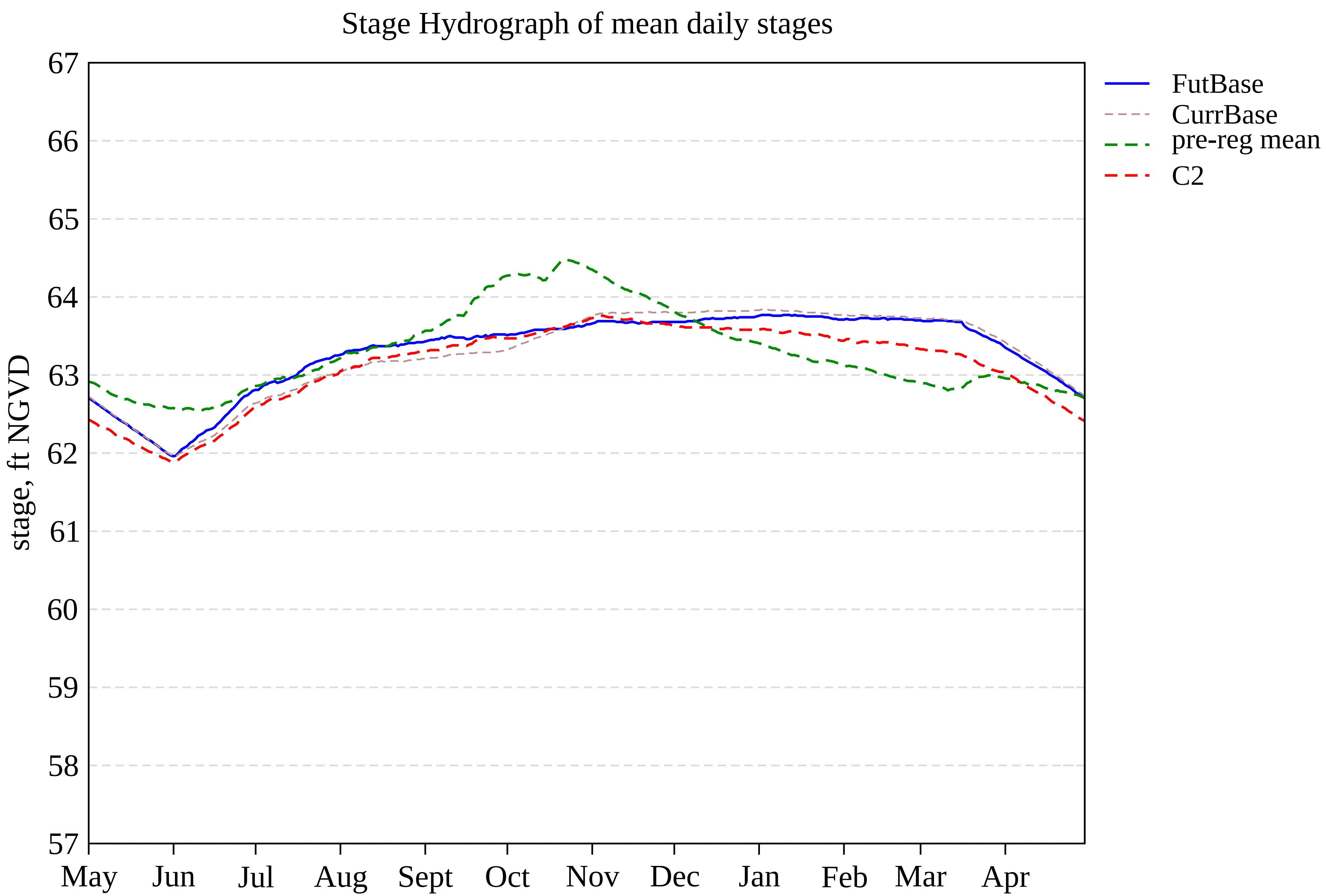
Run ID : Variation of drainage constant, k - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	46.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	97.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	68.6
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	0.0
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	88.6
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	6.5

Tier 2 Report

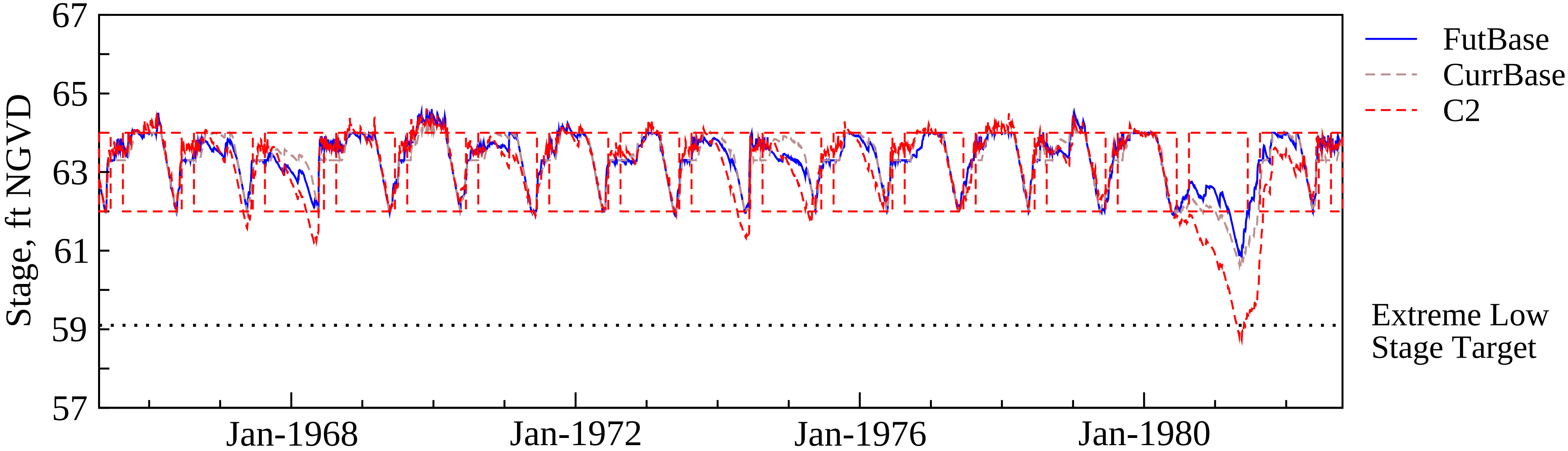
PDF Report for L06

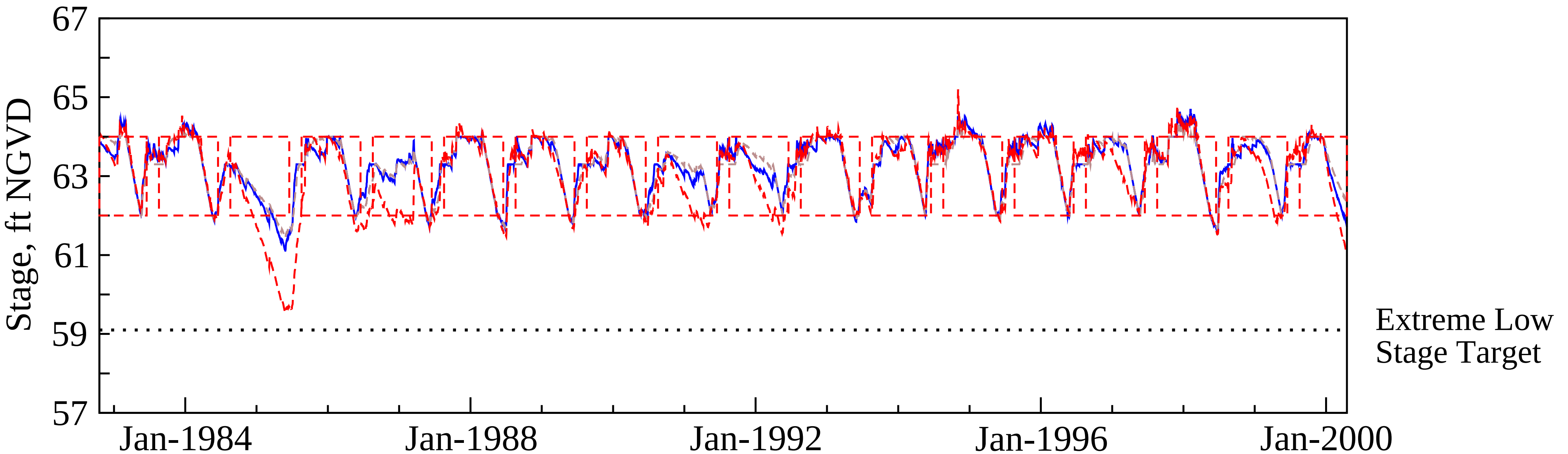
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout



L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

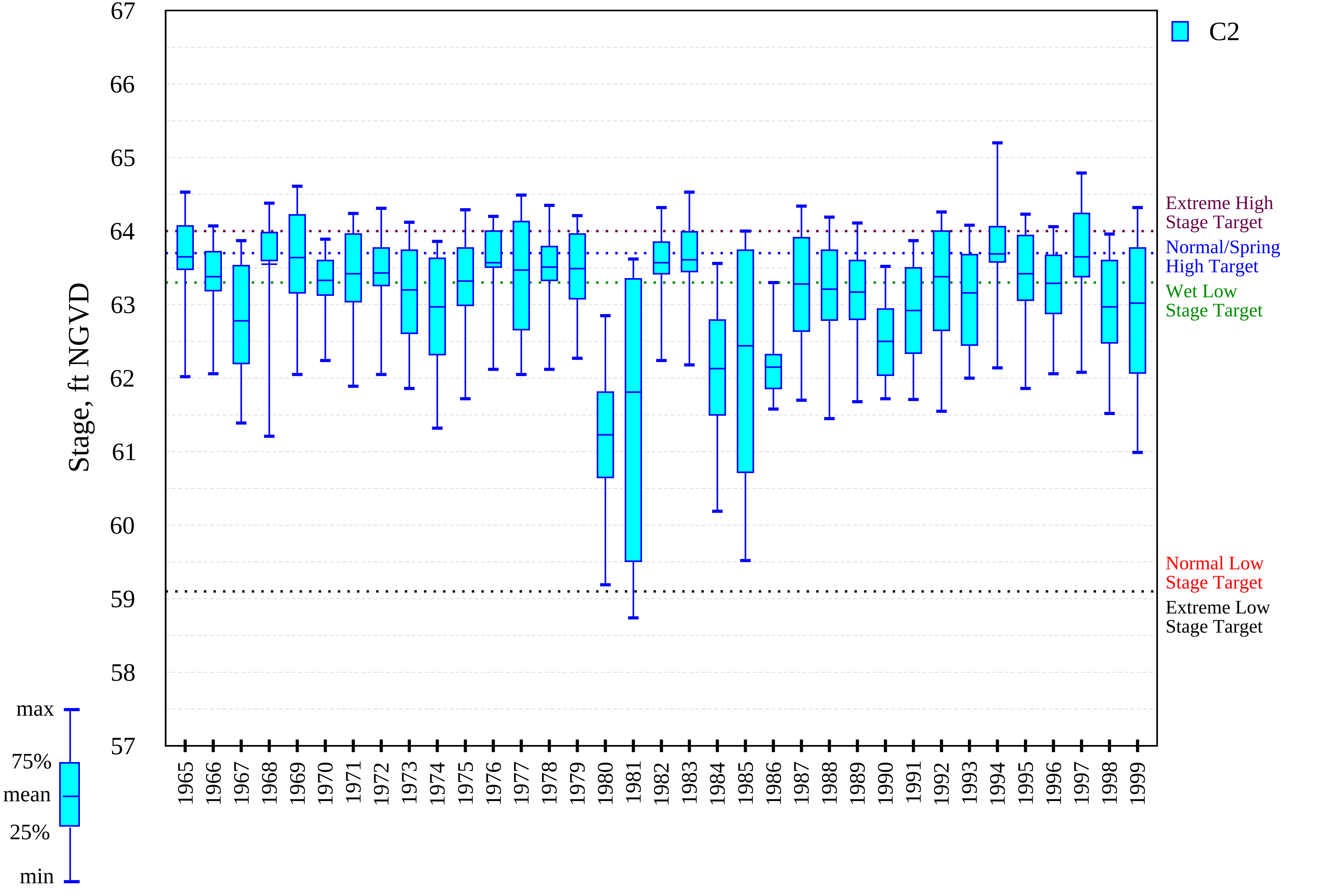
Daily Stage Hydrograph with Water Level recession windows (Sept-June)





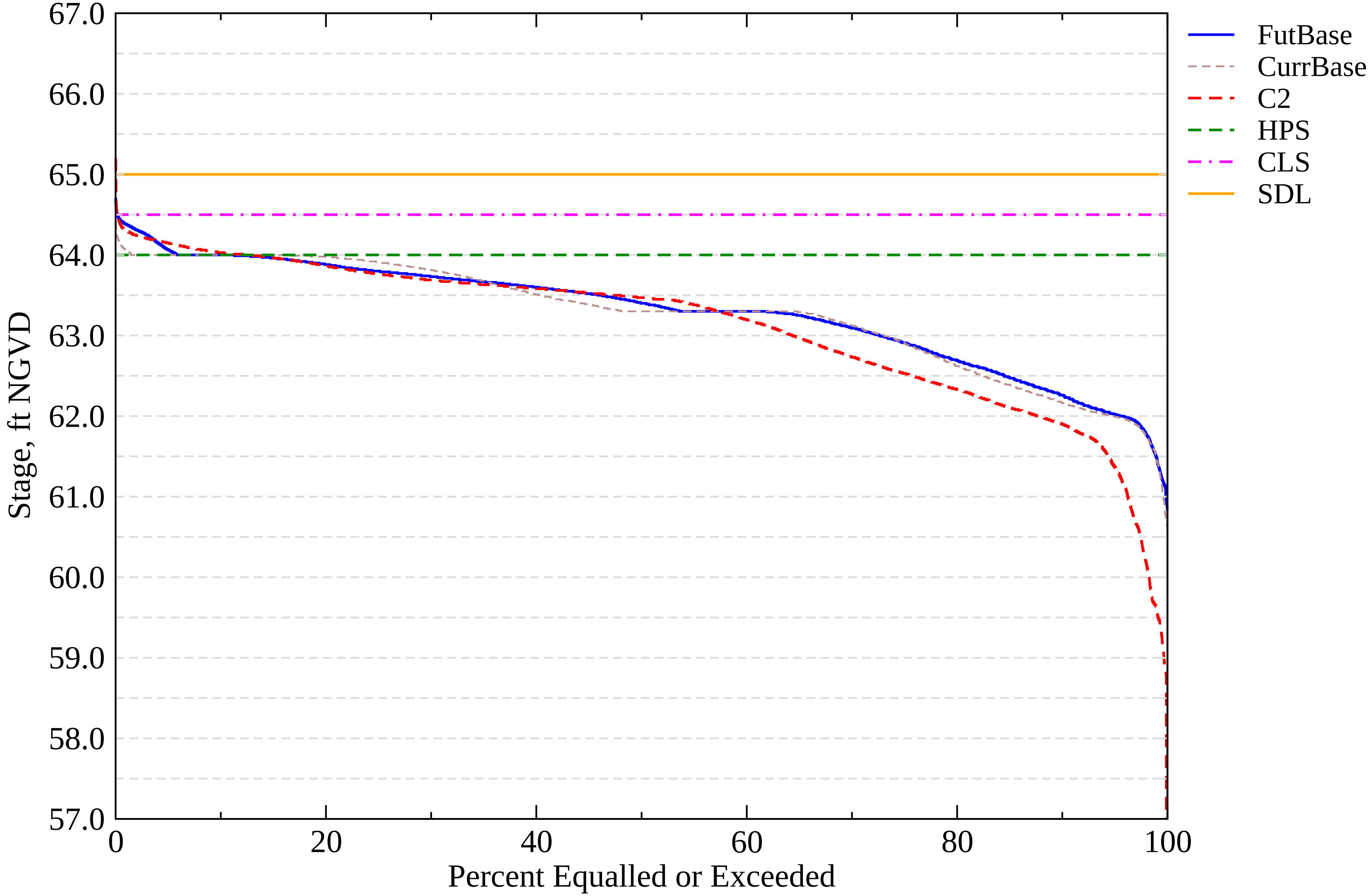
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Intra-annual lake stage variation (water year based)

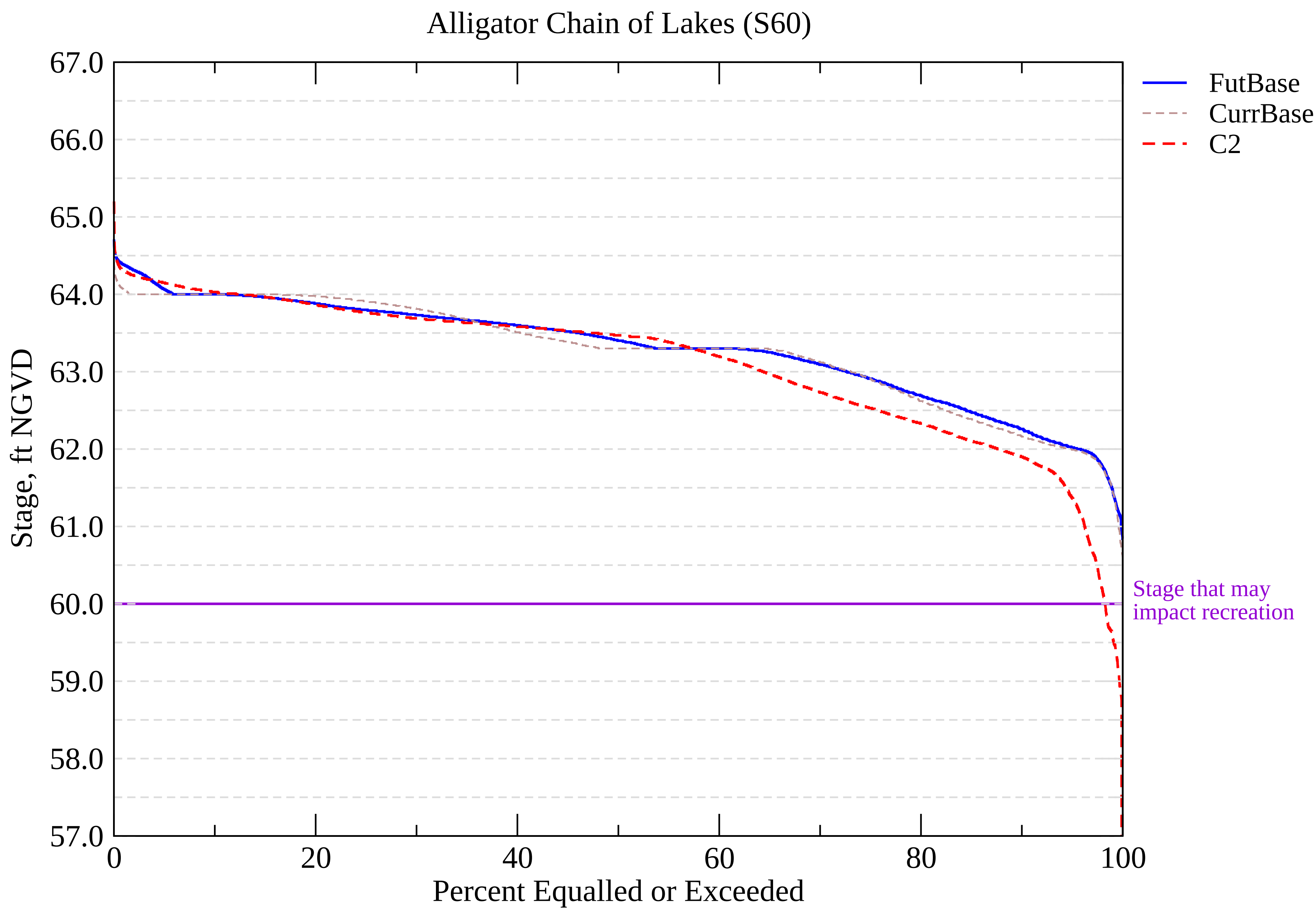


I-01. Probable High Lake Stage Performance Indicator

Alligator Chain of Lakes (S60)



I-07. Stage Duration for Navigation and Recreation



Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

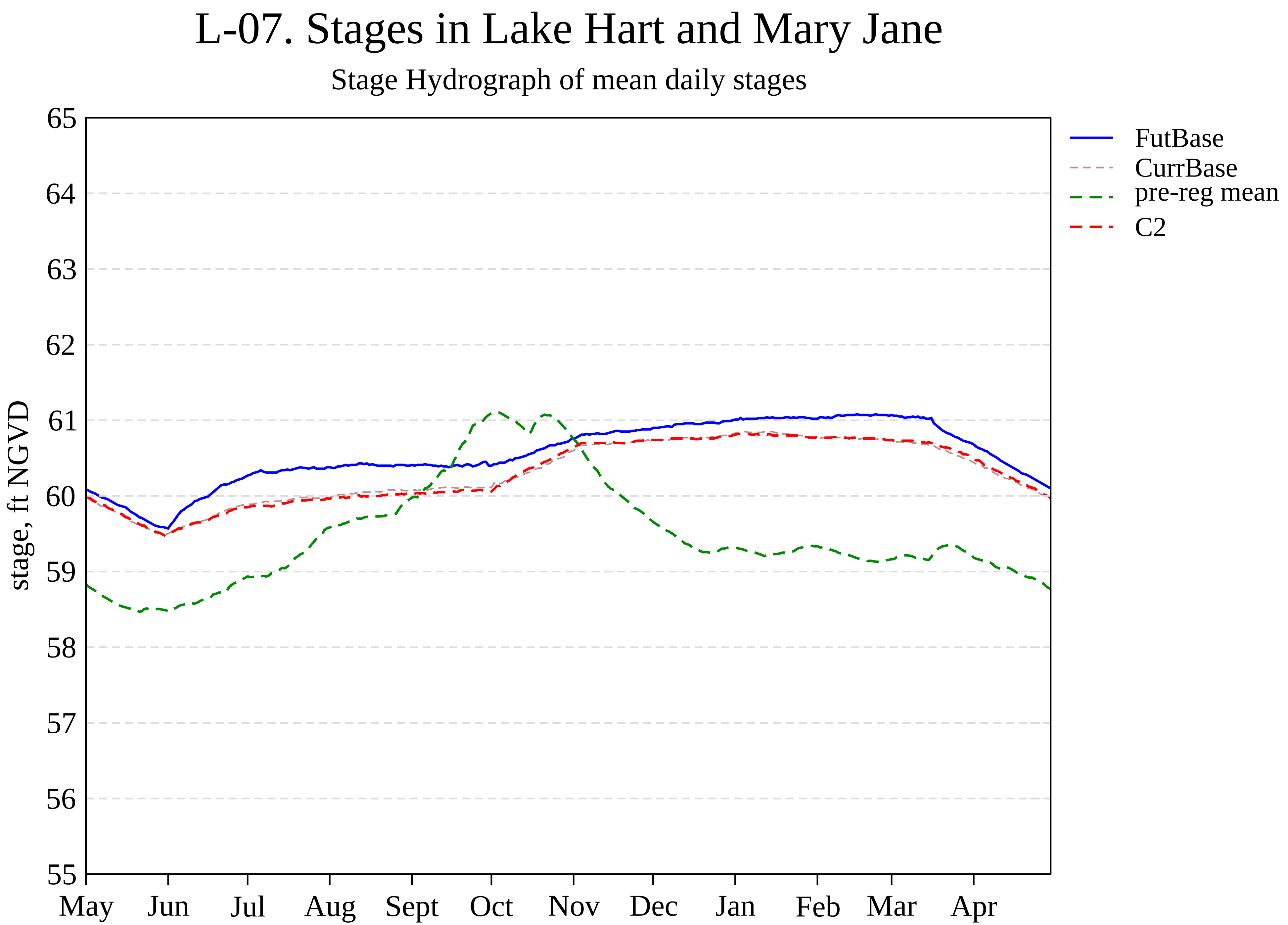
Alternative Description : Uncertainty Analysis - Simulation C2

Run ID : Variation of drainage constant, k - HIGH

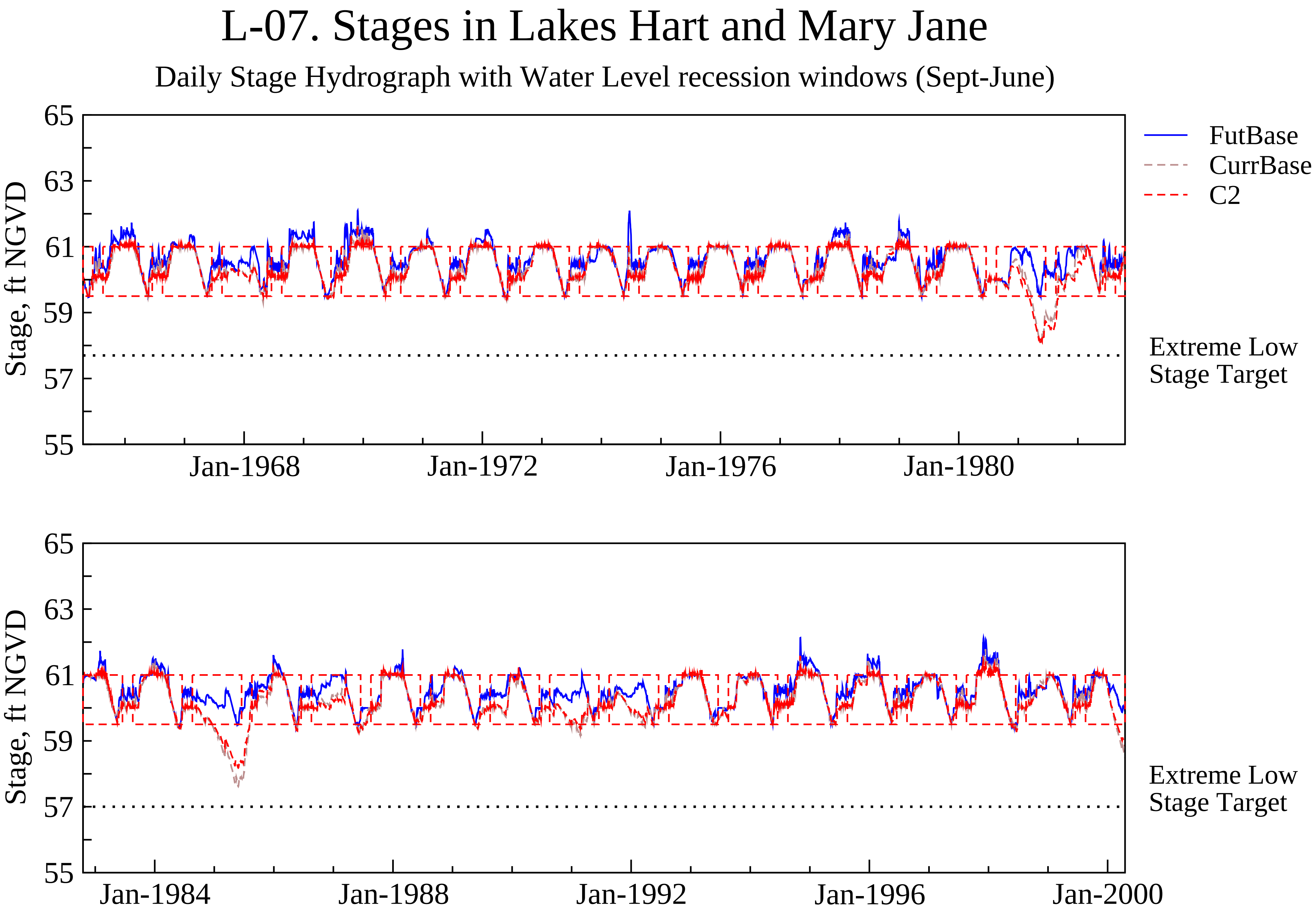
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	74.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	71.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	46.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	20.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	5.7
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	3.6
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	60.0

Tier 2 Report

PDF Report for L07

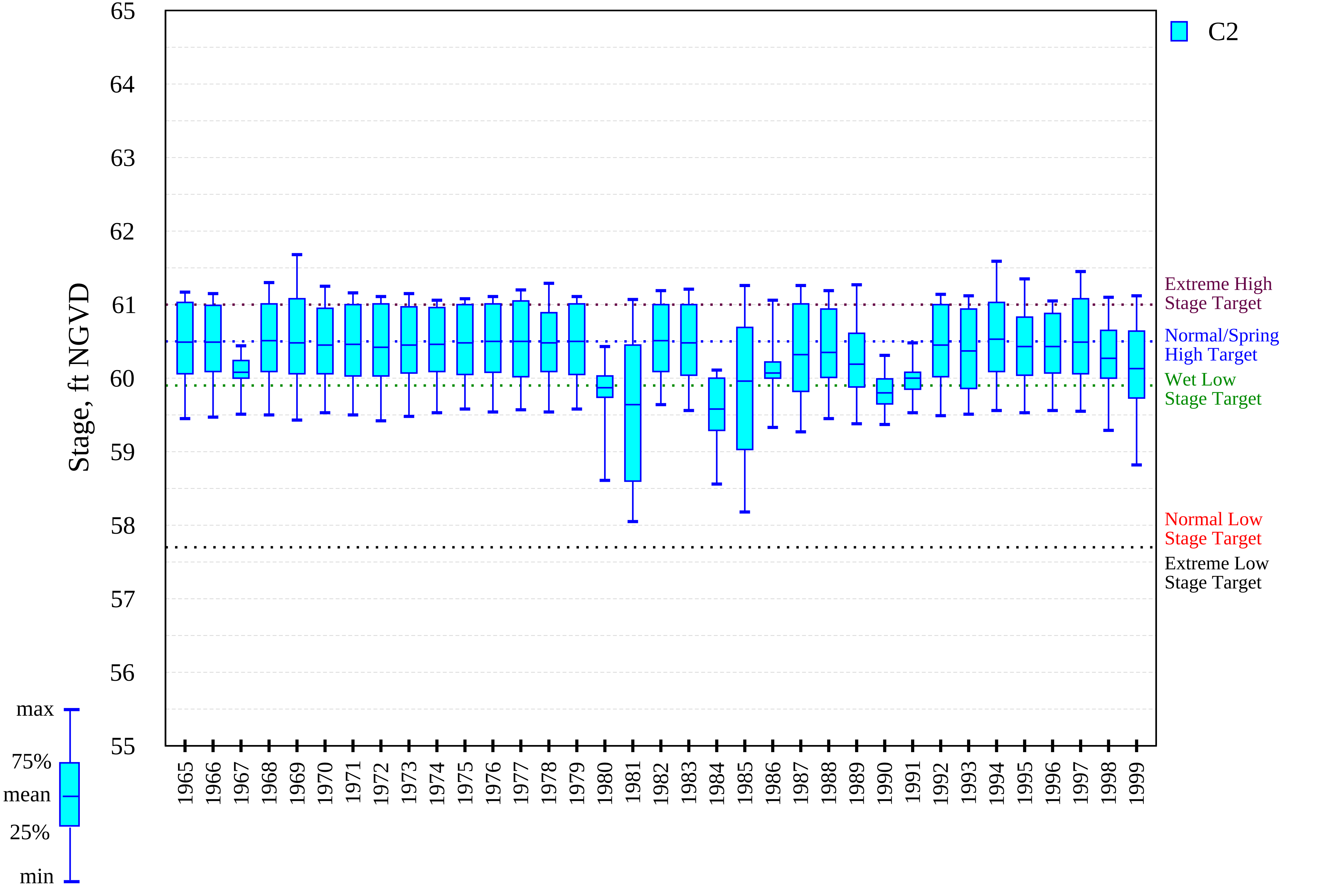


L-07. Stages in Lake Hart and Mary Jane
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
C2


L-07. Stages in Lakes Hart and Mary Jane
Daily Stage Hydrograph with Water Level recession windows (Sept-June)
Stage, ft NGVD
65
63
61
59
57
55
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
C2
Extreme Low
Stage Target
Stage, ft NGVD
65
63
61
59
57
55
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000
Extreme Low
Stage Target

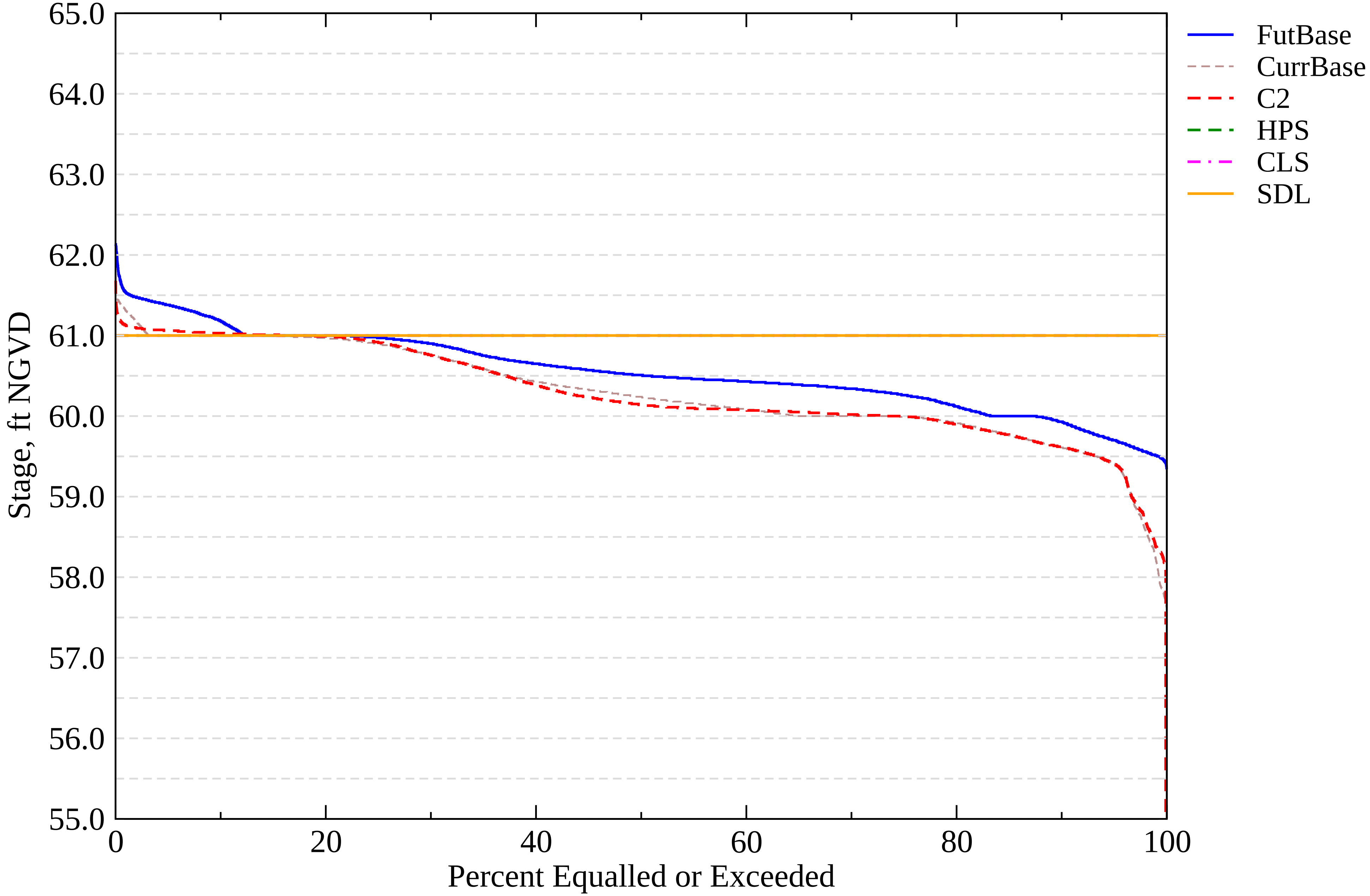
L-07. Stages in Lakes Hart and Mary Jane

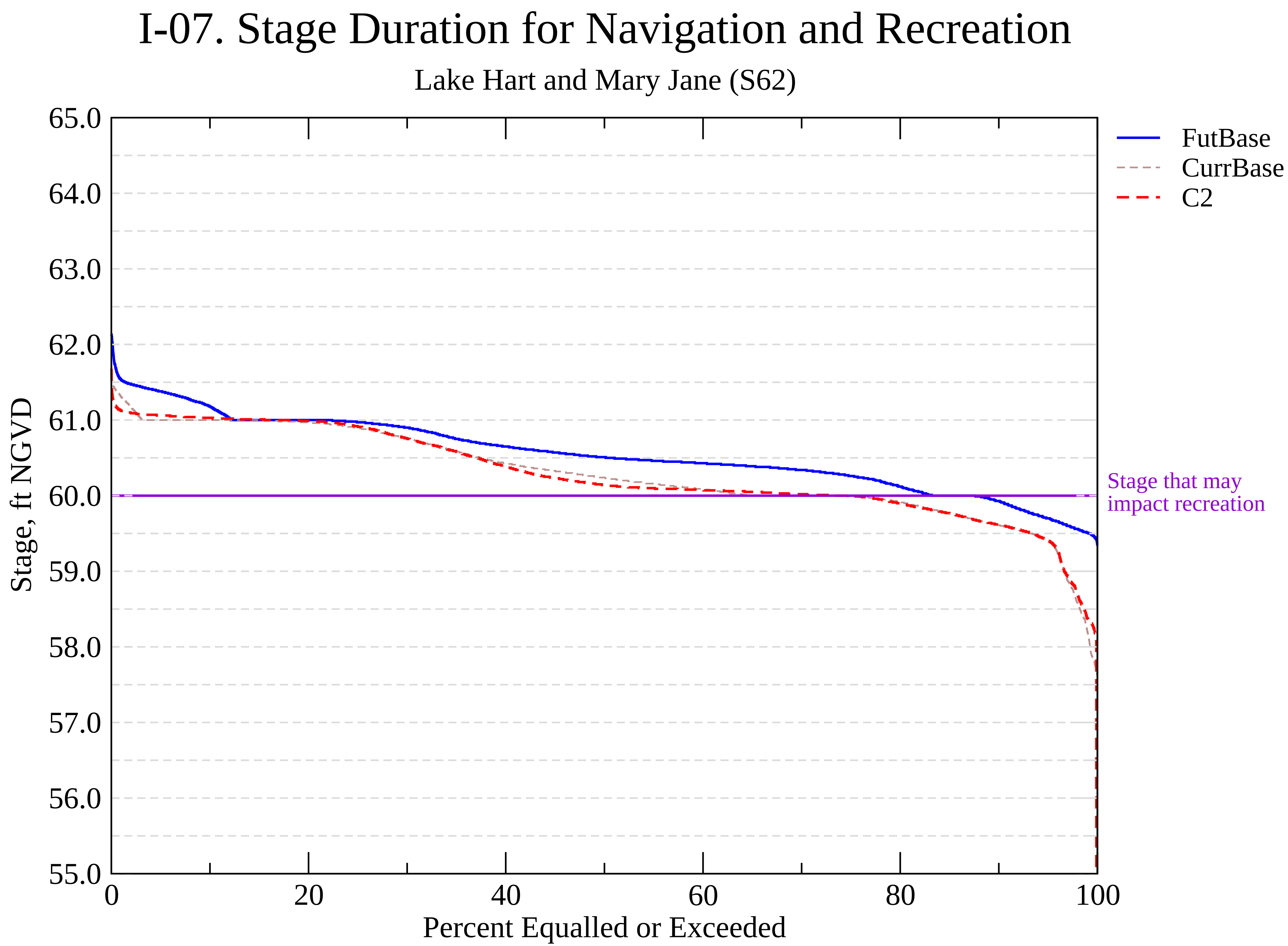
Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Lakes Hart and Mary Jane (S62)




I-07. Stage Duration for Navigation and Recreation
Lake Hart and Mary Jane (S62)
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
C2
Stage that may
impact recreation

Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

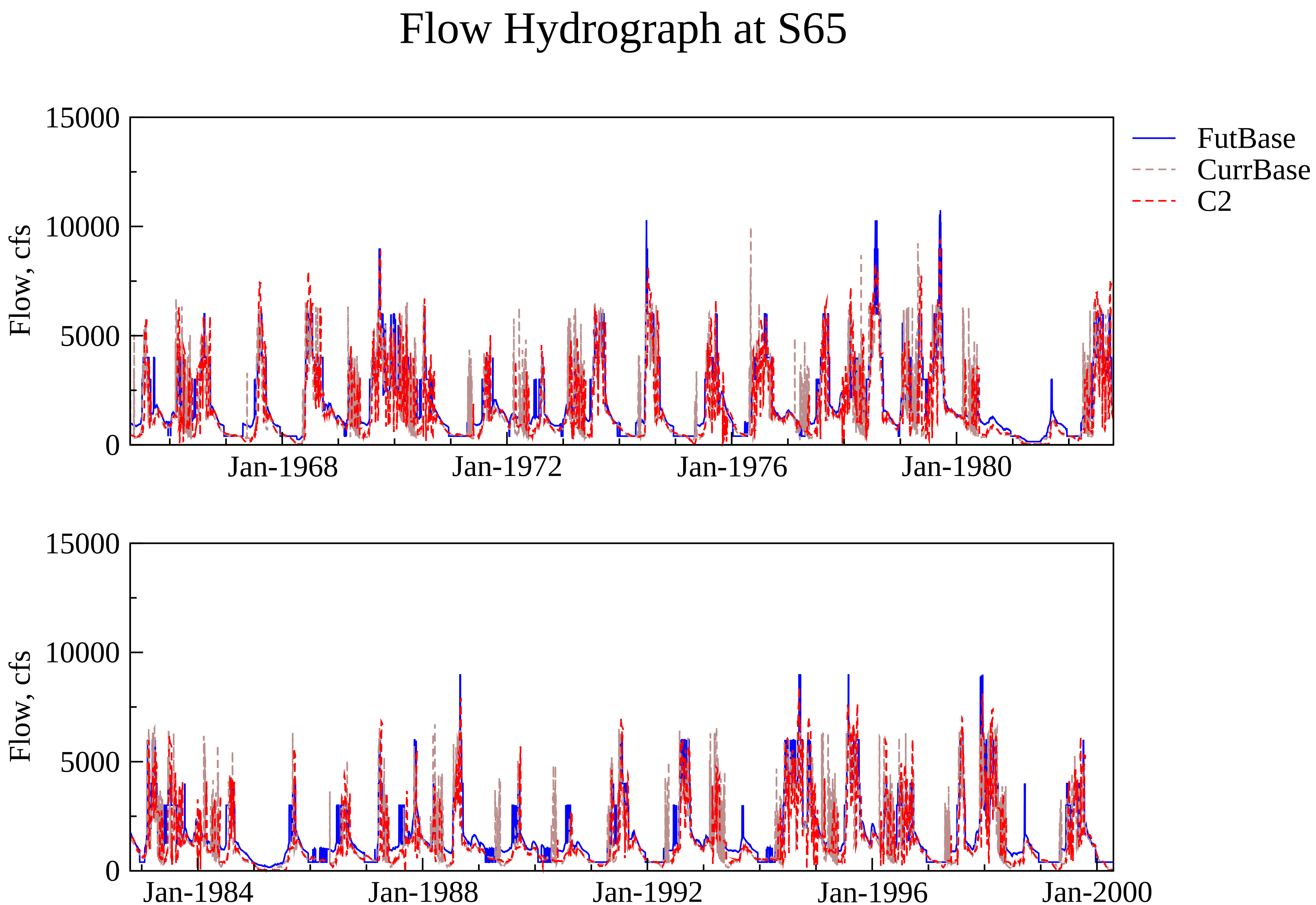
Alternative Description : Uncertainty Analysis - Simulation C2

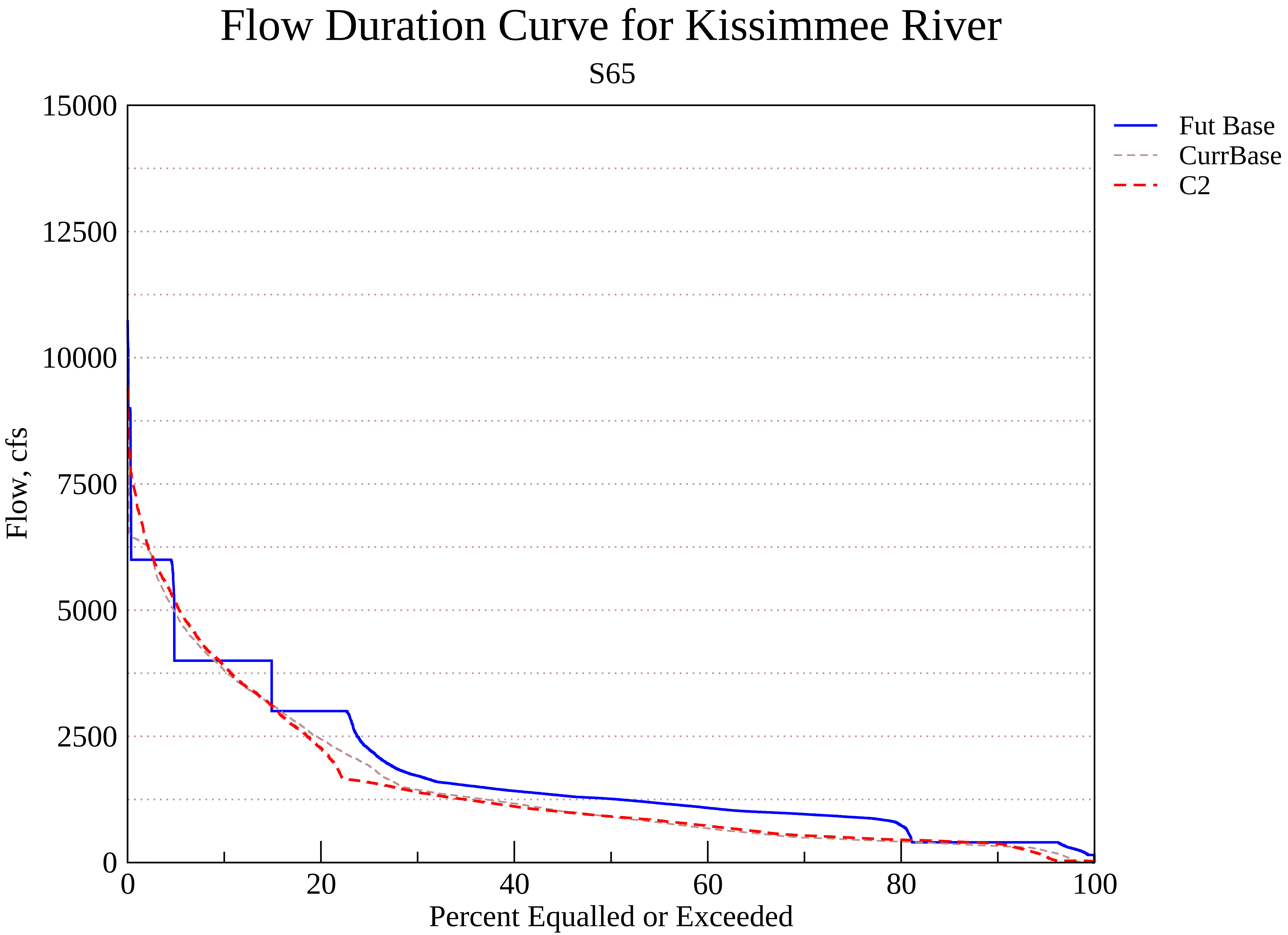
Run ID : Variation of drainage constant, k - HIGH

Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	31.4	37.1
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	51.4	54.3
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	88.6	82.9
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	5.7	5.7
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	210.0	271.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	436.0	570.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	2.3	6.4
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

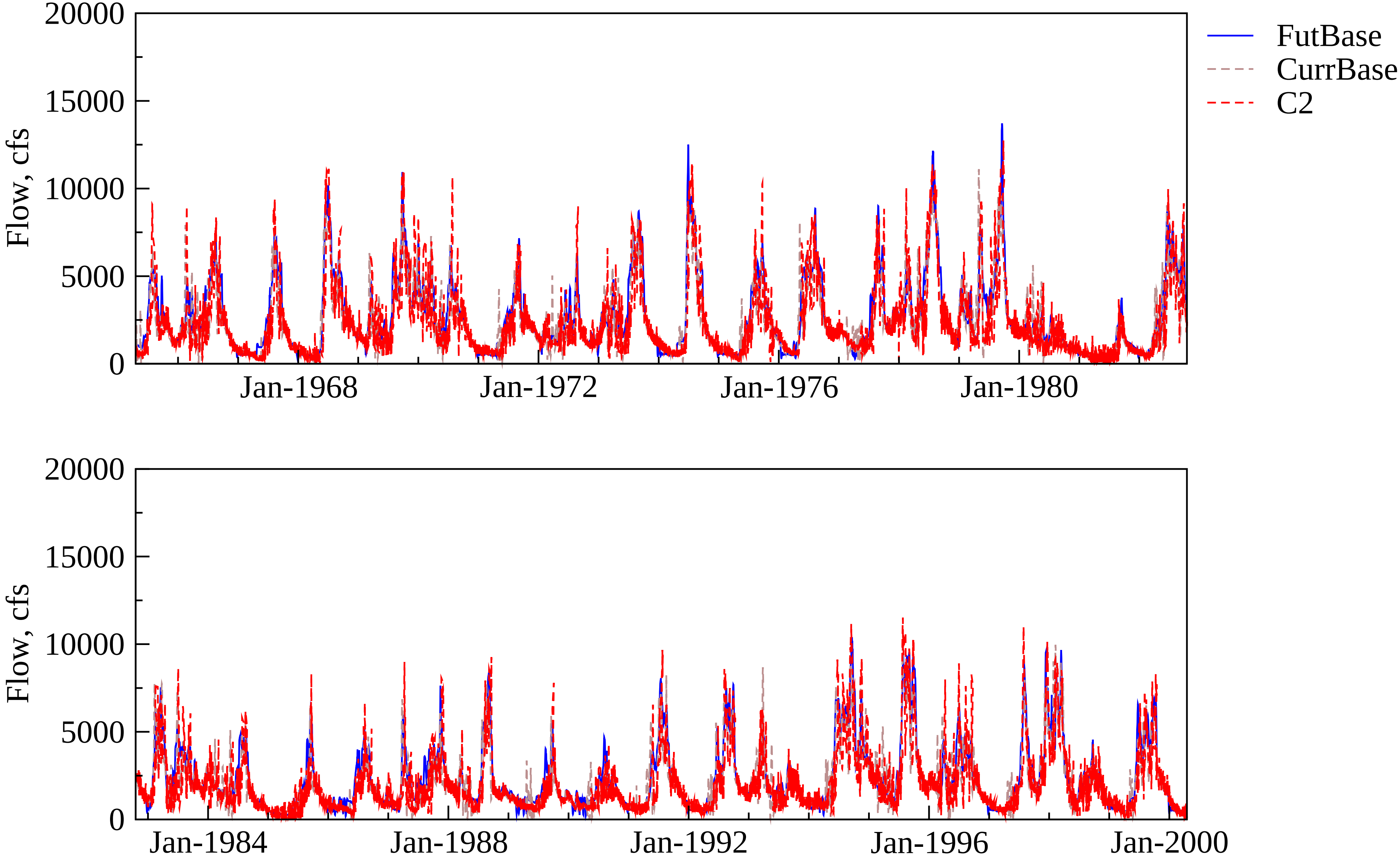
Tier 2 Report

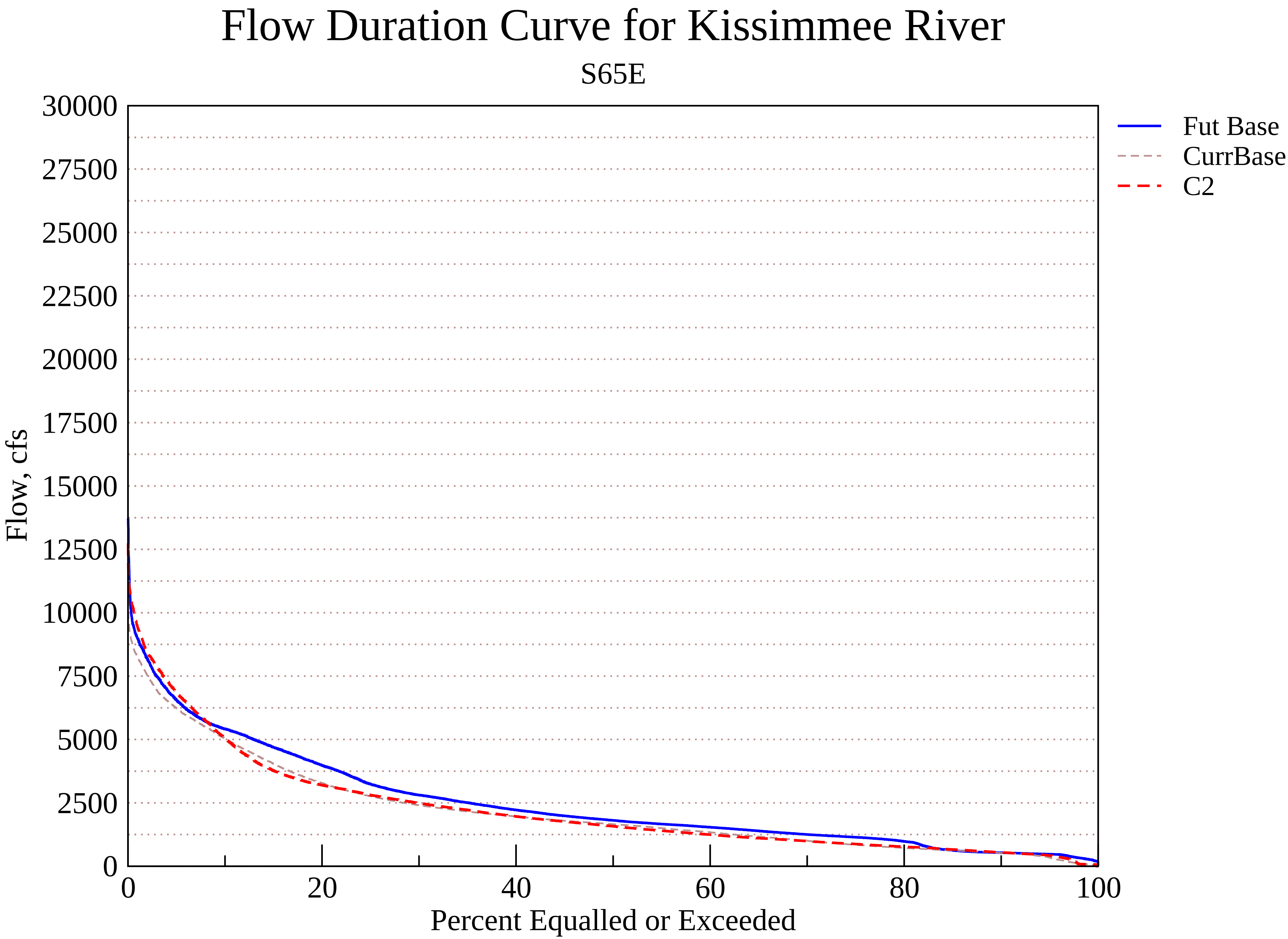
PDF Report for R01


Flow Hydrograph at S65
Flow, cfs
15000
10000
5000
0
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
C2
Flow, cfs
15000
10000
5000
0
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000


Flow Duration Curve for Kissimmee River
S65
Flow, cfs
Percent Equalled or Exceeded
Fut Base
CurrBase
C2
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100

Flow Hydrograph at S65E





Flow Duration Curve for Kissimmee River
S65E
Flow, cfs
30000
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
C2

Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation C2

Run ID : Variation of drainage constant, k - HIGH

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Number of days per water year that river channel depth is greater than average floodplain ground elevation (average).	252.0	250.0	203.0	315.0
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	54.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	4.8
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	7.1

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

Alternative Description : Uncertainty Analysis - Simulation C2

Run ID : Variation of drainage constant, k - HIGH

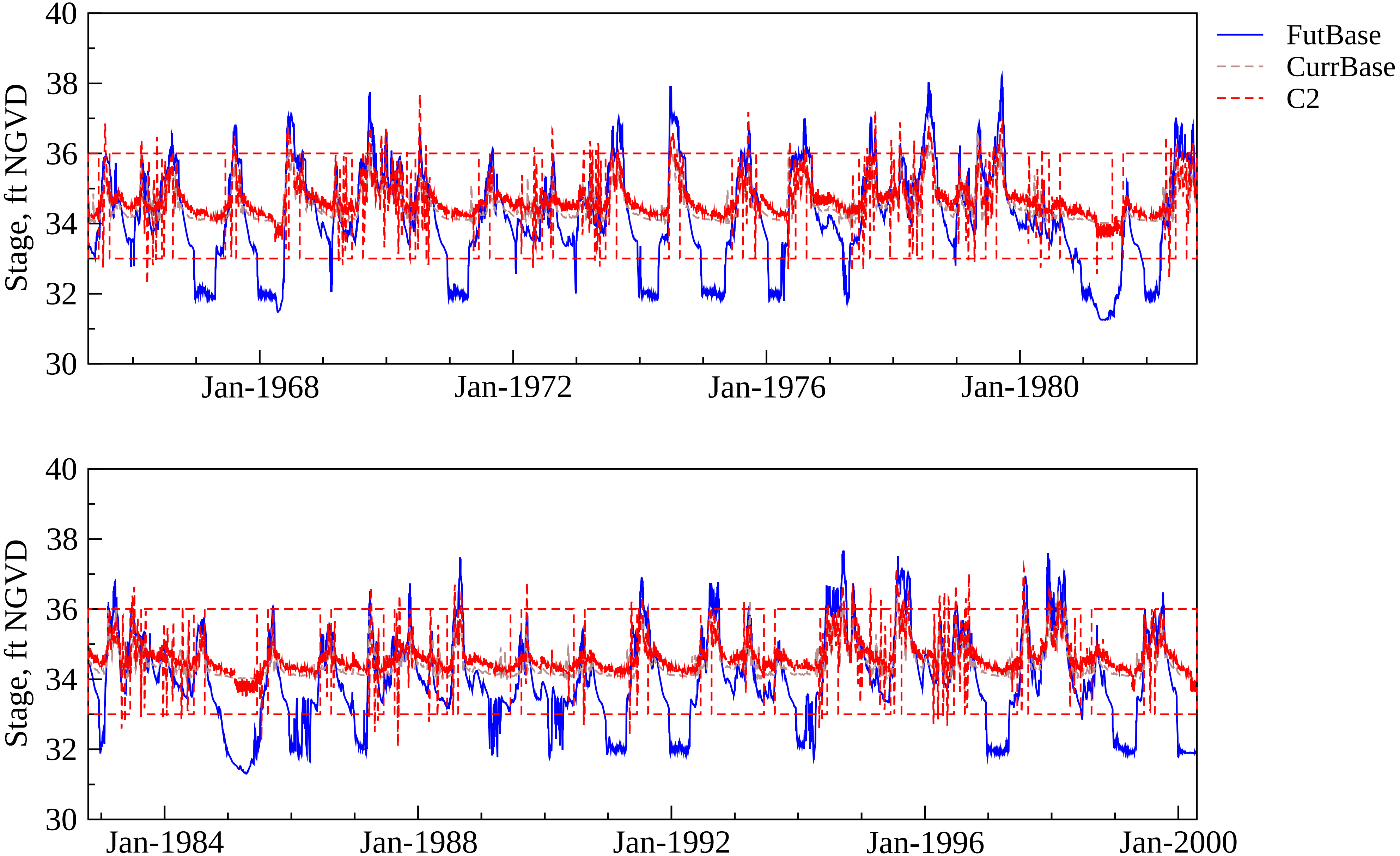
Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	51.4
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	68.6
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	34.3

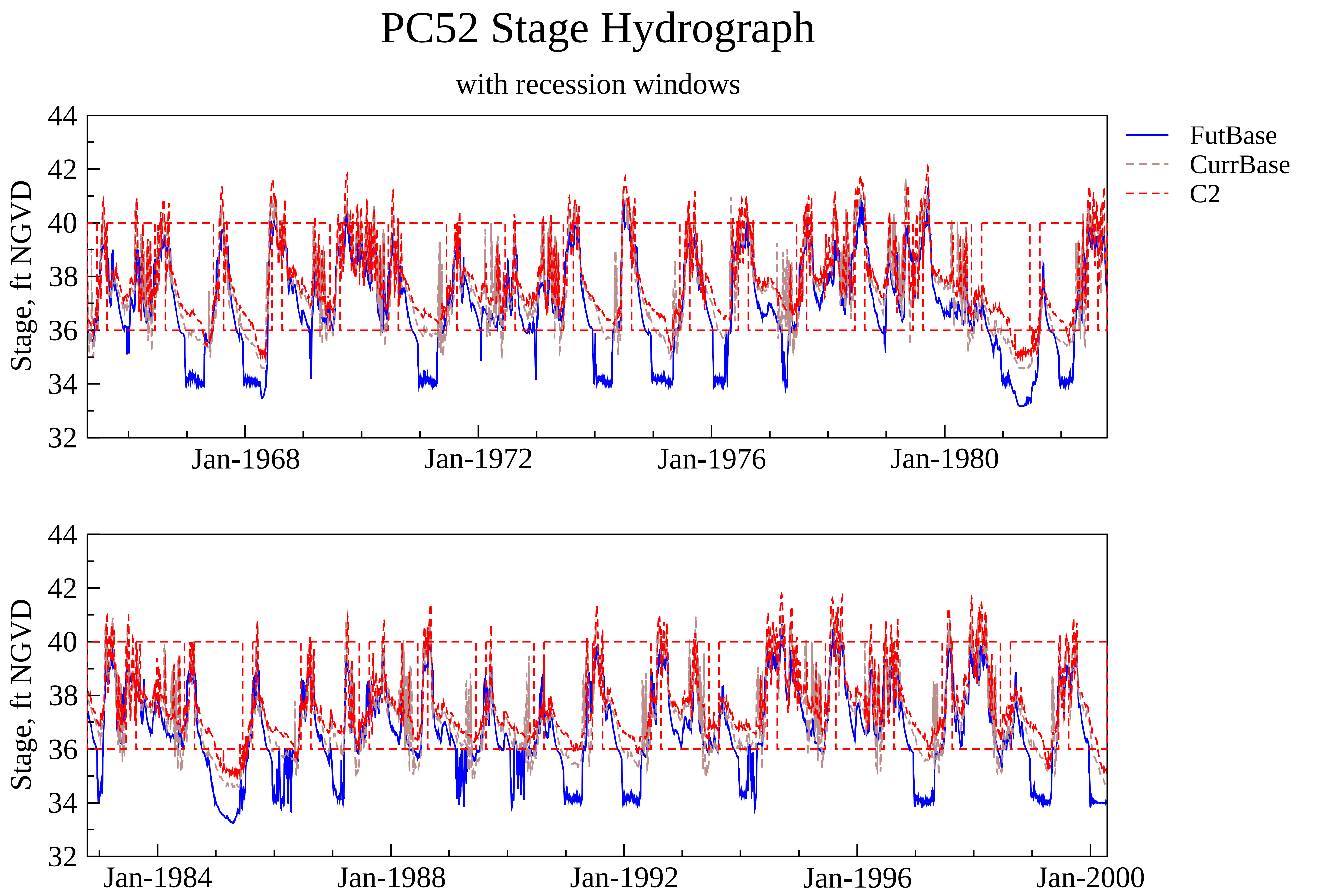
Tier 2 Report

PDF Report for R03

PC33 Stage Hydrograph

with recession windows




PC52 Stage Hydrograph
with recession windows
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
C2
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation D1

Variation of drainage level, k - LOW

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation D1

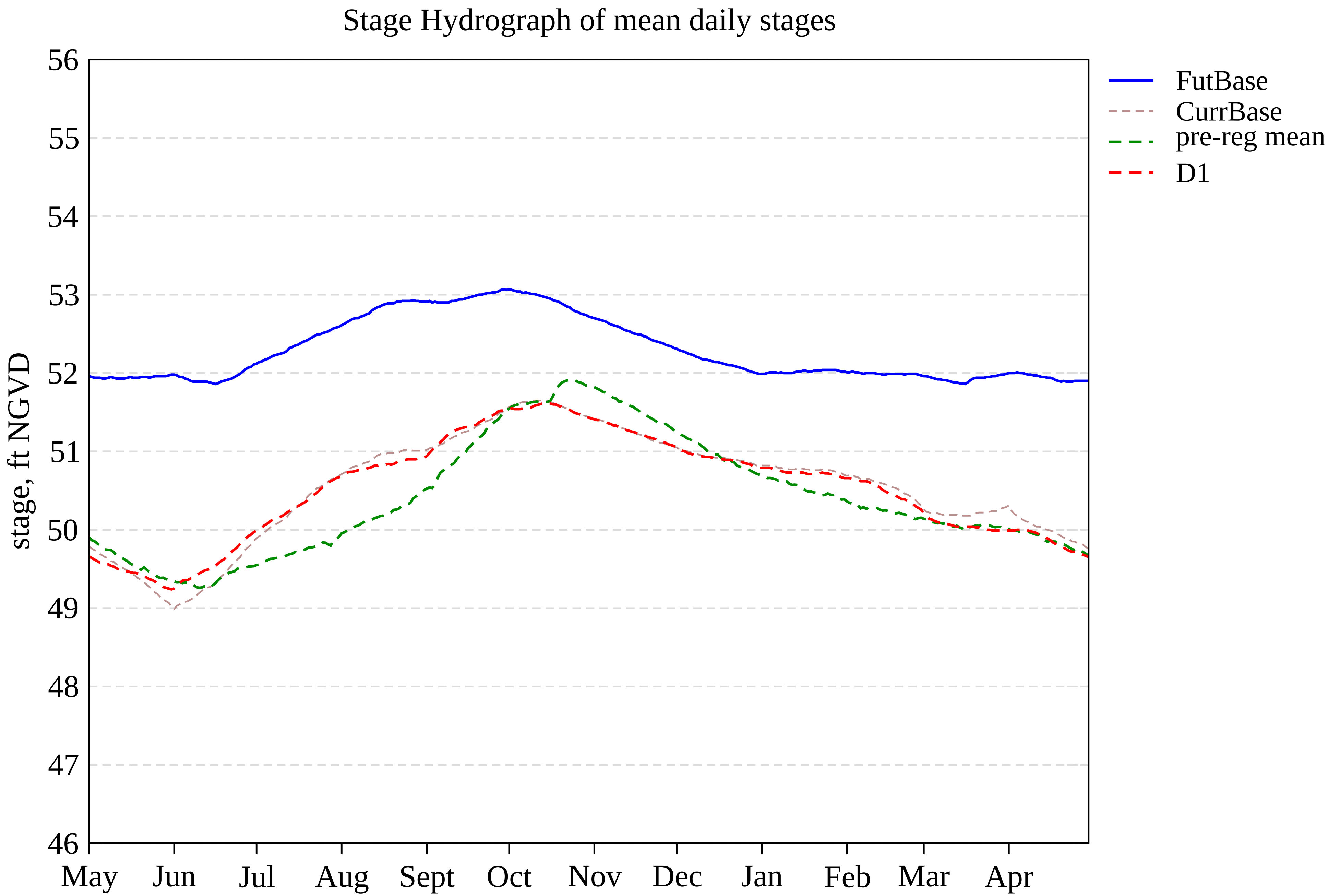
Run ID : Variation of drainage level, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	83.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	20.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	62.9	1.00	0.12	0.12
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	20.0	1.00	0.04	0.04
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	80.0	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (fl	5.0	3.2	2.6	3.3	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft	12.0	5.0	5.5	6.2	0.00	0.12	0.00
						PM Score	**0.16**
						Location Weight	**0.30**
						PM Composite Score	**0.05**

Tier 2 Report

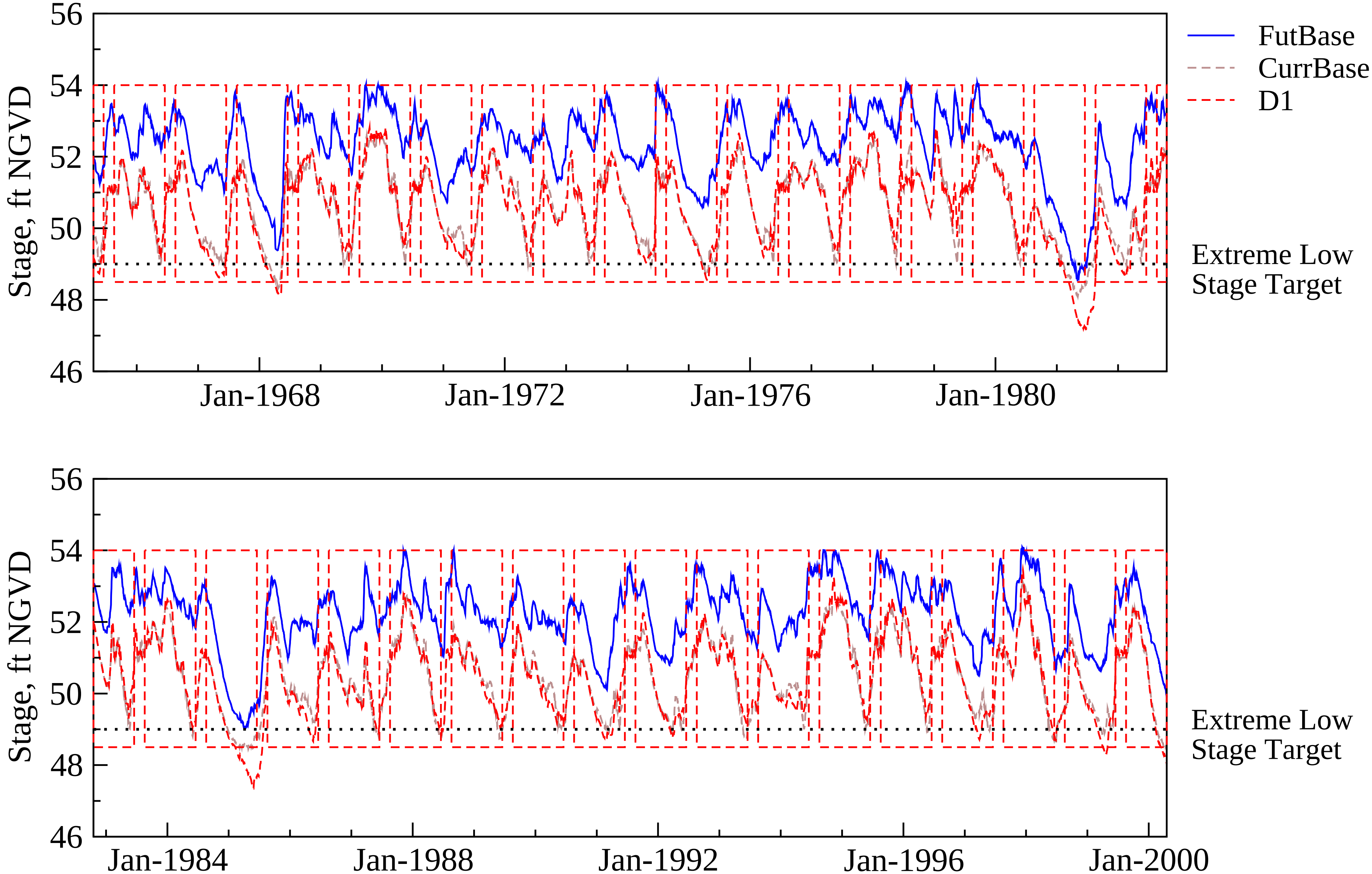
PDF Report for L01

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger



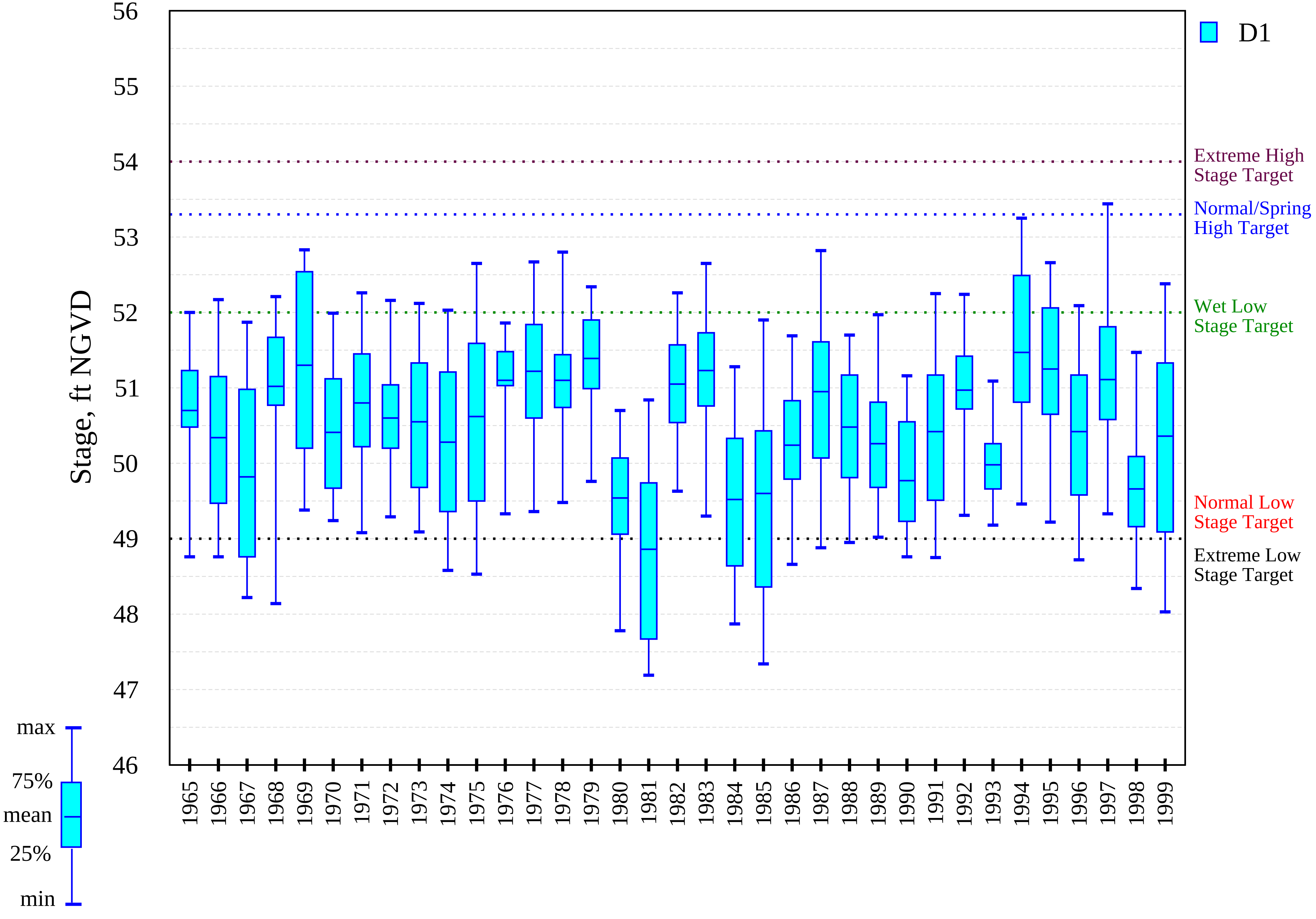
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

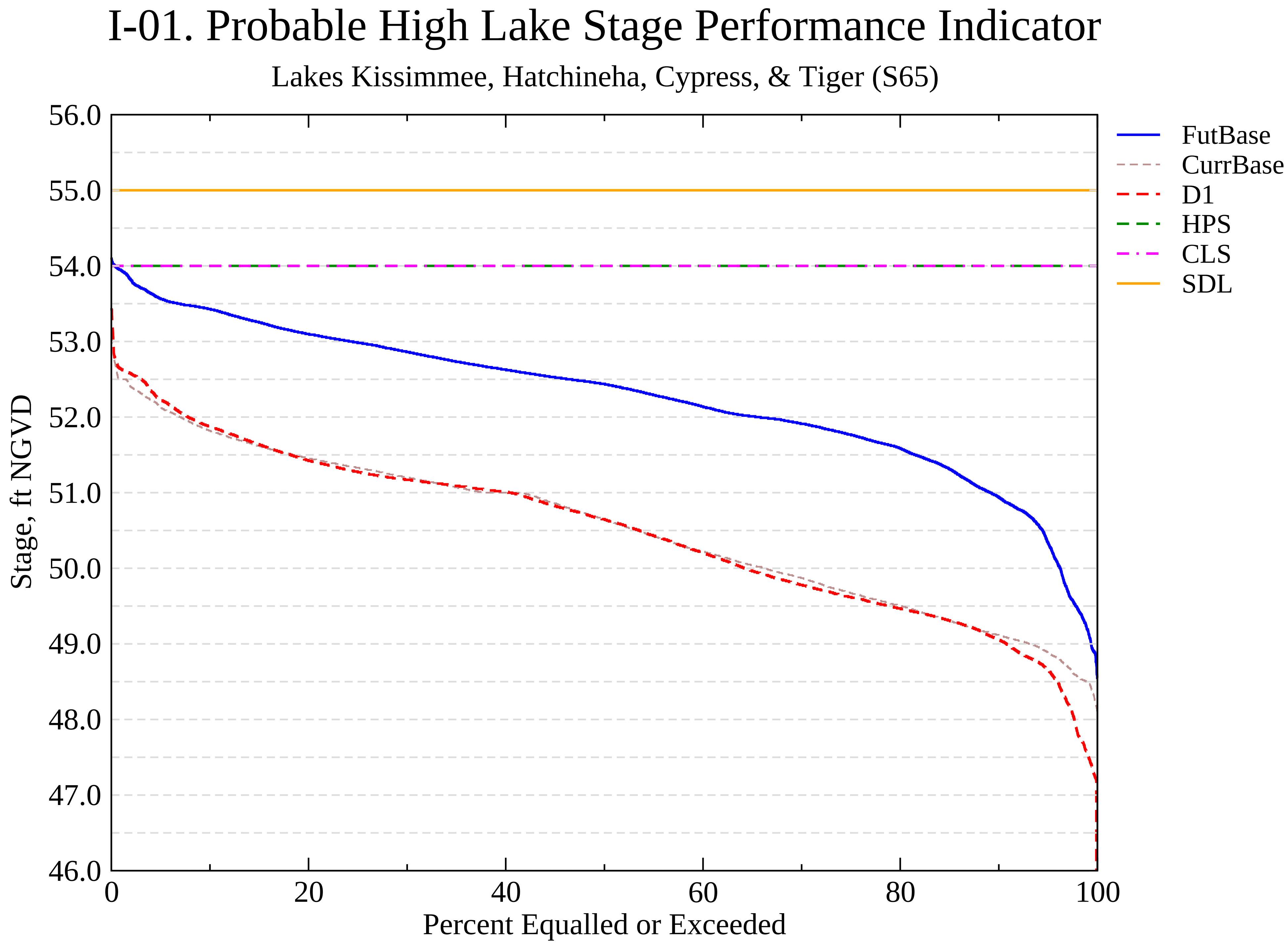
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

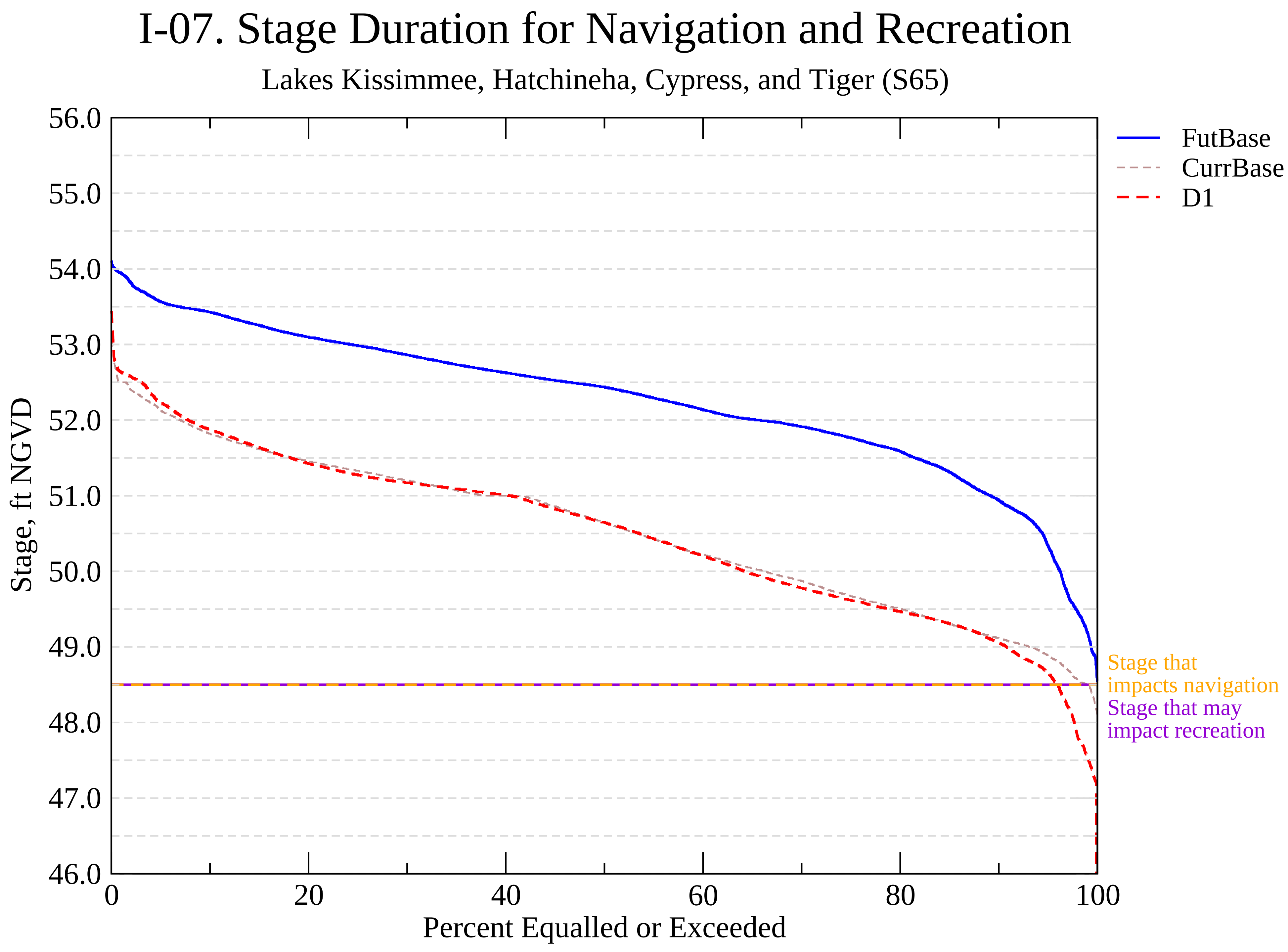


L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)
Stage, ft NGVD
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D1
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)
Stage, ft NGVD
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D1
Stage that impacts navigation
Stage that may impact recreation

Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

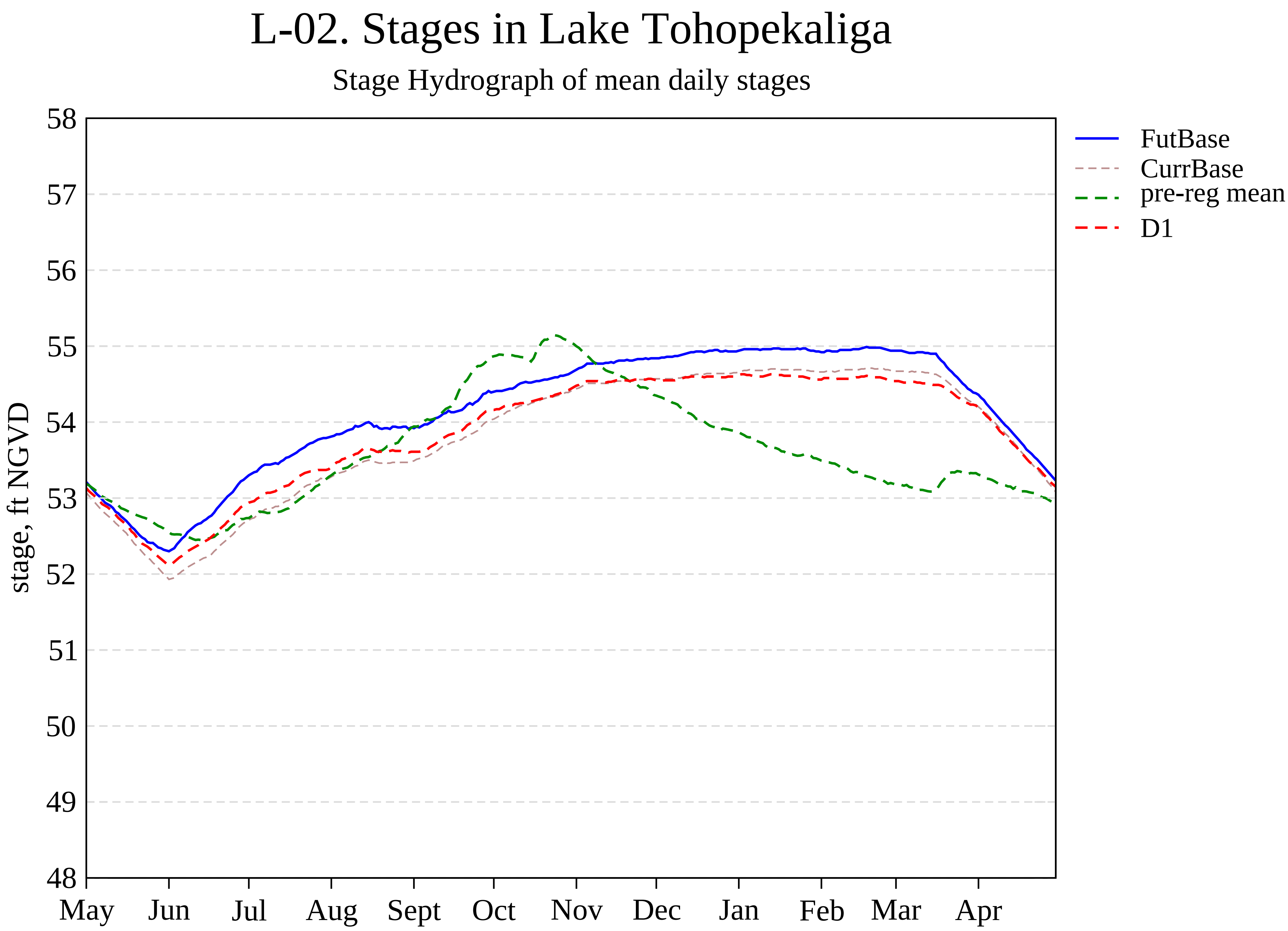
Alternative Description : Uncertainty Analysis - Simulation D1

Run ID : Variation of drainage level, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	54.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	9.0	1.00	0.08	0.08
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	74.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	3.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	40.0	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	5.7	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	85.7	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.2	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	6.0	0.00	0.12	0.00
						PM Score	**0.08**
						Location Weight	**0.20**
						PM Composite Score	**0.02**

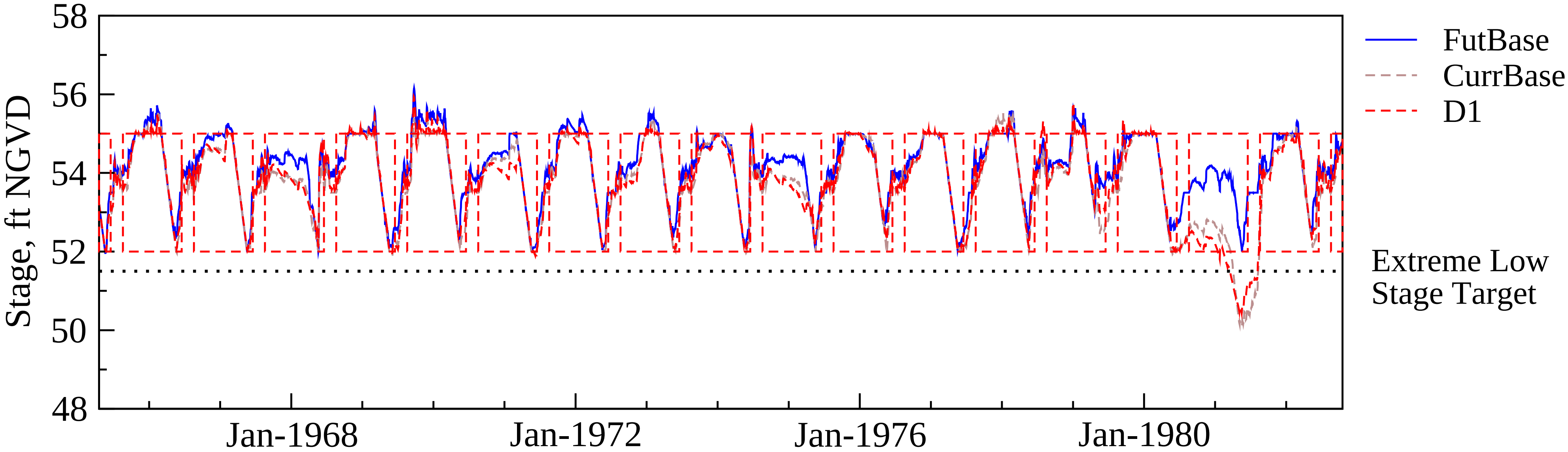
Tier 2 Report

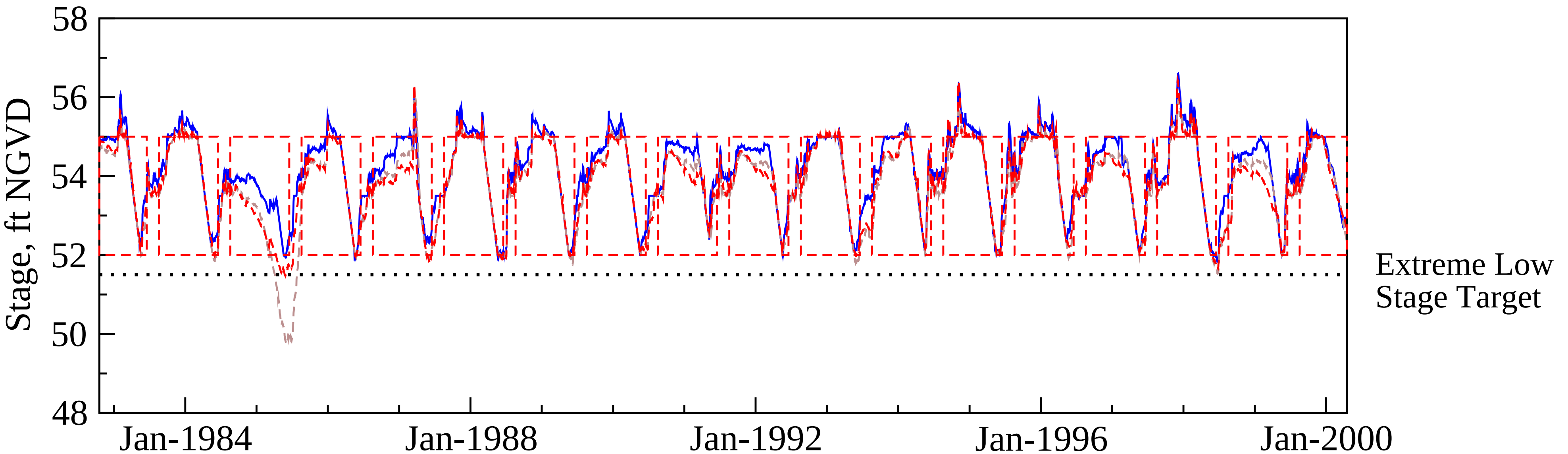
PDF Report for L02

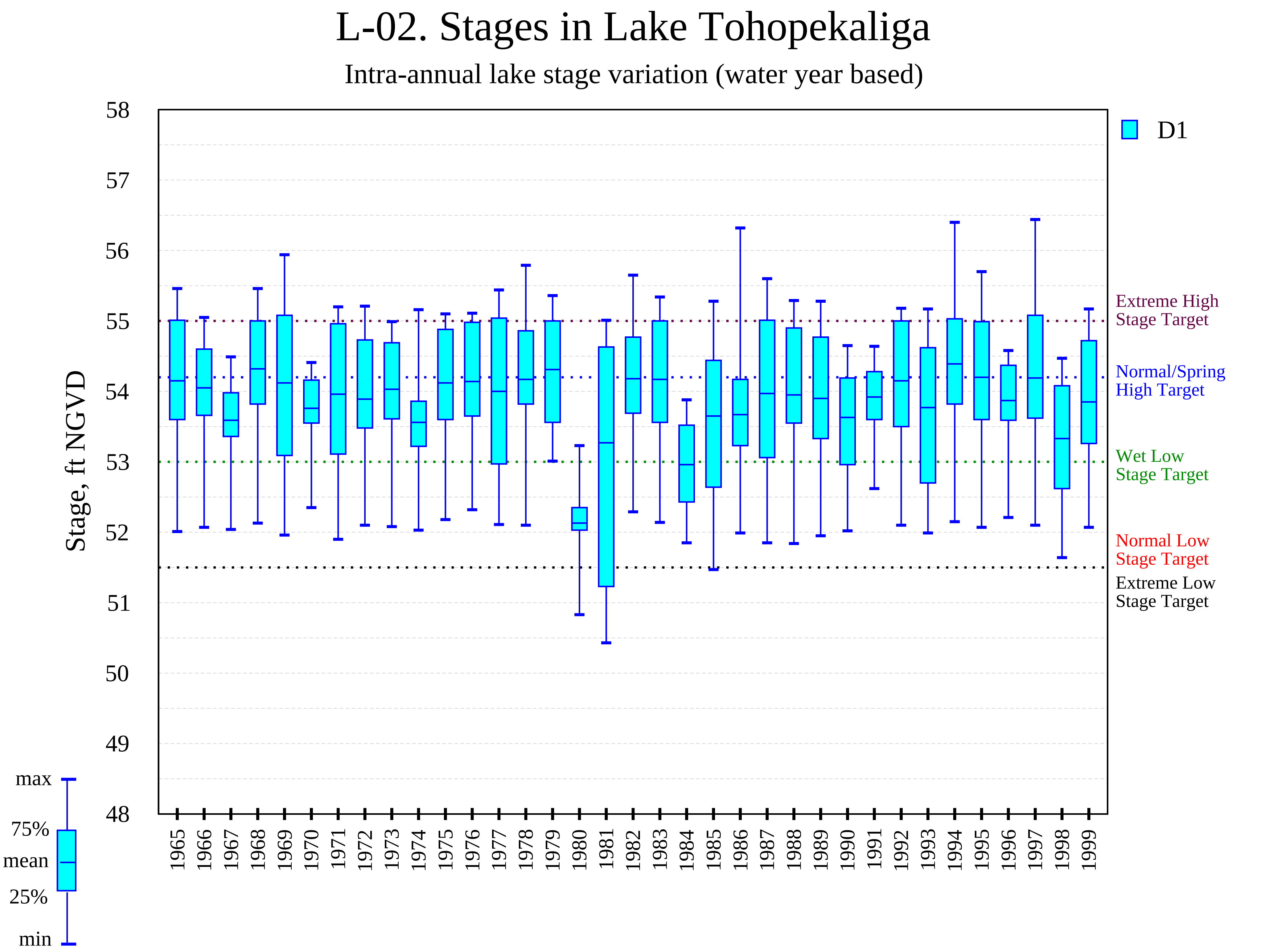

L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
D1

L-02. Stages in Lake Tohopekaliga

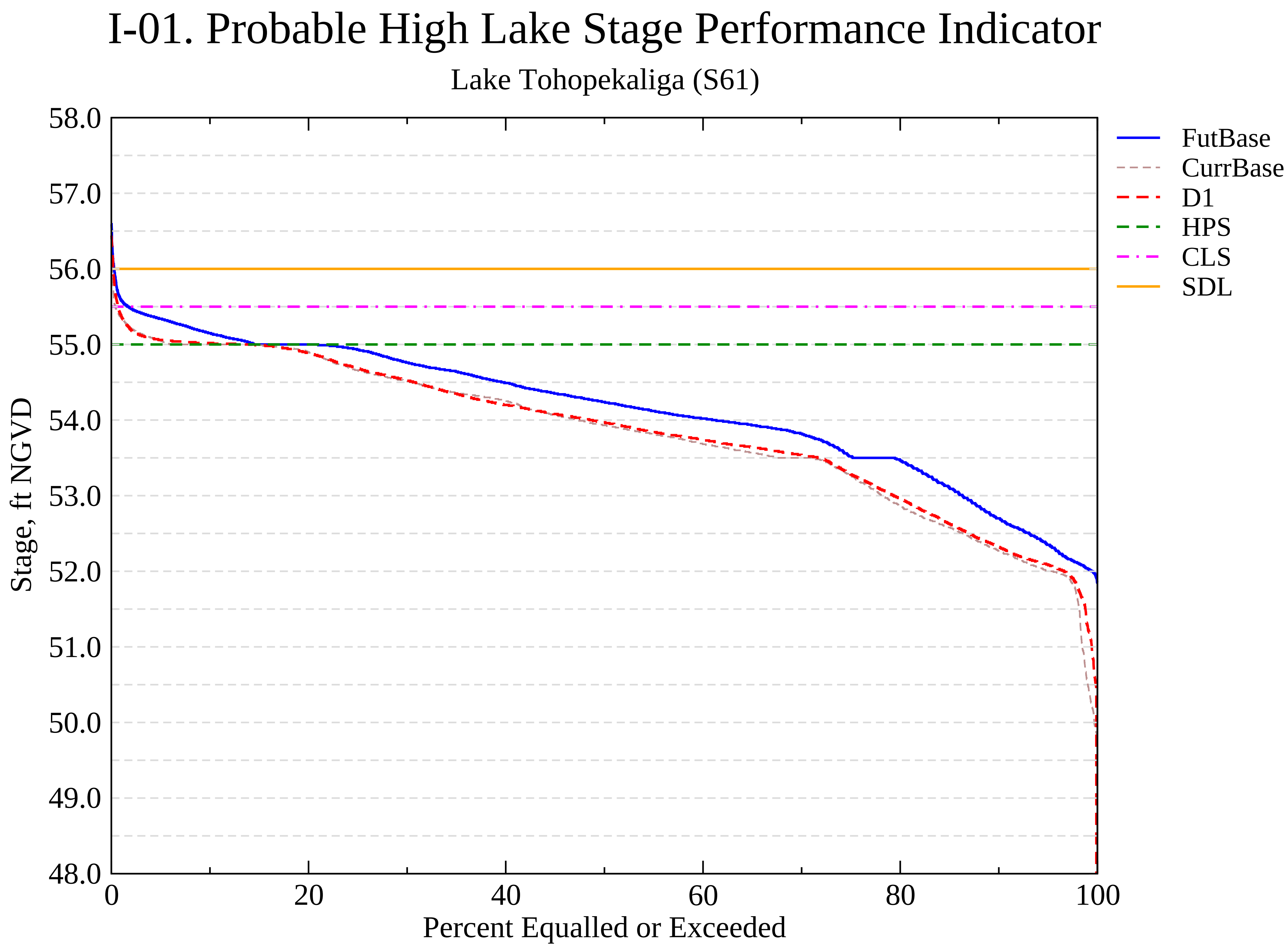
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



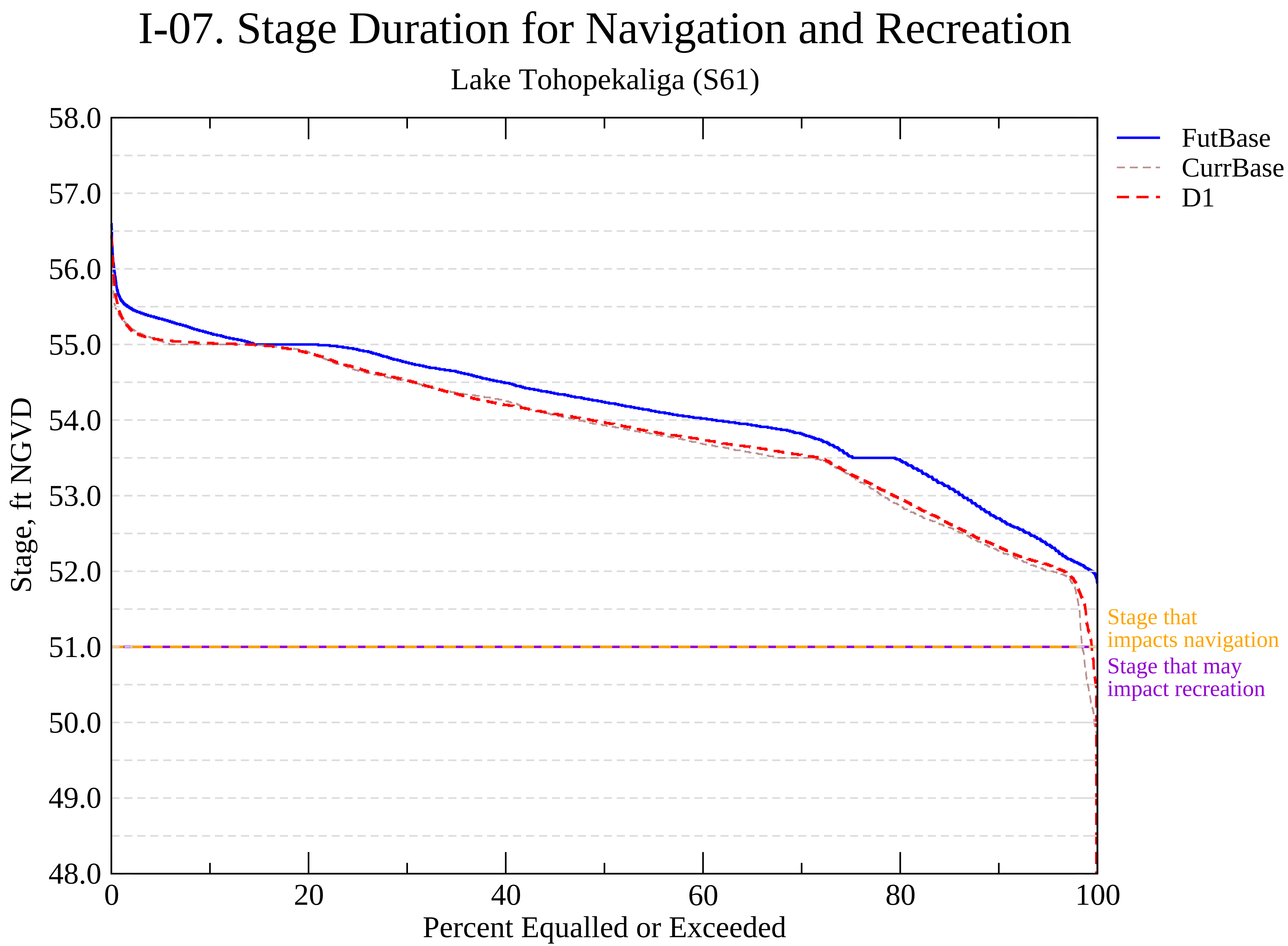




L-02. Stages in Lake Tohopekaliga
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
D1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min



I-01. Probable High Lake Stage Performance Indicator
Lake Tohopekaliga (S61)
Stage, ft NGVD
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D1
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
Lake Tohopekaliga (S61)
Stage, ft NGVD
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D1
Stage that
impacts navigation
Stage that may
impact recreation

Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

Alternative Description : Uncertainty Analysis - Simulation D1

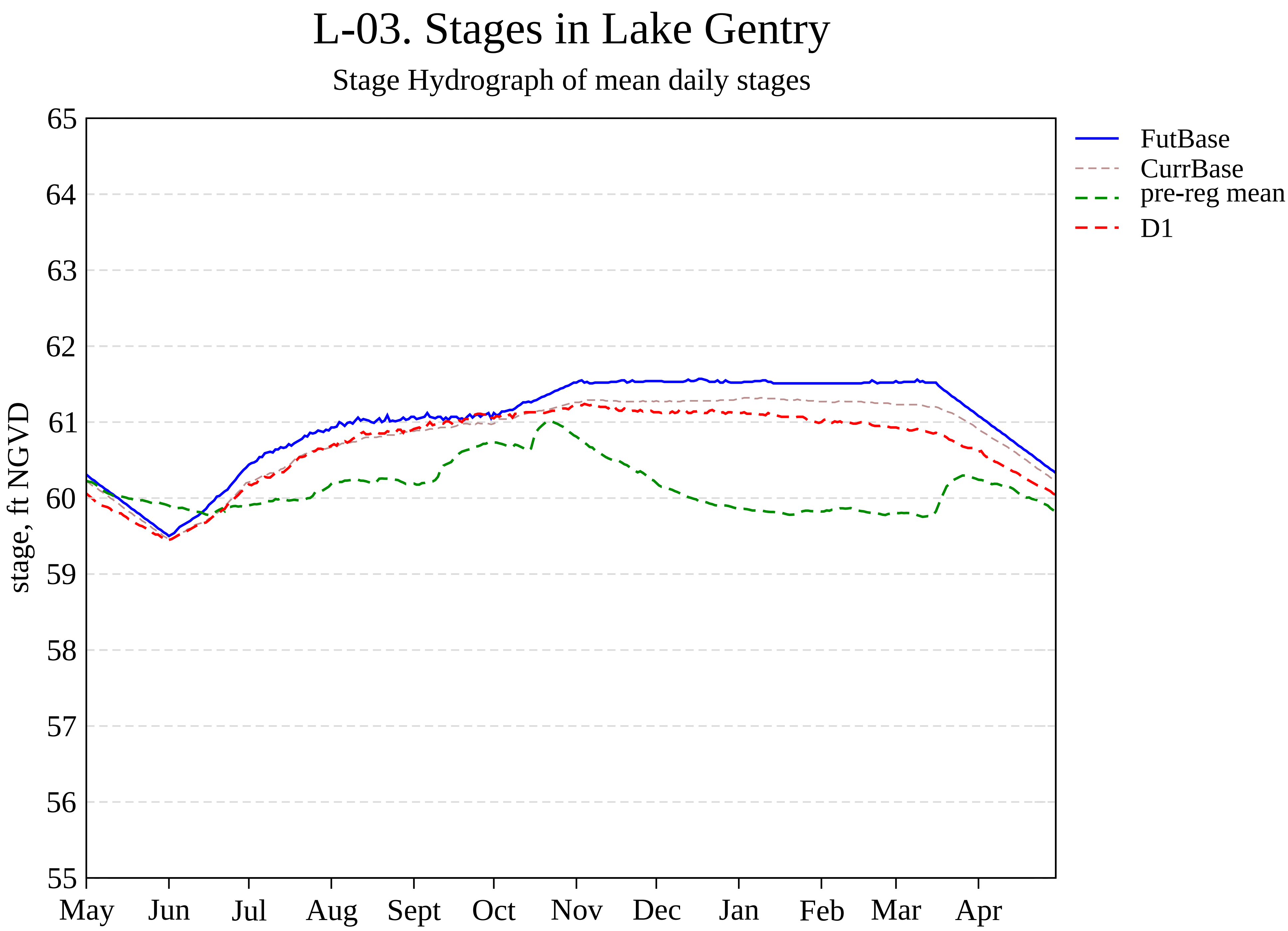
Run ID : Variation of drainage level, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	54.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	68.6	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	8.6	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	74.3	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.5	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.6	0.00	0.12	0.00

PM Score	**0.00**
Location Weight	**0.08**
PM Composite Score	**0.00**

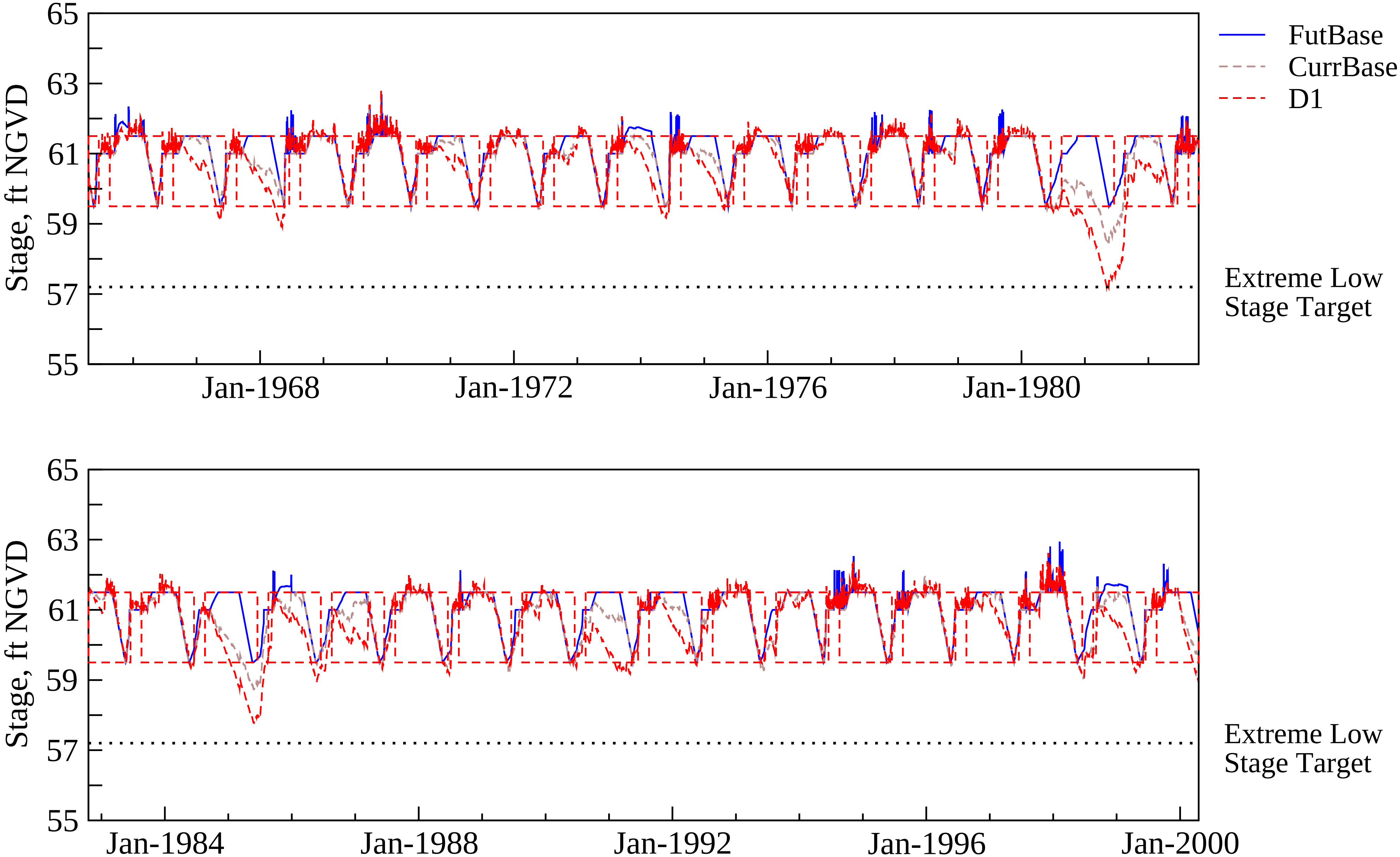
Tier 2 Report

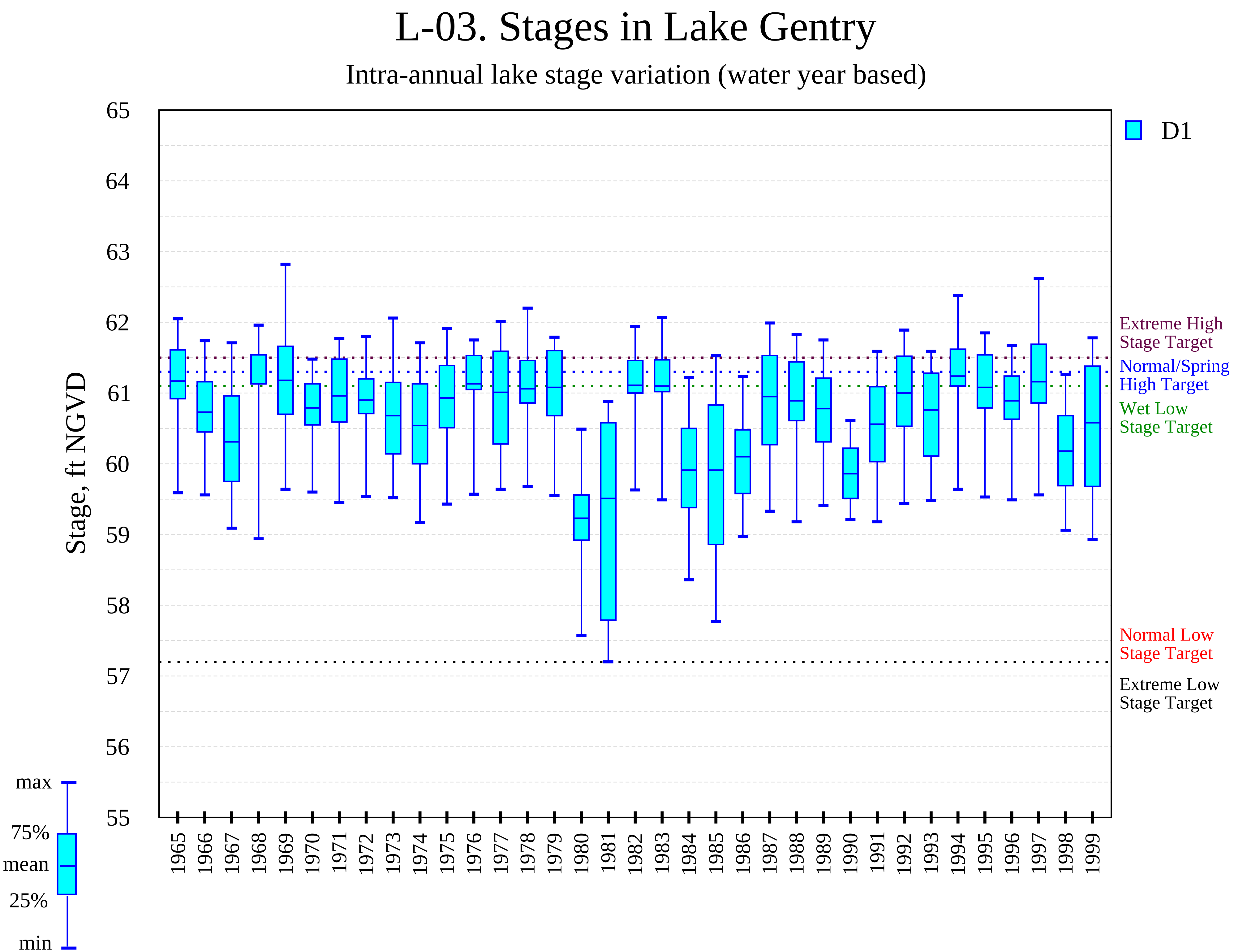
PDF Report for L03

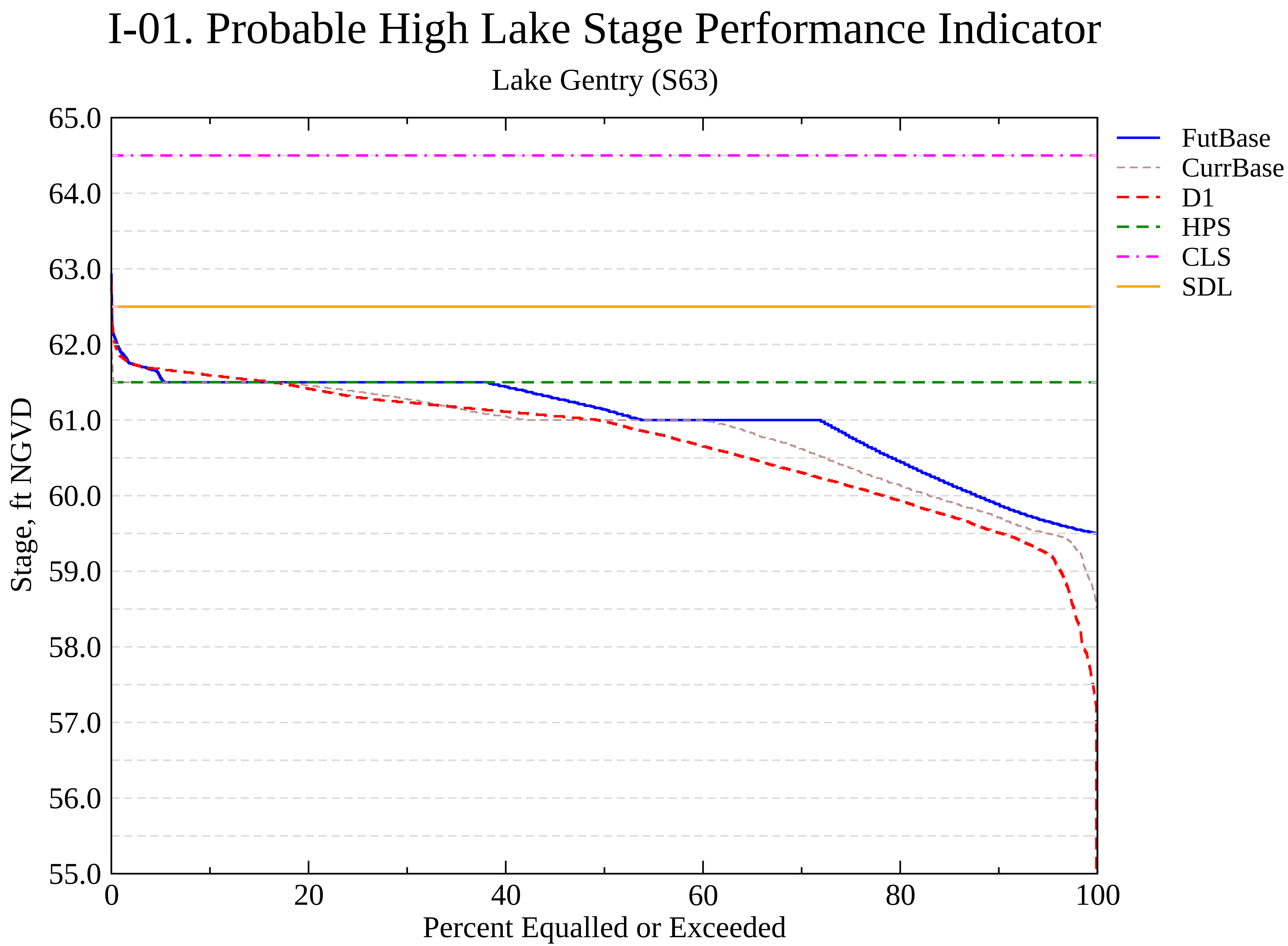

L-03. Stages in Lake Gentry
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
D1

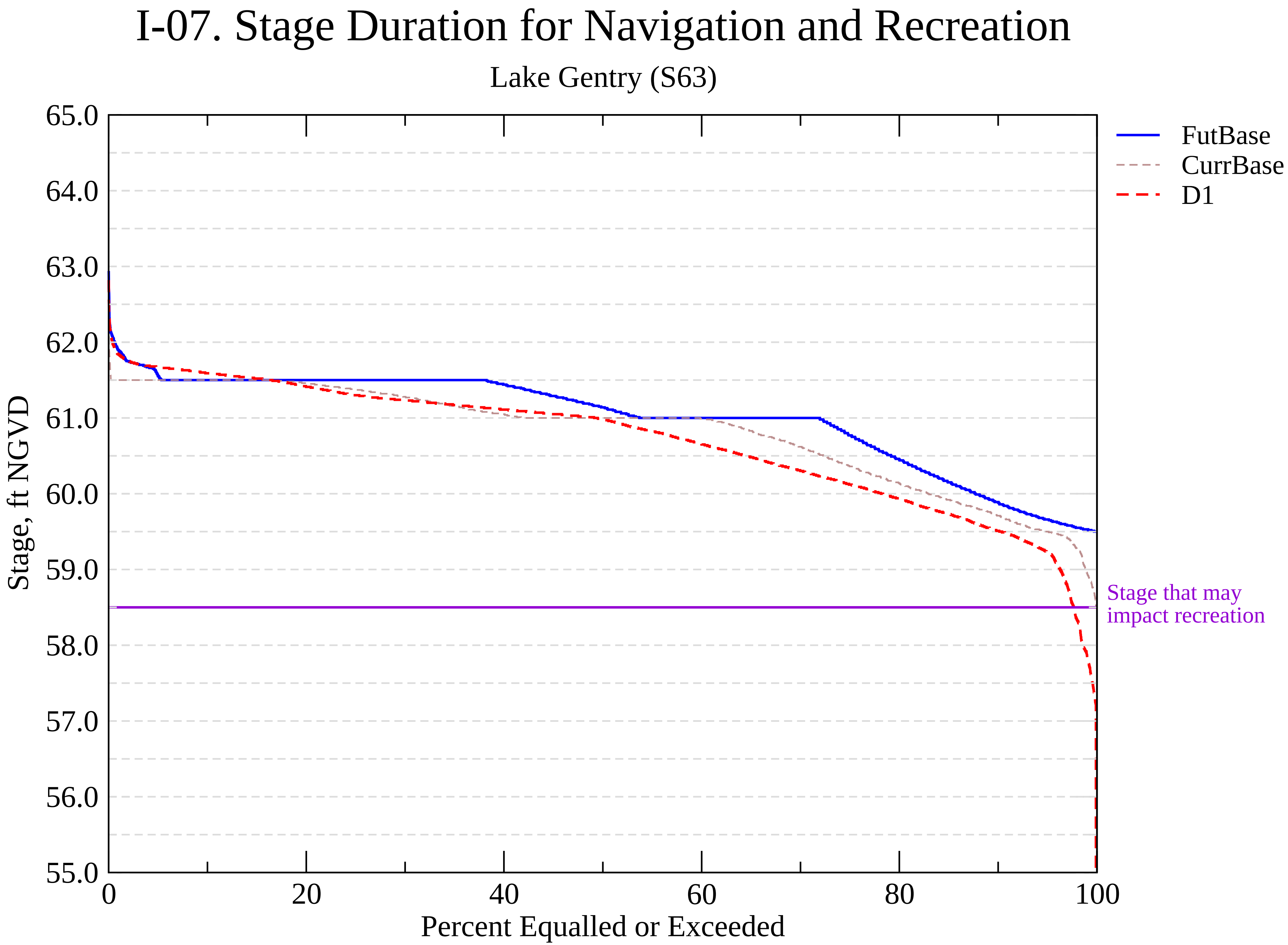
L-03. Stages in Lake Gentry

Daily Stage Hydrograph with Water Level recession windows (Sept-June)




L-03. Stages in Lake Gentry
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
D1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min


I-01. Probable High Lake Stage Performance Indicator
Lake Gentry (S63)
Stage, ft NGVD
Percent Equalled or Exceeded
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
FutBase
CurrBase
D1
HPS
CLS
SDL



I-07. Stage Duration for Navigation and Recreation
Lake Gentry (S63)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D1
Stage that may
impact recreation

Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

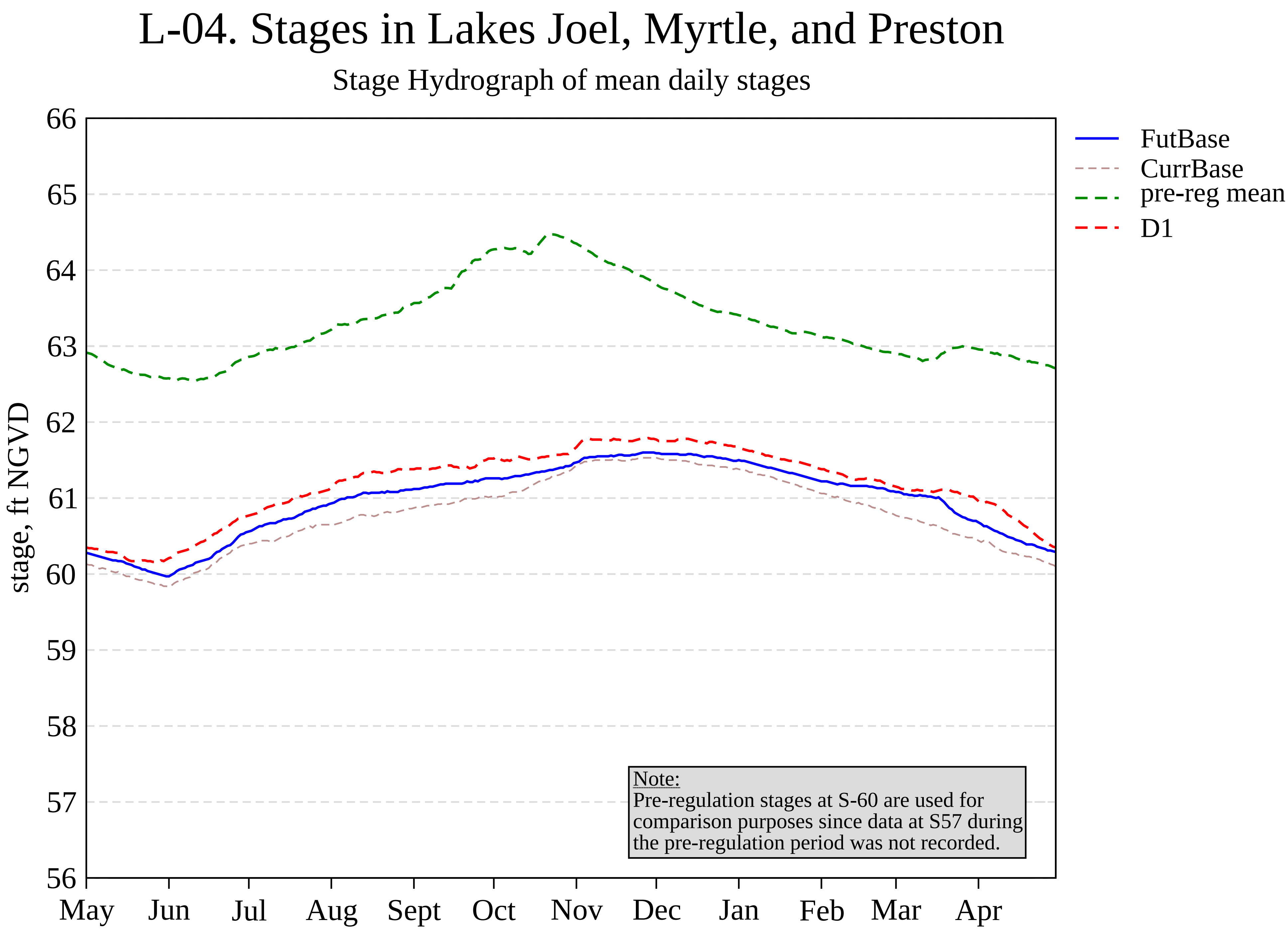
Alternative Description : Uncertainty Analysis - Simulation D1

Run ID : Variation of drainage level, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	94.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	20.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	57.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	65.7	1.00	0.12	0.12
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	25.7	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	80.0	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.3	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	5.3	0.00	0.12	0.00

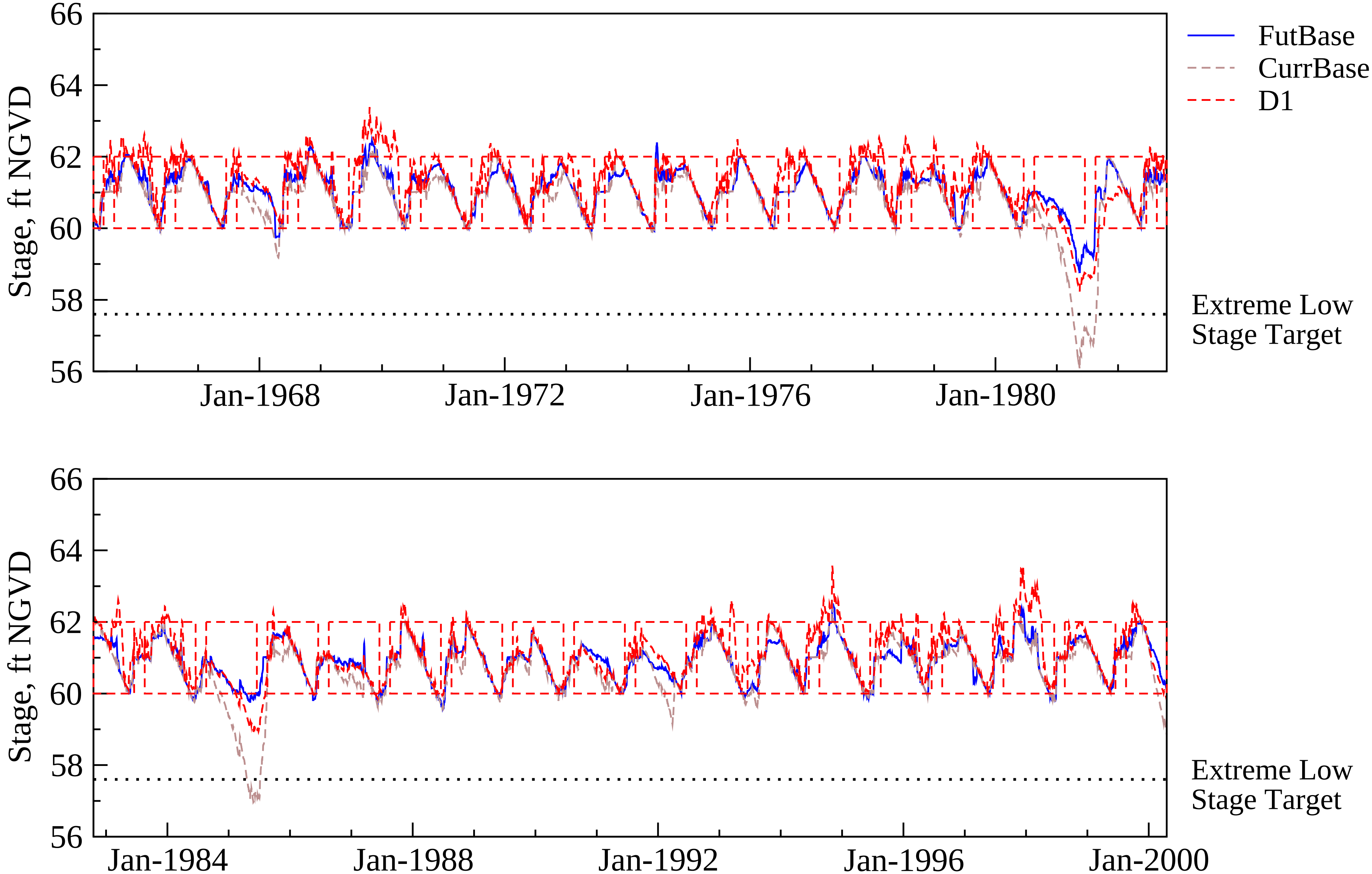
PM Score	**0.12**
Location Weight	**0.08**
PM Composite Score	**0.01**

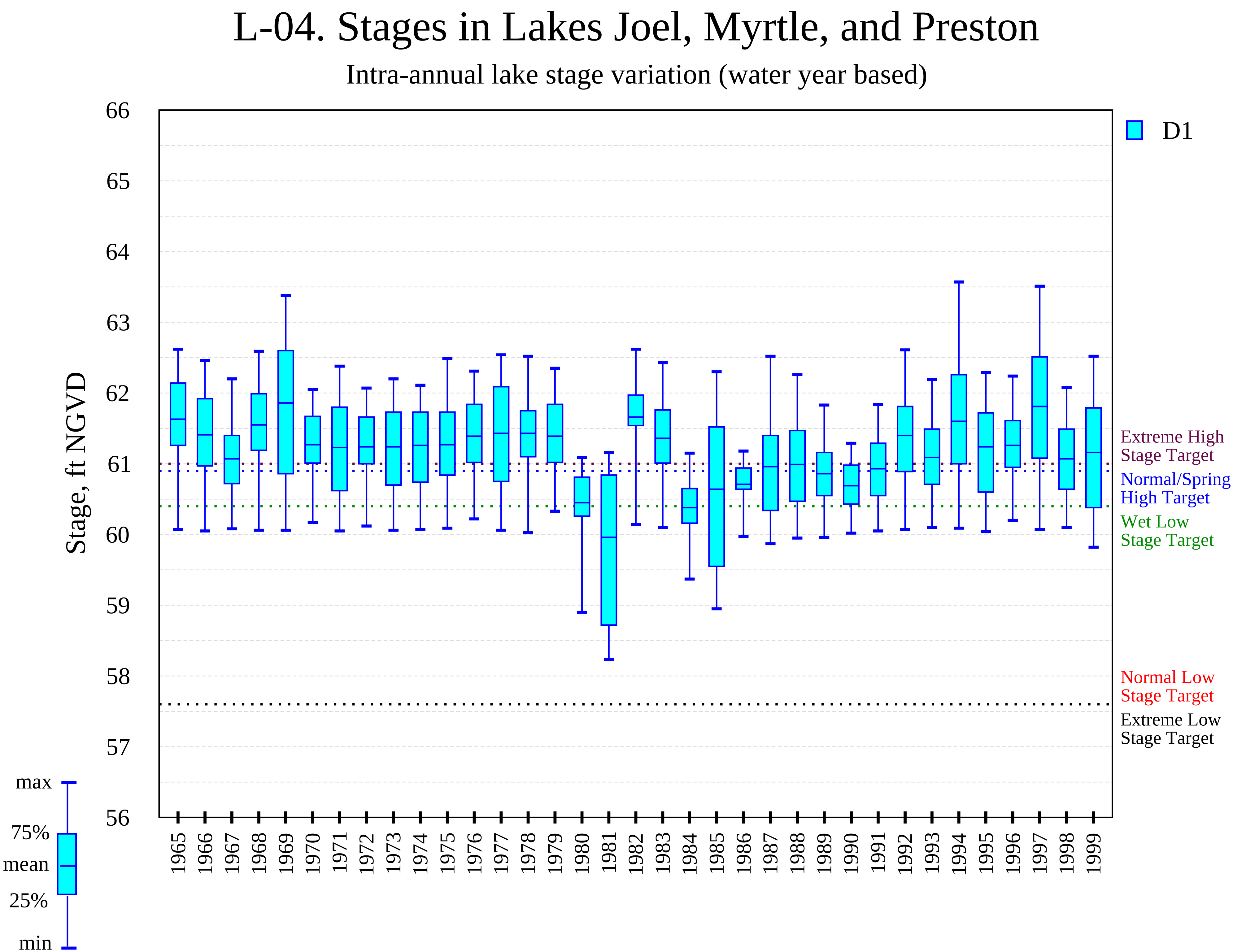
Tier 2 Report

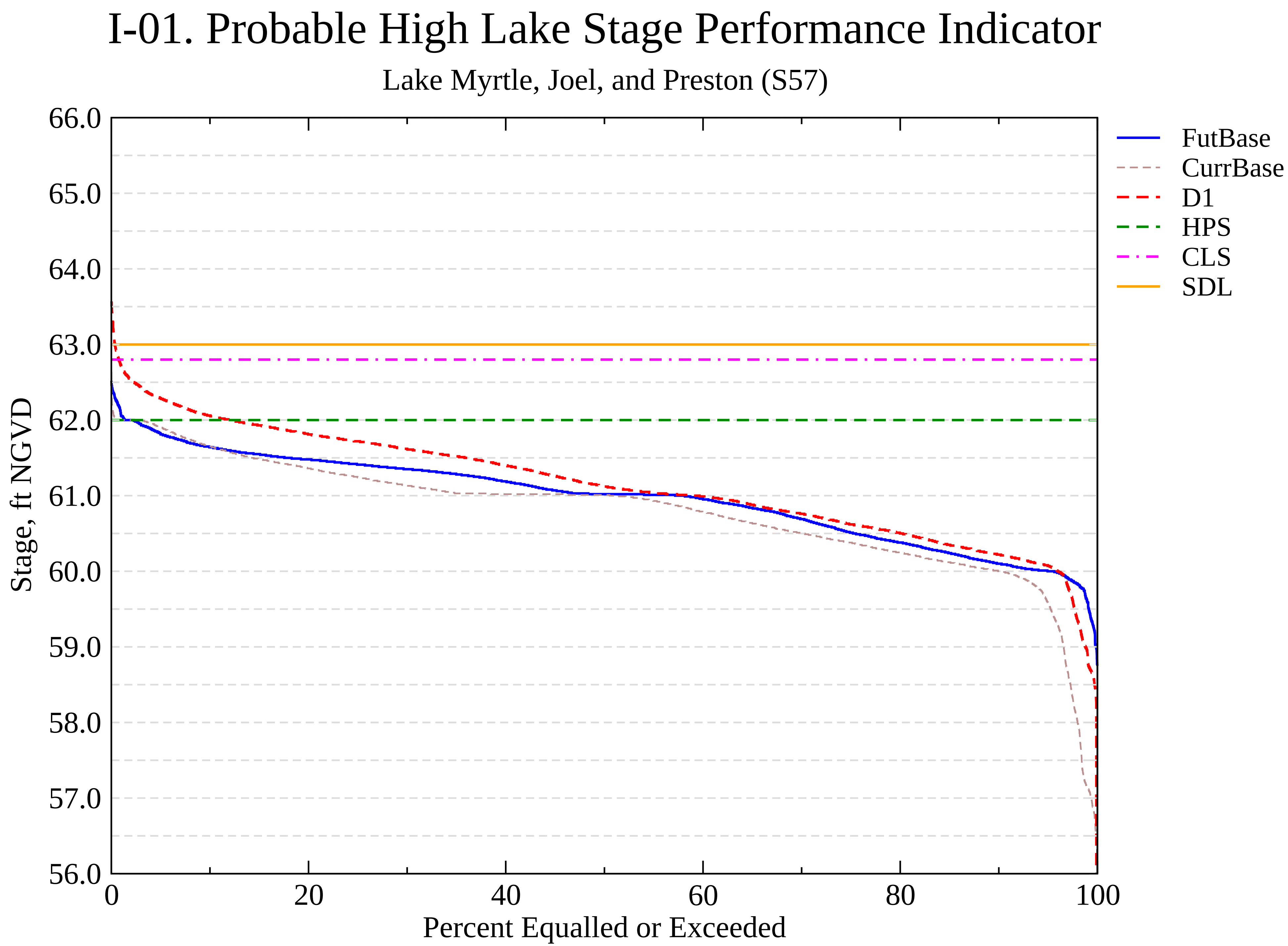

L-04. Stages in Lakes Joel, Myrtle, and Preston
Stage Hydrograph of mean daily stages
stage, ft NGVD
66
65
64
63
62
61
60
59
58
57
56
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
D1
Note:
Pre-regulation stages at S-60 are used for comparison purposes since data at S57 during the pre-regulation period was not recorded.

L-04. Stages in Lakes Joel, Myrtle, and Preston

Daily Stage Hydrograph with Water Level recession windows (Sept-June)




L-04. Stages in Lakes Joel, Myrtle, and Preston
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
66
65
64
63
62
61
60
59
58
57
56
D1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999



I-01. Probable High Lake Stage Performance Indicator
Lake Myrtle, Joel, and Preston (S57)
Stage, ft NGVD
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D1
HPS
CLS
SDL

Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation D1

Run ID : Variation of drainage level, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	57.0	0.40	0.12	0.05
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	51.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	31.4	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	0.0	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	94.3	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.0	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.4	0.00	0.12	0.00

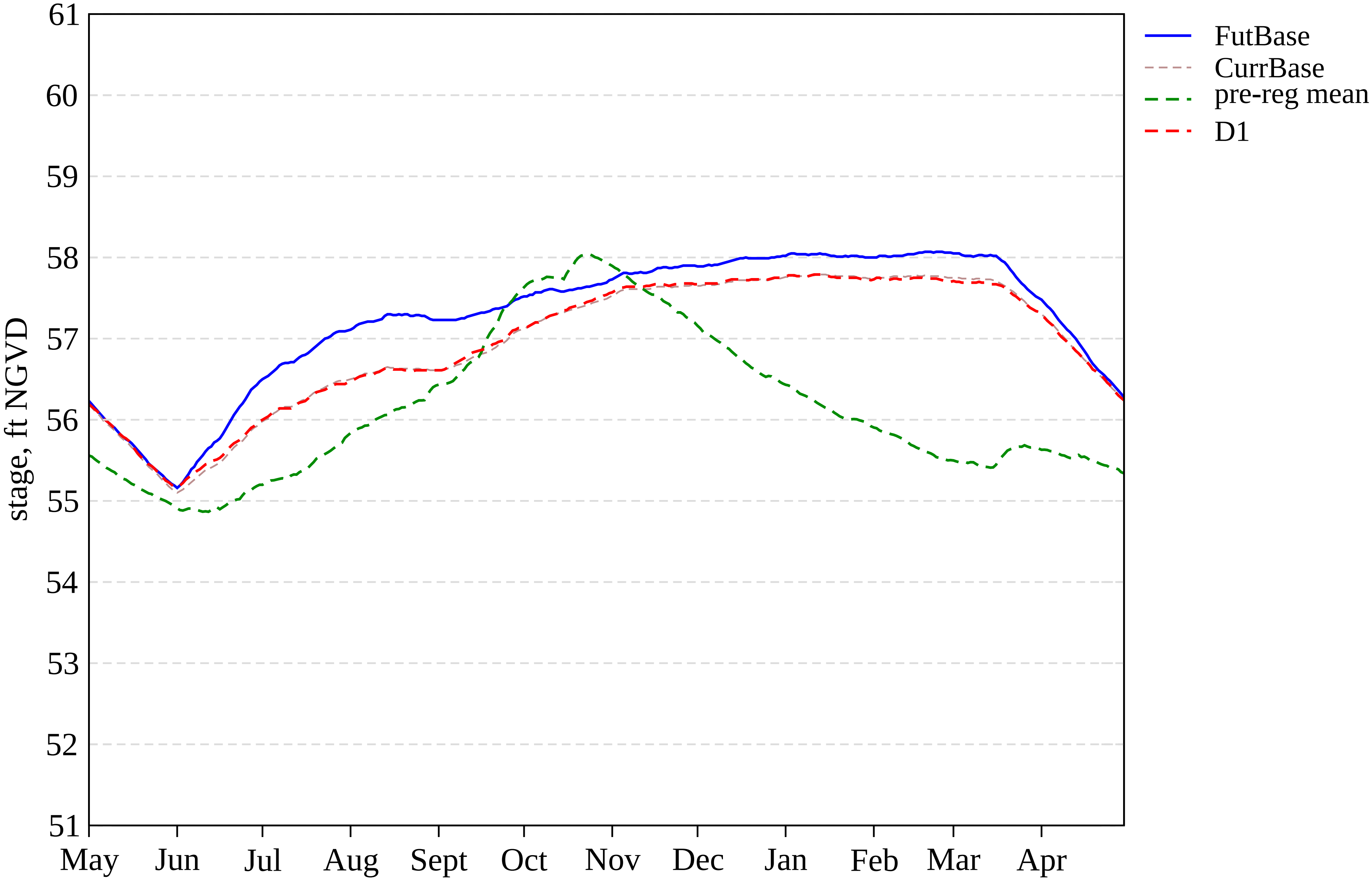
PM Score	**0.05**
Location Weight	**0.13**
PM Composite Score	**0.01**

Tier 2 Report

PDF Report for L05

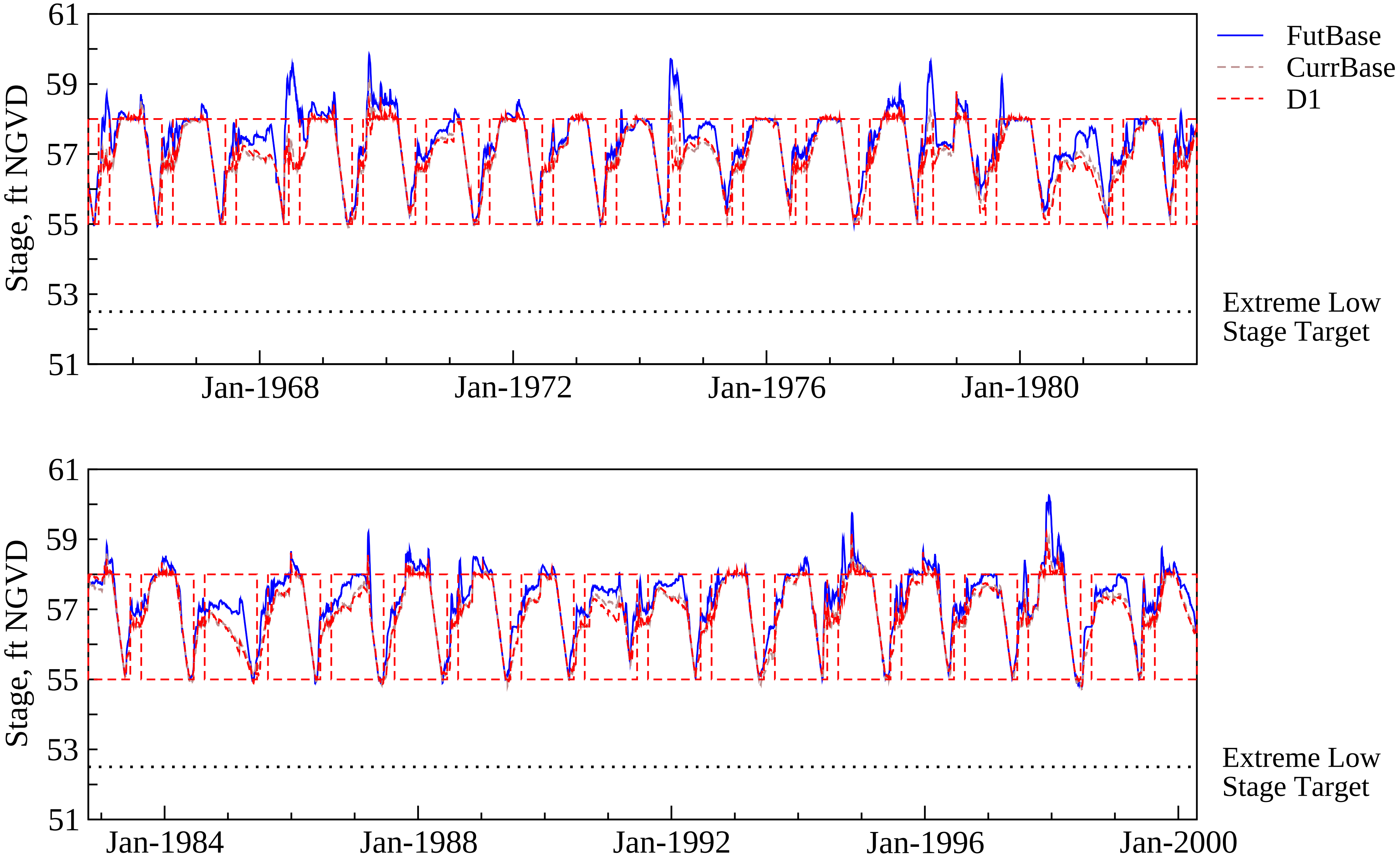
L-05. Stages in East Lake Toho, Fell’s Cove, and Lake Ajay

Stage Hydrograph of mean daily stages



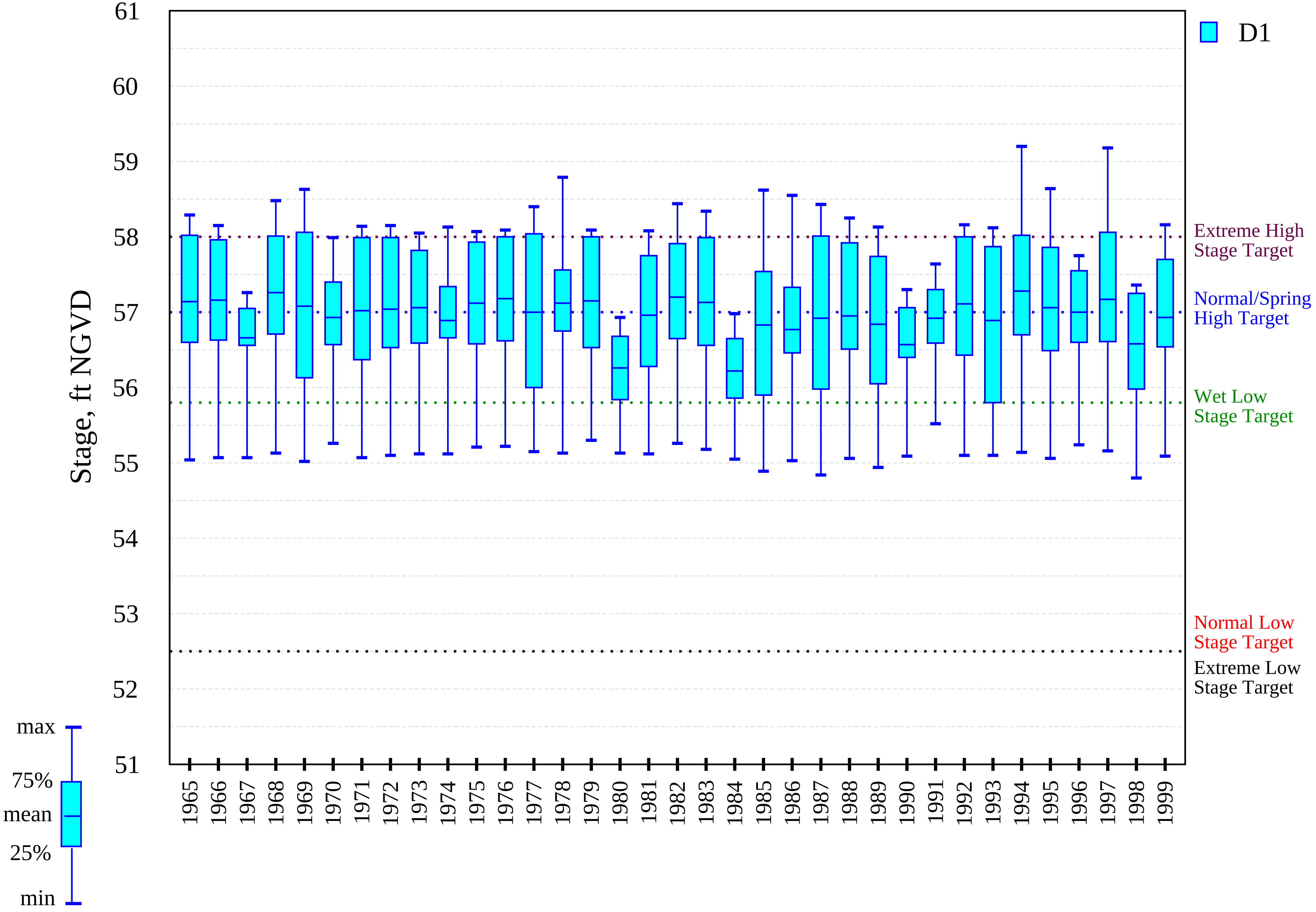
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

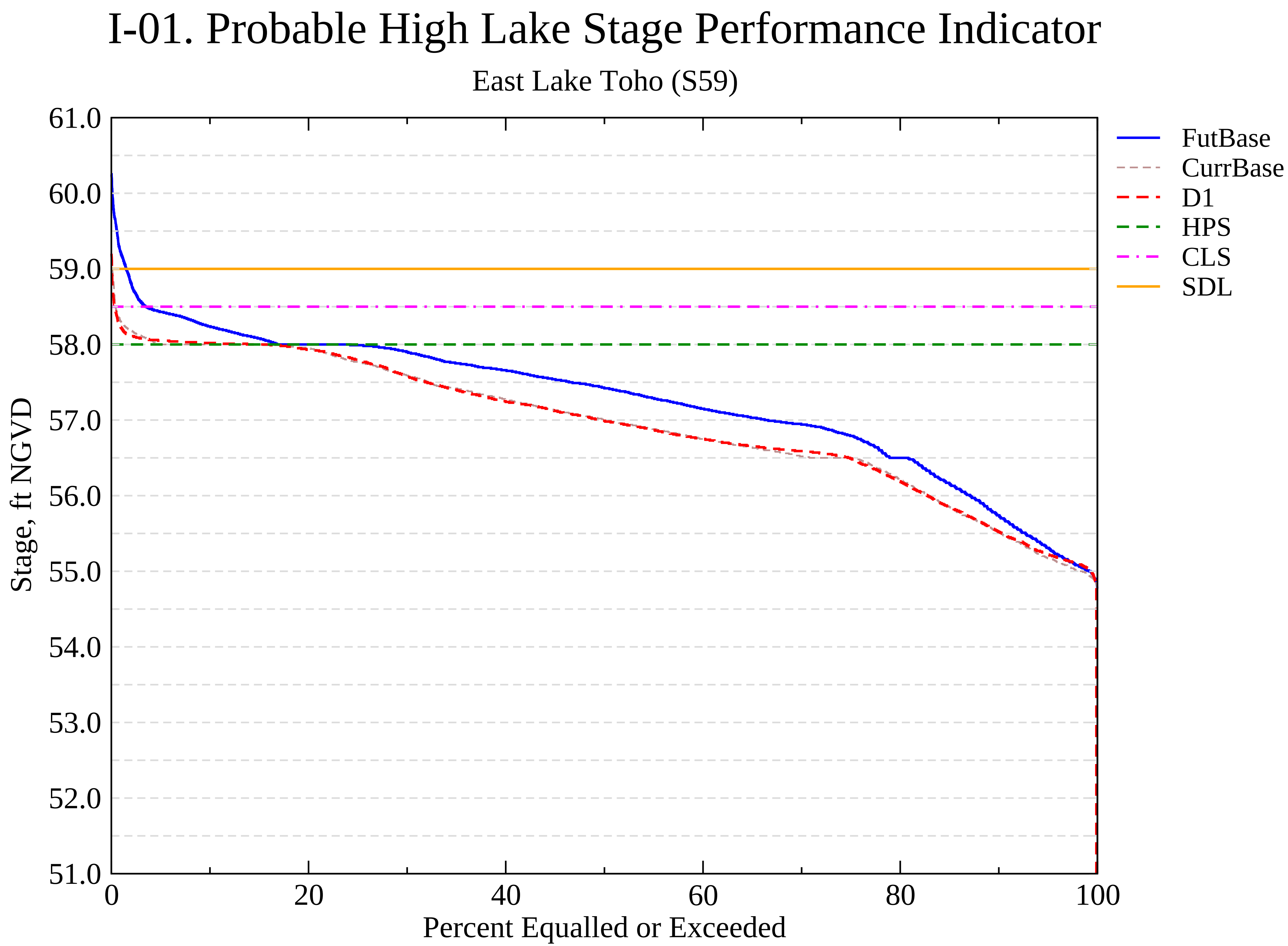
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

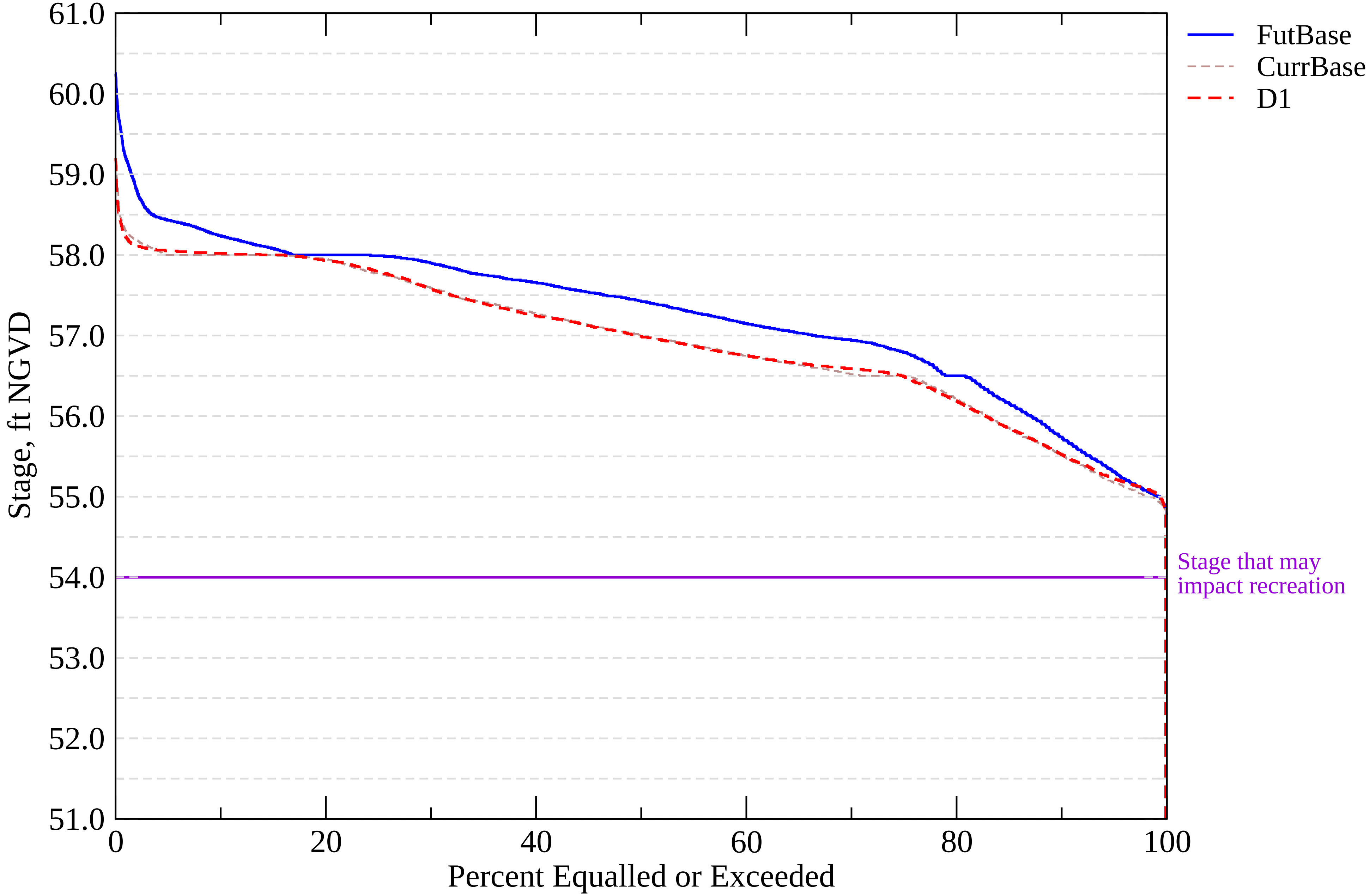
Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

East Lake Toho (S59)



Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Alternative Description : Uncertainty Analysis - Simulation D1

Run ID : Variation of drainage level, k - LOW

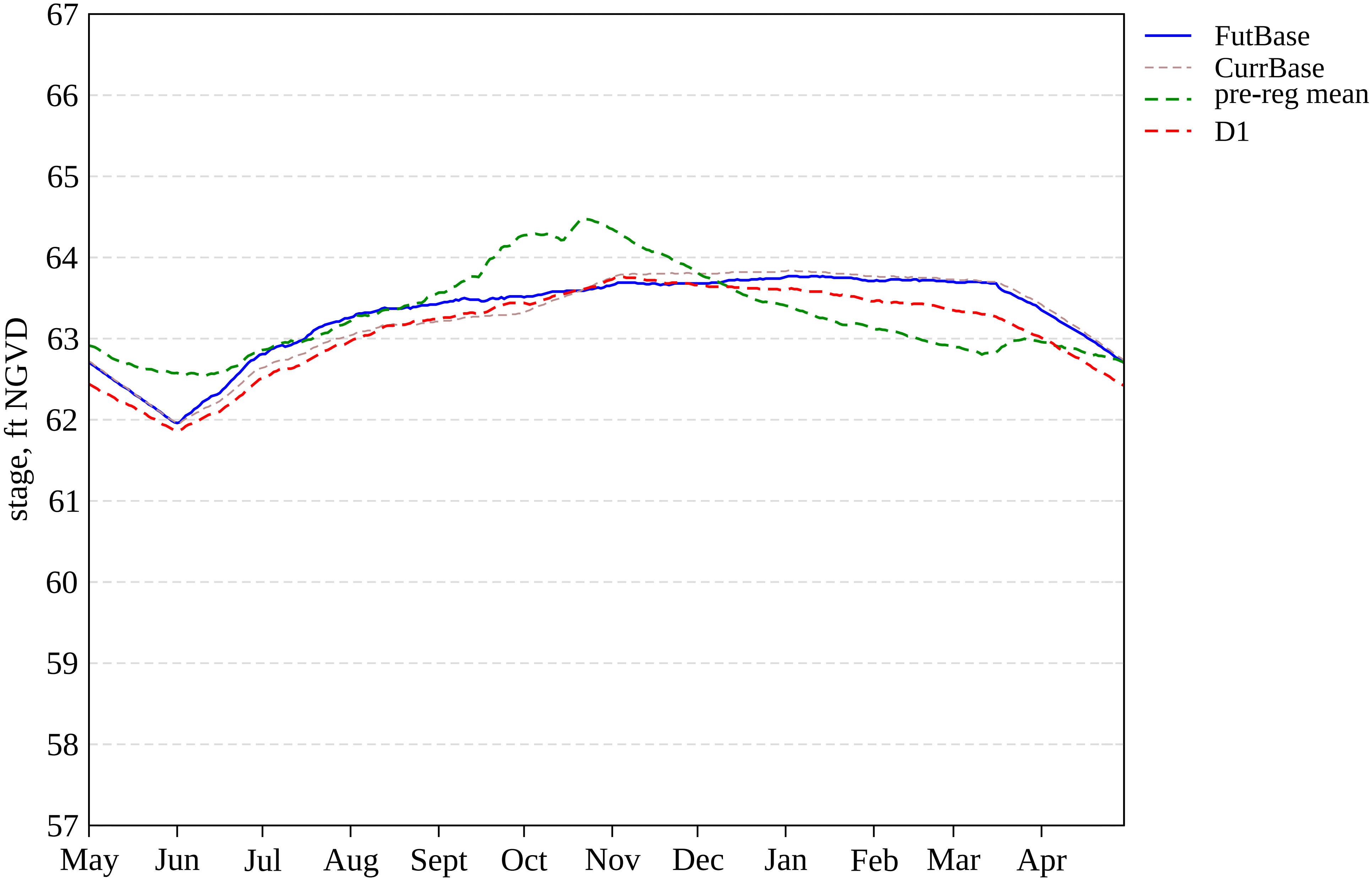
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	51.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.08	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0	0.00	0.08	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	97.0	0.00	0.04	0.00
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	62.9	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	5.7	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	85.7	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.5	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	6.3	0.00	0.12	0.00
						PM Score	**0.00**
						Location Weight	**0.08**
						PM Composite Score	**0.00**

Tier 2 Report

PDF Report for L06

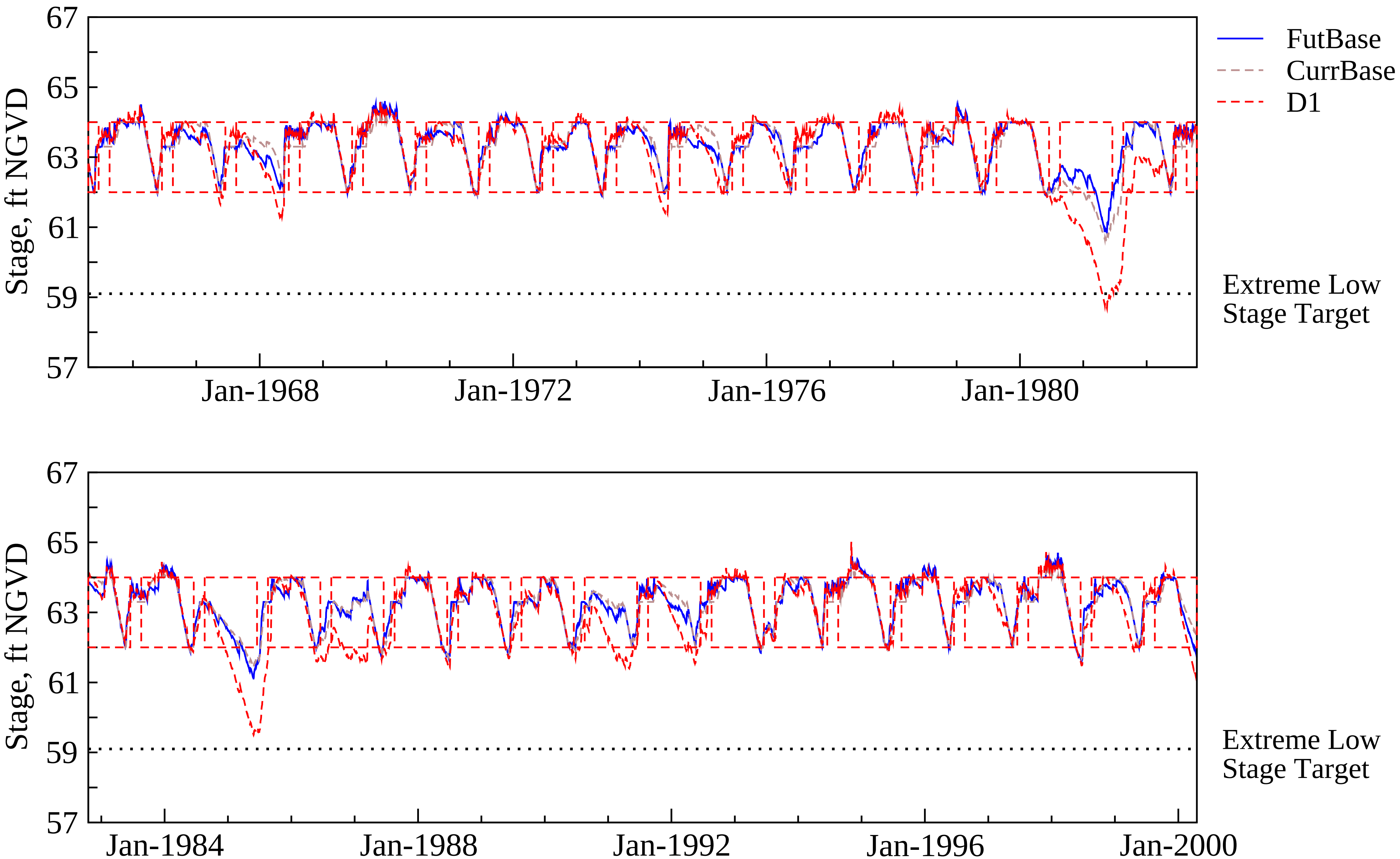
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout

Stage Hydrograph of mean daily stages



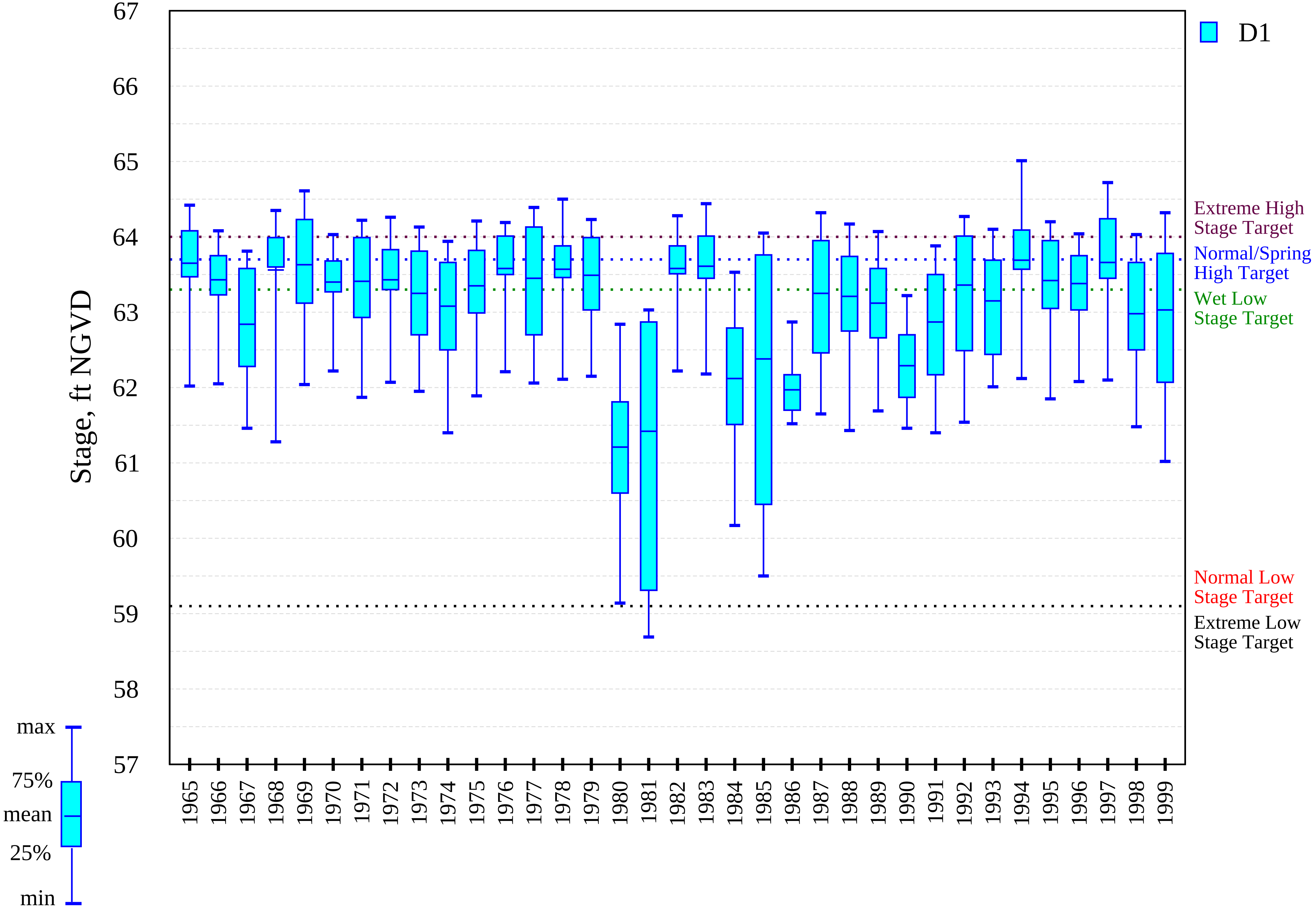
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

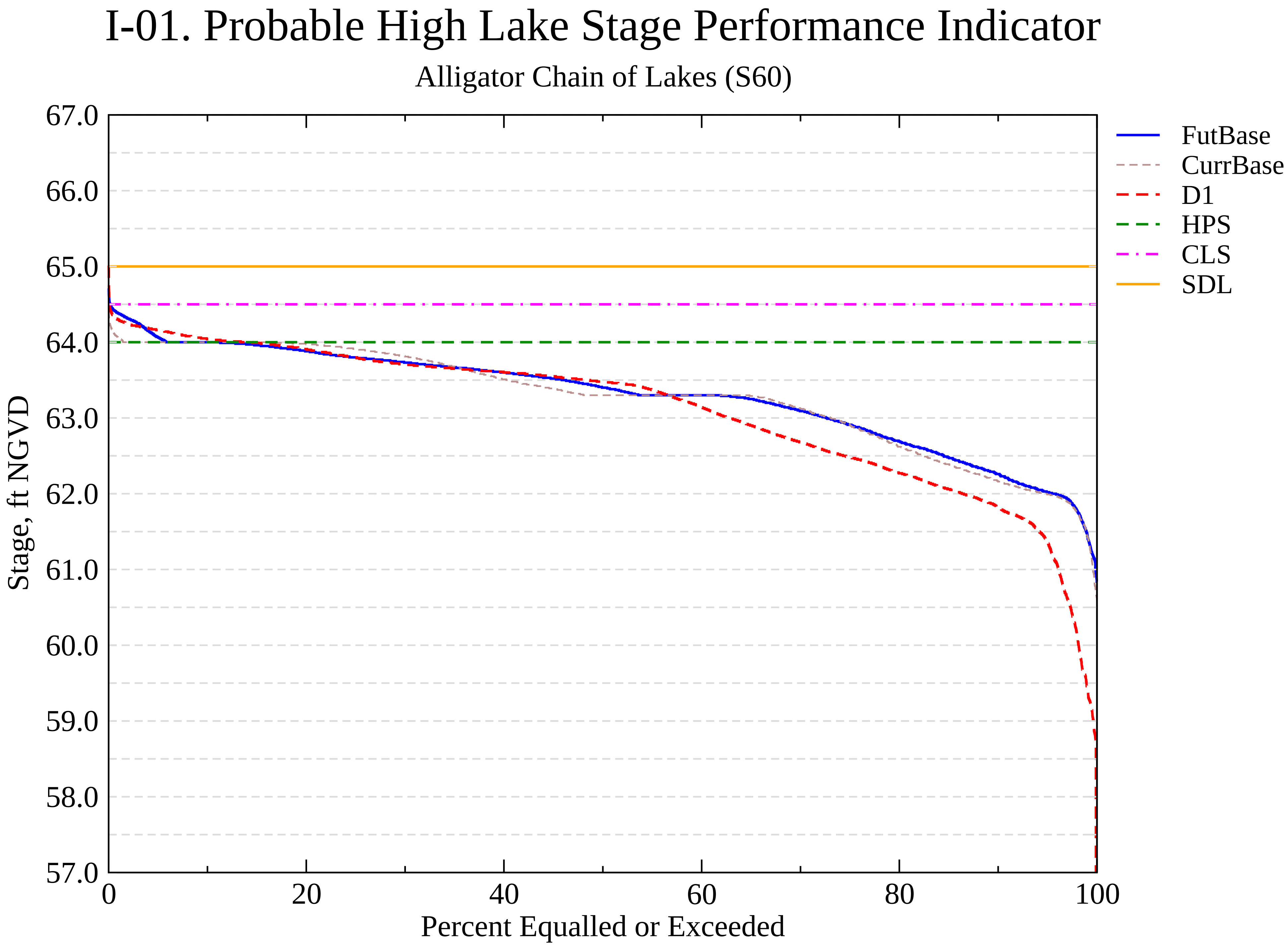
Daily Stage Hydrograph with Water Level recession windows (Sept-June)



L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Intra-annual lake stage variation (water year based)

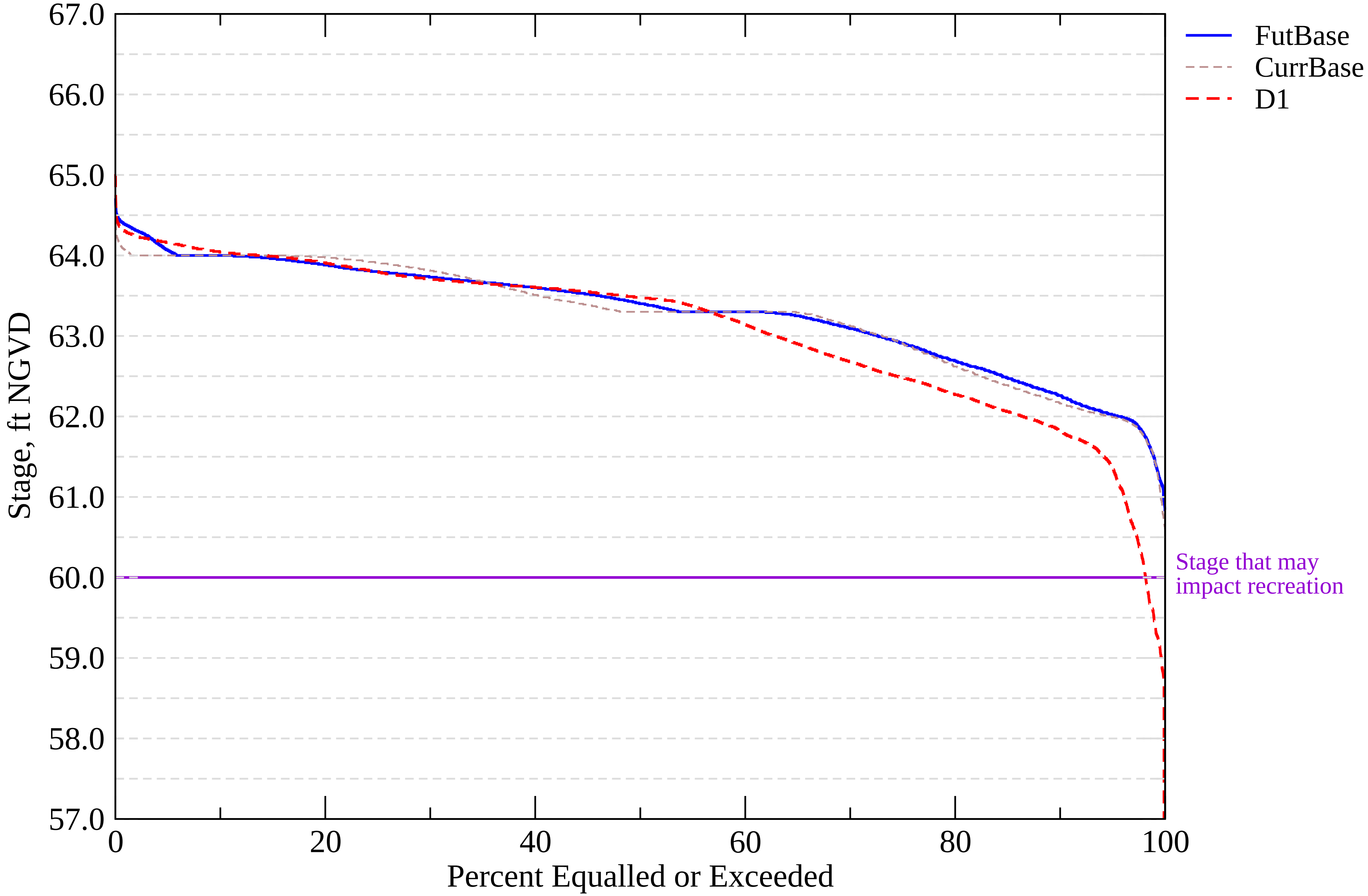




I-01. Probable High Lake Stage Performance Indicator
Alligator Chain of Lakes (S60)
Stage, ft NGVD
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Alligator Chain of Lakes (S60)



Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

Alternative Description : Uncertainty Analysis - Simulation D1

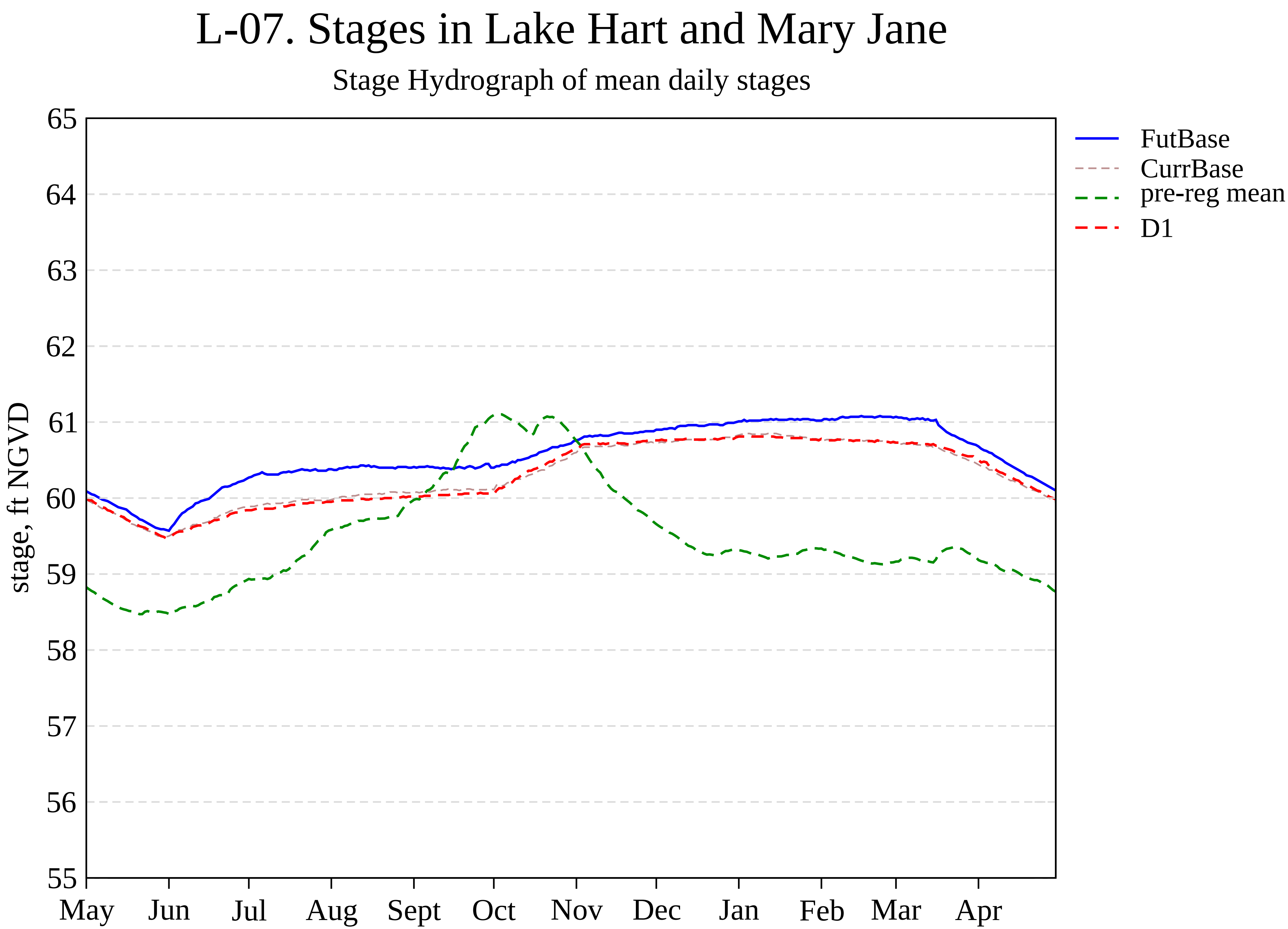
Run ID : Variation of drainage level, k - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Value	Component Weight	Component Score
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	71.0	0.00	0.12	0.00
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0	0.00	0.06	0.00
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	71.0	0.00	0.06	0.00
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0	0.00	0.04	0.00
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	46.0	0.66	0.04	0.03
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0	0.00	0.12	0.00
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	17.1	0.00	0.12	0.00
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	2.9	0.00	0.04	0.00
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	82.9	0.00	0.12	0.00
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7	0.00	0.12	0.00
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	3.6	0.00	0.12	0.00
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	60.0		0.04	

PM Score	**0.03**
Location Weight	**0.08**
PM Composite Score	**0.00**

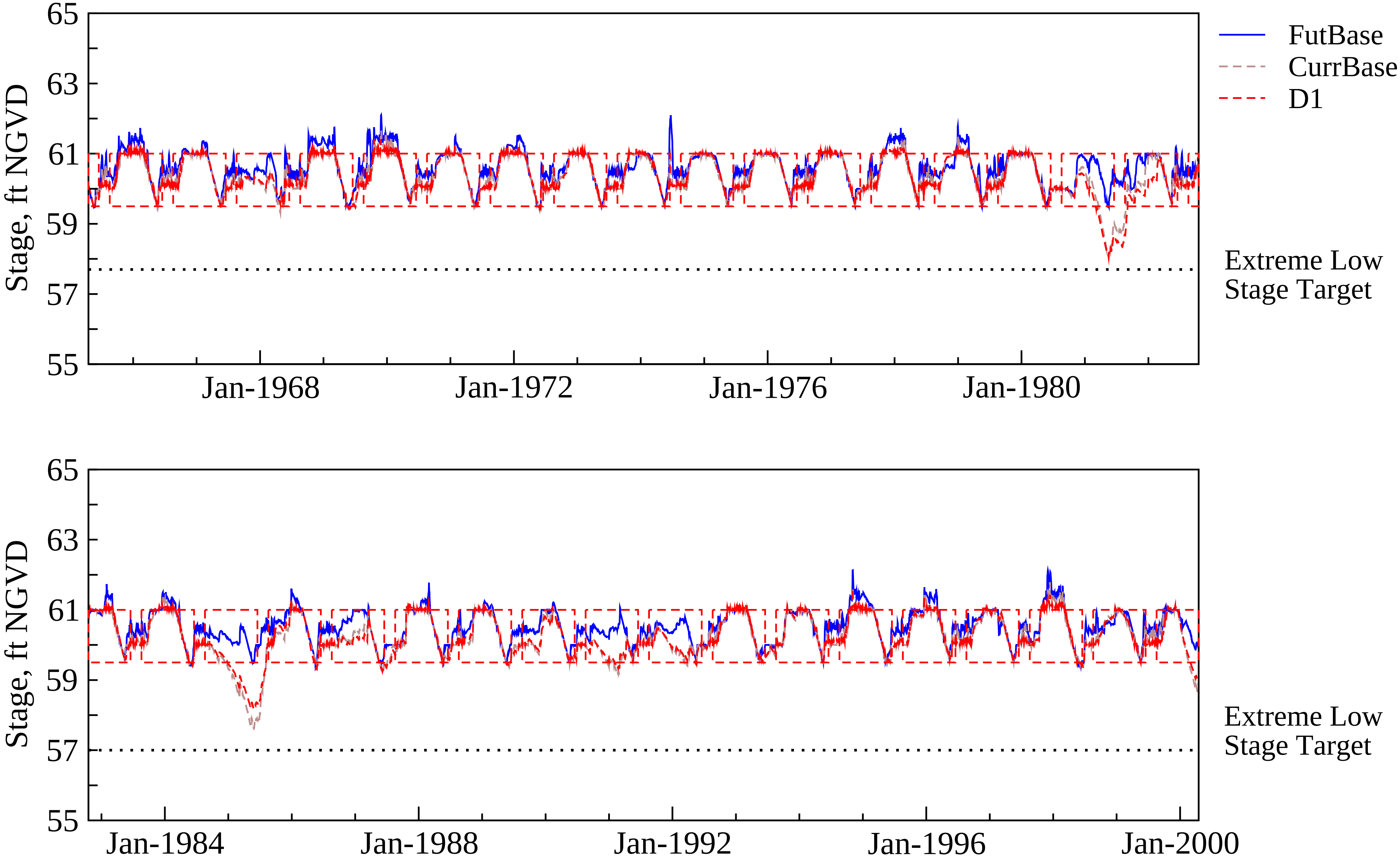
Tier 2 Report

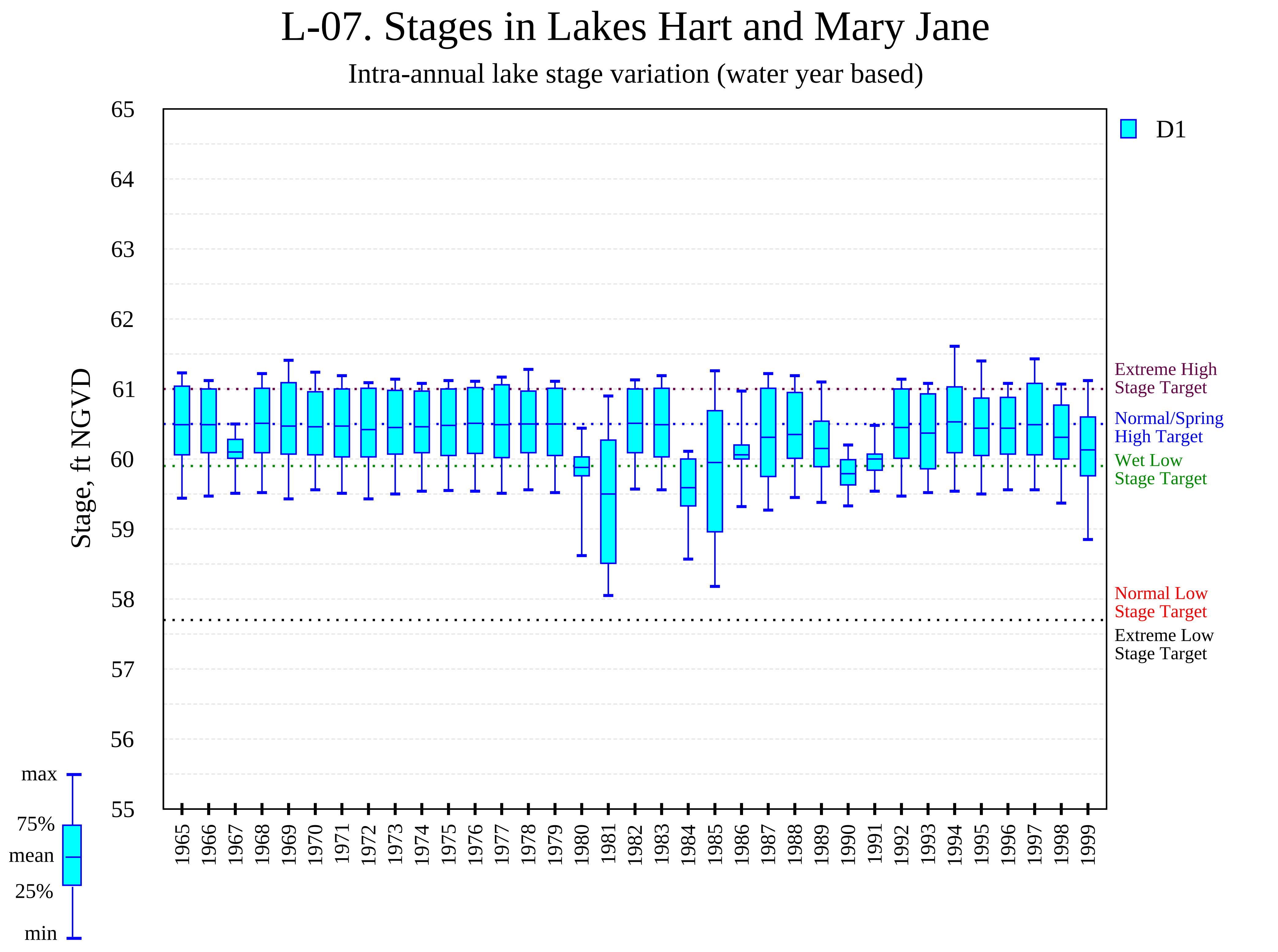
PDF Report for L07


L-07. Stages in Lake Hart and Mary Jane
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
D1

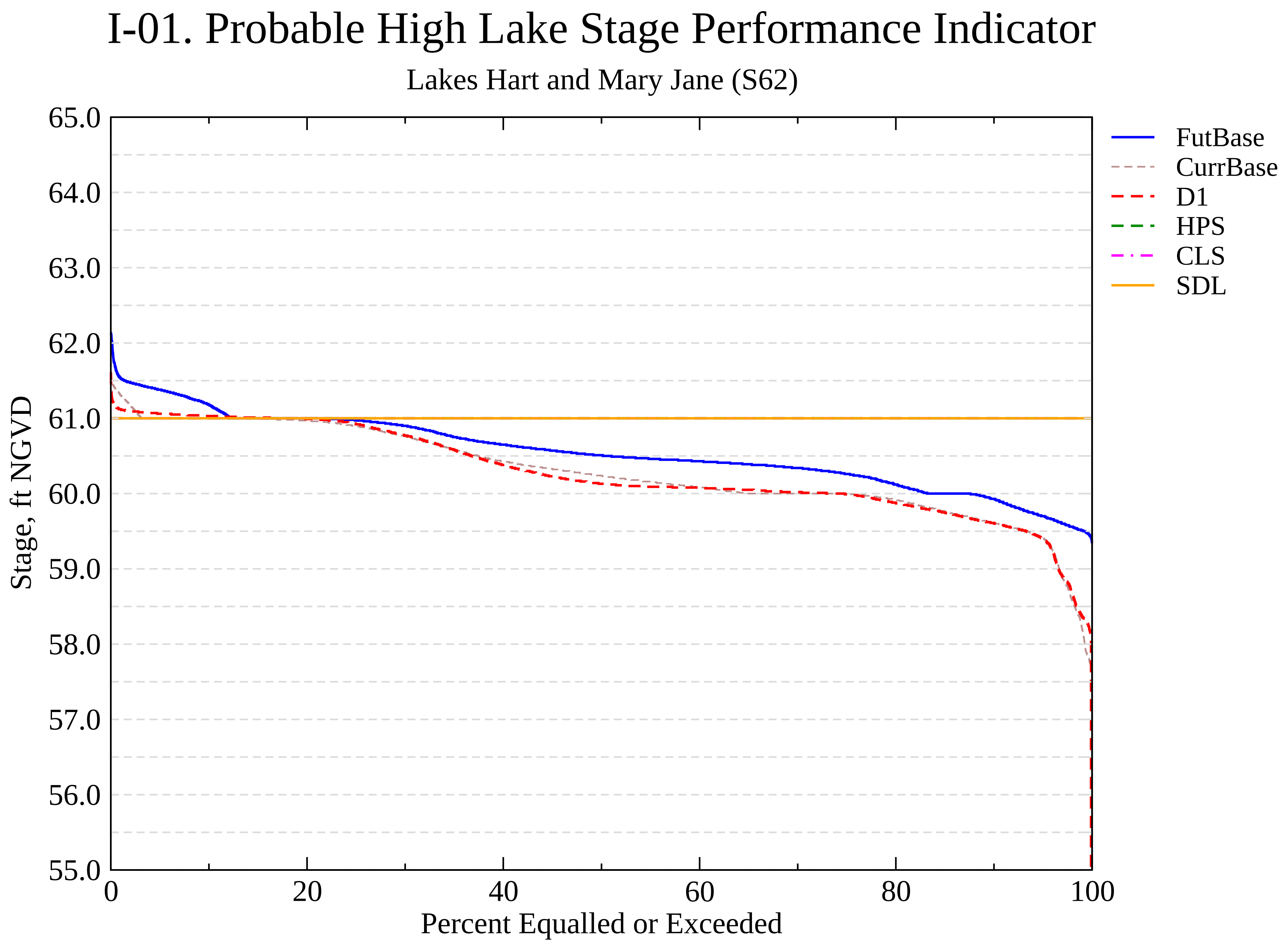
L-07. Stages in Lakes Hart and Mary Jane

Daily Stage Hydrograph with Water Level recession windows (Sept-June)

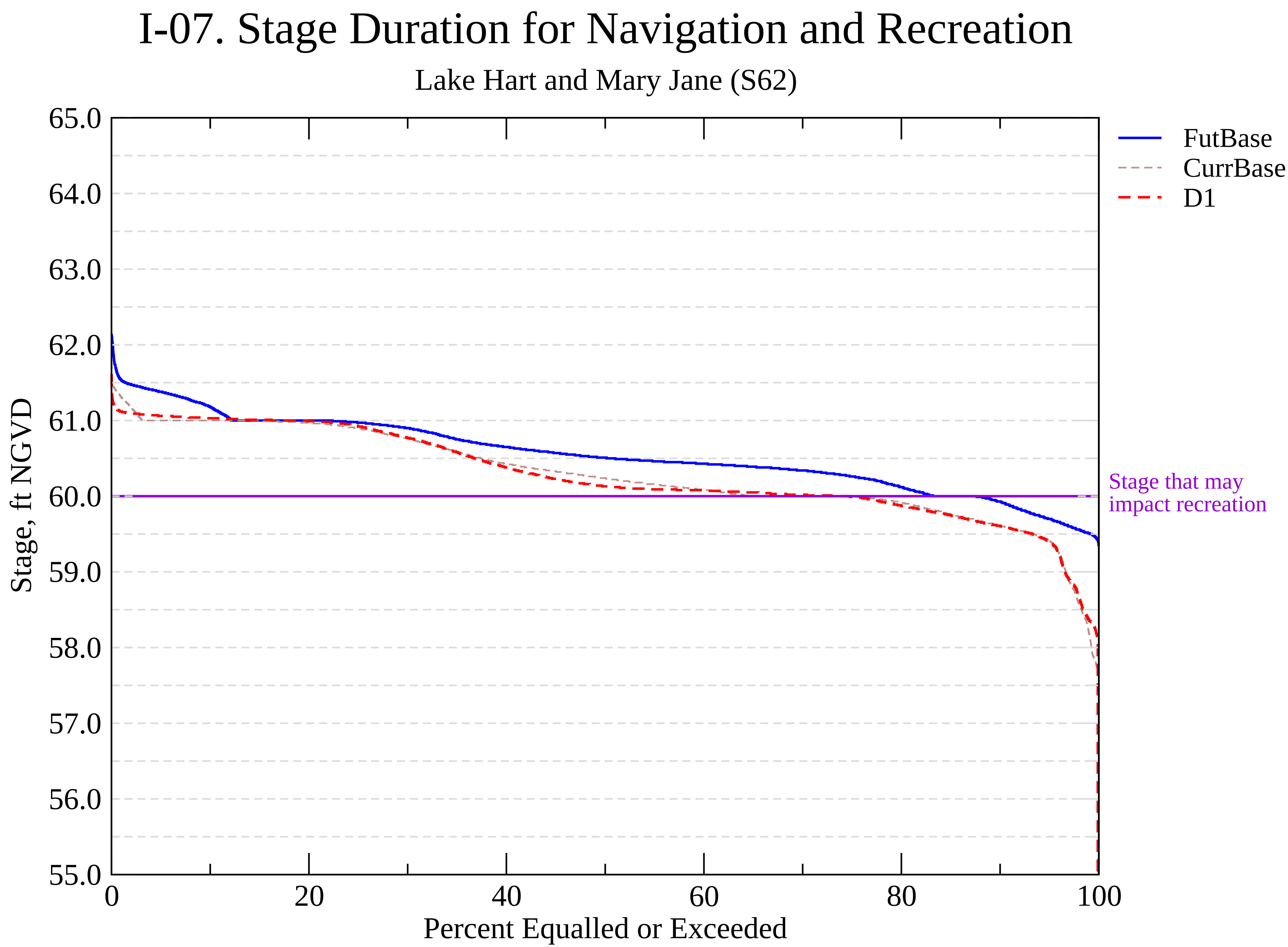




L-07. Stages in Lakes Hart and Mary Jane
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
D1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min



I-01. Probable High Lake Stage Performance Indicator
Lakes Hart and Mary Jane (S62)
Stage, ft NGVD
Percent Equalled or Exceeded
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
FutBase
CurrBase
D1
HPS
CLS
SDL



I-07. Stage Duration for Navigation and Recreation
Lake Hart and Mary Jane (S62)
Stage, ft NGVD
Percent Equalled or Exceeded
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
FutBase
CurrBase
D1
Stage that may impact recreation

Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

Alternative Description : Uncertainty Analysis - Simulation D1

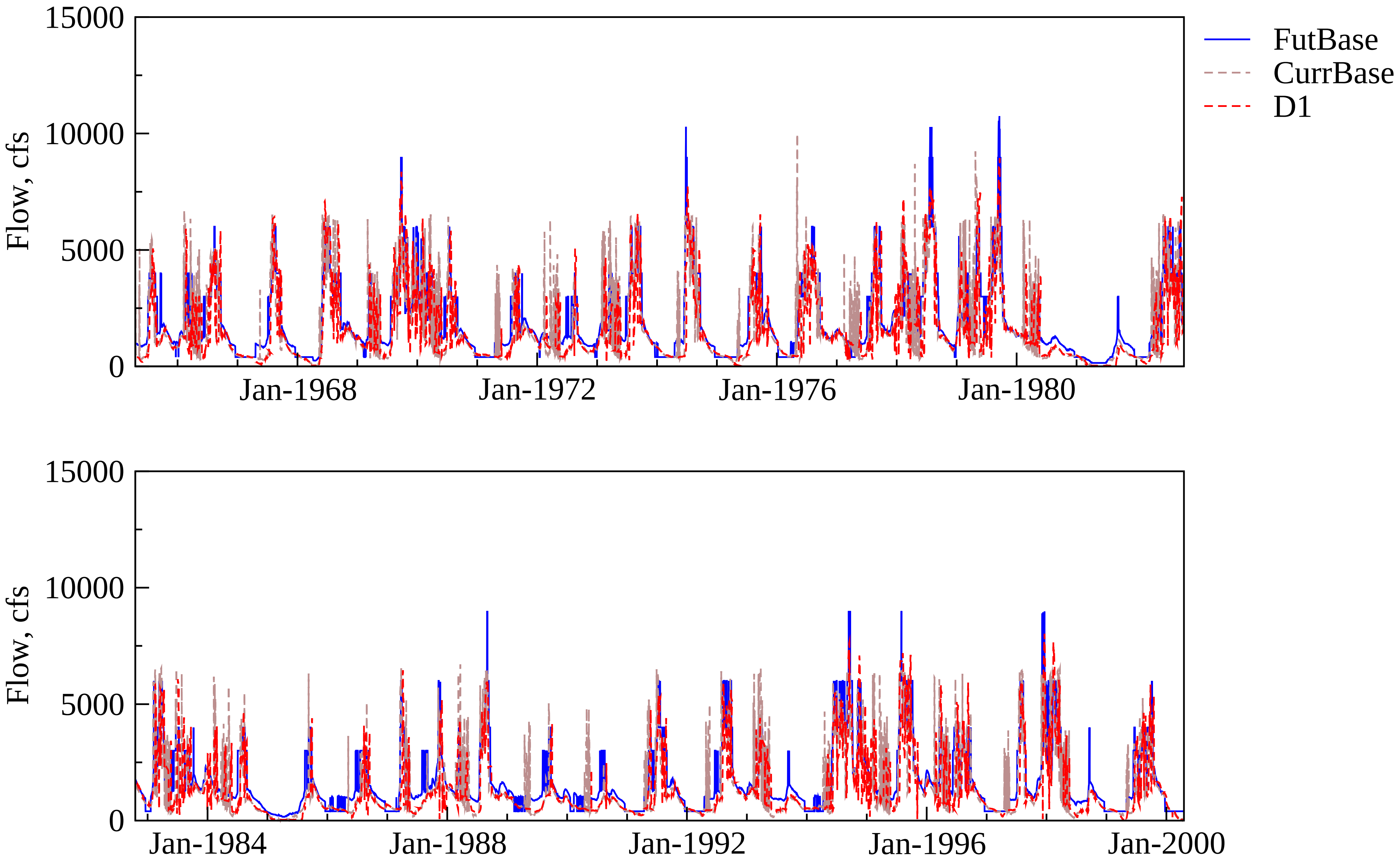
Run ID : Variation of drainage level, k - LOW

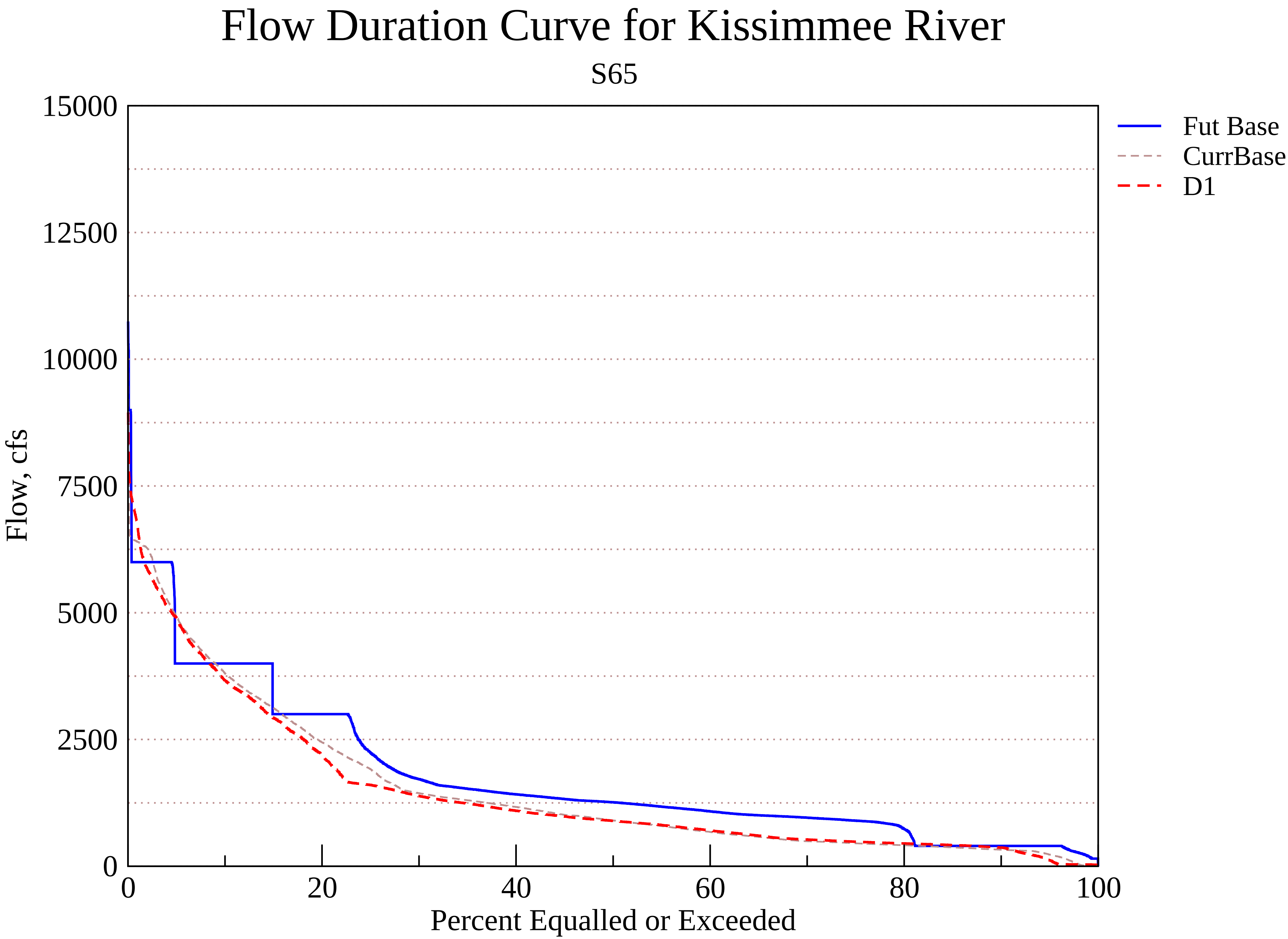
Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value		Utility Based on Linear Functions: Utility Index Score		Component Weight	Component Score	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E	S65	S65E		S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	31.4	45.7	0.00	0.49	0.15	0.00	0.07
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	48.6	45.7	0.00	0.00	0.1	0.00	0.00
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	85.7	85.7	0.31	1.00	0.15	0.05	0.15
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	8.6	5.7	0.00	0.00	0.1	0.00	0.00
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	193.0	243.0	0.00	1.00	0.15	0.00	0.15
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	420.0	545.0	1.00	0.09	0.15	0.15	0.01
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	2.3	13.3	0.00	0.00	0.15	0.00	0.00
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00	1.00	0.05	0.05	0.05
												0.25	**0.44**
												0.65	**0.35**
												0.31	

Tier 2 Report

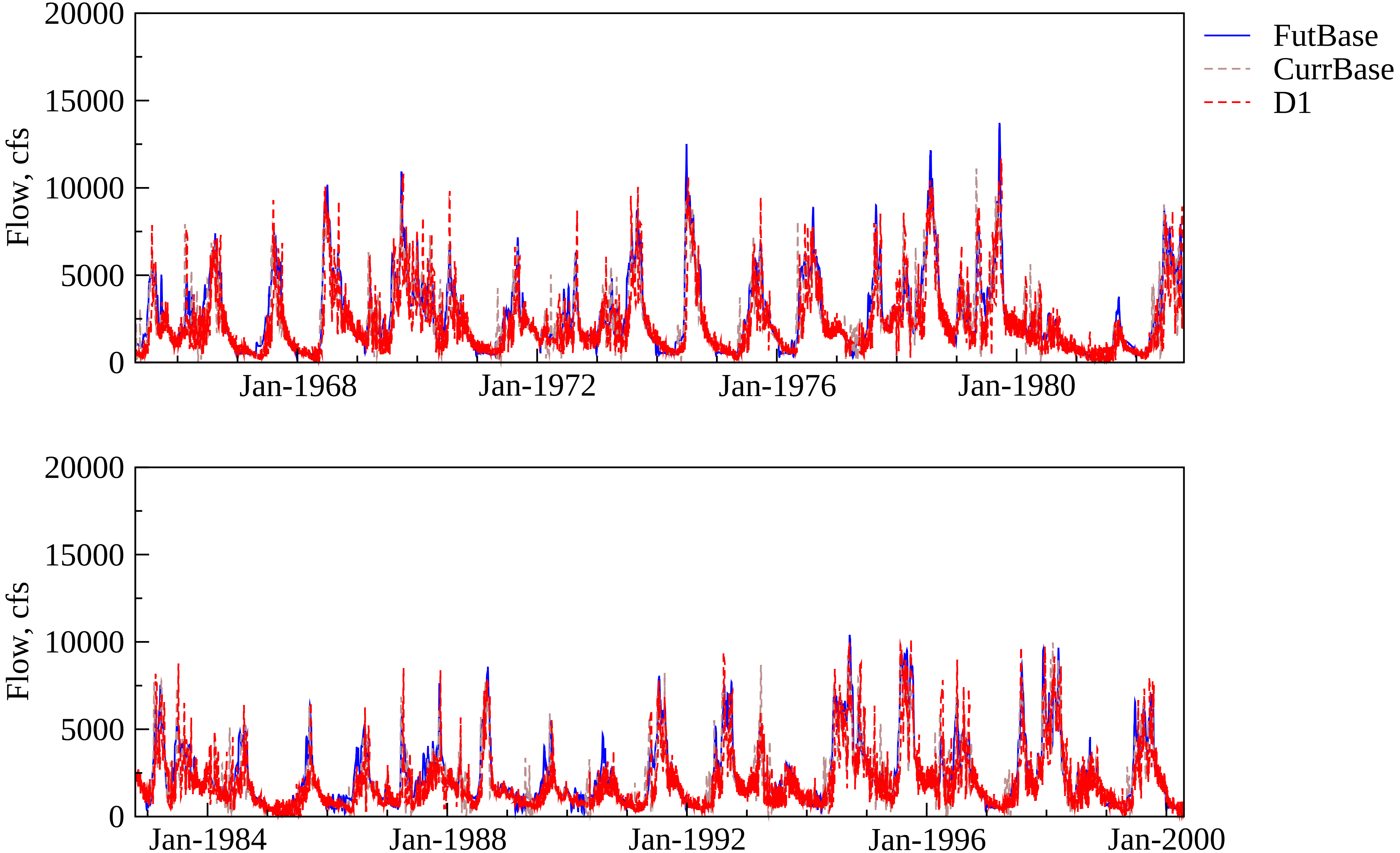
PDF Report for R01

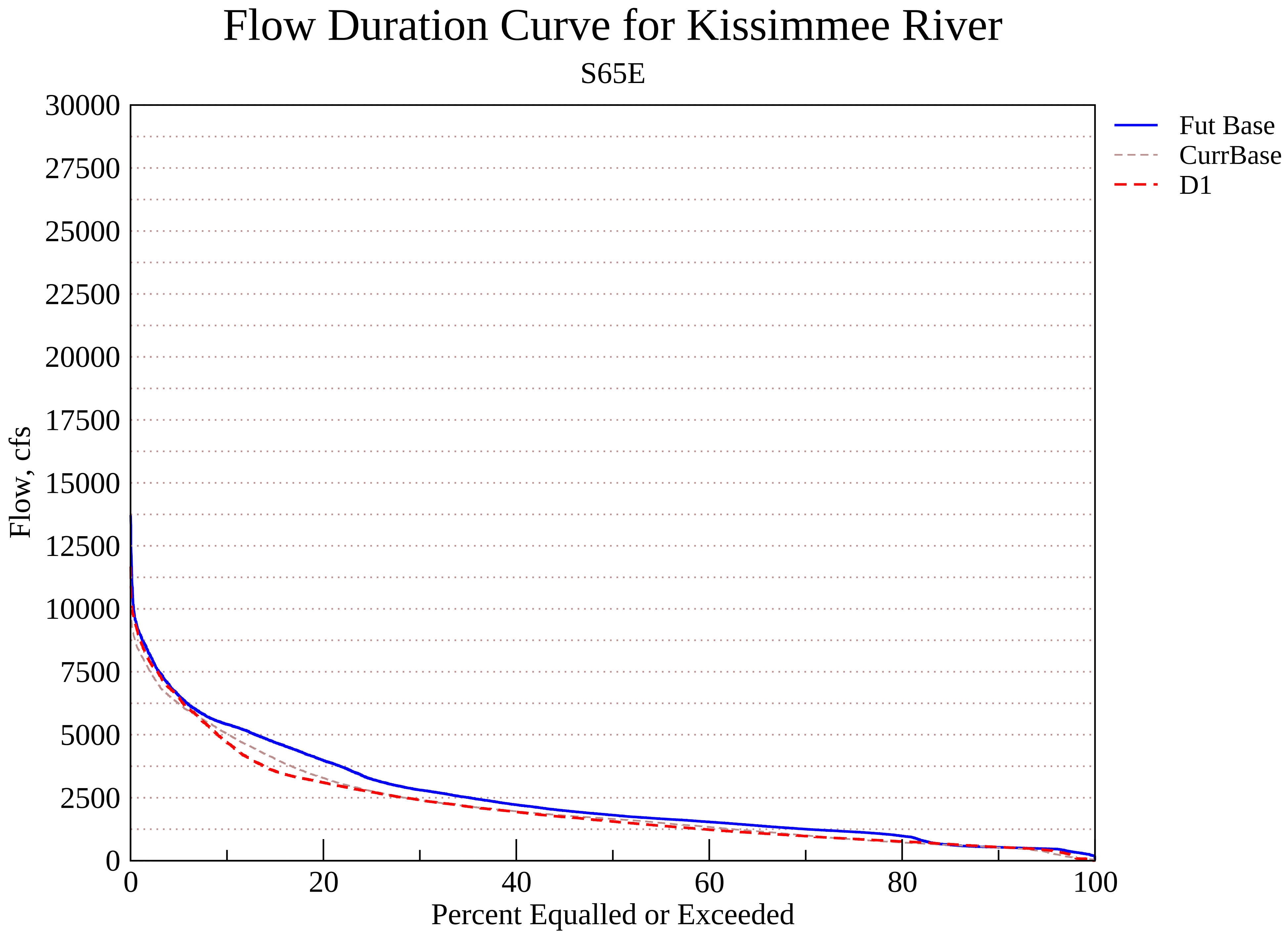
Flow Hydrograph at S65




Flow Duration Curve for Kissimmee River
S65
Flow, cfs
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
D1

Flow Hydrograph at S65E




Flow Duration Curve for Kissimmee River
S65E
Flow, cfs
30000
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
D1

Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation D1

Run ID : Variation of drainage level, k - LOW

				Calculated	Utility Based on Linear Functions		
Evaluation Component	**Target**	**Current Base Condition**	**Future Base Conditions**	**Component Value**	**Utility Index Score**	**Component Weight**	**Component Score**
A. Number of days per water year that river channel depth is greater than average floodplain ground elelvation (average).	252.0	250.0	203.0	316.0	0.00	0.2	0.00
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	55.0	0.00	0.2	0.00
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	4.6	1.00	0.3	0.30
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	6.8	0.00	0.3	0.00
						PM Score	**0.30**
						Location Weight	**1.00**
						PM Composite Score	**0.30**

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

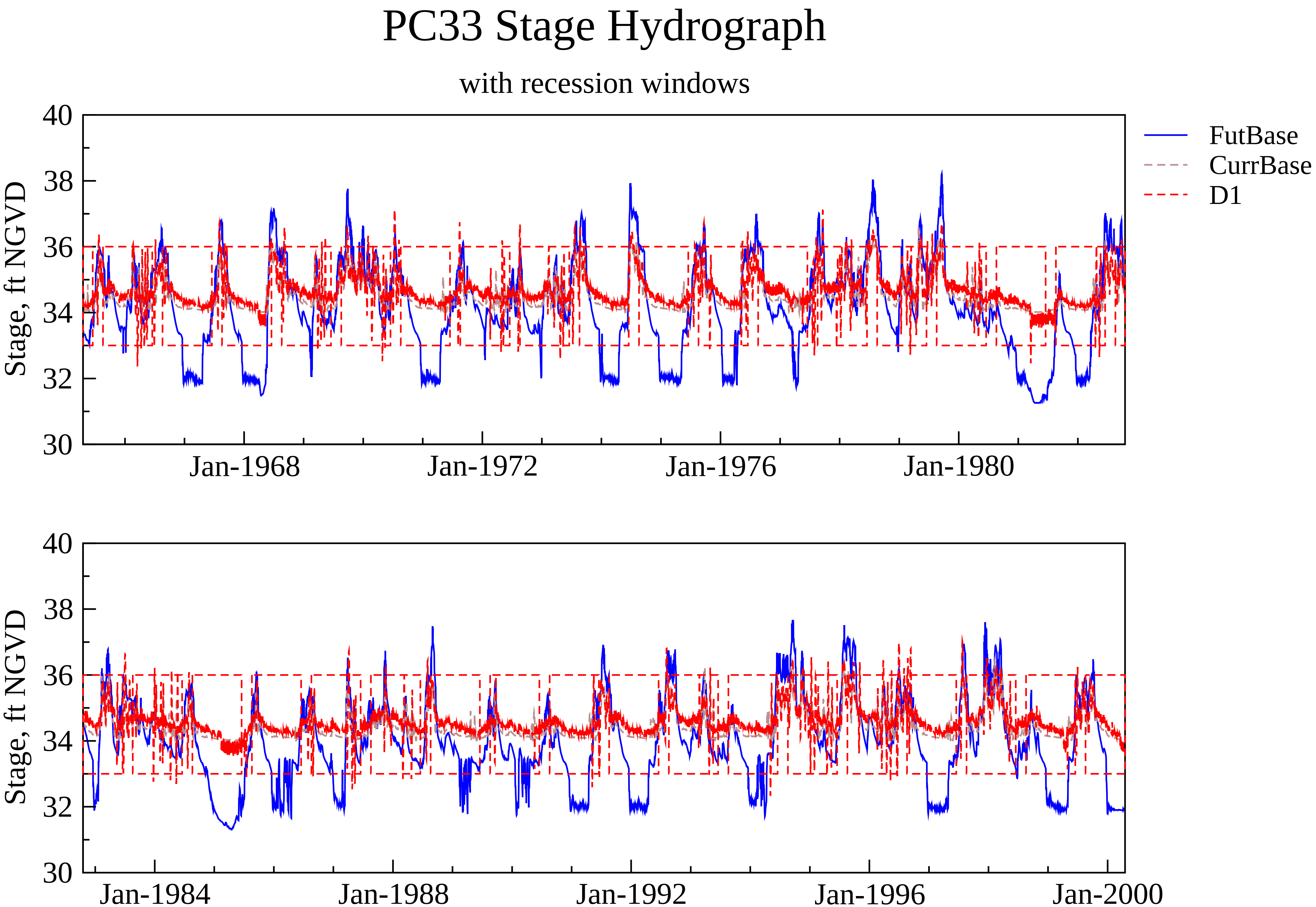
Alternative Description : Uncertainty Analysis - Simulation D1

Run ID : Variation of drainage level, k - LOW

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value	Utility Based on Linear Functions: Utility Index Score	Component Weight	Component Score
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	48.6	0.00	0.33	0.00
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	65.7	0.00	0.33	0.00
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	37.1	0.00	0.34	0.00
						PM Score	**0.00**
						Location Weight	**1.00**
						PM Composite Score	**0.00**

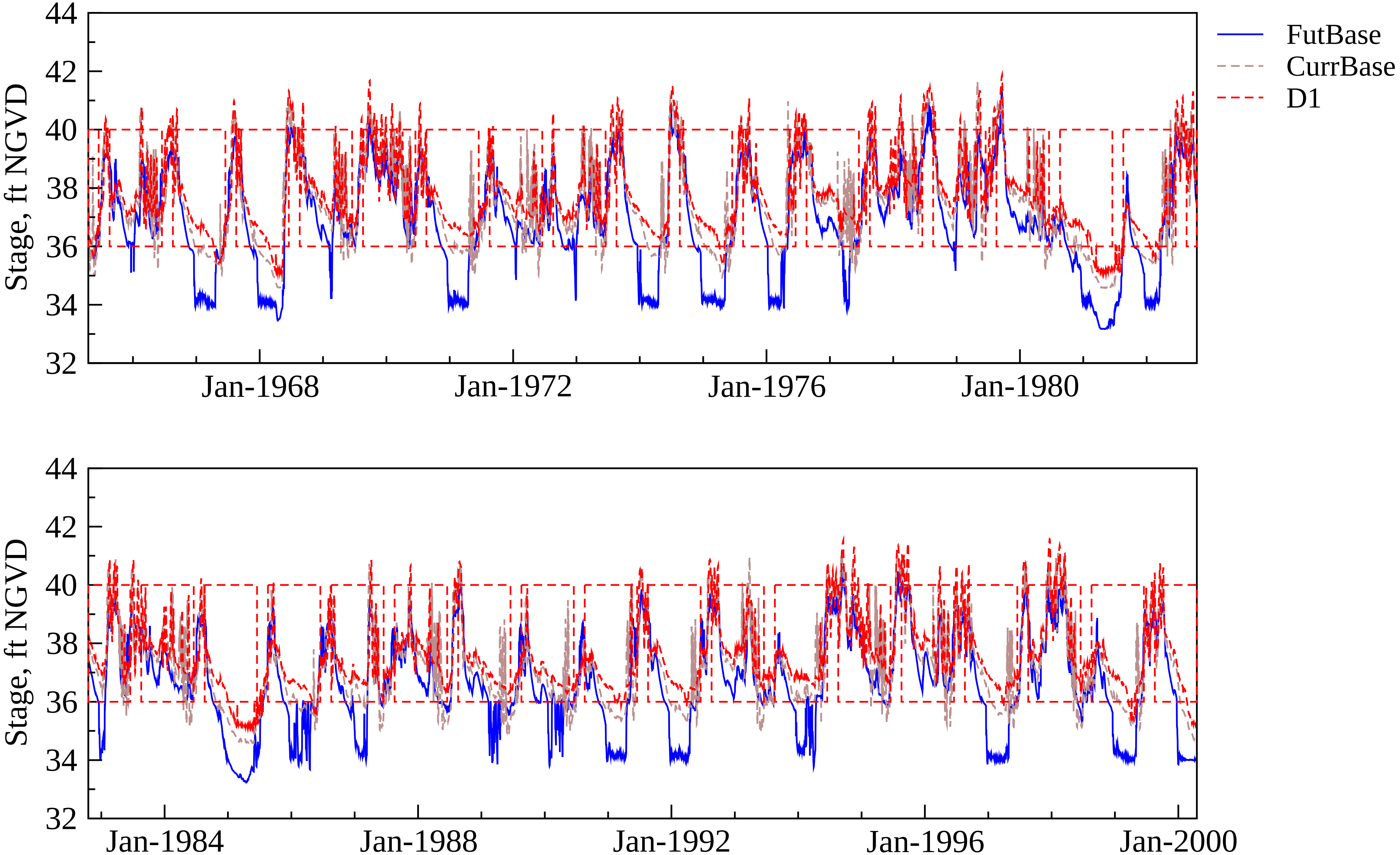
Tier 2 Report

PDF Report for R03


PC33 Stage Hydrograph
with recession windows
Stage, ft NGVD
40
38
36
34
32
30
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000
FutBase
CurrBase
D1

PC52 Stage Hydrograph

with recession windows



KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation D2

Variation of drainage level, k - HIGH

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

A tyco International Ltd. Company

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation D2

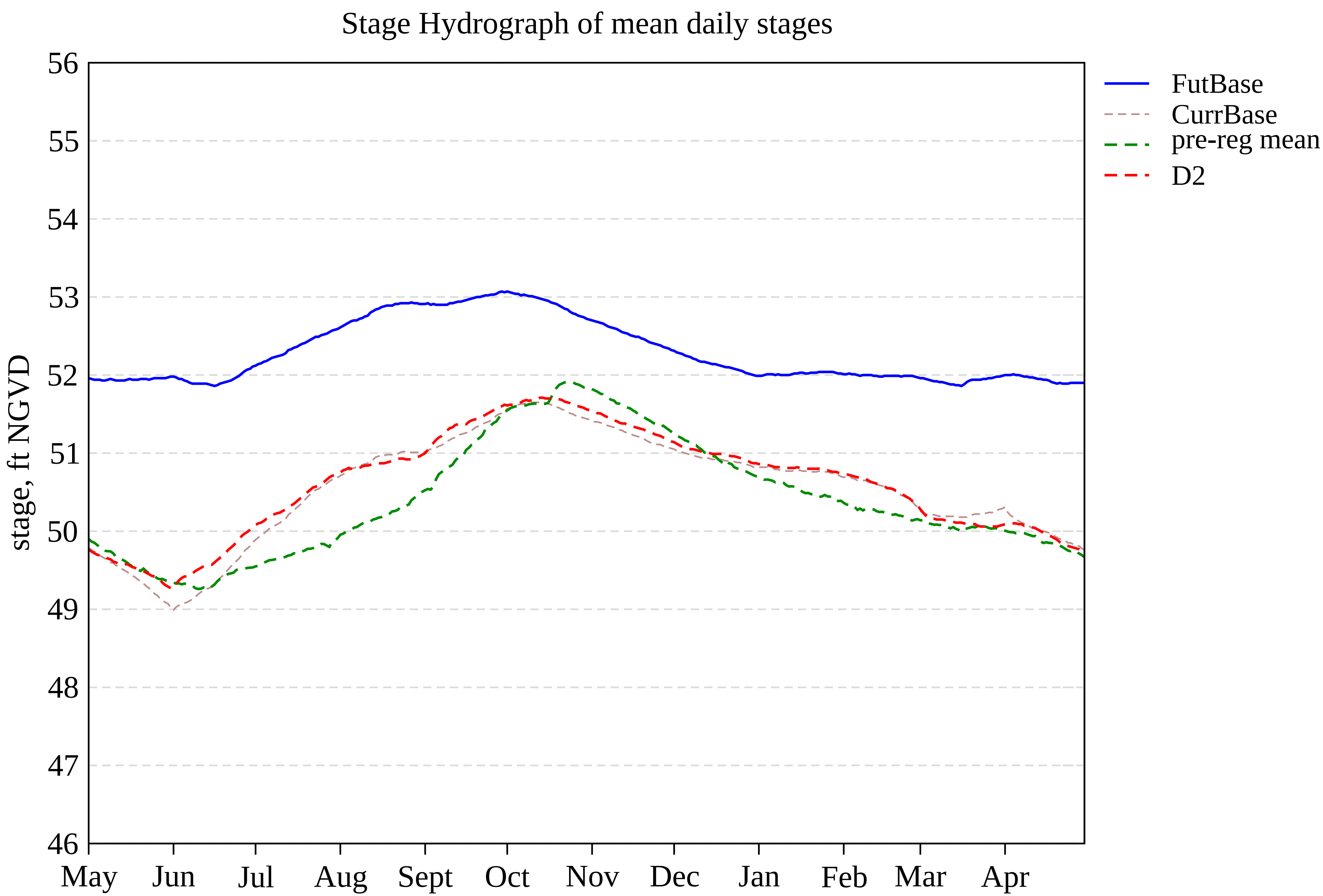
Run ID : Variation of drainage level, k - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	89.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	11.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	14.3
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	88.6
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	2.6	3.3
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	5.5	6.1

Tier 2 Report

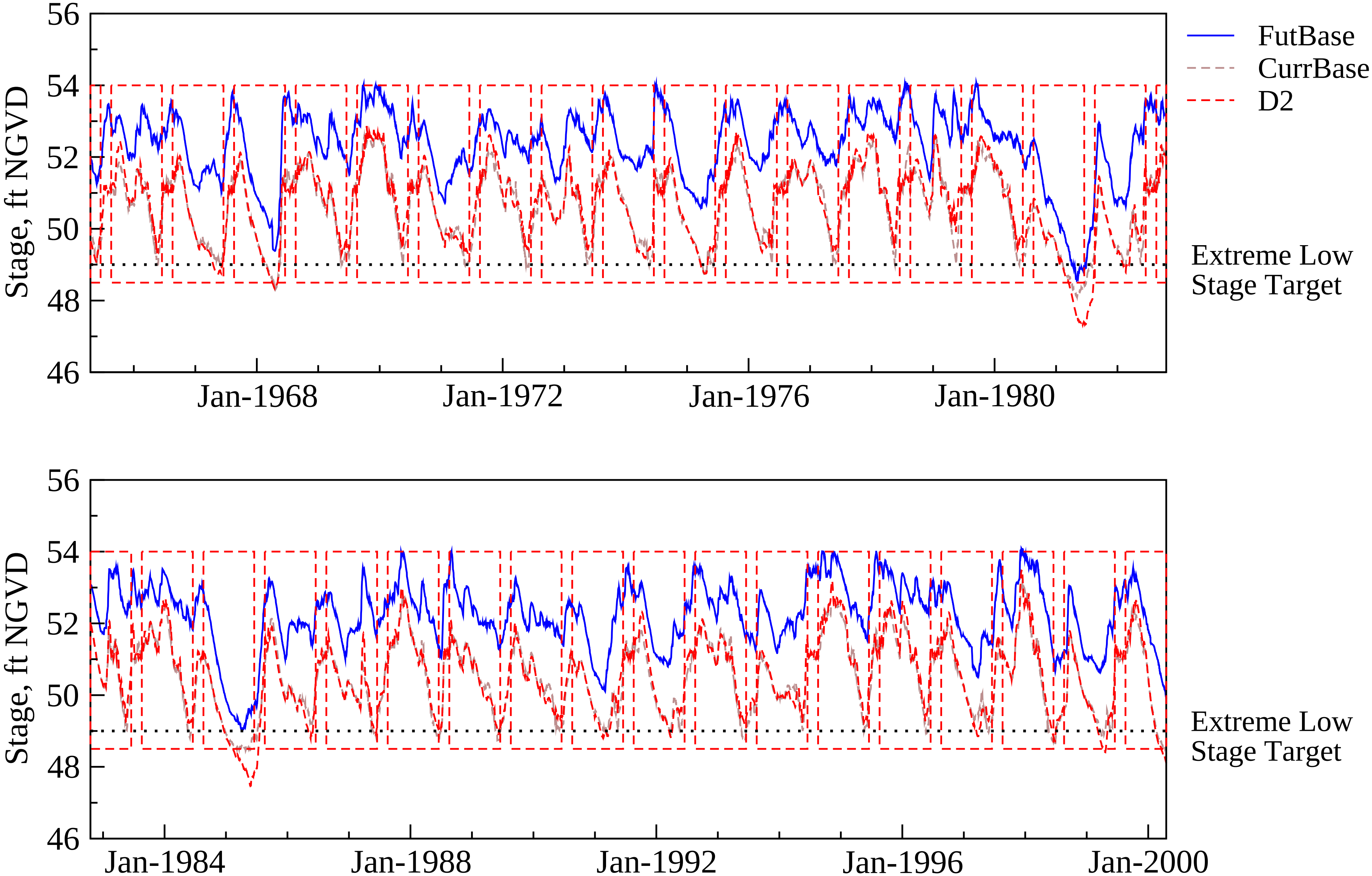
PDF Report for L01

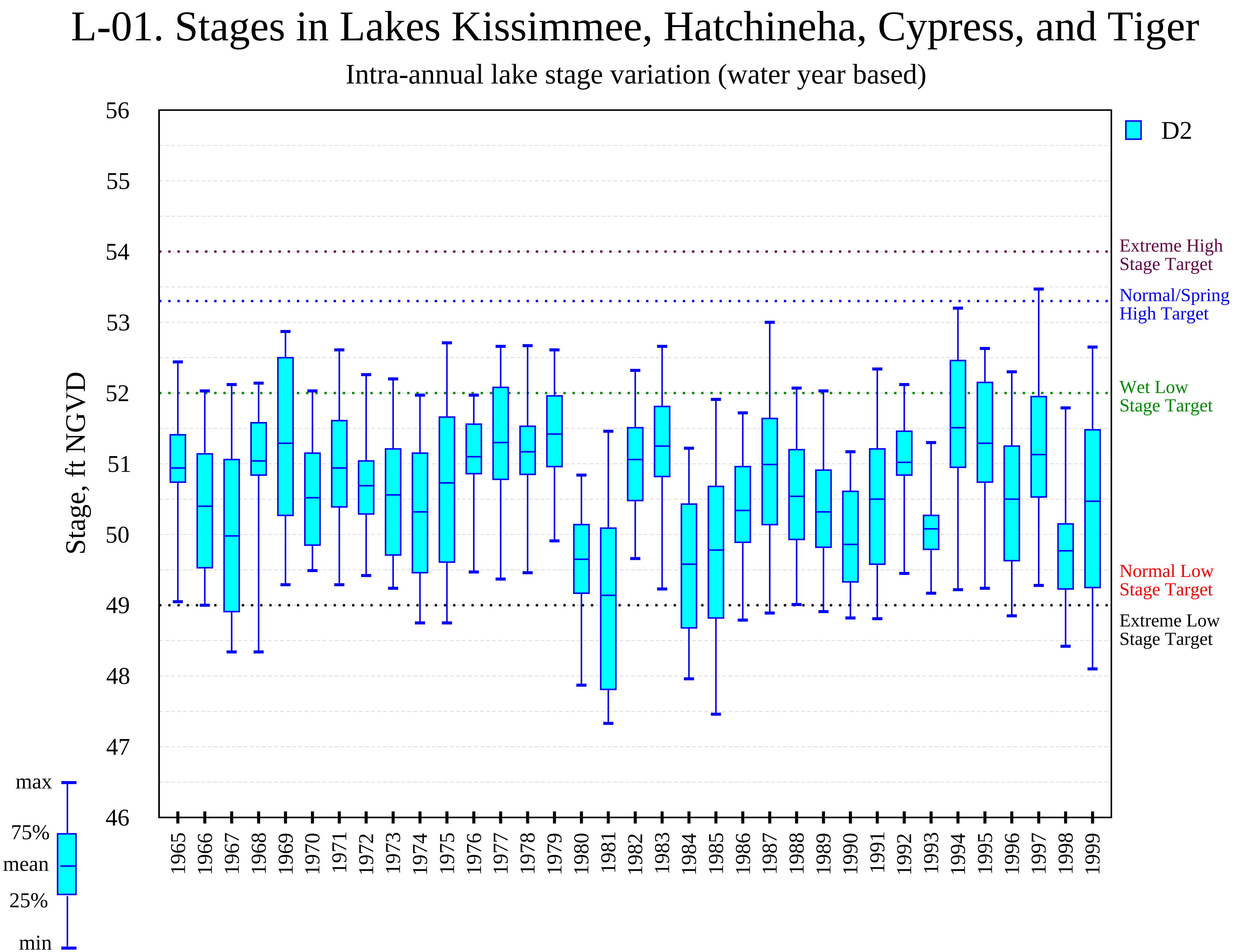
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger



L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

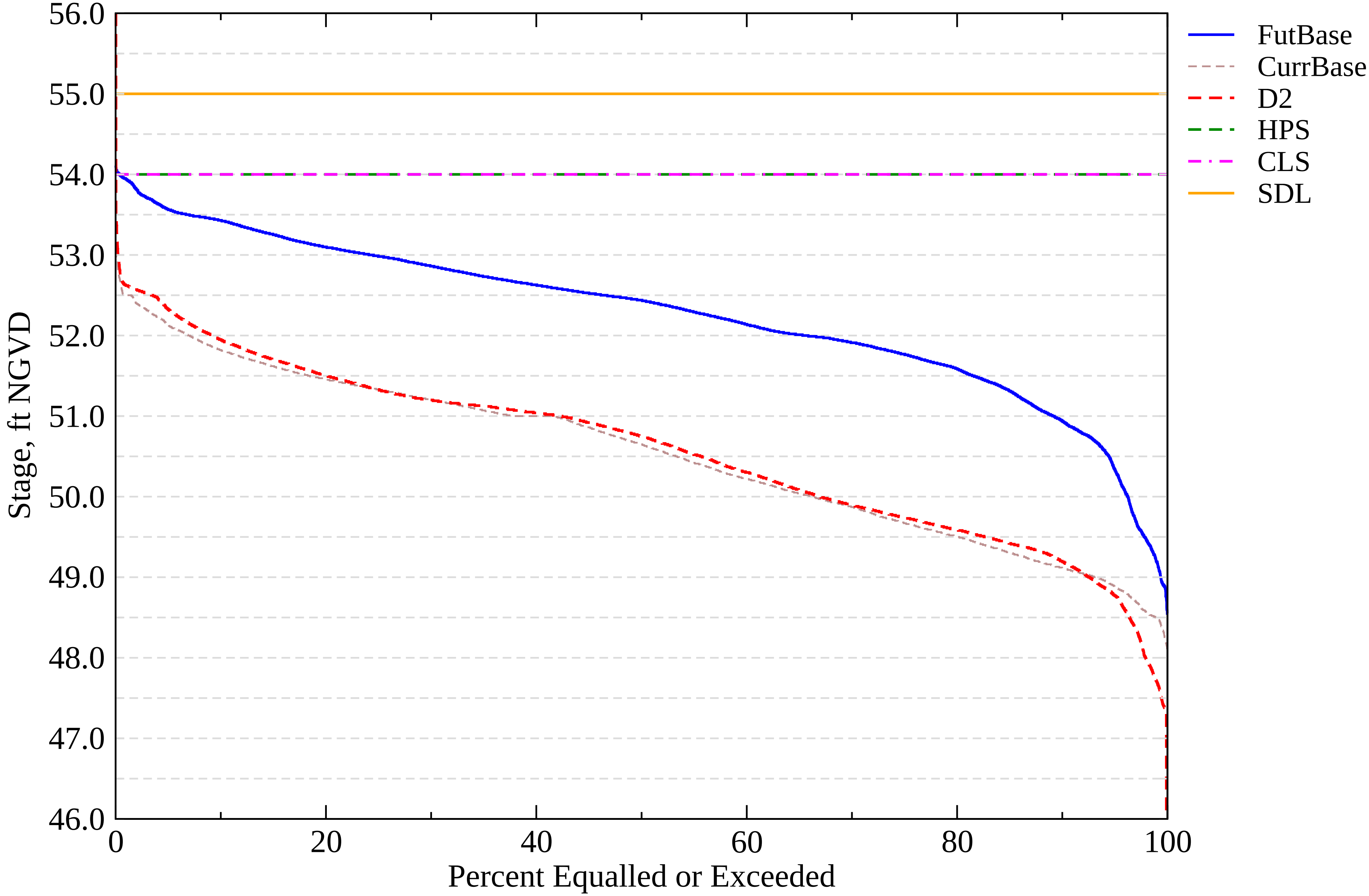
Daily Stage Hydrograph with Water Level recession windows (Sept-June)




L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
56
55
54
53
52
51
50
49
48
47
46
D2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

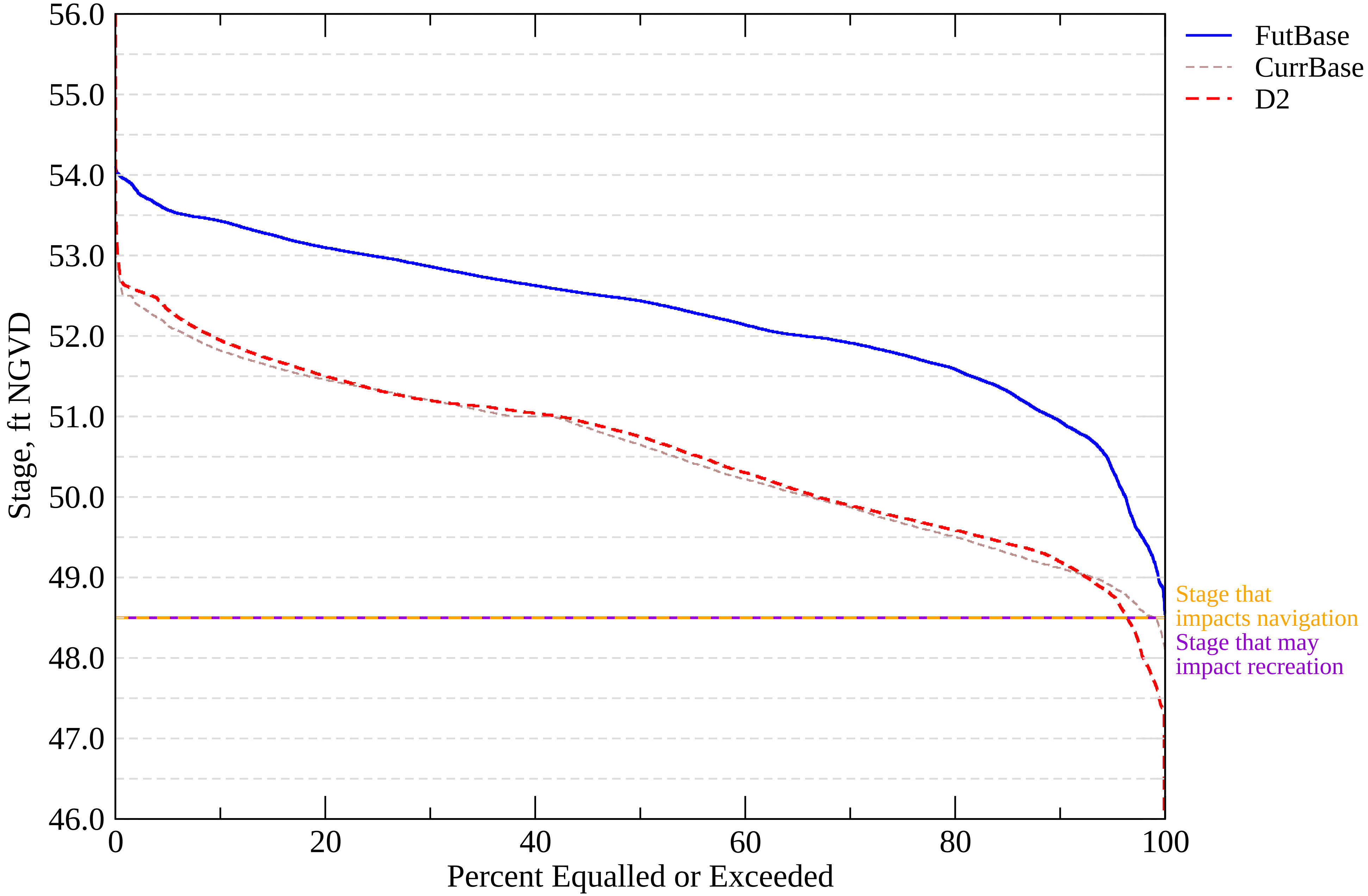
I-01. Probable High Lake Stage Performance Indicator

Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)



I-07. Stage Duration for Navigation and Recreation

Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)



Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

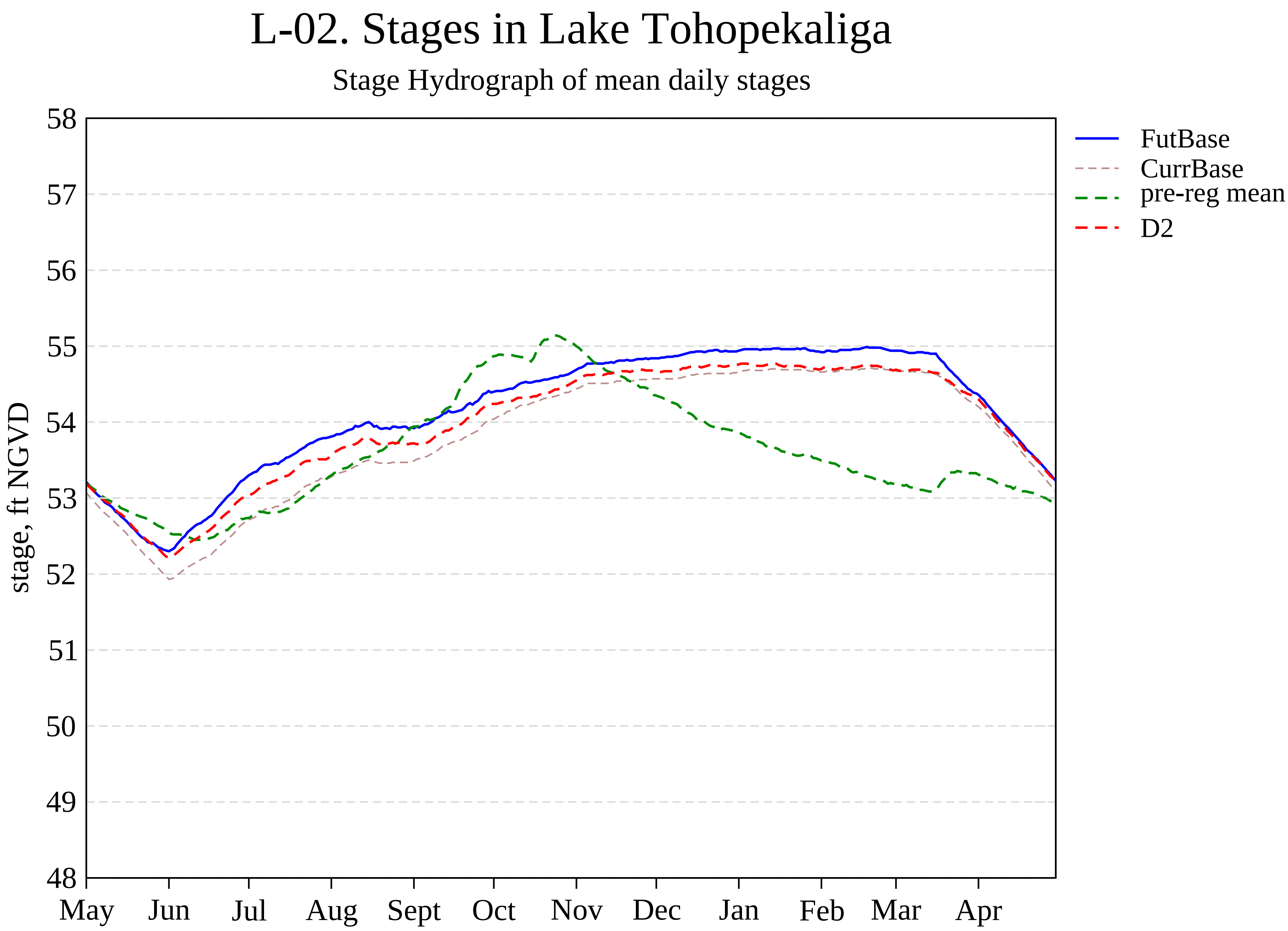
Alternative Description : Uncertainty Analysis - Simulation D2

Run ID : Variation of drainage level, k - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	57.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	31.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	37.1
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	8.6
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	80.0
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.2
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	5.7

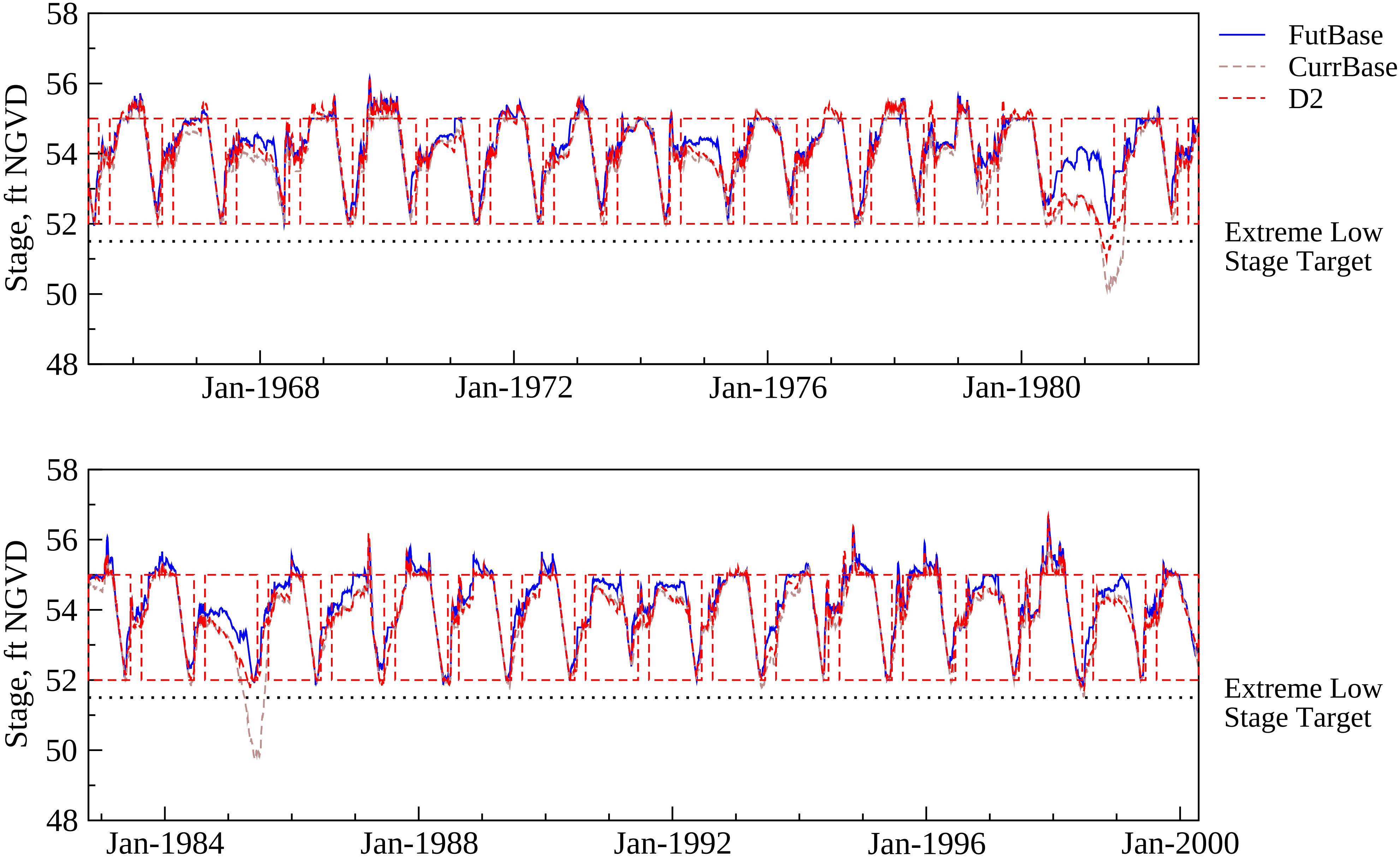
Tier 2 Report

PDF Report for L02


L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
D2

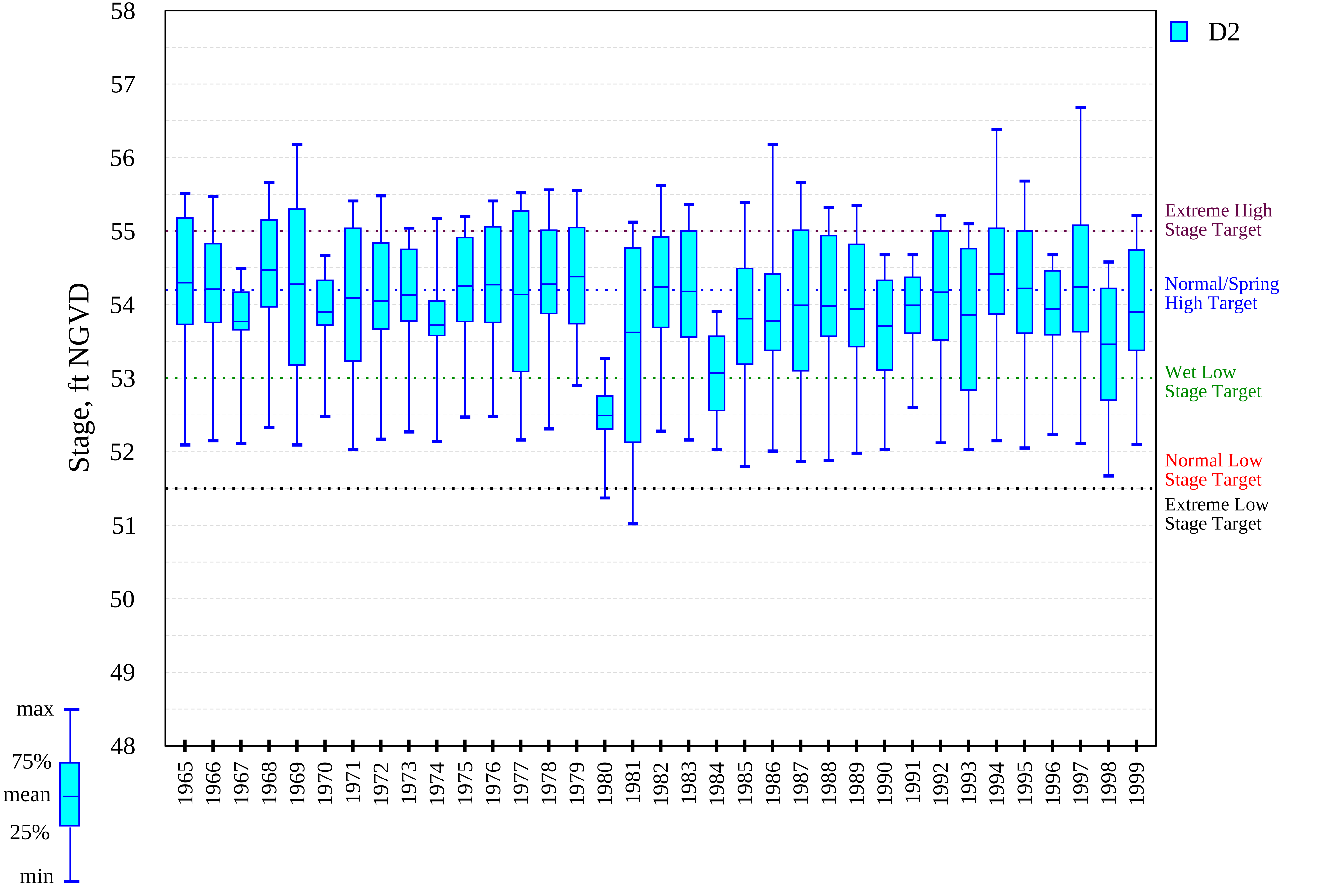
L-02. Stages in Lake Tohopekaliga

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



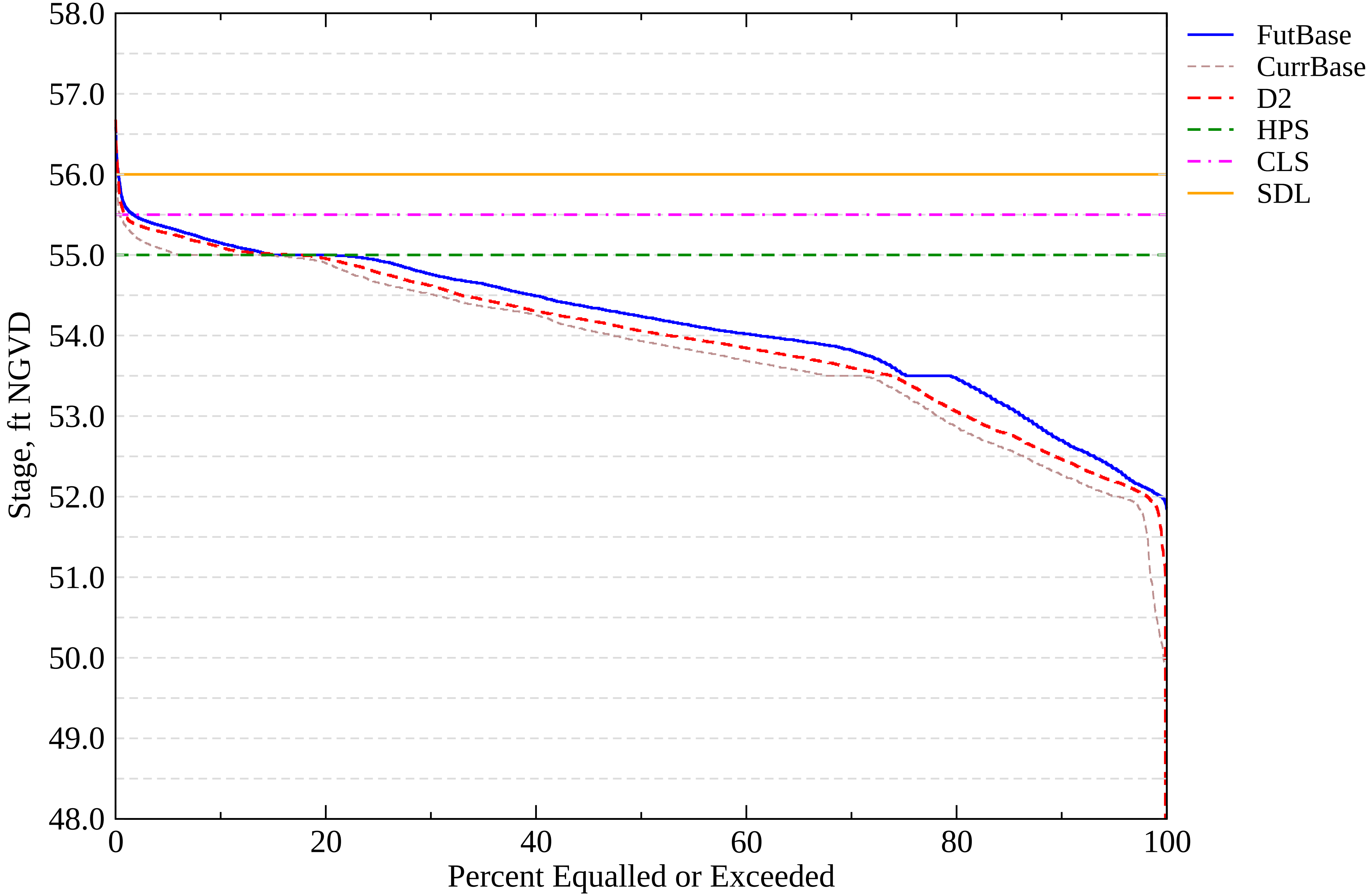
L-02. Stages in Lake Tohopekaliga

Intra-annual lake stage variation (water year based)



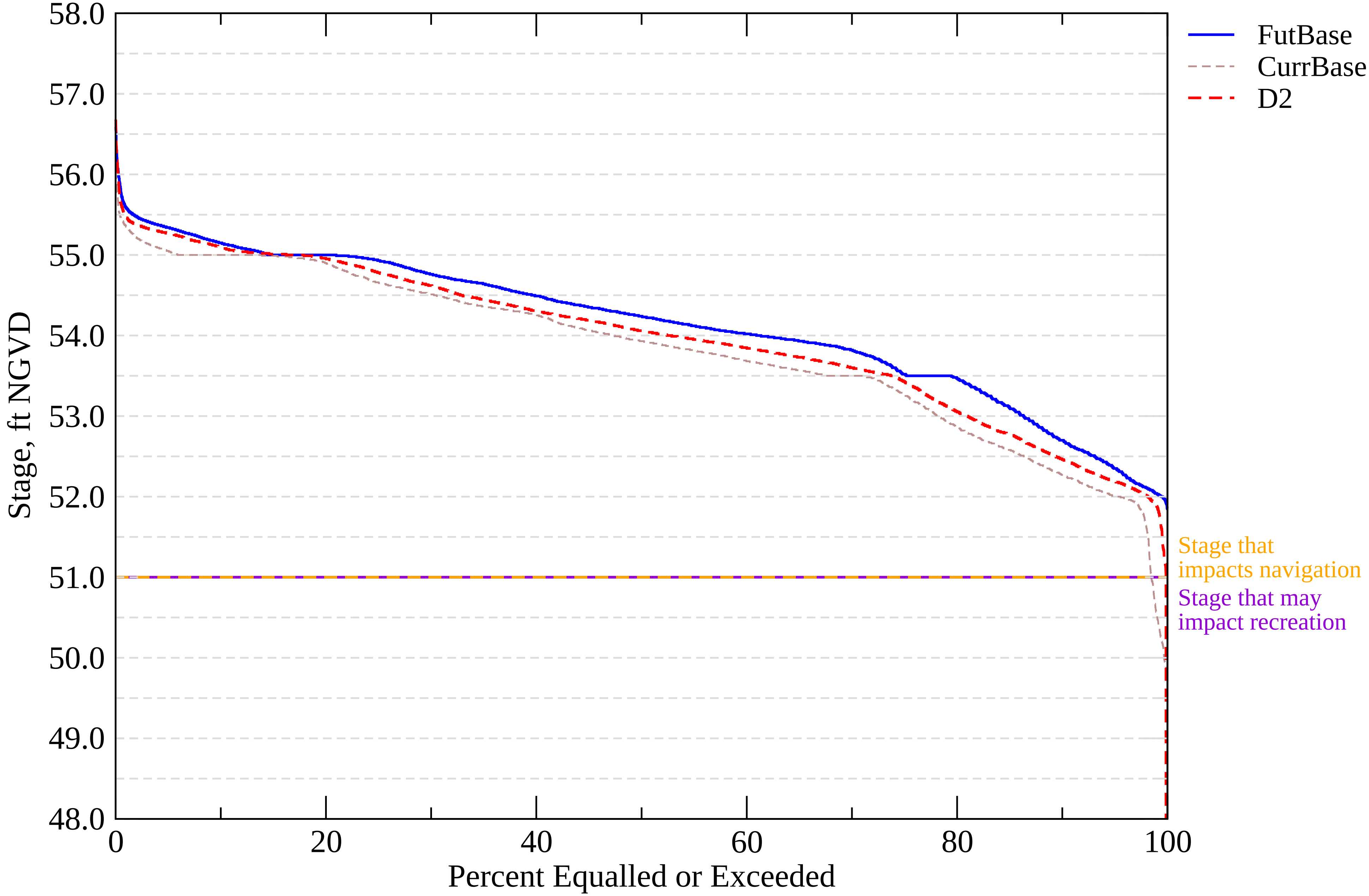
I-01. Probable High Lake Stage Performance Indicator

Lake Tohopekaliga (S61)



I-07. Stage Duration for Navigation and Recreation

Lake Tohopekaliga (S61)



Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

Alternative Description : Uncertainty Analysis - Simulation D2

Run ID : Variation of drainage level, k - HIGH

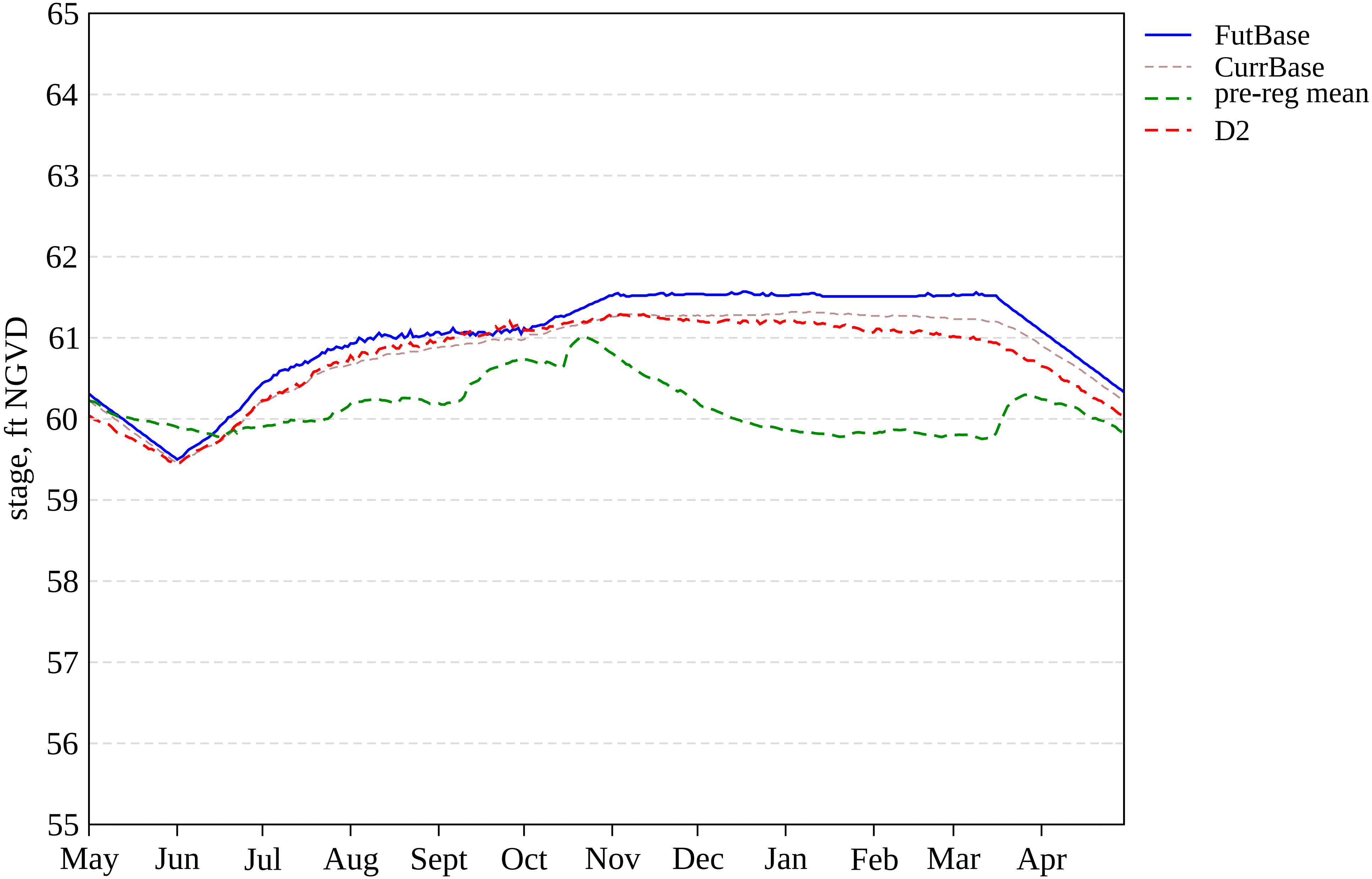
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	60.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	68.6
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	11.4
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	74.3
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.6

Tier 2 Report

PDF Report for L03

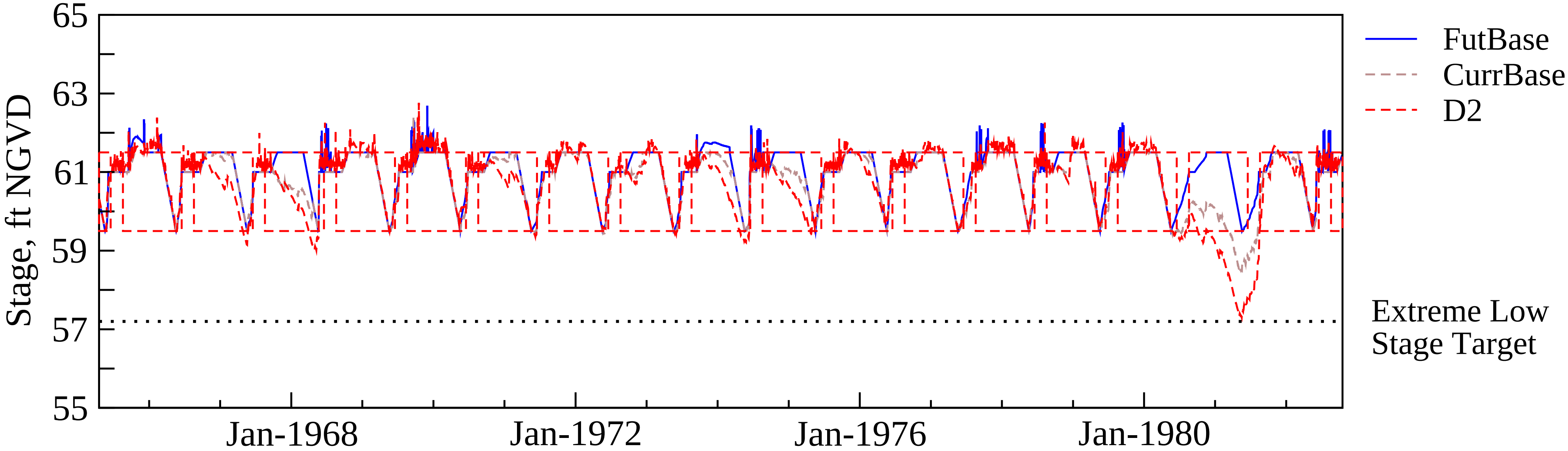
L-03. Stages in Lake Gentry

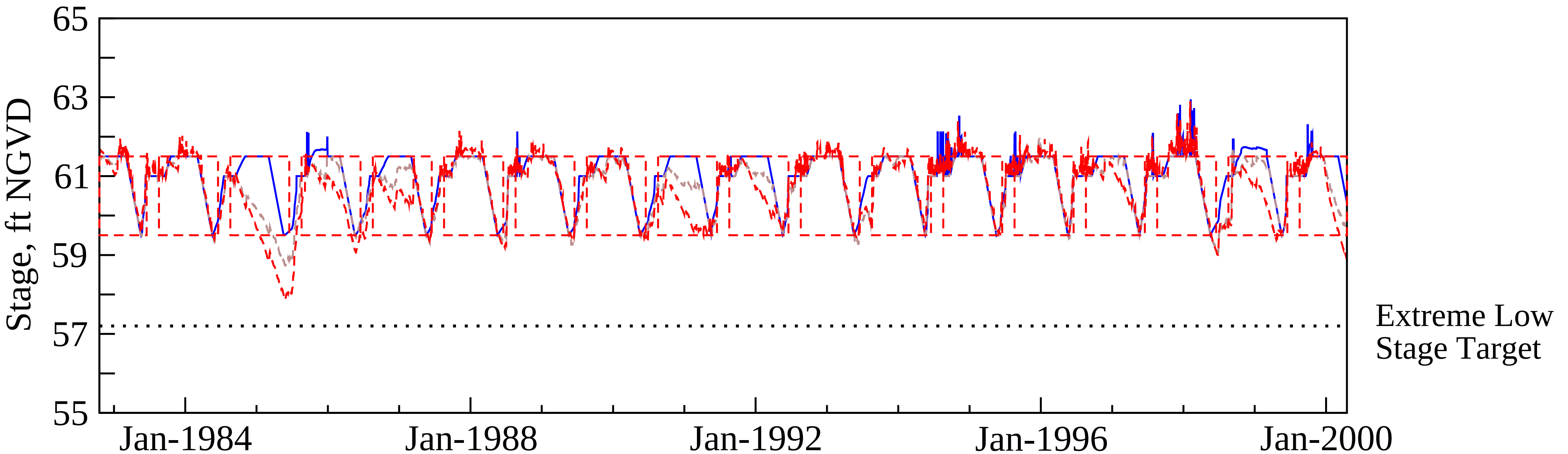
Stage Hydrograph of mean daily stages

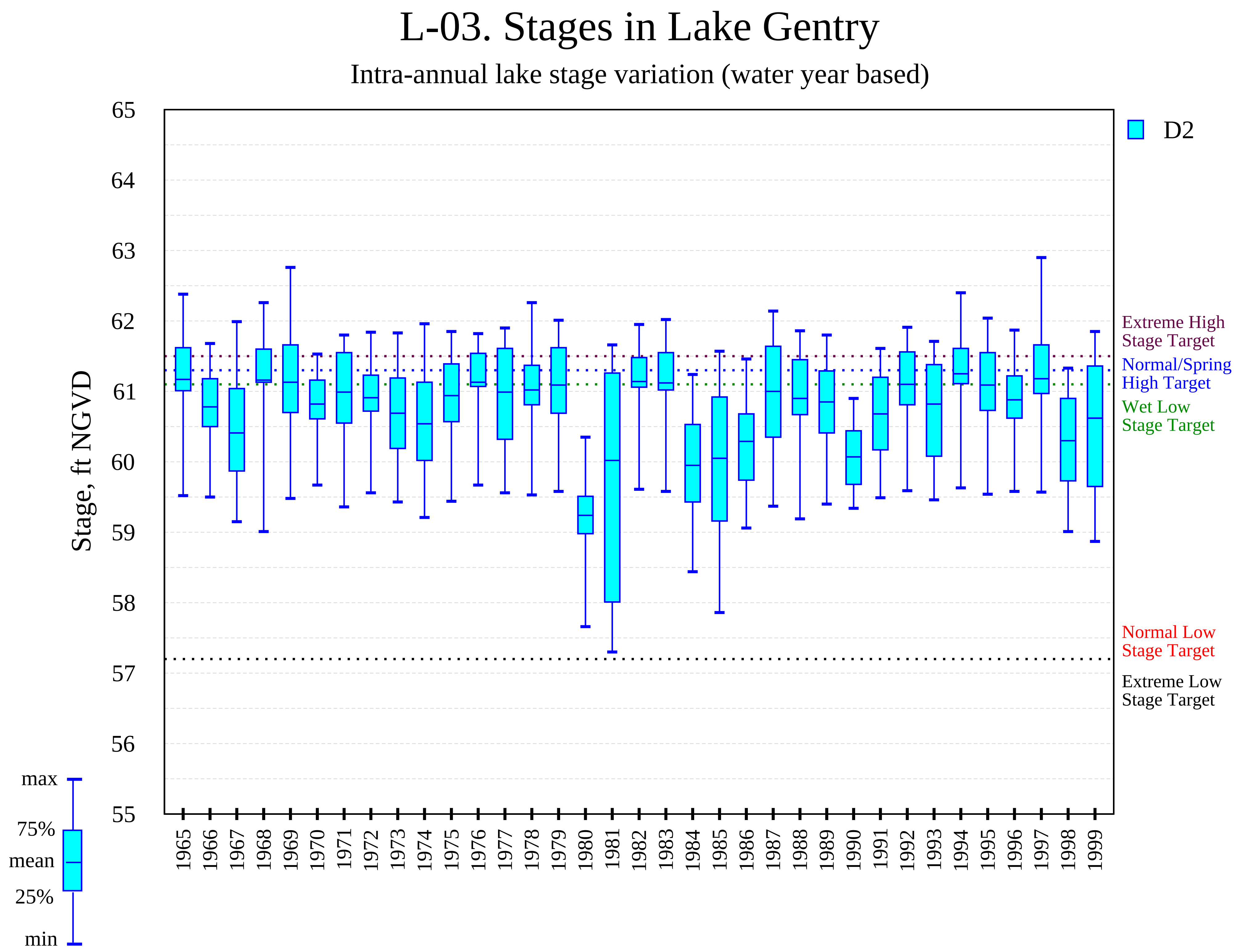


L-03. Stages in Lake Gentry

Daily Stage Hydrograph with Water Level recession windows (Sept-June)







L-03. Stages in Lake Gentry
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
D2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
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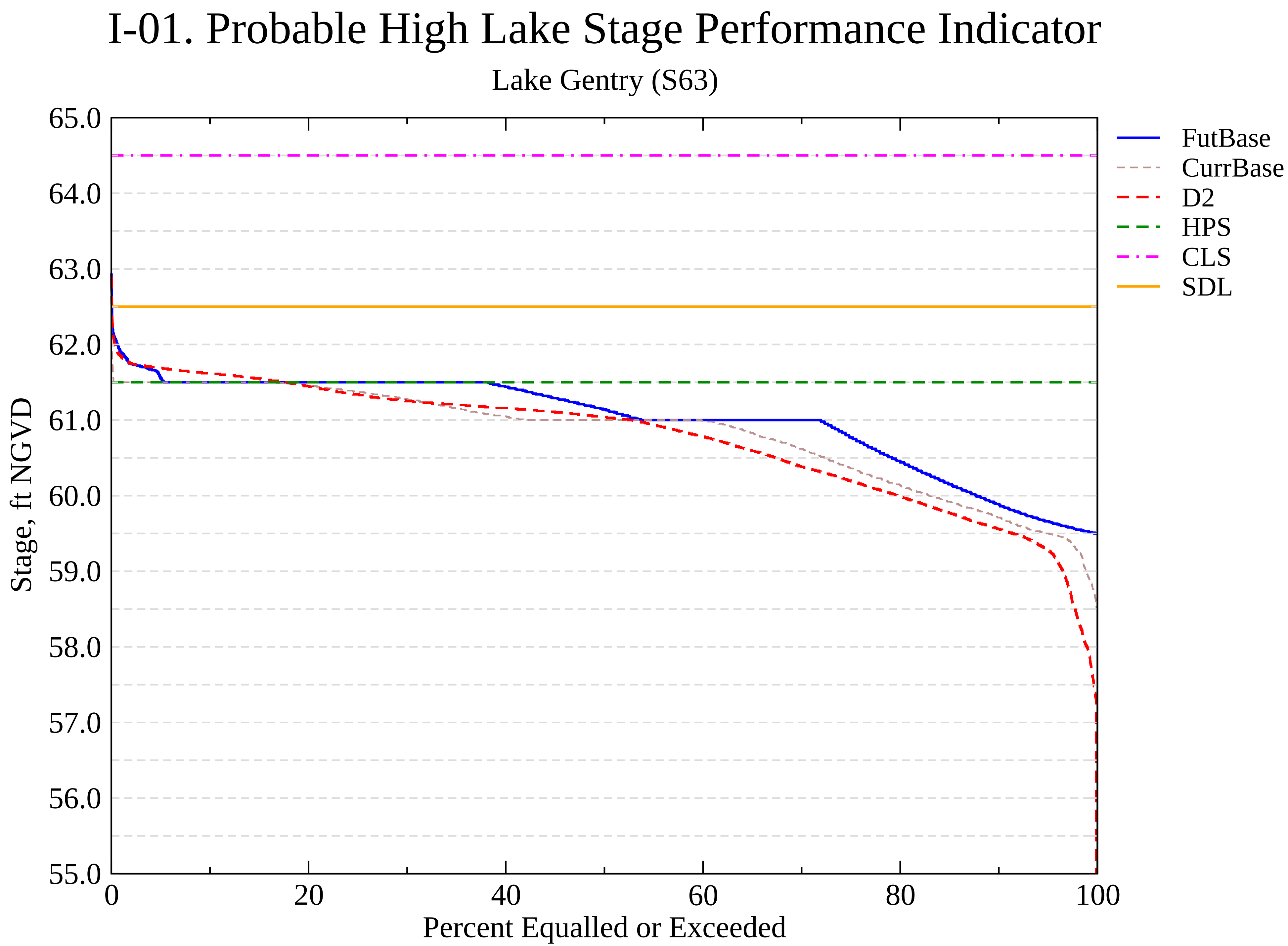
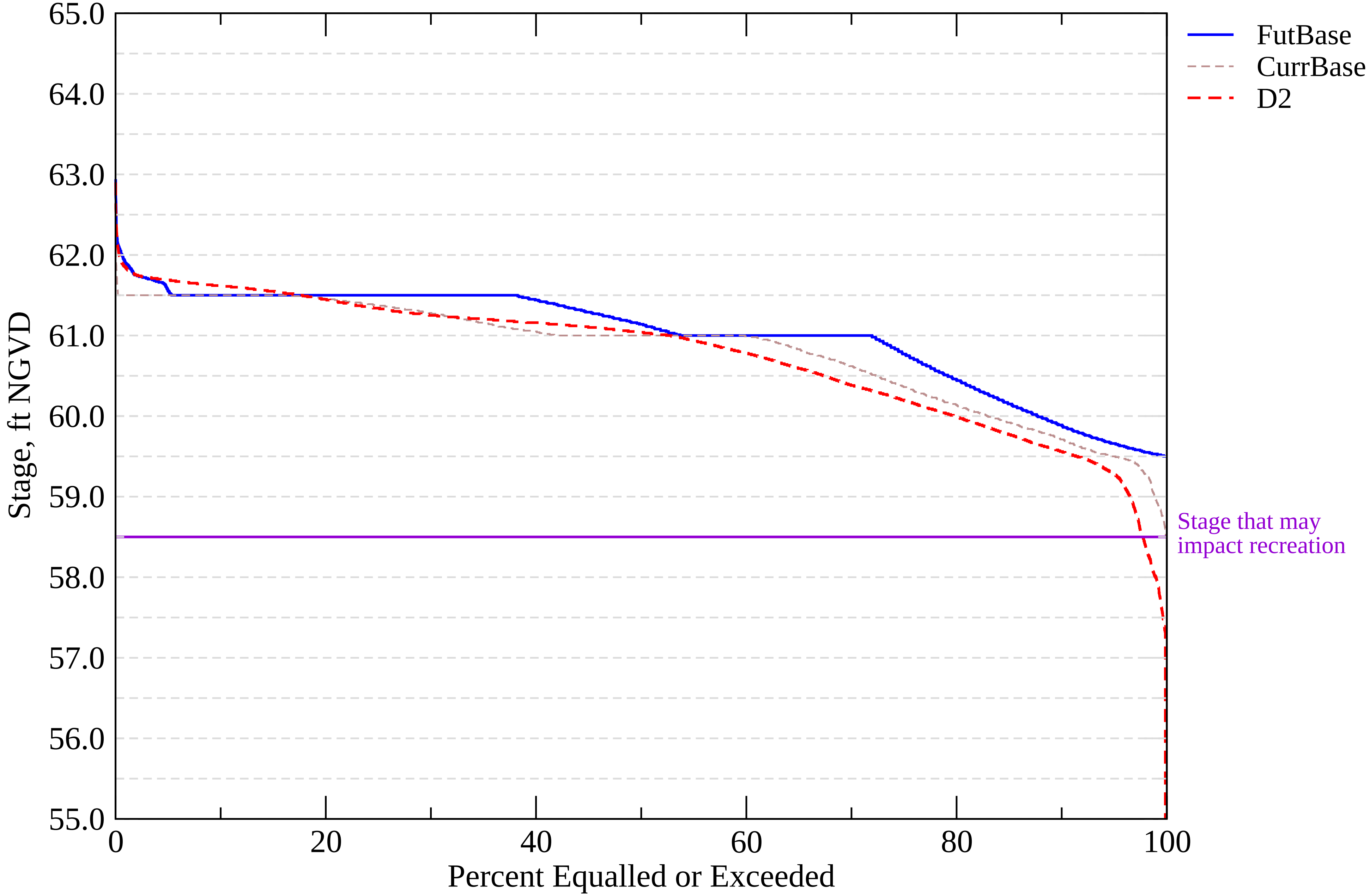
1993
1994
1995
1996
1997
1998
1999



I-01. Probable High Lake Stage Performance Indicator
Lake Gentry (S63)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D2
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lake Gentry (S63)



Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

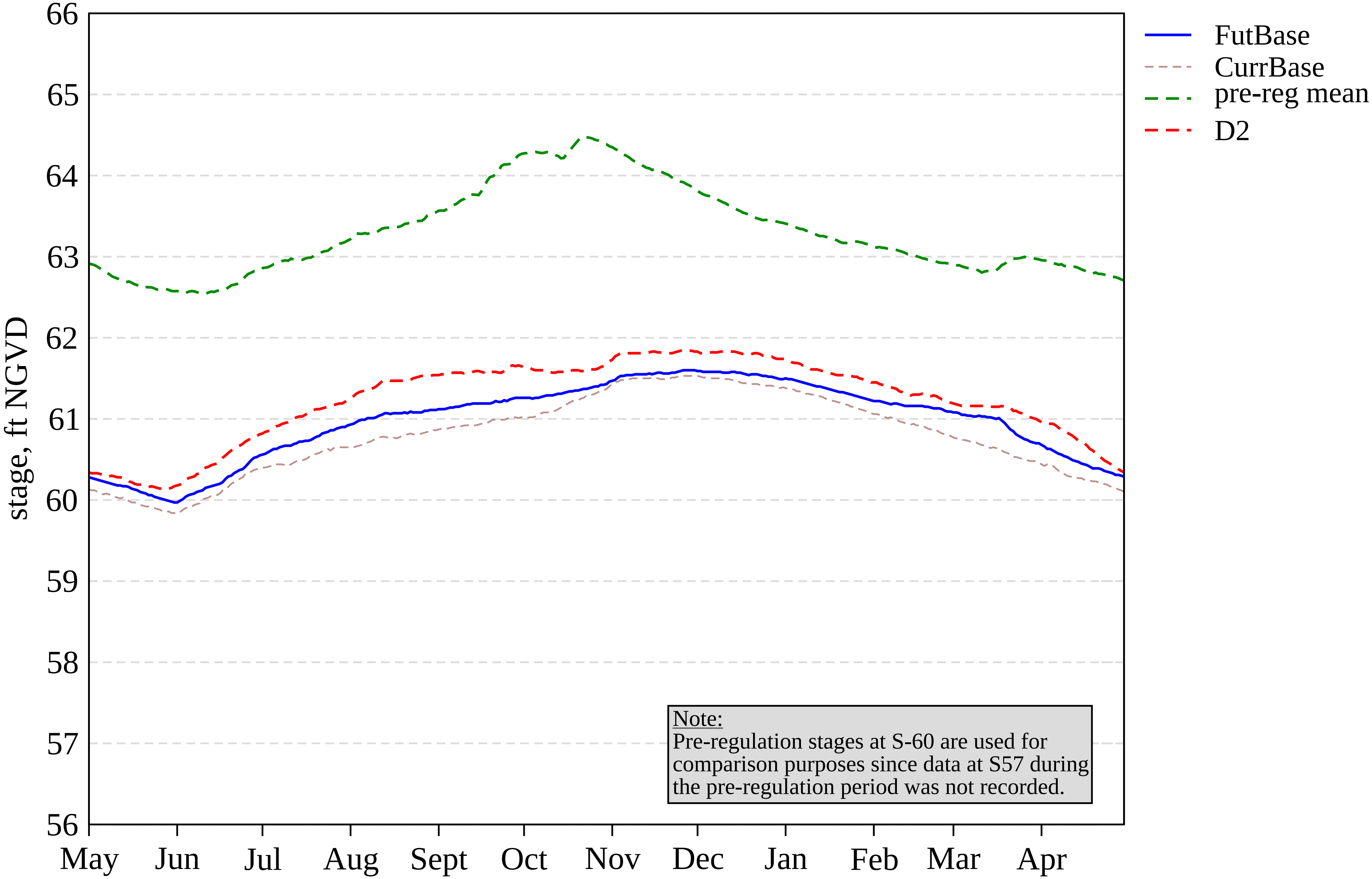
Alternative Description : Uncertainty Analysis - Simulation D2

Run ID : Variation of drainage level, k - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	94.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	20.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	63.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	62.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	22.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	80.0
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.4
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	5.2

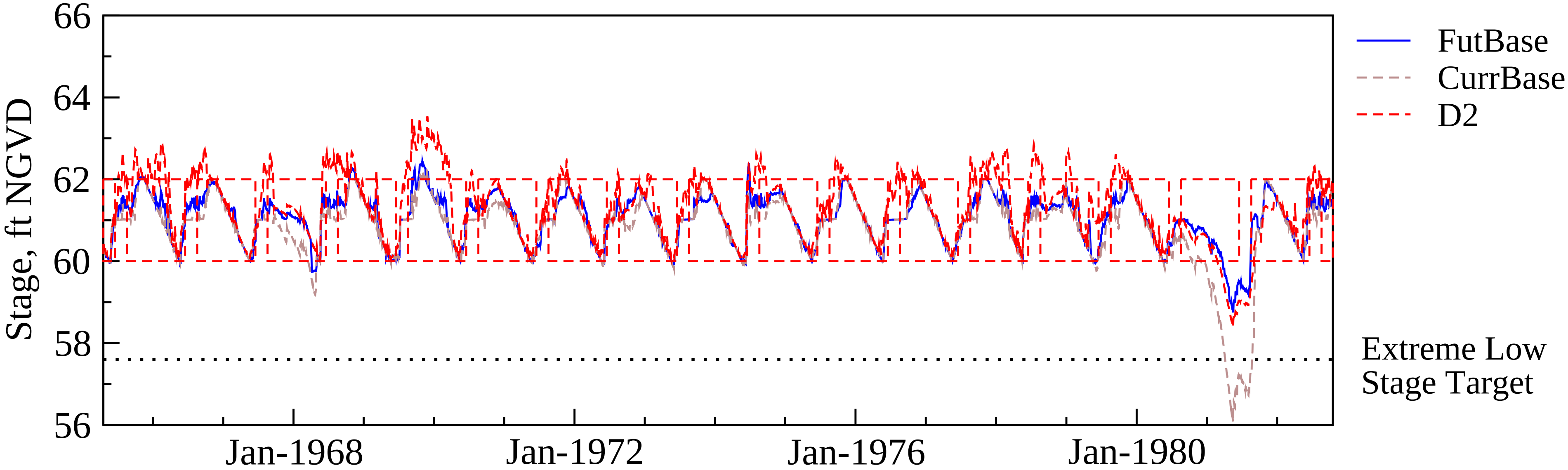
L-04. Stages in Lakes Joel, Myrtle, and Preston

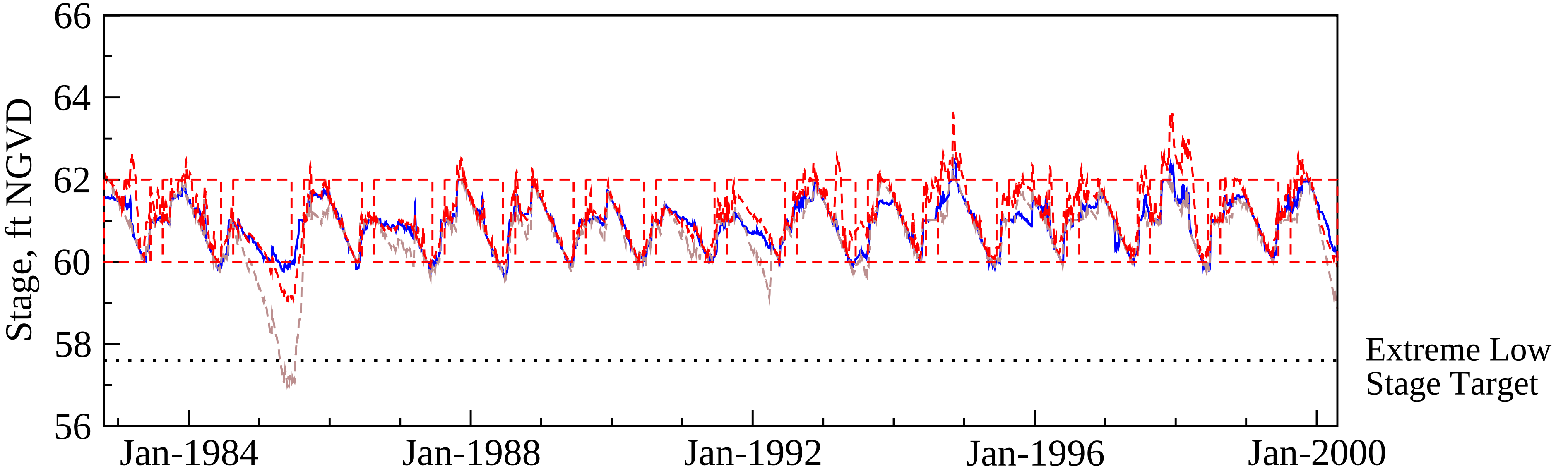
Stage Hydrograph of mean daily stages



L-04. Stages in Lakes Joel, Myrtle, and Preston

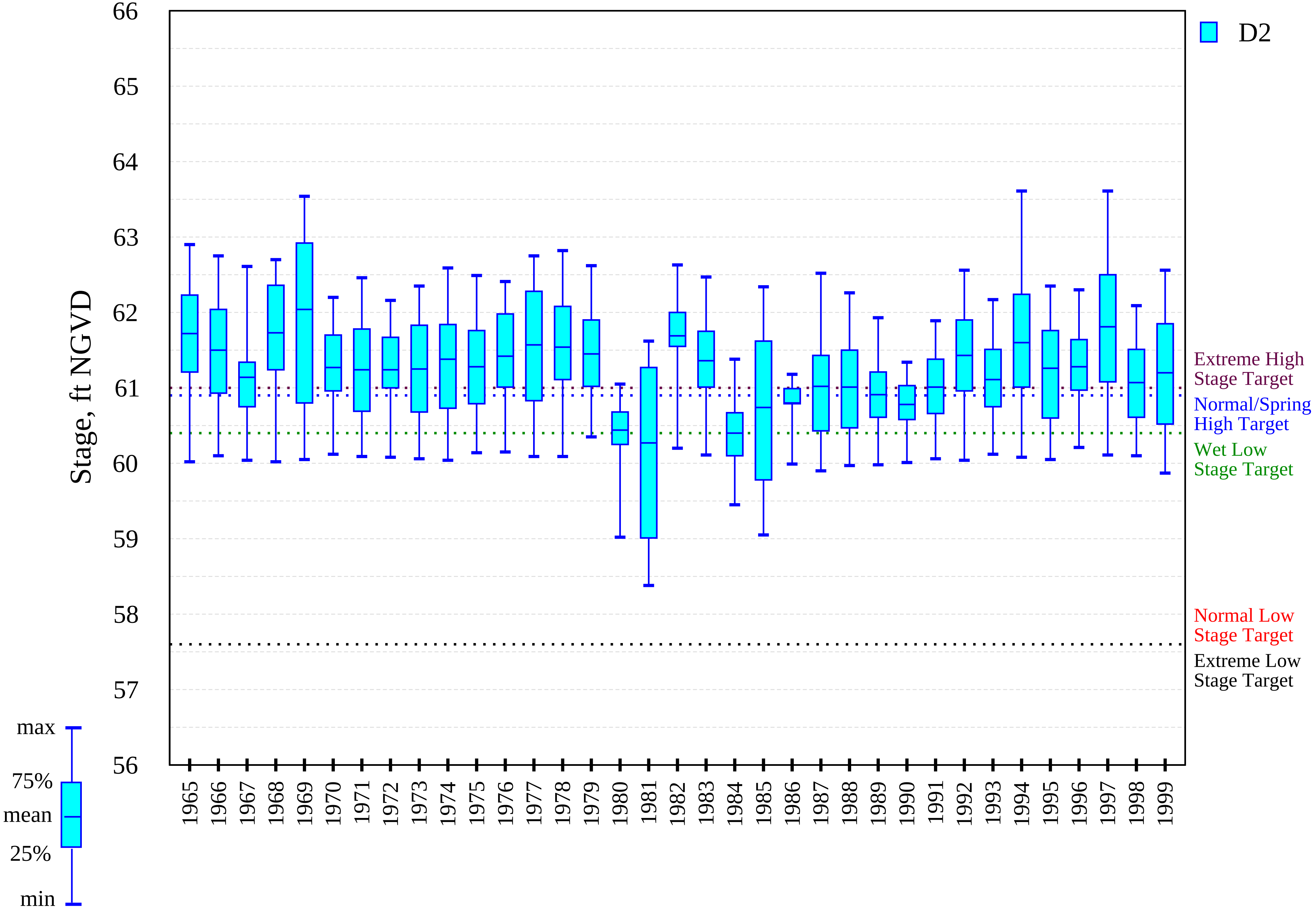
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

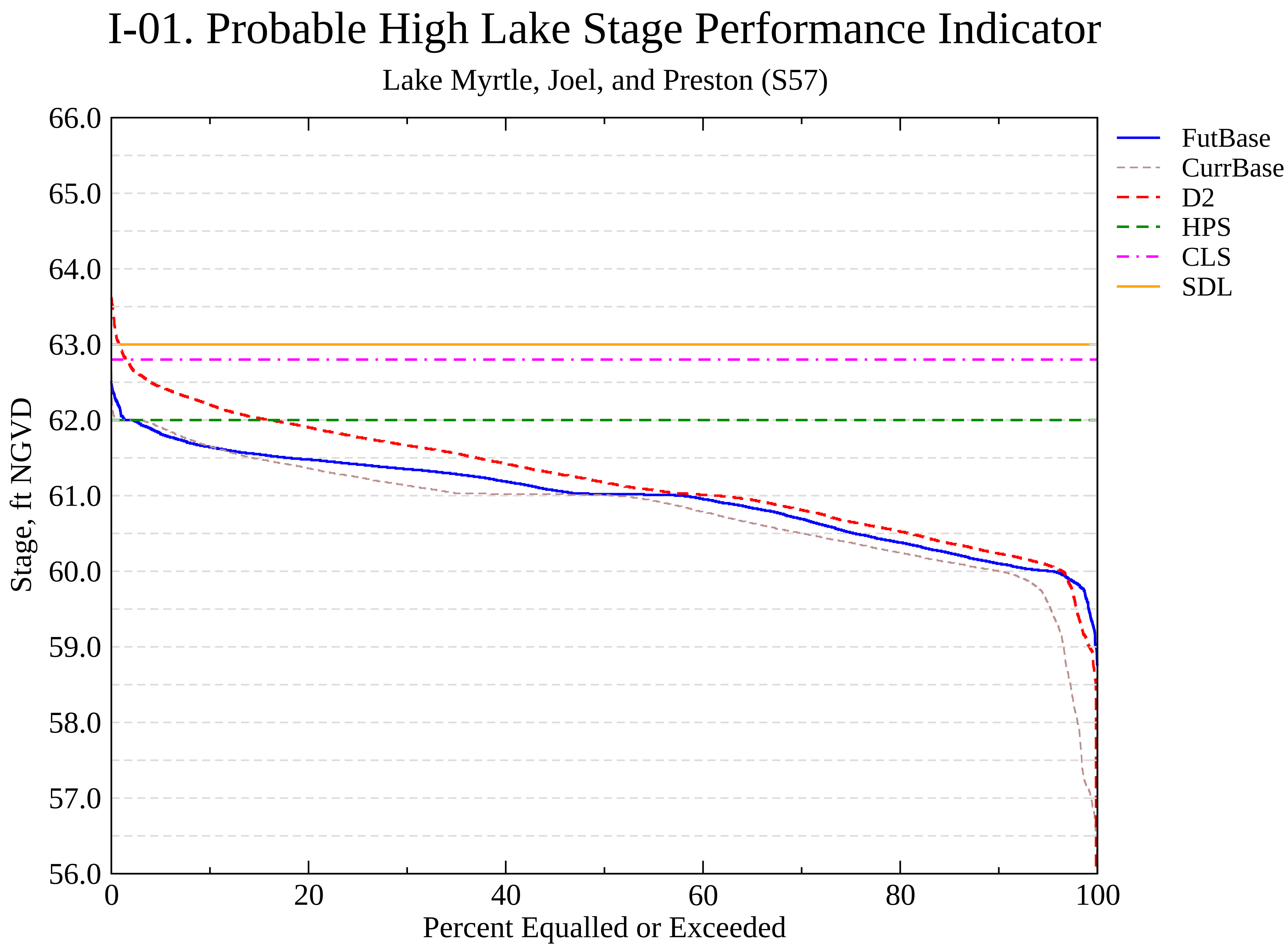




L-04. Stages in Lakes Joel, Myrtle, and Preston

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Lake Myrtle, Joel, and Preston (S57)
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
Stage, ft NGVD
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D2
HPS
CLS
SDL

Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation D2

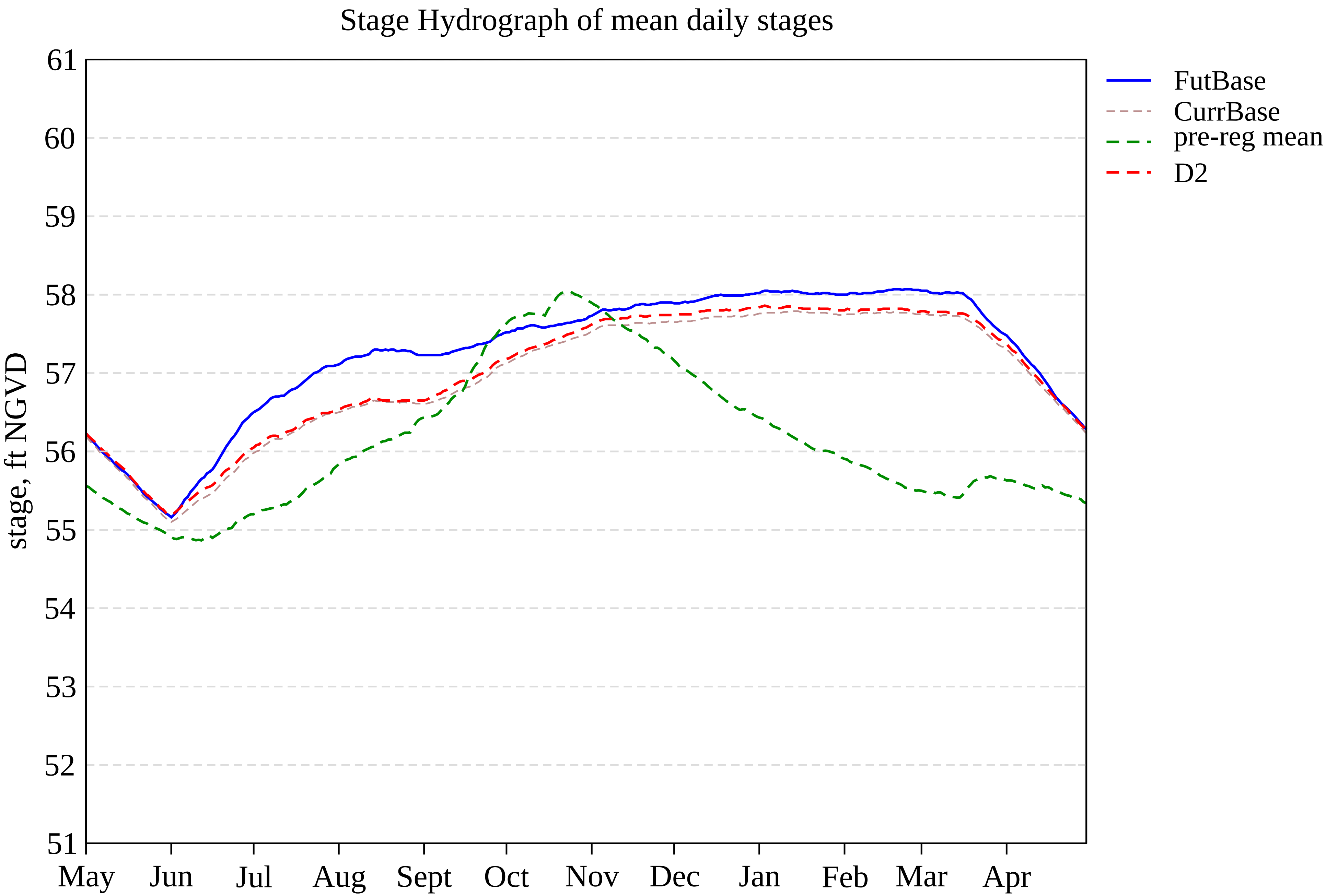
Run ID : Variation of drainage level, k - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	60.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	69.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	20.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	97.1
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.0
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.4

Tier 2 Report

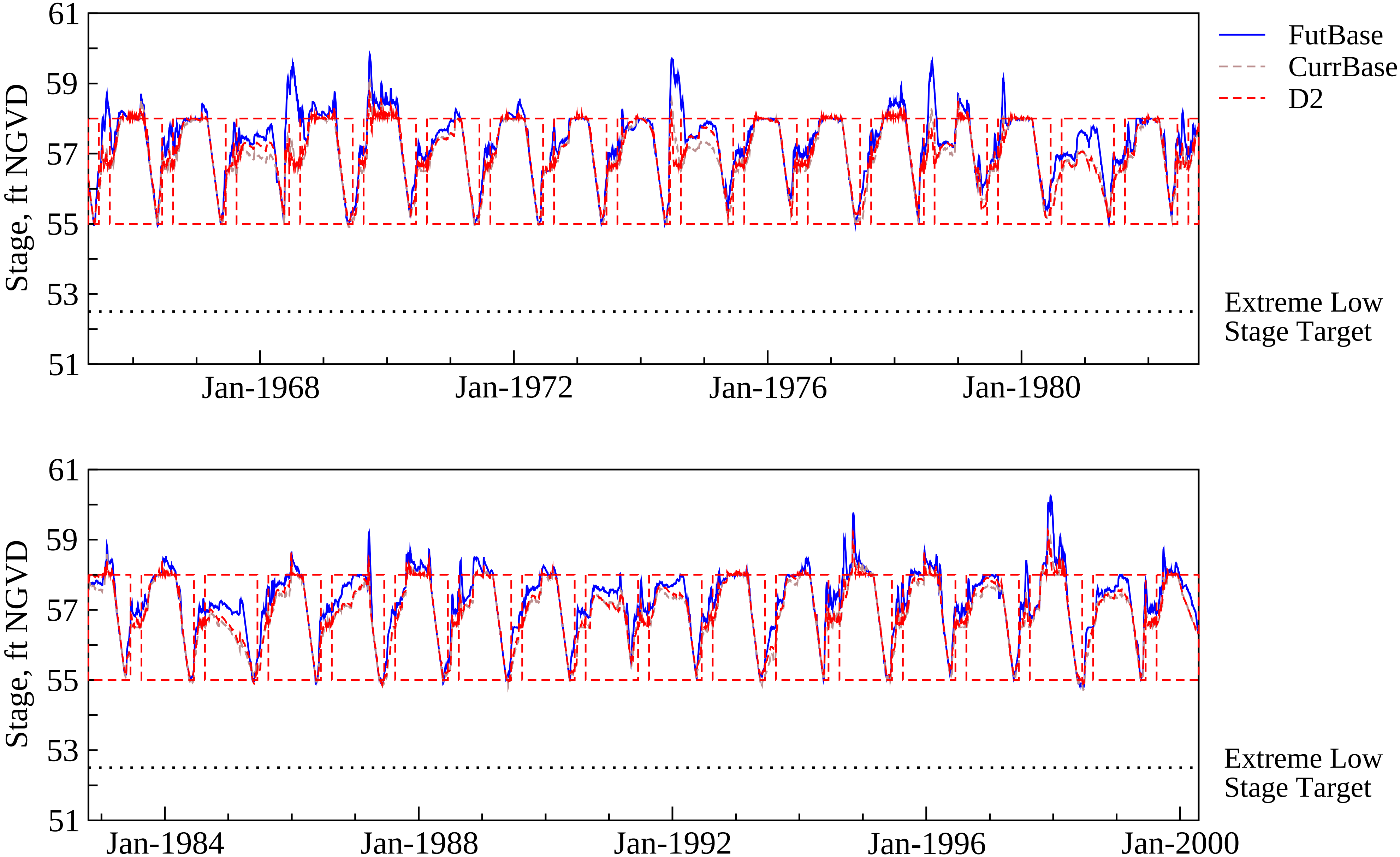
PDF Report for L05

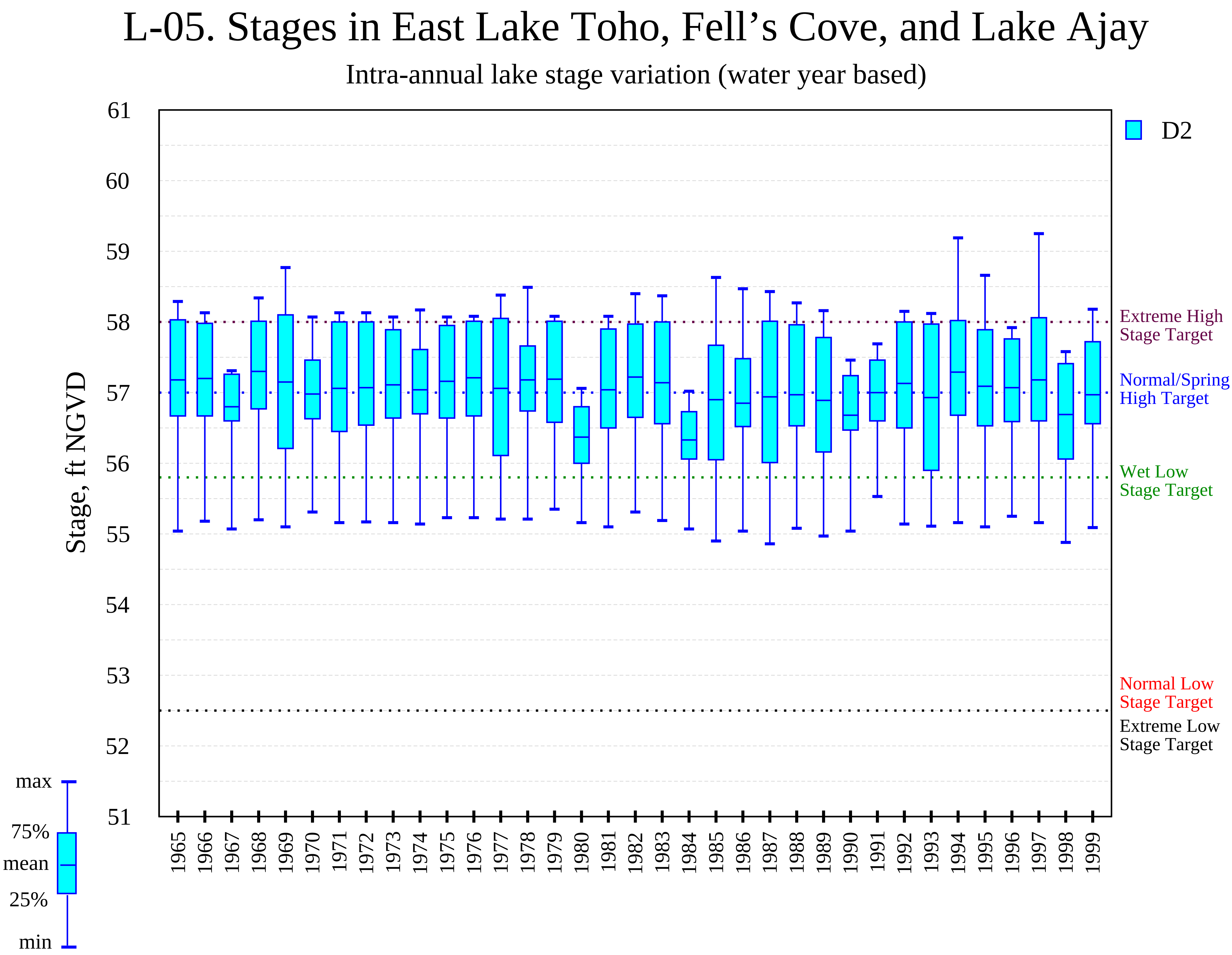
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay



L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

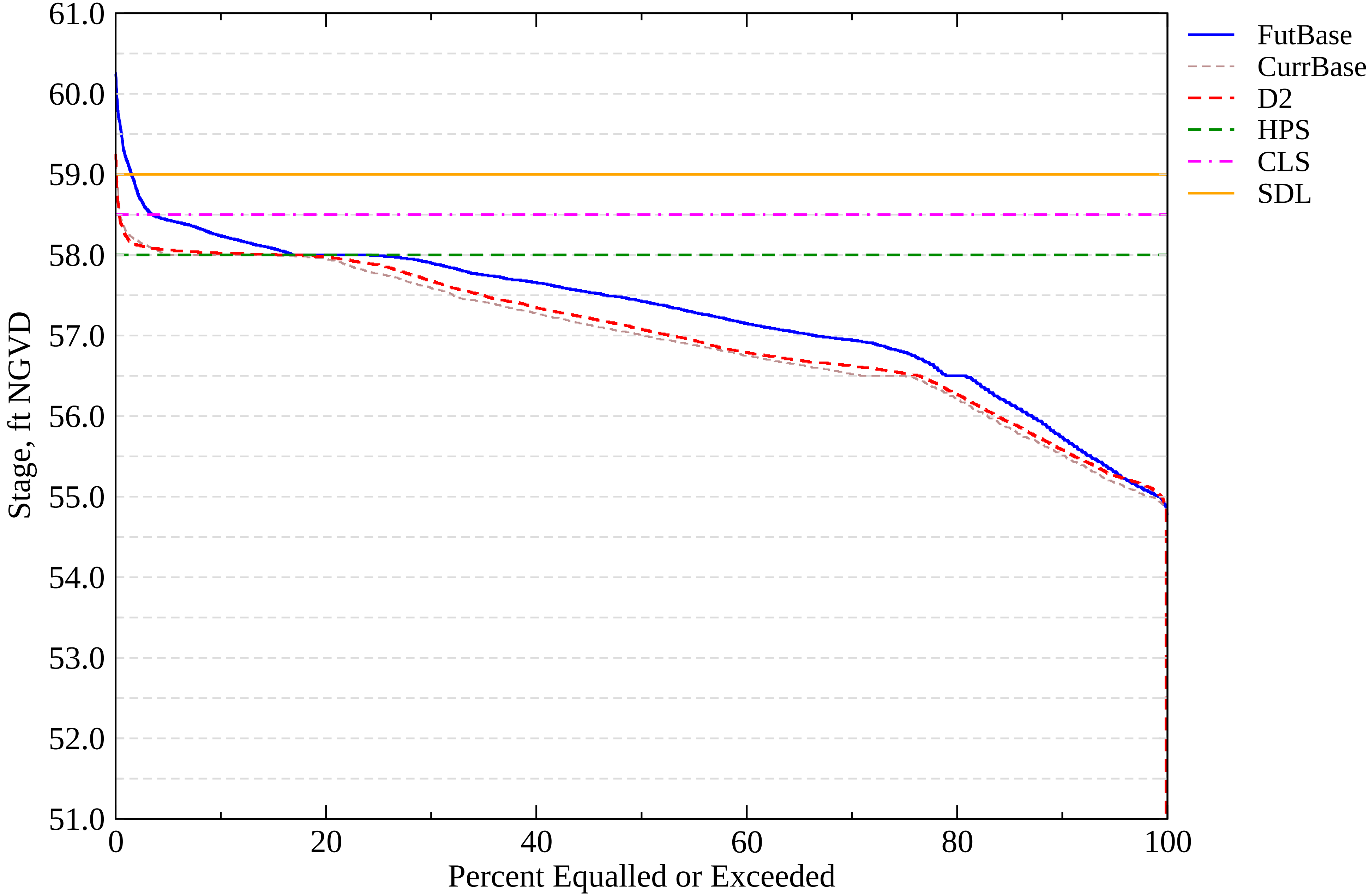
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

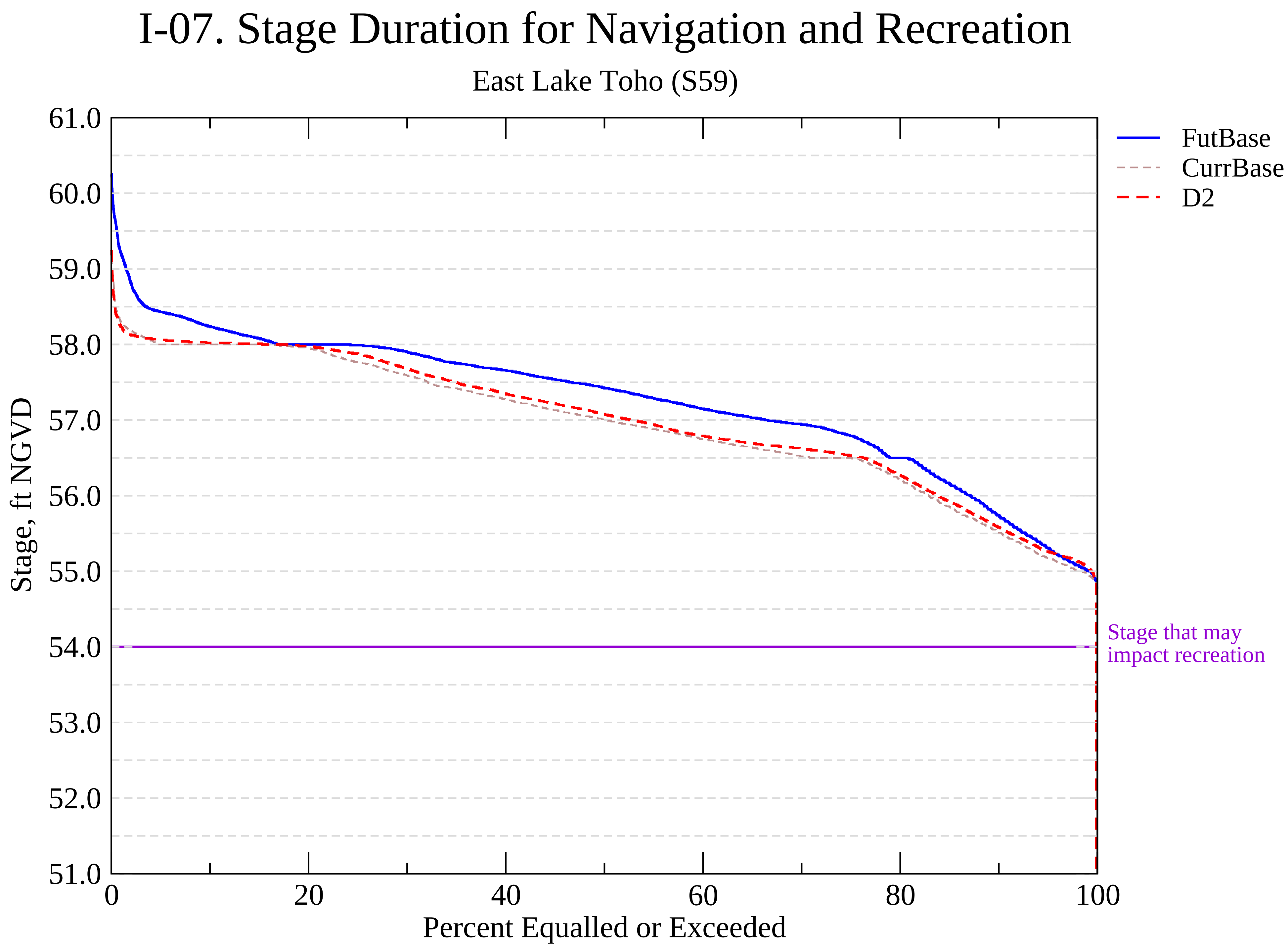



L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
61
60
59
58
57
56
55
54
53
52
51
D2
Extreme High
Stage Target
Normal/Spring
High Target
Wet Low
Stage Target
Normal Low
Stage Target
Extreme Low
Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

I-01. Probable High Lake Stage Performance Indicator

East Lake Toho (S59)




I-07. Stage Duration for Navigation and Recreation
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D2
Stage that may impact recreation

Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

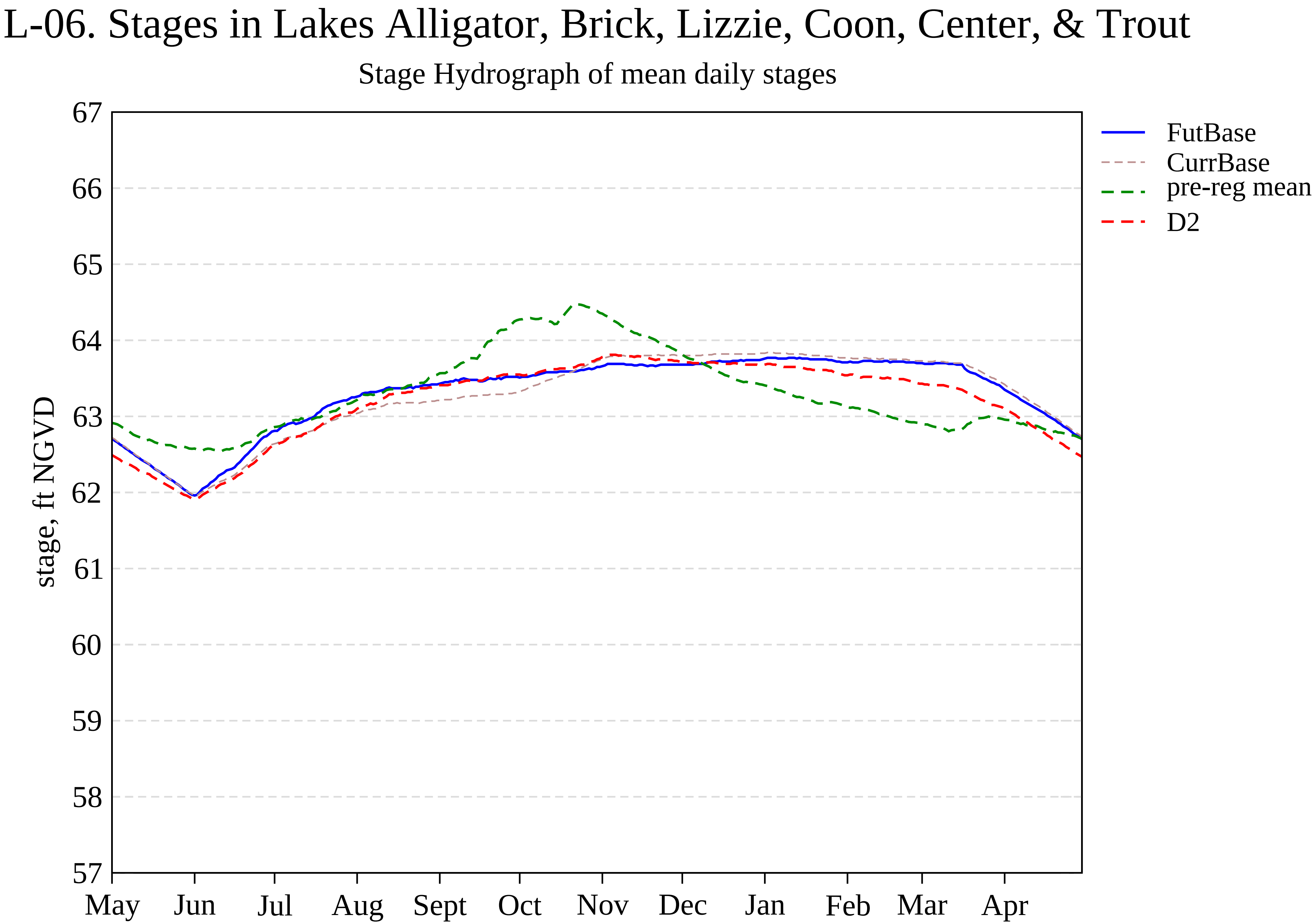
Alternative Description : Uncertainty Analysis - Simulation D2

Run ID : Variation of drainage level, k - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	60.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	94.3
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	6.2

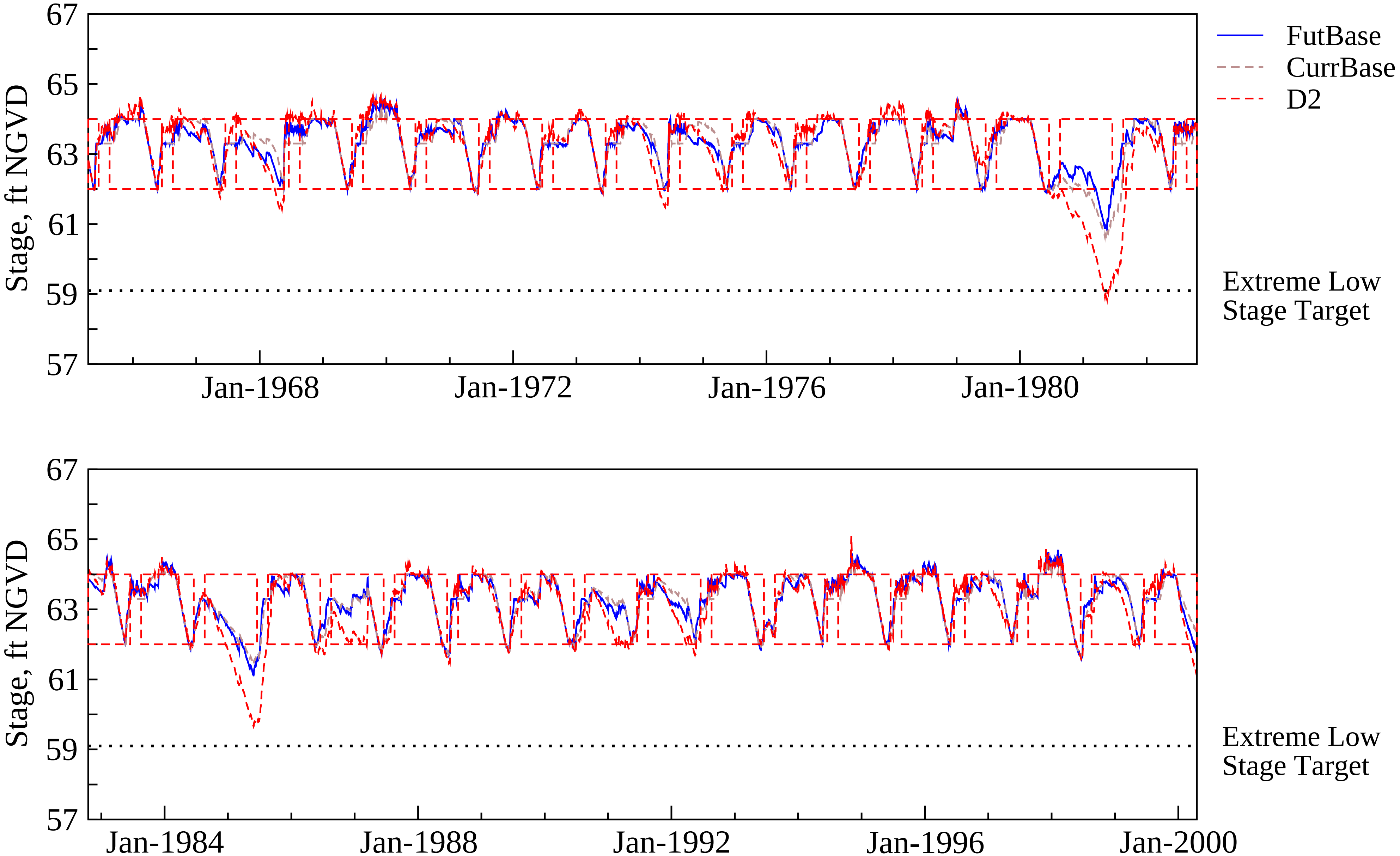
Tier 2 Report

PDF Report for L06


L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout
Stage Hydrograph of mean daily stages
stage, ft NGVD
67
66
65
64
63
62
61
60
59
58
57
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
D2

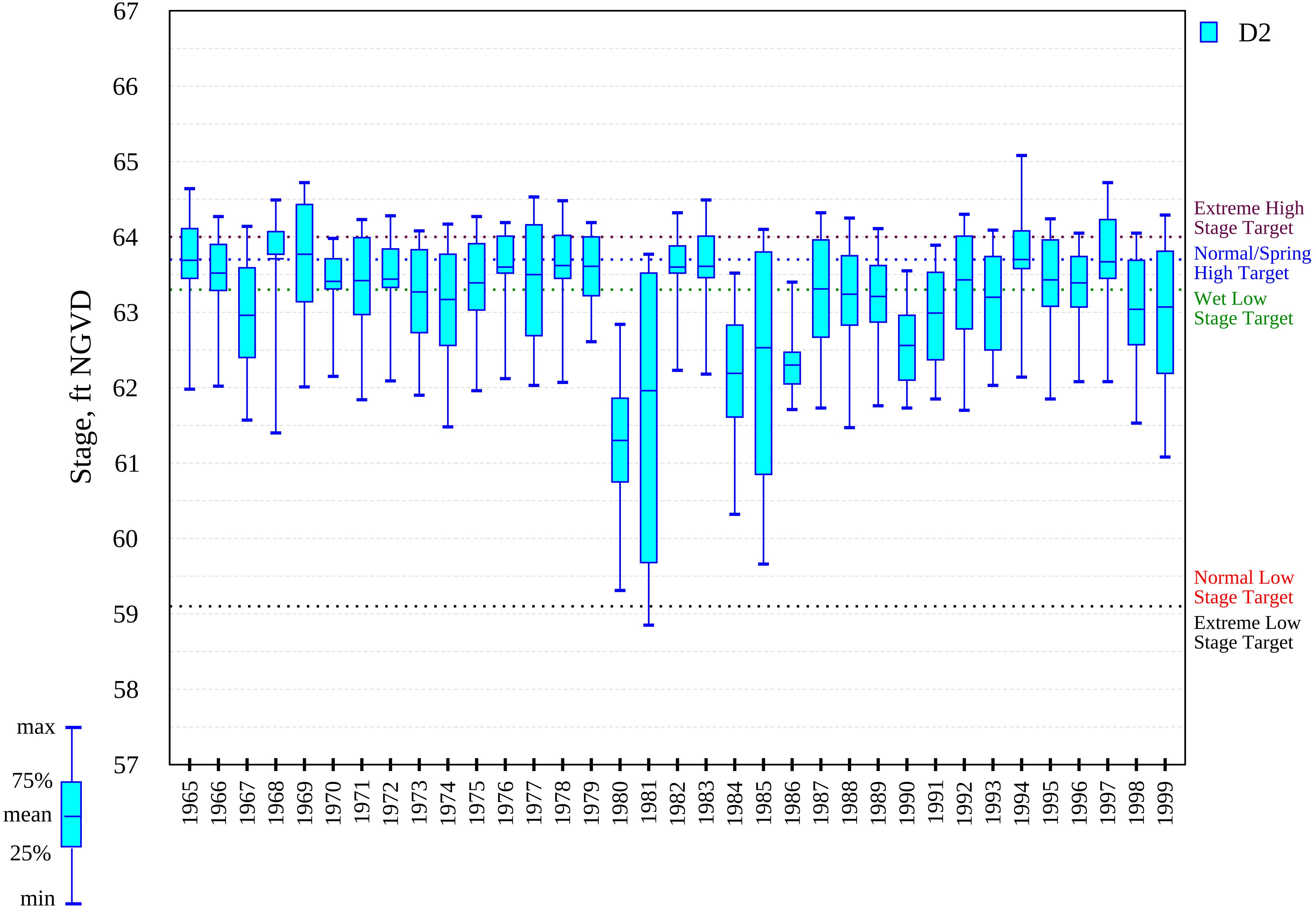
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



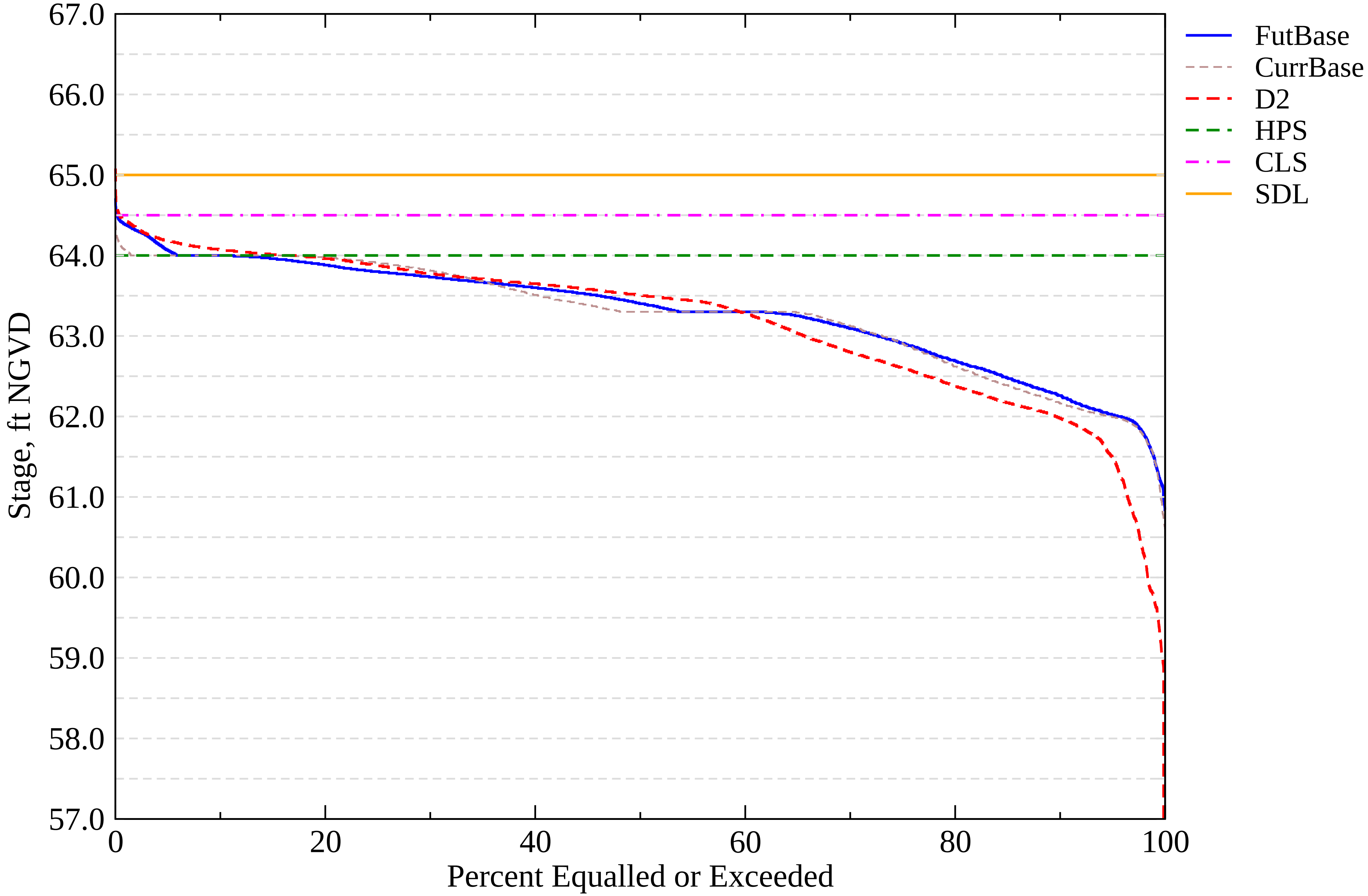
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

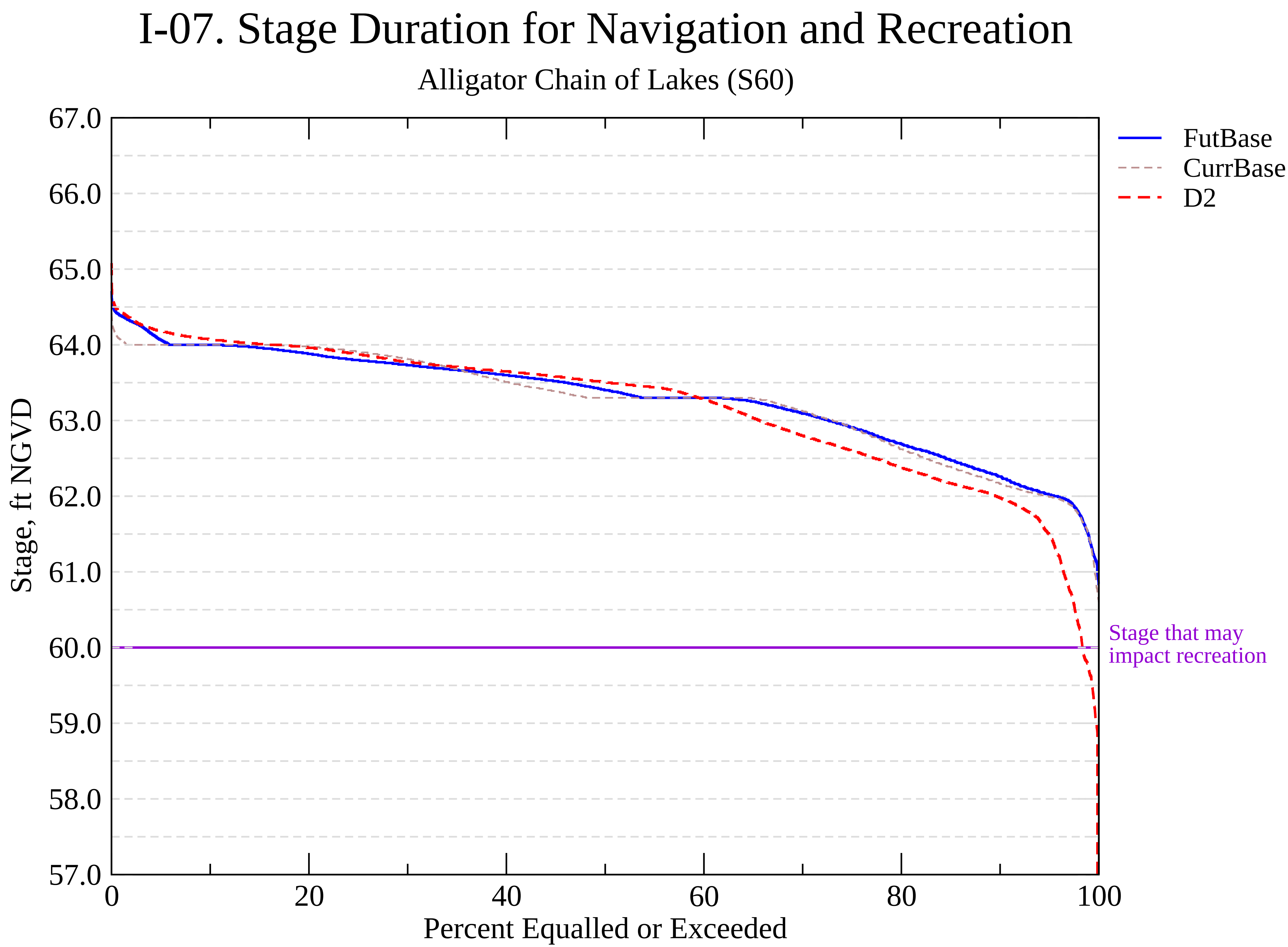
Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Alligator Chain of Lakes (S60)




I-07. Stage Duration for Navigation and Recreation
Alligator Chain of Lakes (S60)
Stage, ft NGVD
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D2
Stage that may impact recreation

Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

Alternative Description : Uncertainty Analysis - Simulation D2

Run ID : Variation of drainage level, k - HIGH

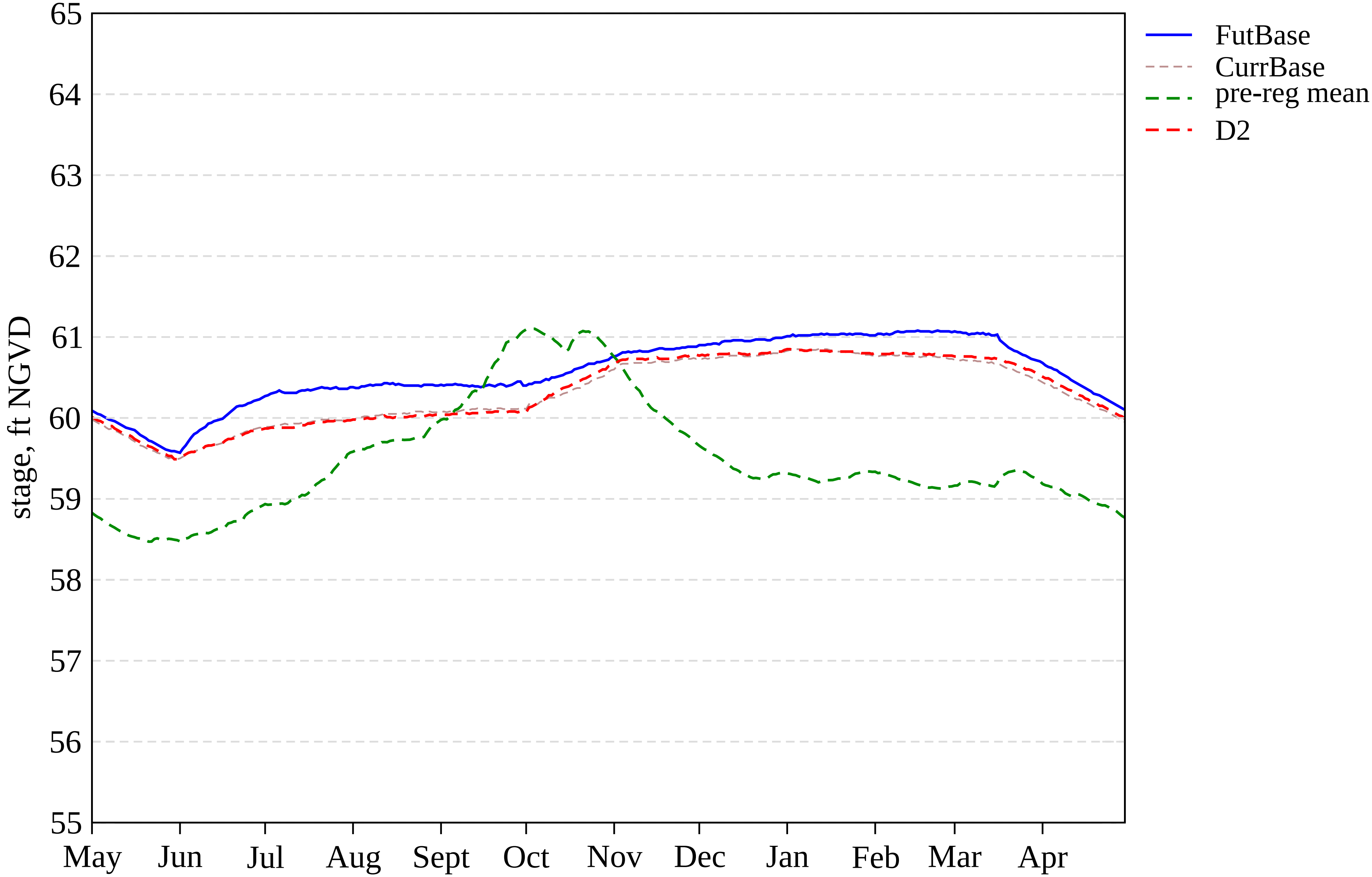
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	71.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	71.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	40.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	20.0
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	5.7
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	3.6
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	66.0

Tier 2 Report

PDF Report for L07

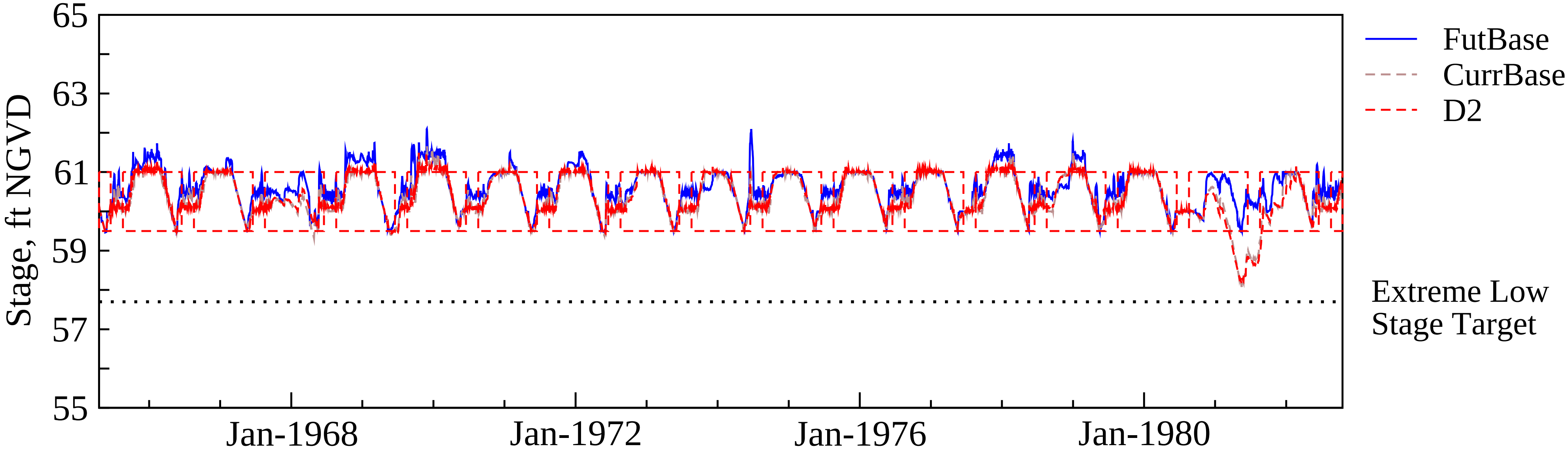
L-07. Stages in Lake Hart and Mary Jane

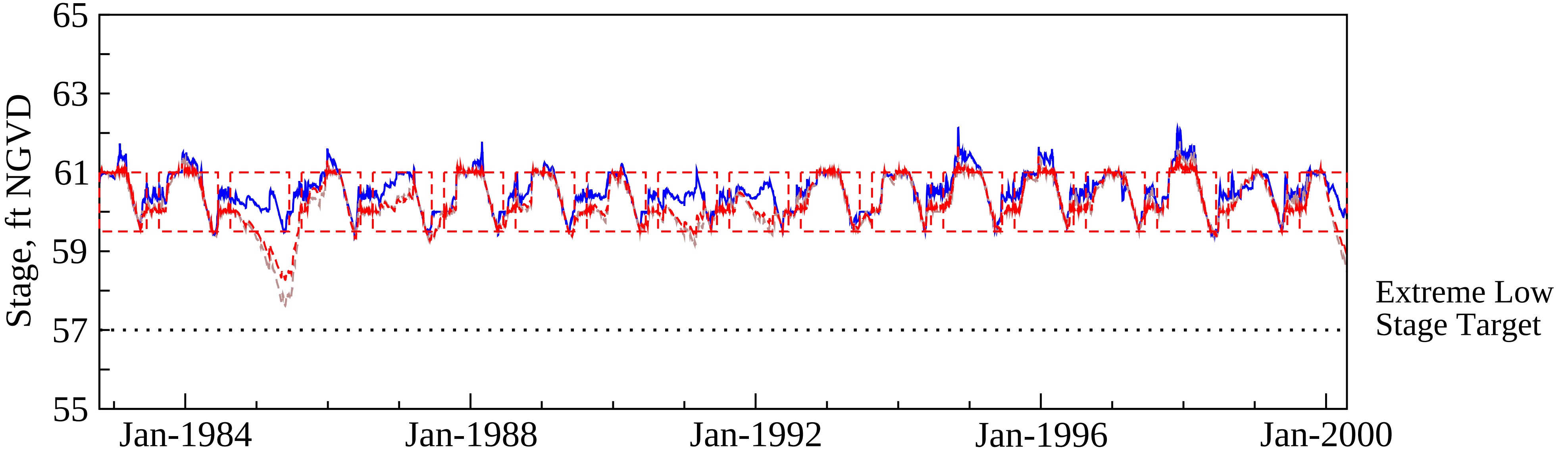
Stage Hydrograph of mean daily stages



L-07. Stages in Lakes Hart and Mary Jane

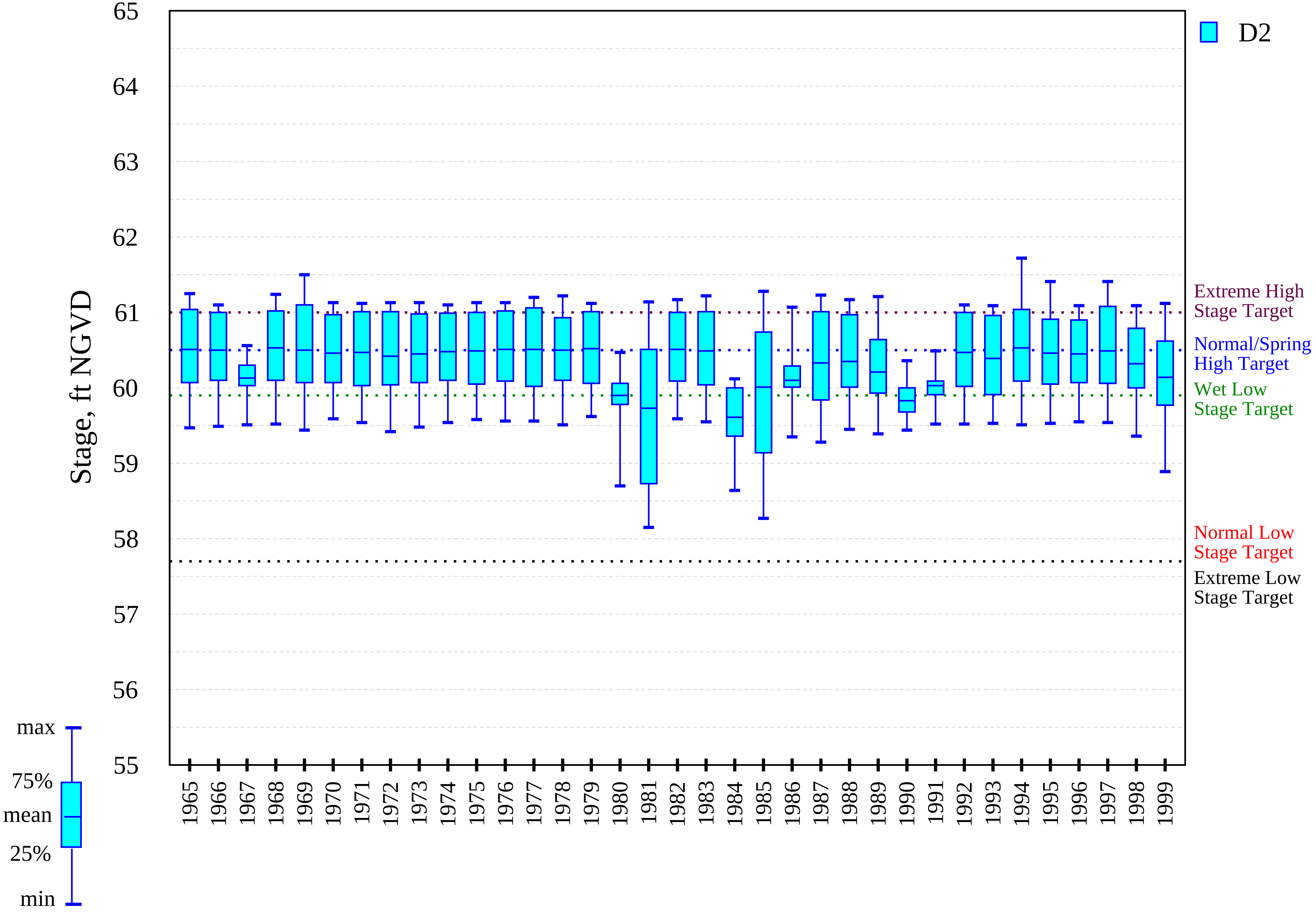
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

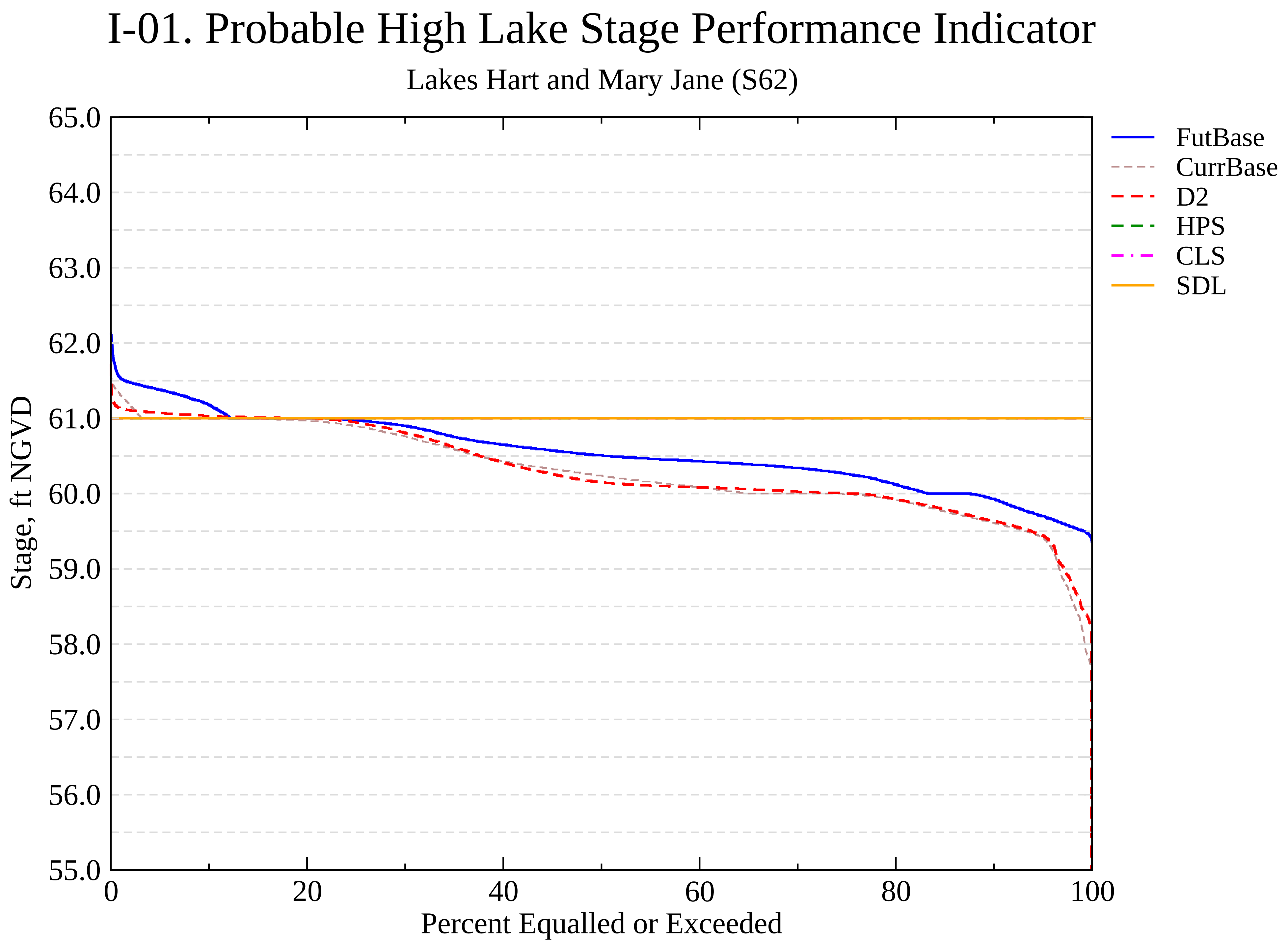


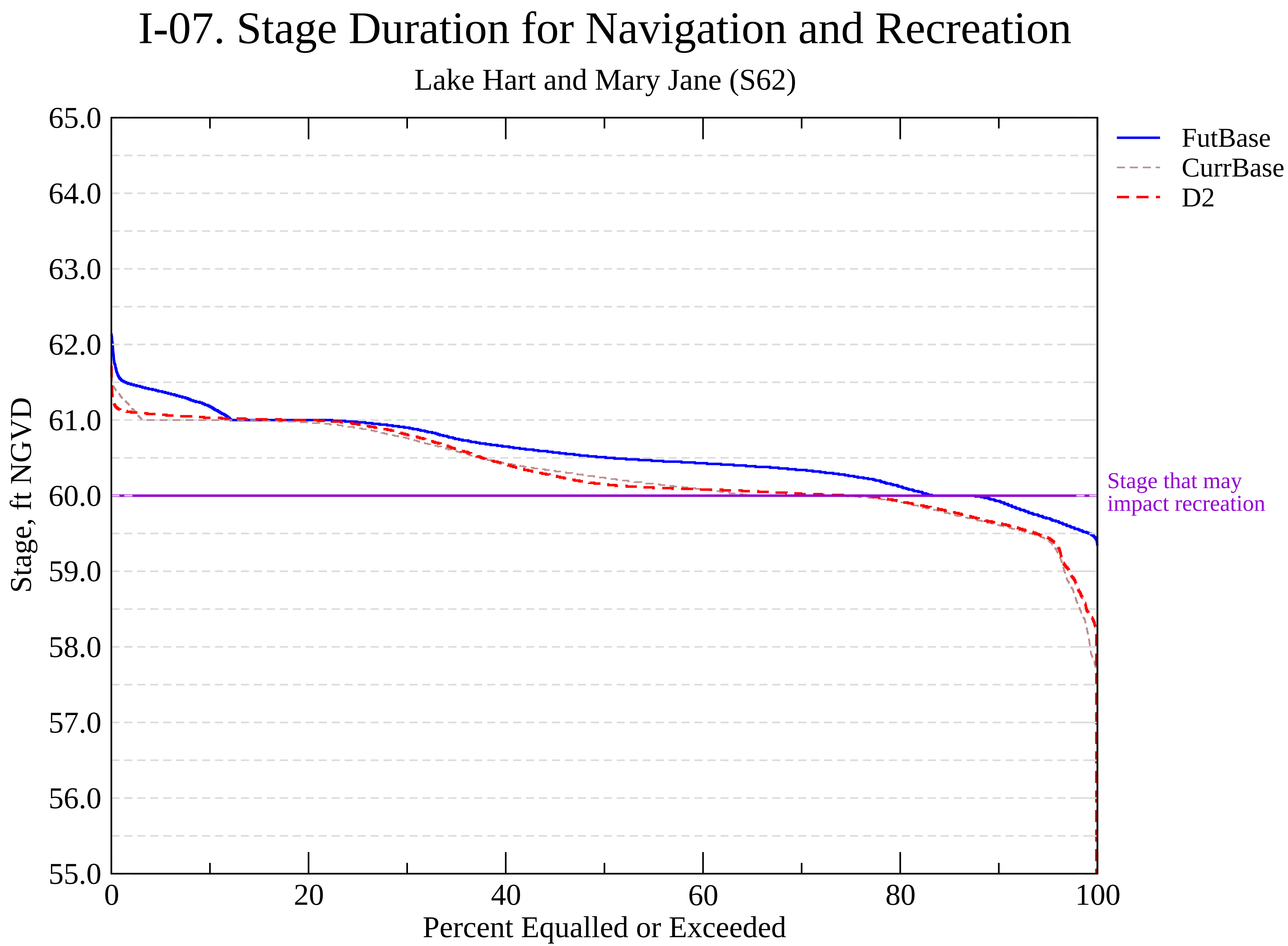


L-07. Stages in Lakes Hart and Mary Jane

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Lakes Hart and Mary Jane (S62)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
D2
HPS
CLS
SDL



I-07. Stage Duration for Navigation and Recreation
Lake Hart and Mary Jane (S62)
Stage, ft NGVD
Percent Equalled or Exceeded
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
FutBase
CurrBase
D2
Stage that may
impact recreation

Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

Alternative Description : Uncertainty Analysis - Simulation D2

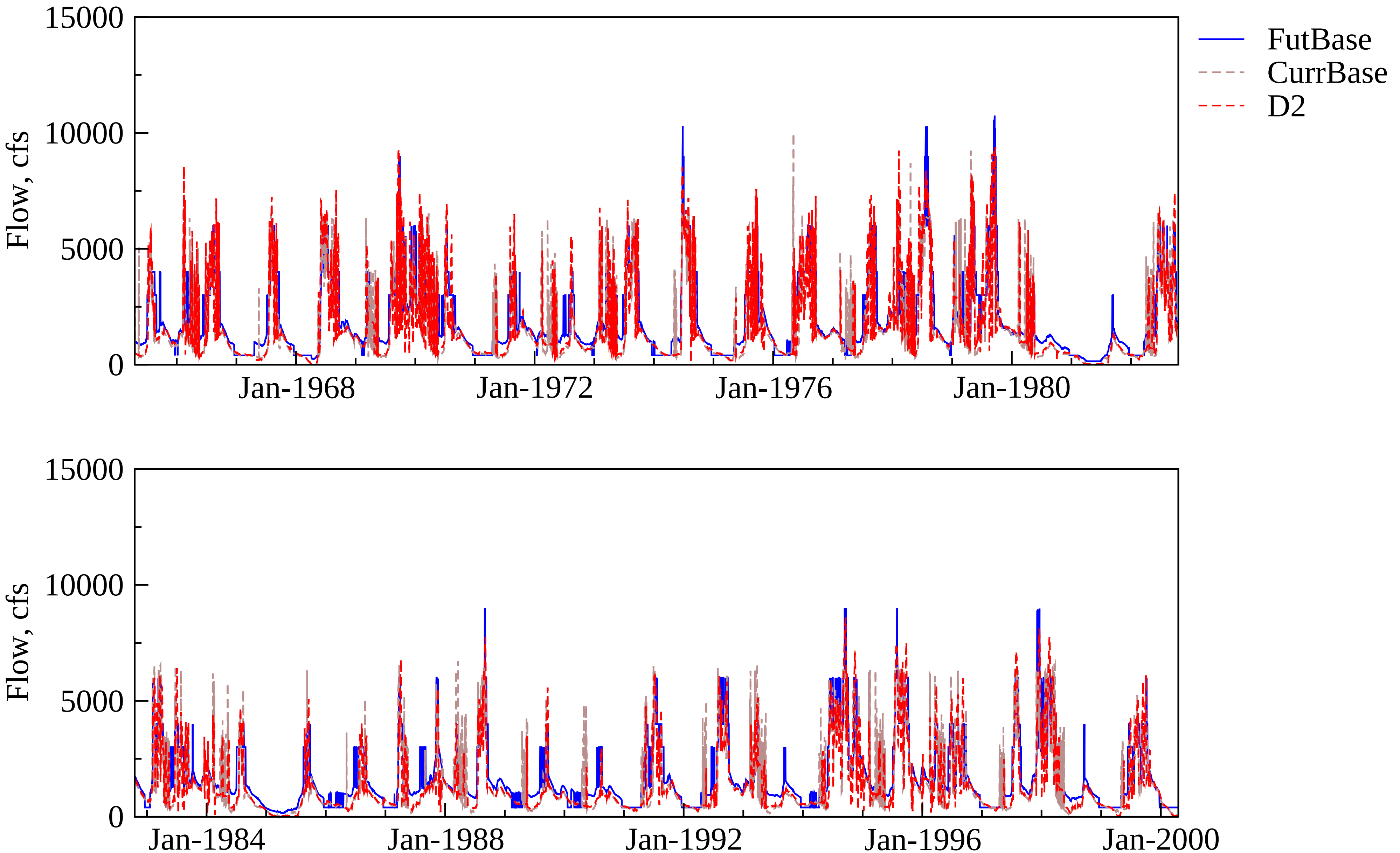
Run ID : Variation of drainage level, k - HIGH

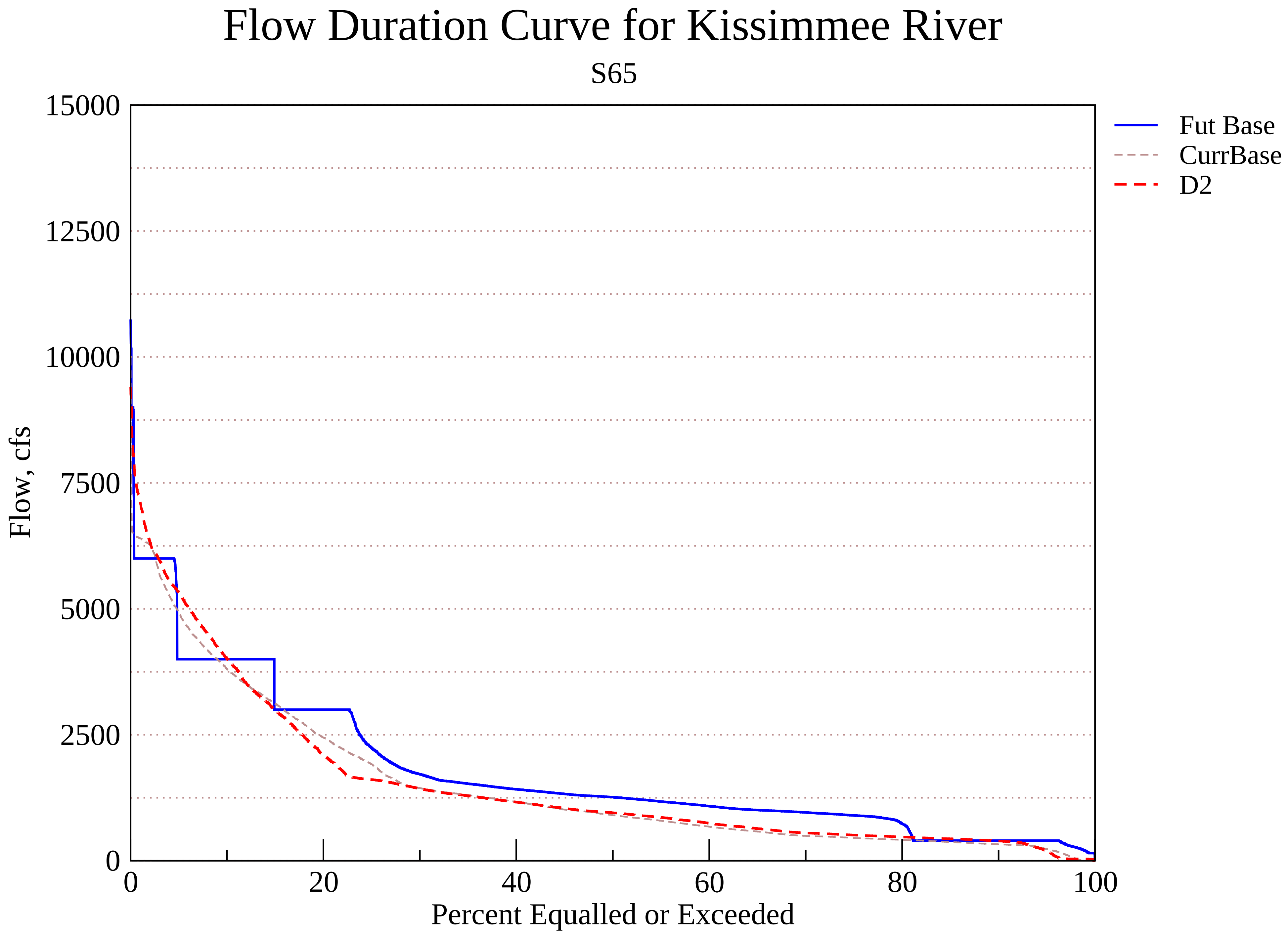
Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	31.4	42.9
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	51.4	51.4
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	85.7	82.9
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	8.6	5.7
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	206.0	268.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	431.0	547.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	3.1	5.5
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tier 2 Report

PDF Report for R01

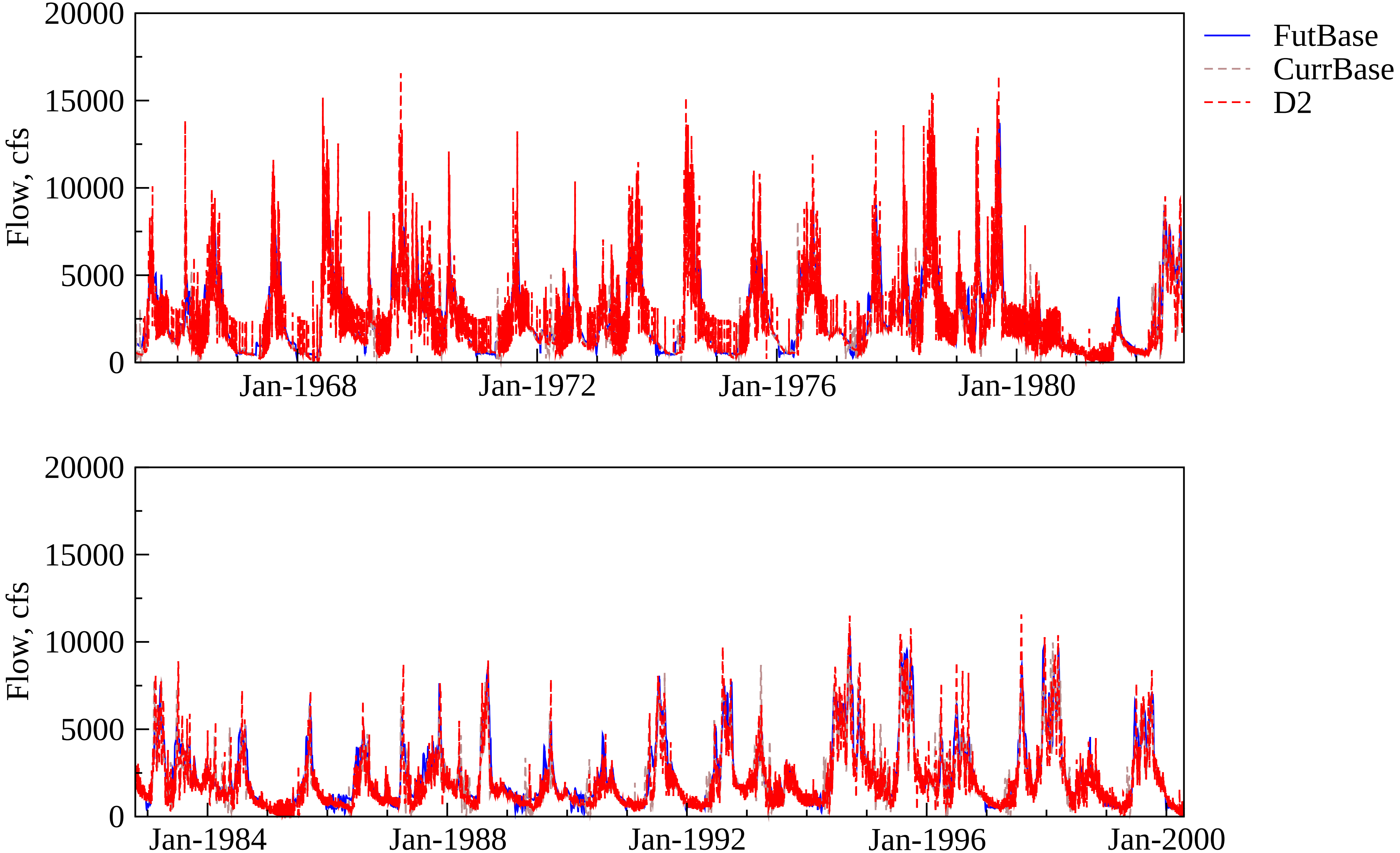
Flow Hydrograph at S65





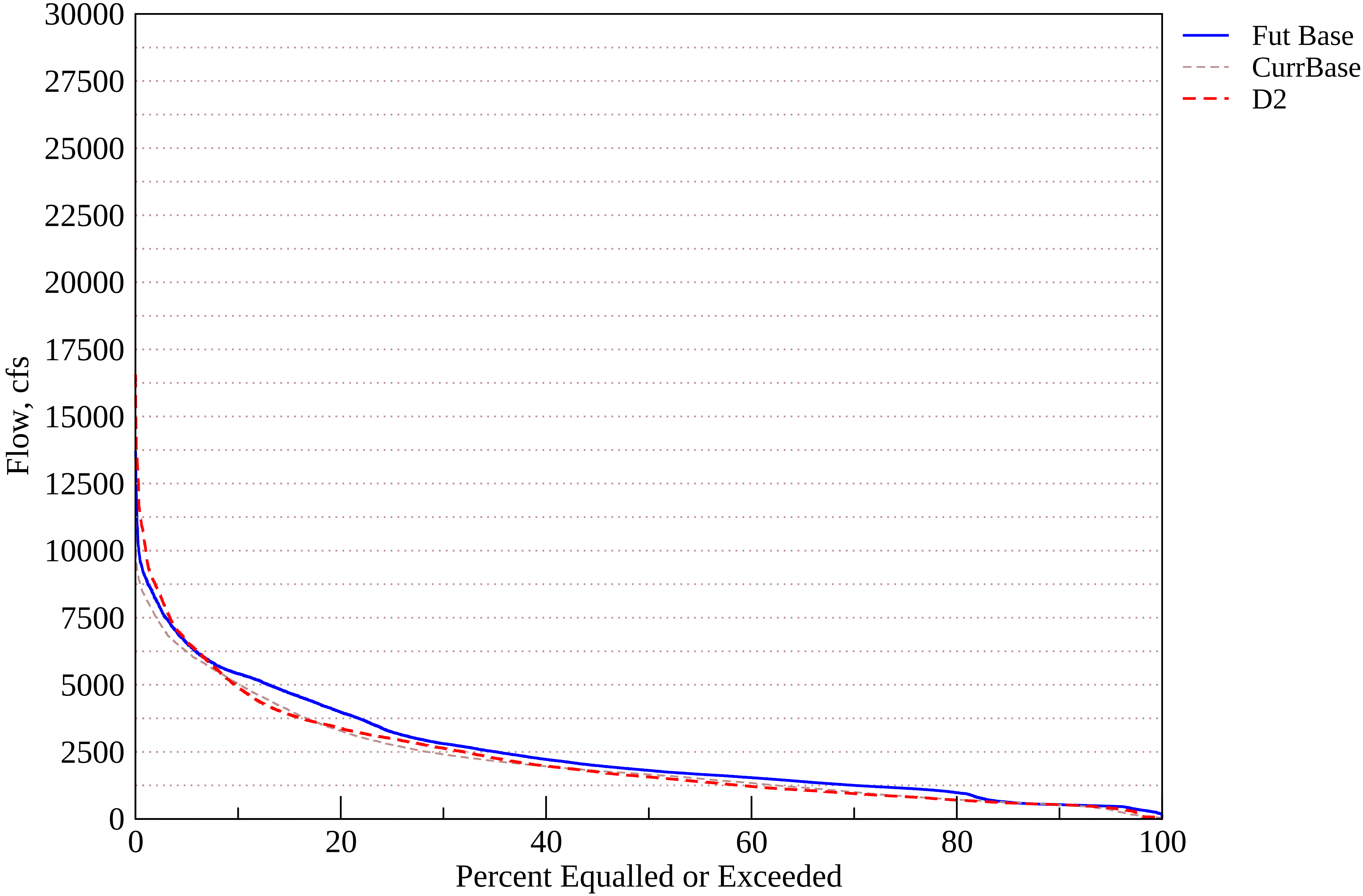
Flow Duration Curve for Kissimmee River
S65
Flow, cfs
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
D2

Flow Hydrograph at S65E



Flow Duration Curve for Kissimmee River

S65E



Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation D2

Run ID : Variation of drainage level, k - HIGH

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Number of days per water year that river channel depth is greater than average floodplain ground elelvation (average).	252.0	250.0	203.0	311.0
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	56.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	5.1
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	9.4

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

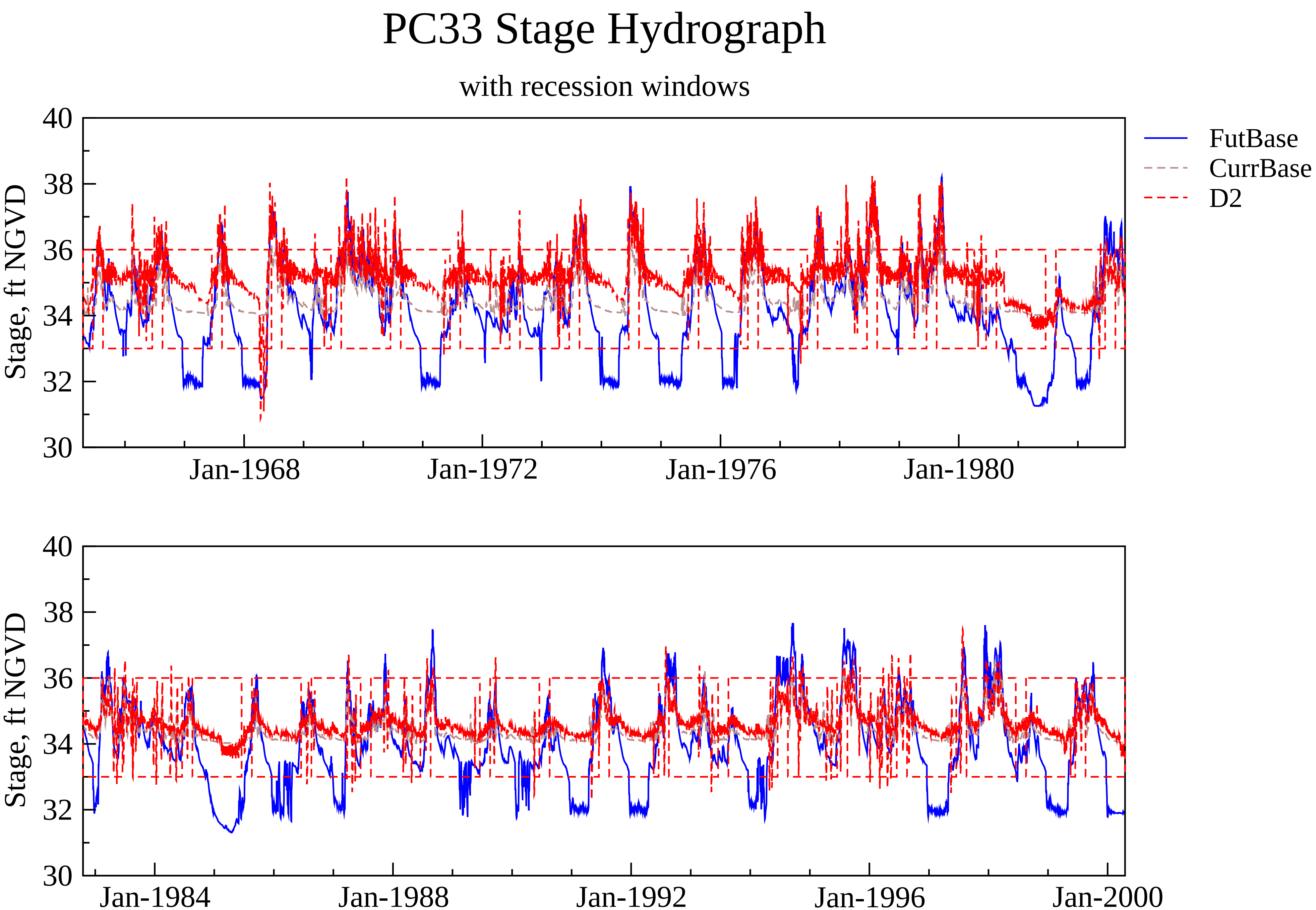
Alternative Description : Uncertainty Analysis - Simulation D2

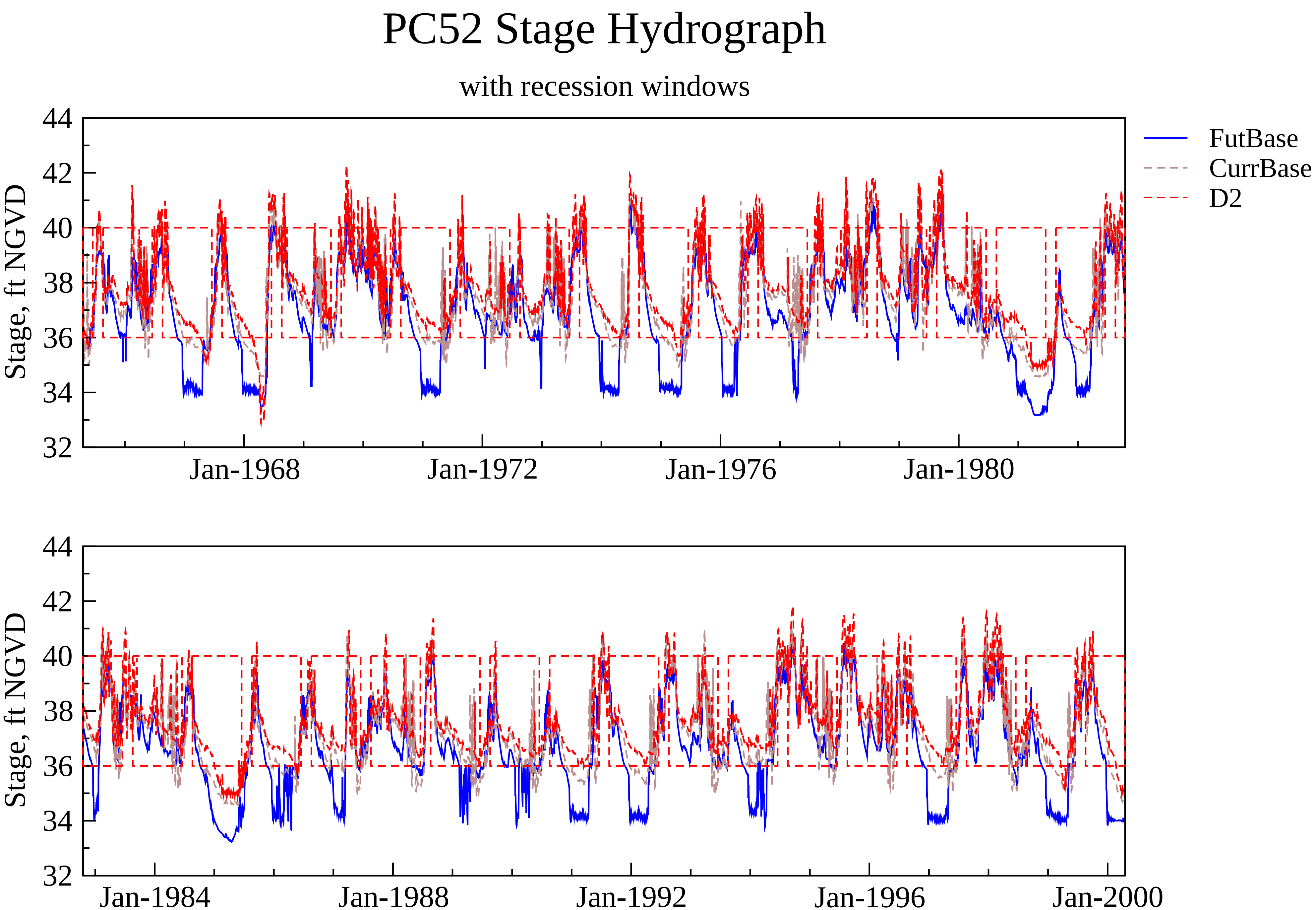
Run ID : Variation of drainage level, k - HIGH

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	48.6
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	82.9
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	31.4

Tier 2 Report

PDF Report for R03


PC33 Stage Hydrograph
with recession windows
FutBase
CurrBase
D2
Stage, ft NGVD
40
38
36
34
32
30
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000



PC52 Stage Hydrograph
with recession windows
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
D2
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation E1

Variation of Kv_ICU - LOW

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation E1

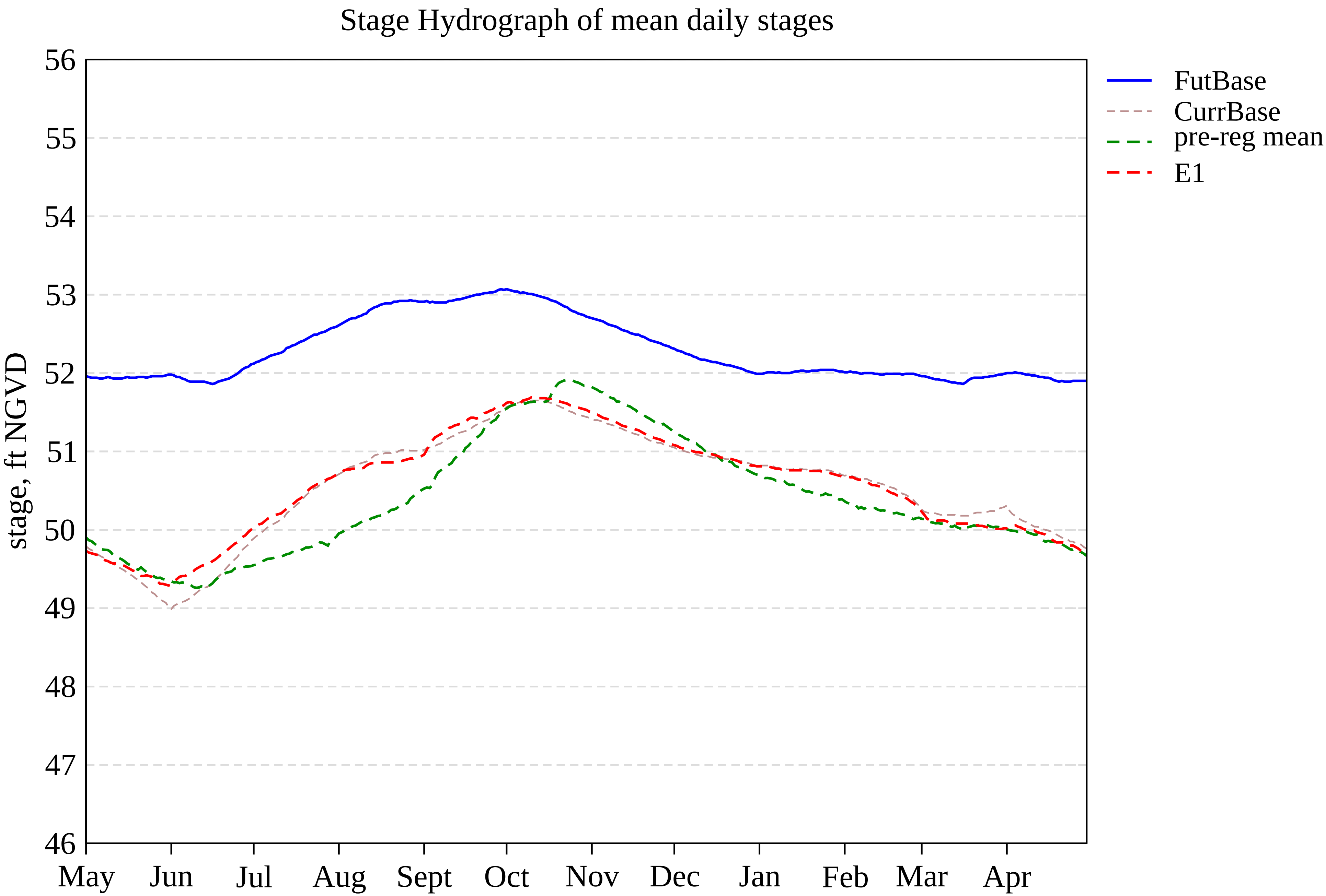
Run ID : Variation of Kv_ICU - LOW

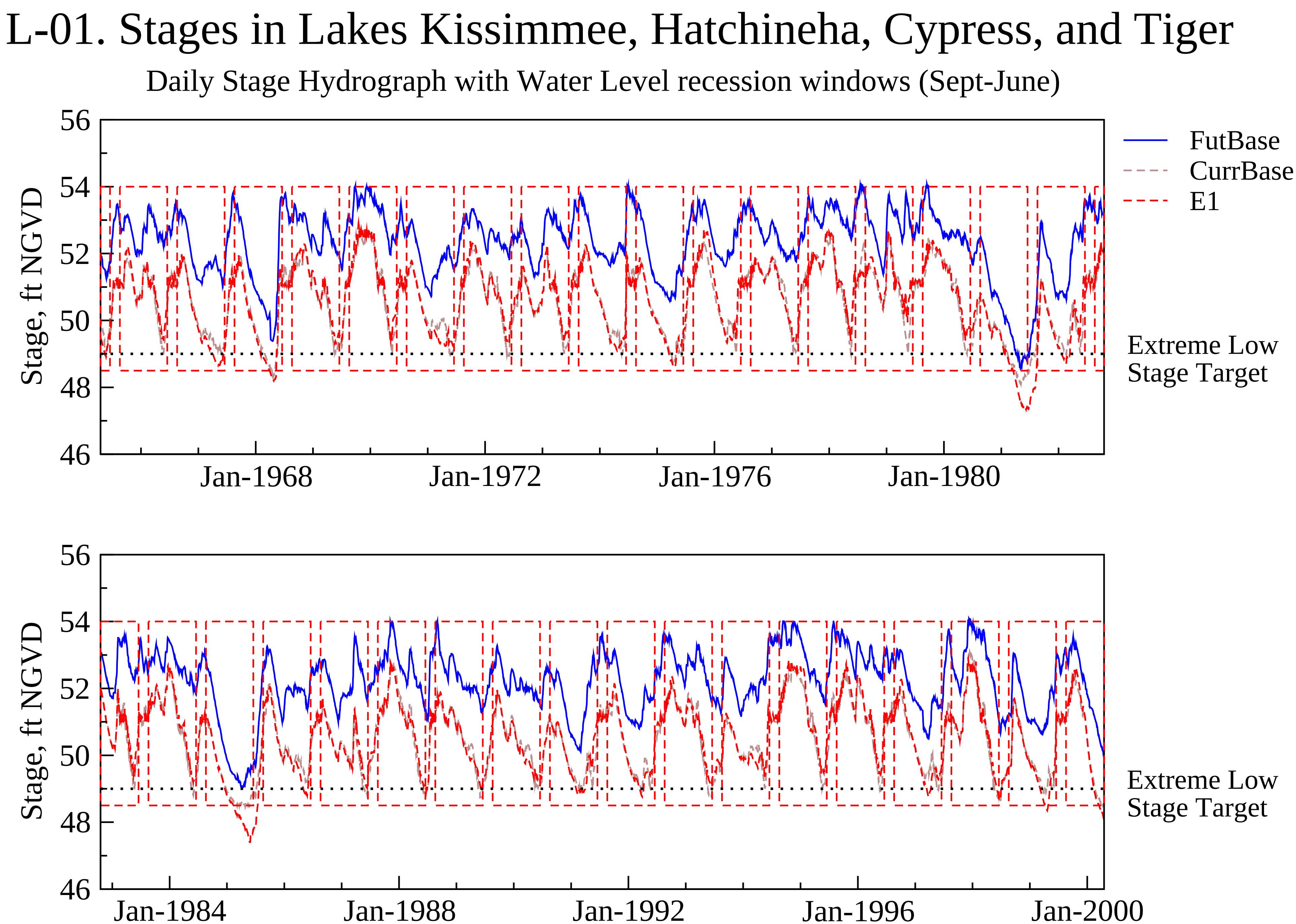
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	86.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	17.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	71.4
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	17.1
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	88.6
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	2.6	3.3
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	5.5	5.6

Tier 2 Report

PDF Report for L01

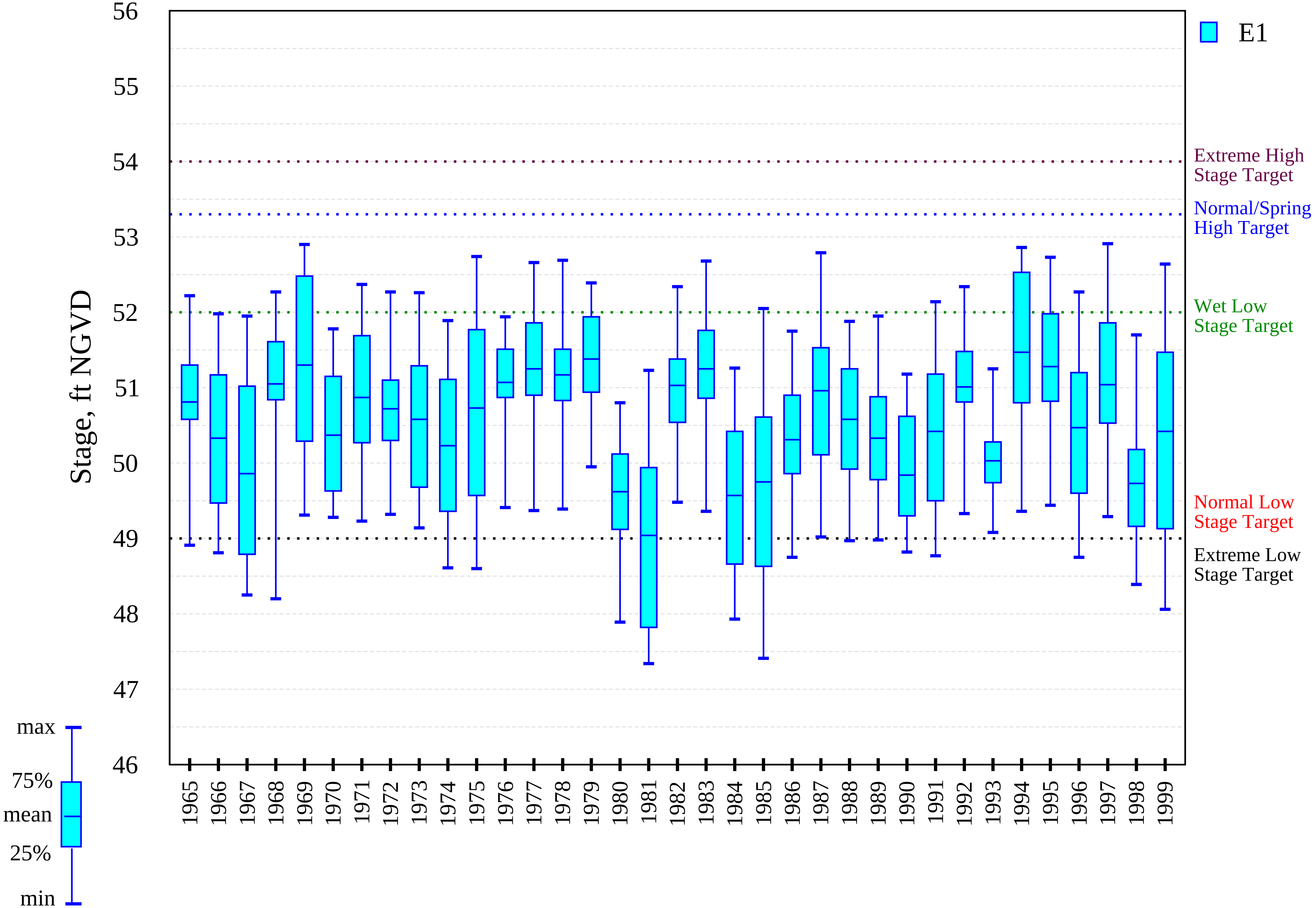
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

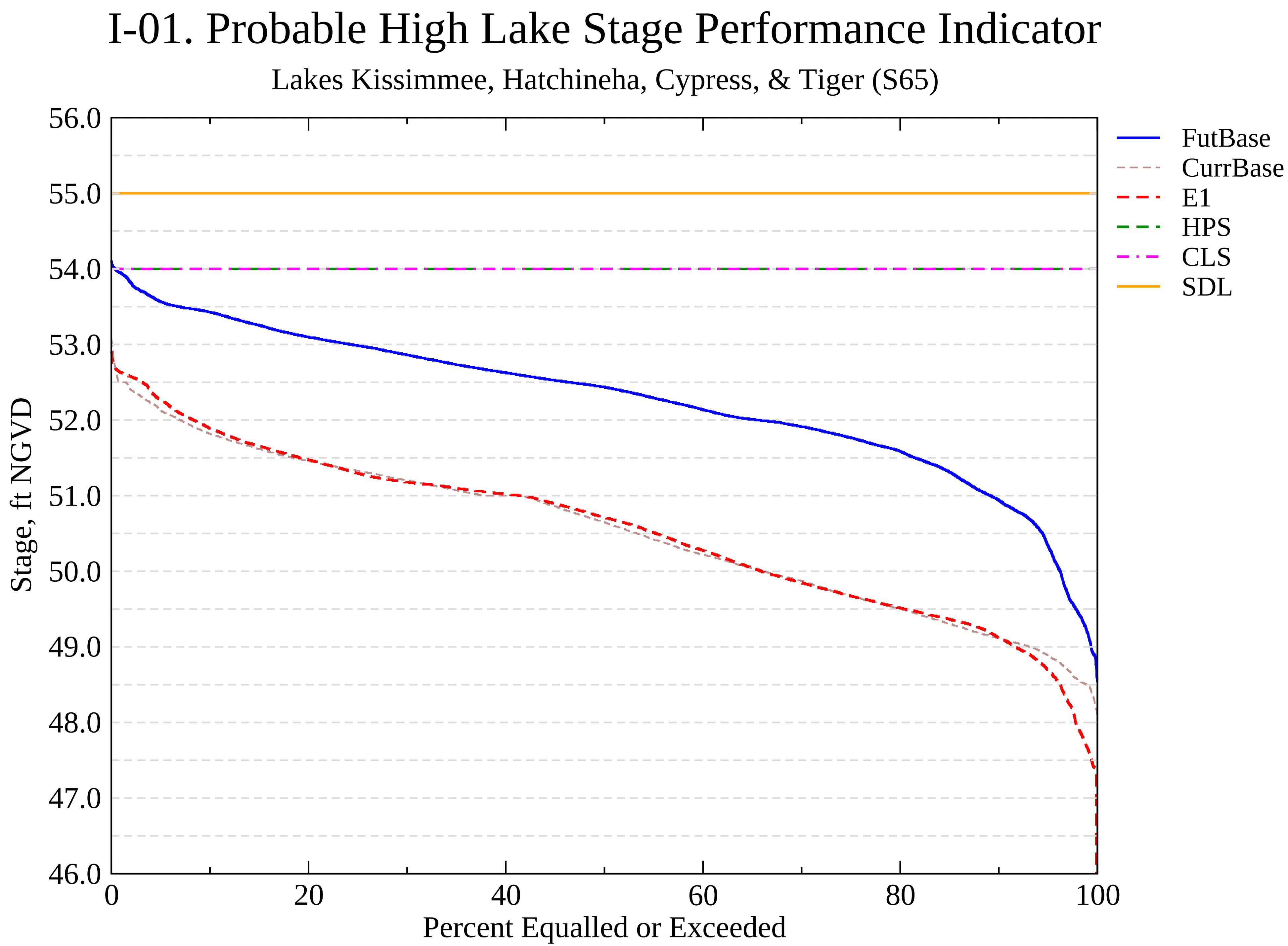


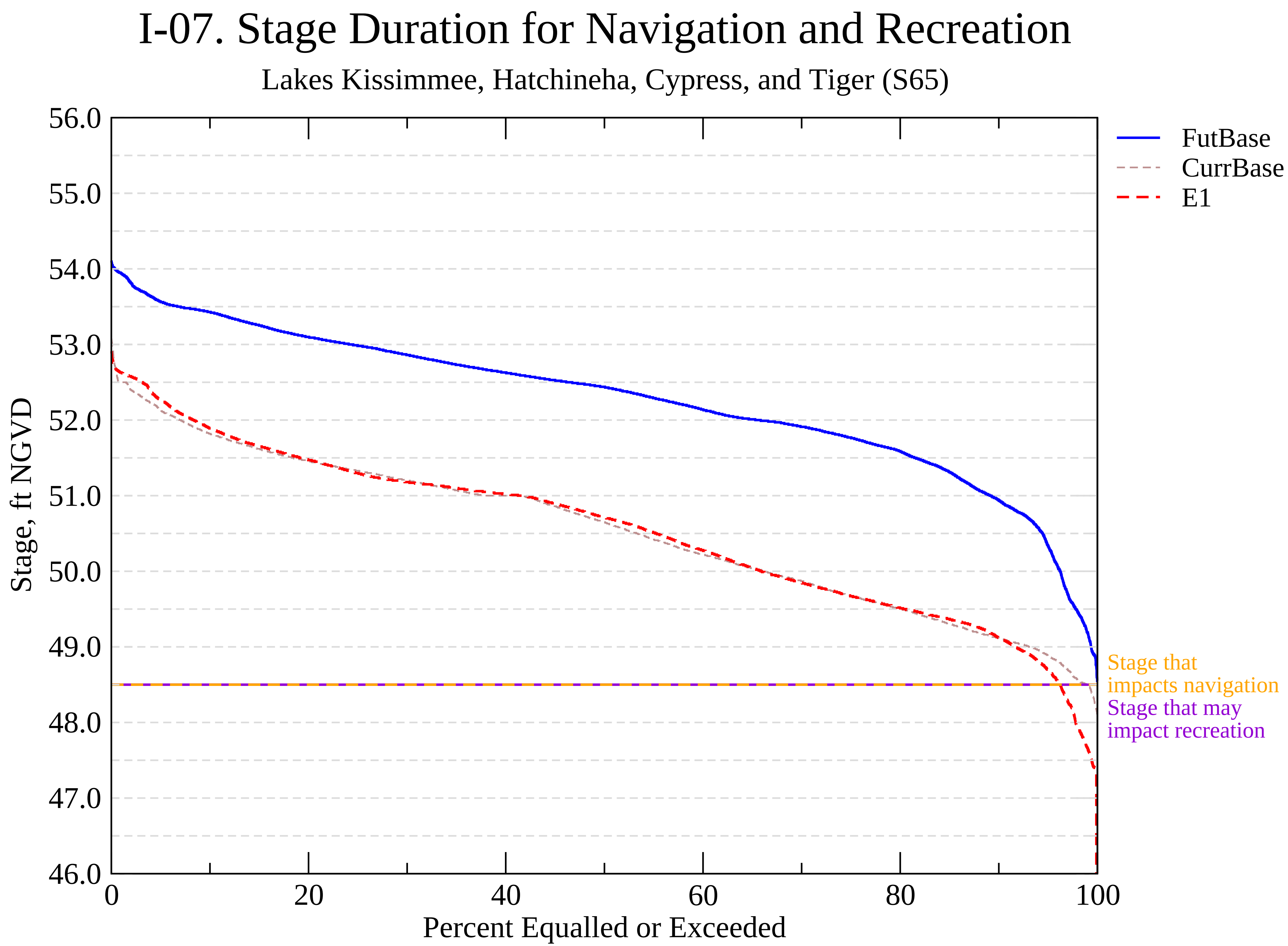

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger
Daily Stage Hydrograph with Water Level recession windows (Sept-June)
Stage, ft NGVD
56
54
52
50
48
46
Jan-1968
Jan-1972
Jan-1976
Jan-1980
FutBase
CurrBase
E1
Extreme Low
Stage Target
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)
Stage, ft NGVD
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E1
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)
Stage, ft NGVD
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E1
Stage that impacts navigation
Stage that may impact recreation

Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

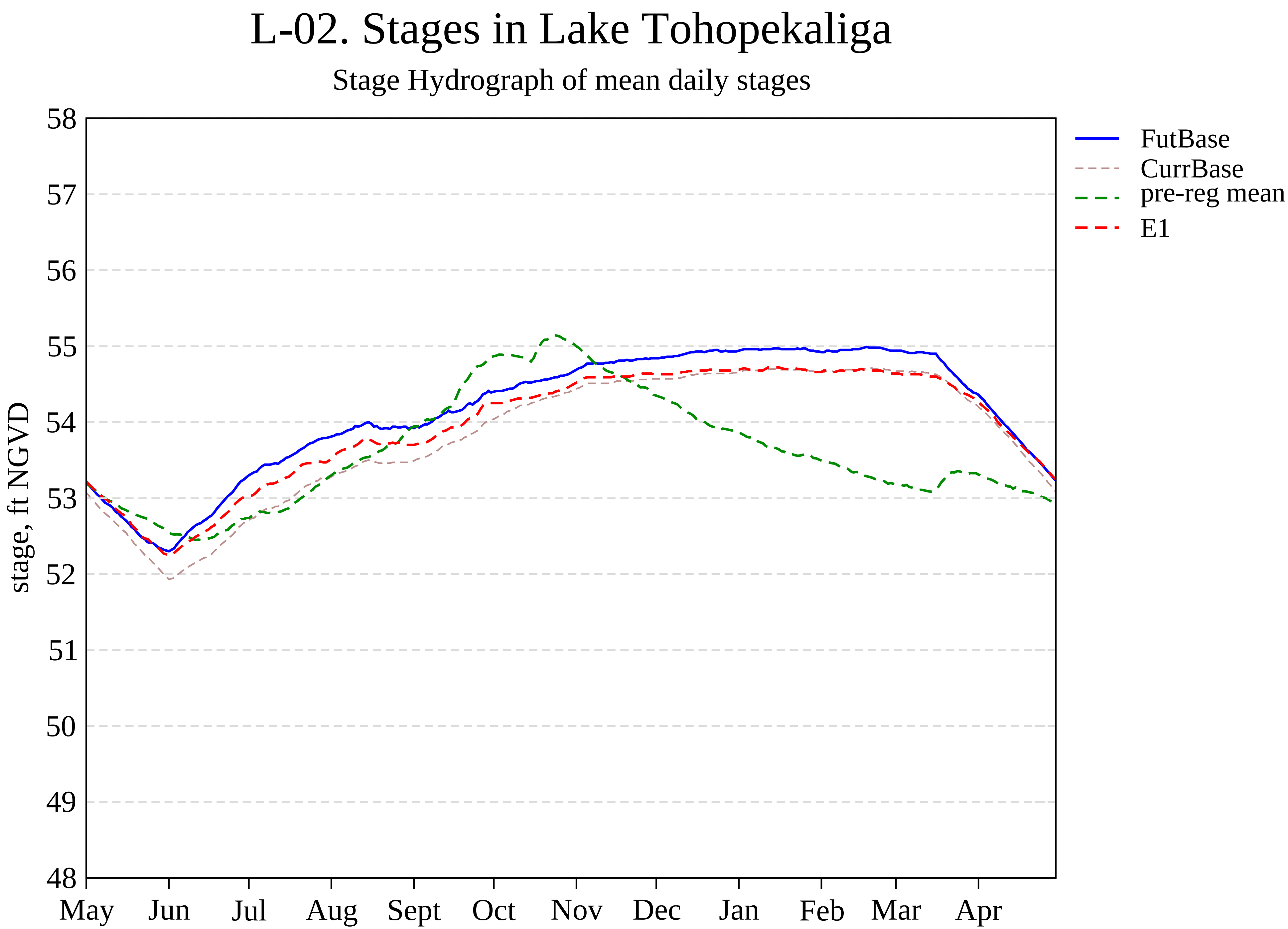
Alternative Description : Uncertainty Analysis - Simulation E1

Run ID : Variation of Kv_ICU - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	37.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	63.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	3.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	42.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	8.6
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.1
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	5.6

Tier 2 Report

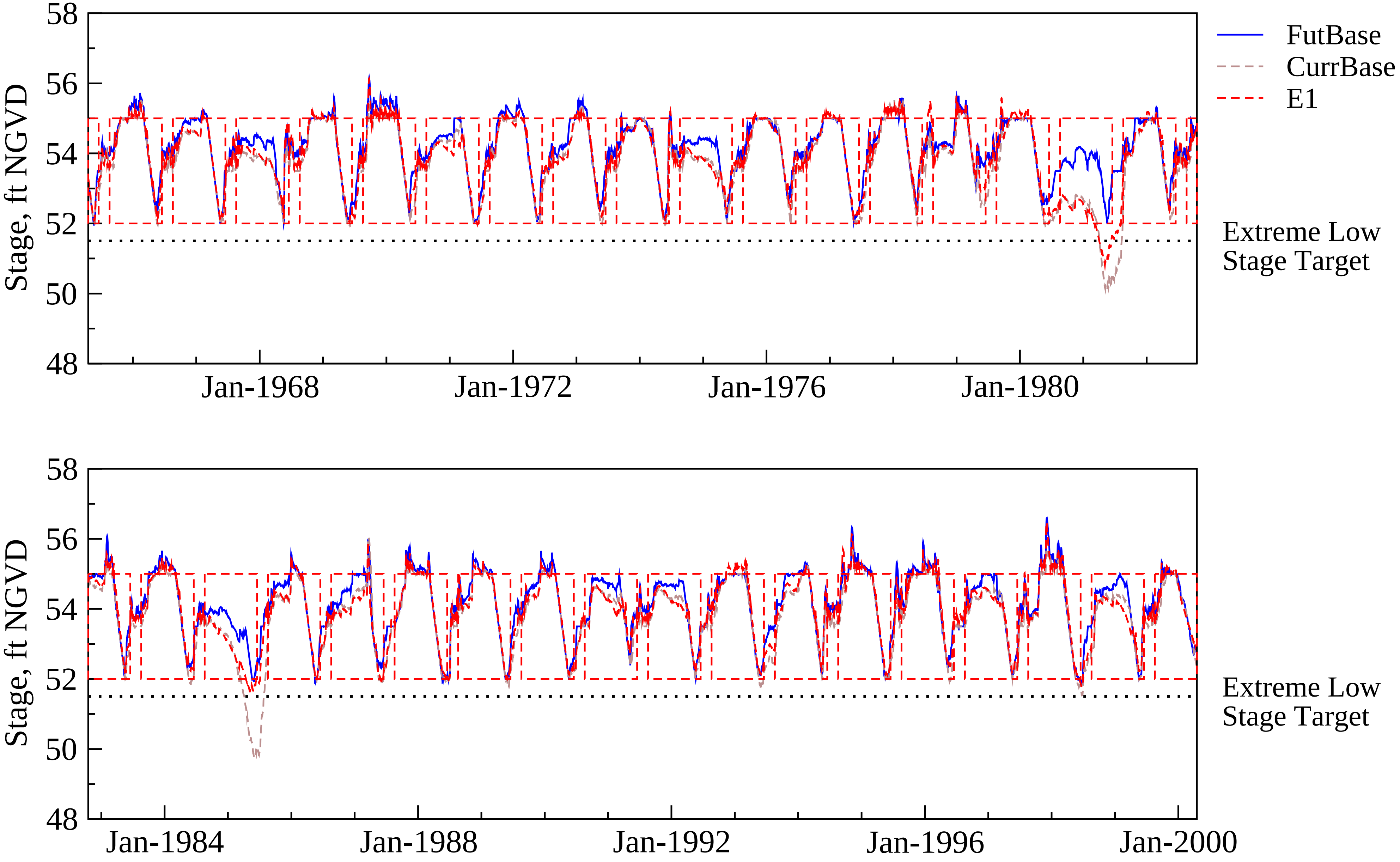
PDF Report for L02

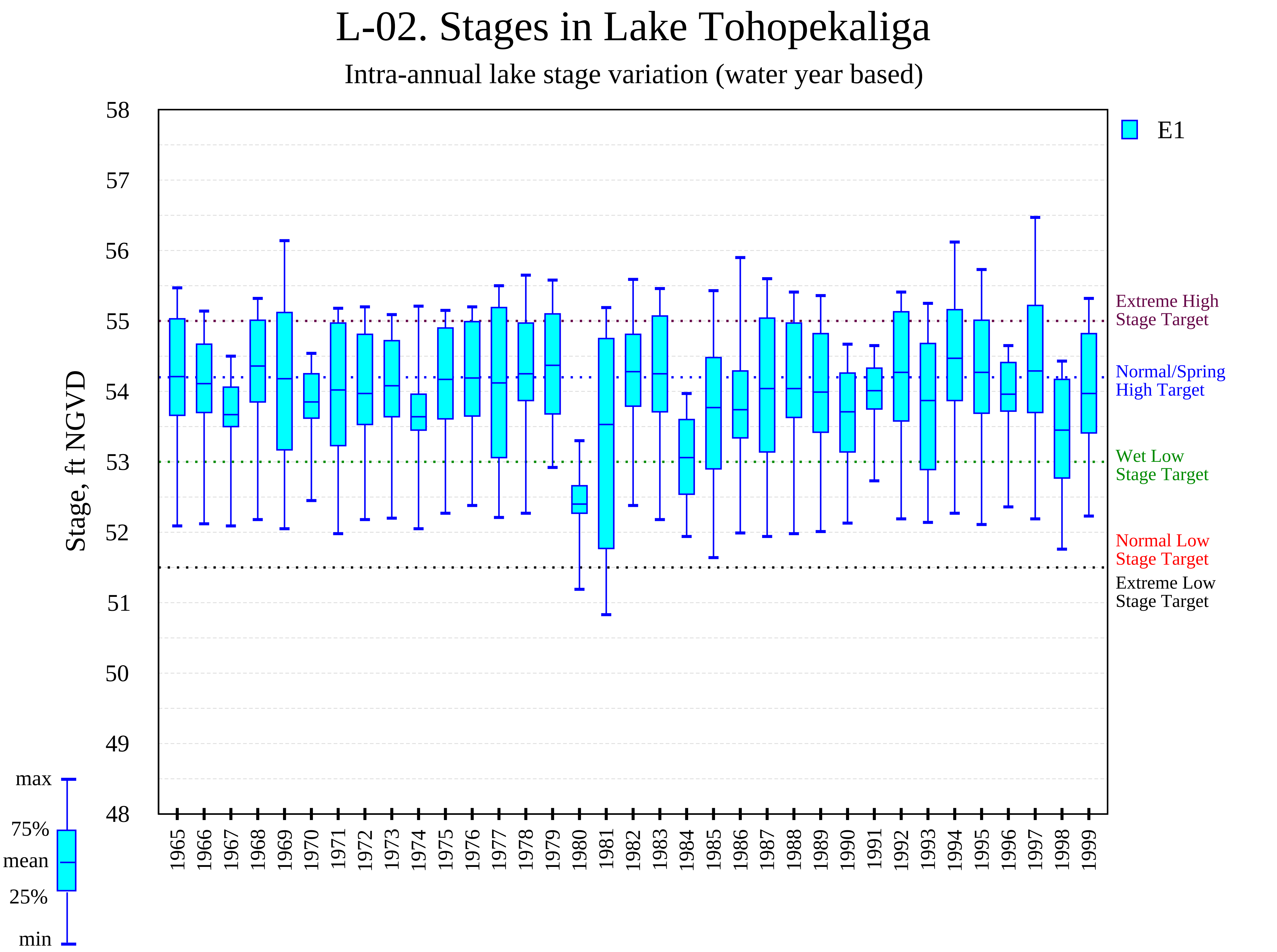


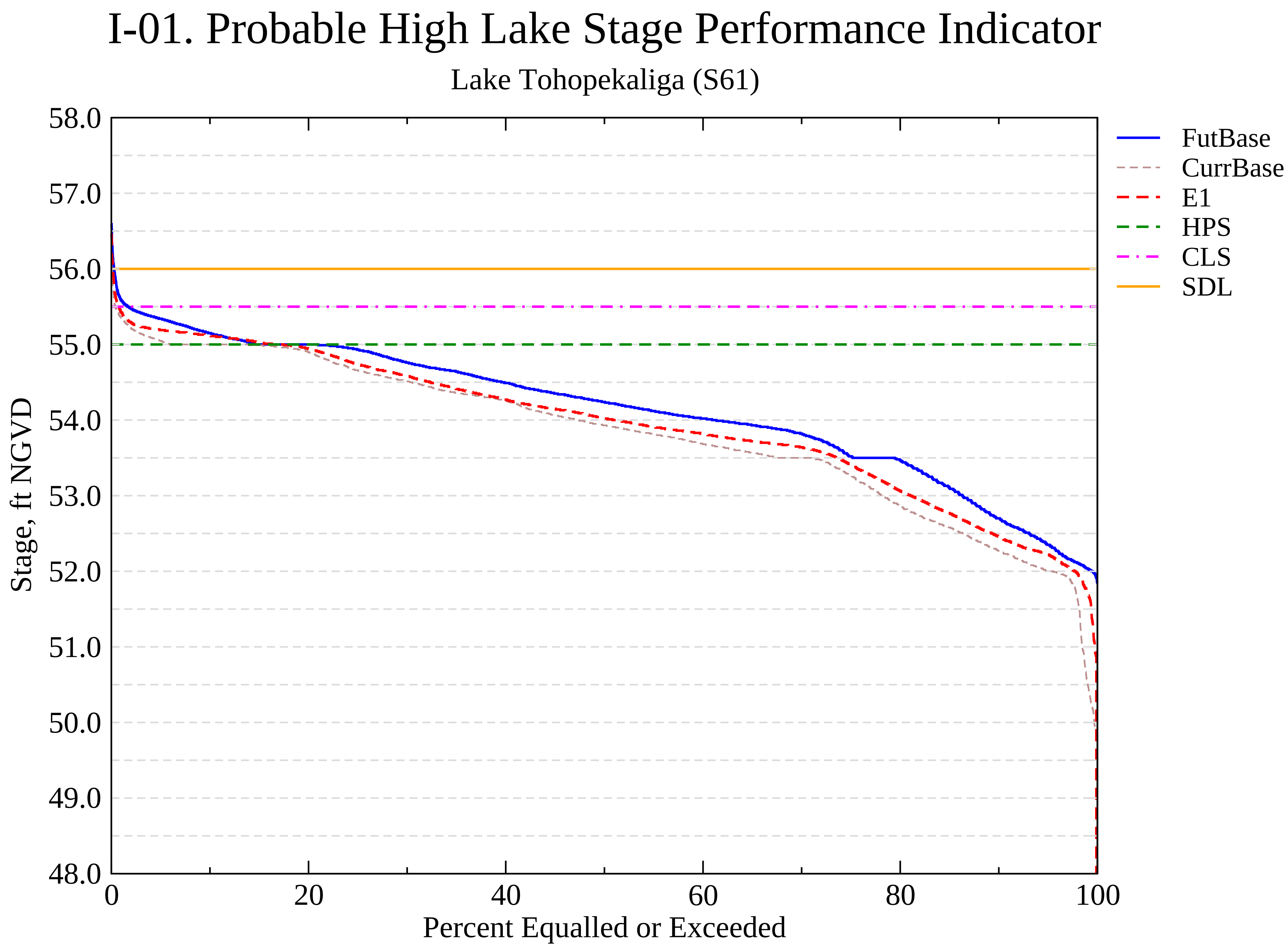
L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
E1

L-02. Stages in Lake Tohopekaliga

Daily Stage Hydrograph with Water Level recession windows (Sept-June)

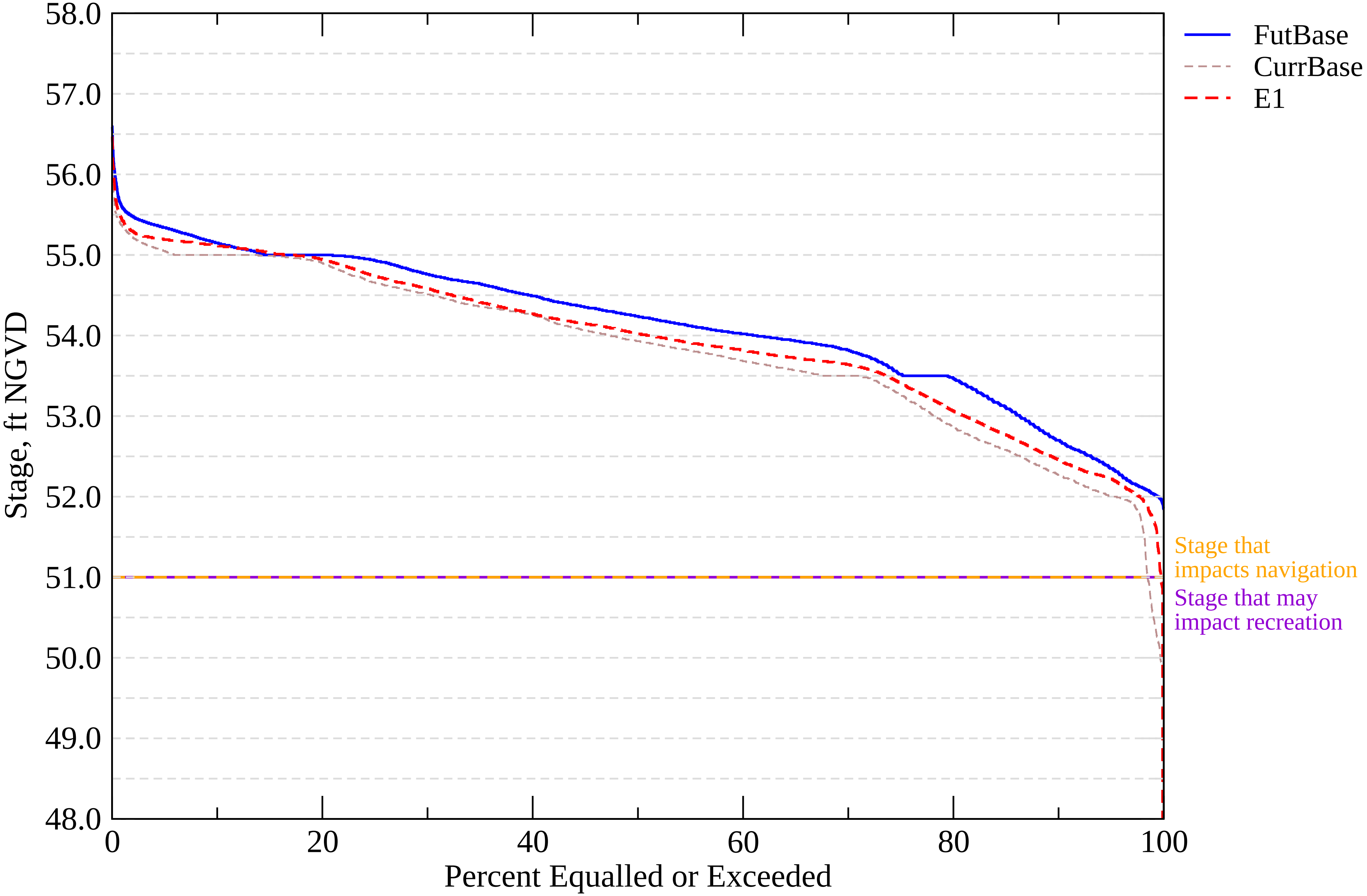



L-02. Stages in Lake Tohopekaliga
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
E1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min


I-01. Probable High Lake Stage Performance Indicator
Lake Tohopekaliga (S61)
Stage, ft NGVD
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E1
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation

Lake Tohopekaliga (S61)



Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

Alternative Description : Uncertainty Analysis - Simulation E1

Run ID : Variation of Kv_ICU - LOW

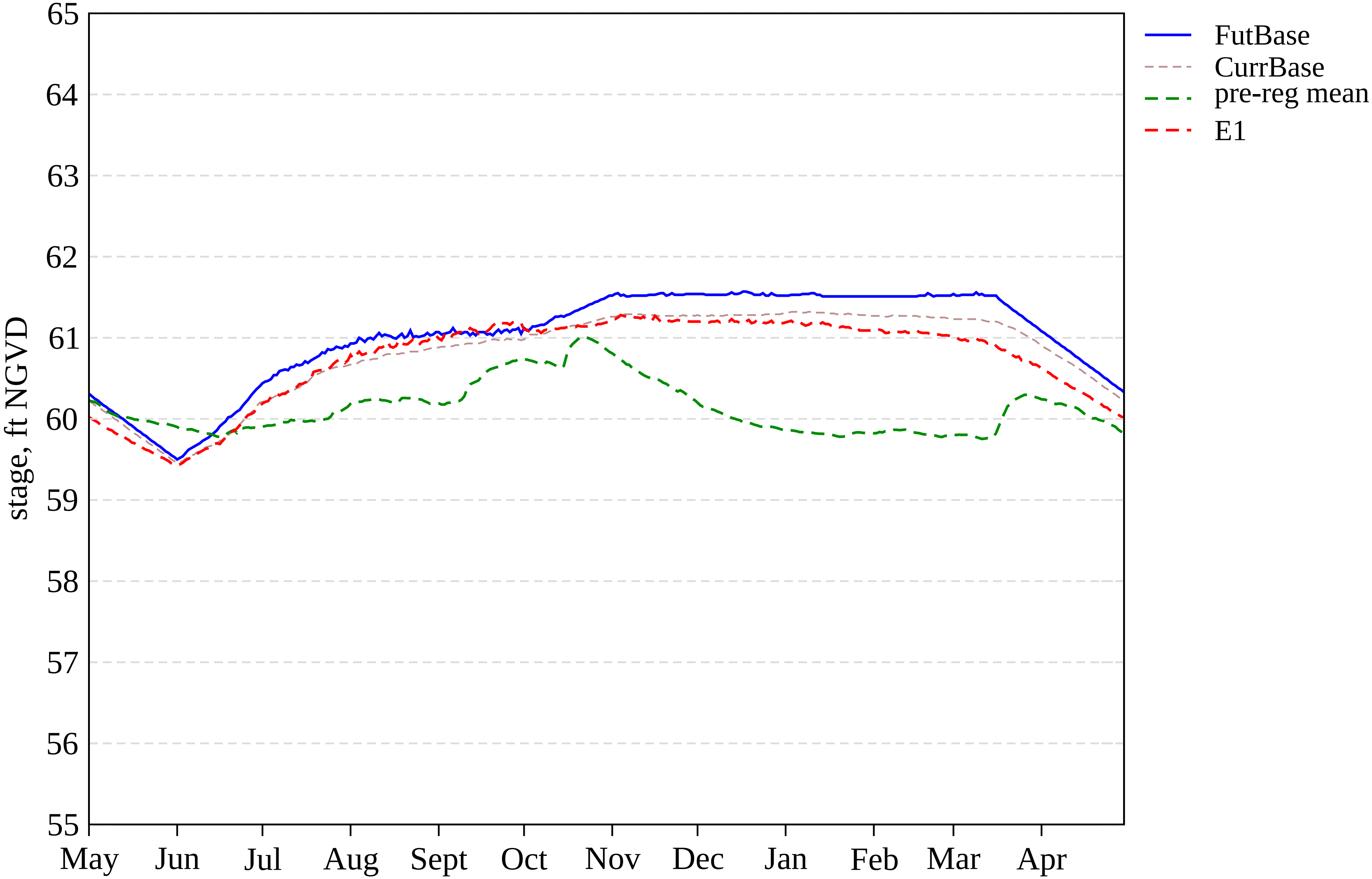
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	25.7
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	71.4
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.8

Tier 2 Report

PDF Report for L03

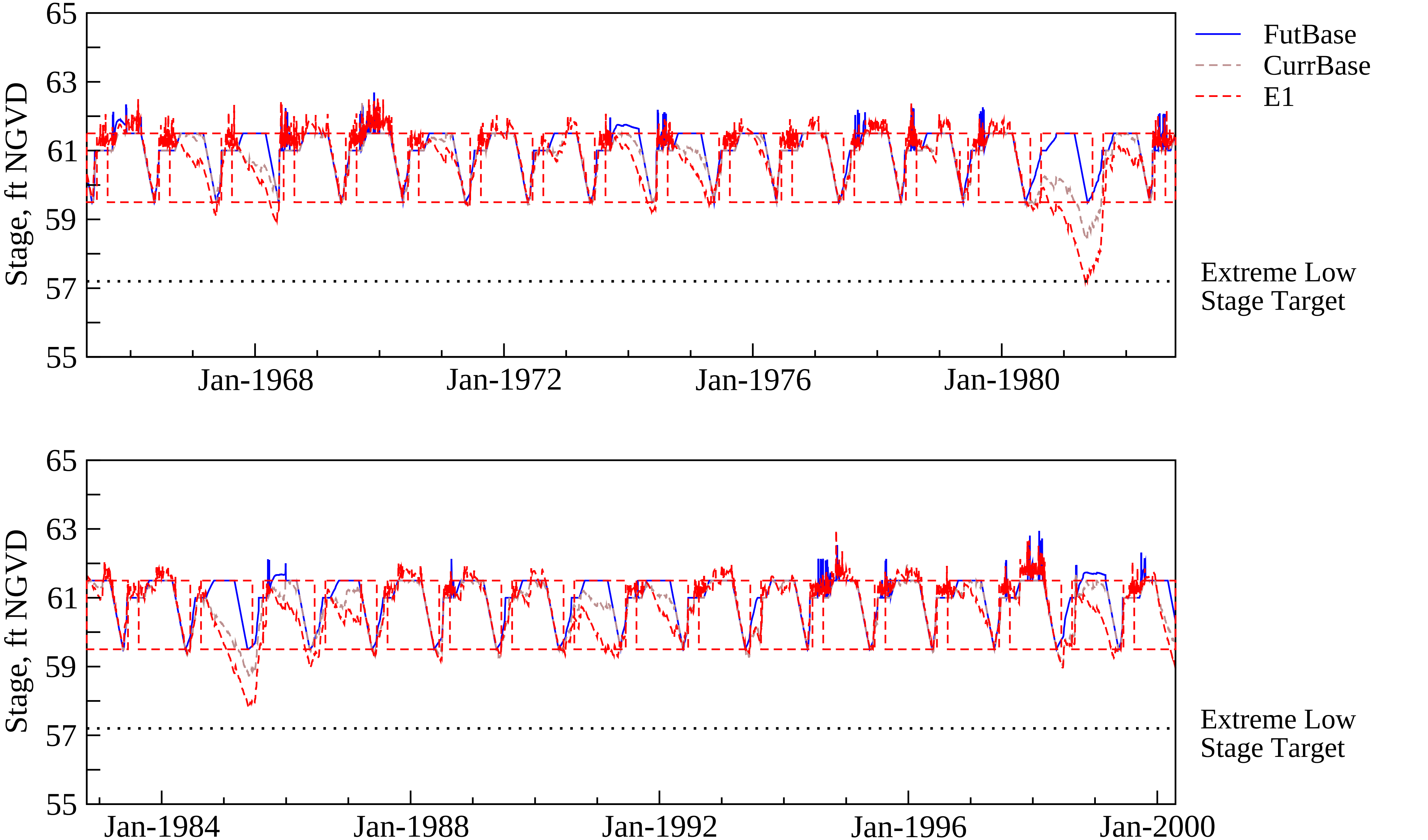
L-03. Stages in Lake Gentry

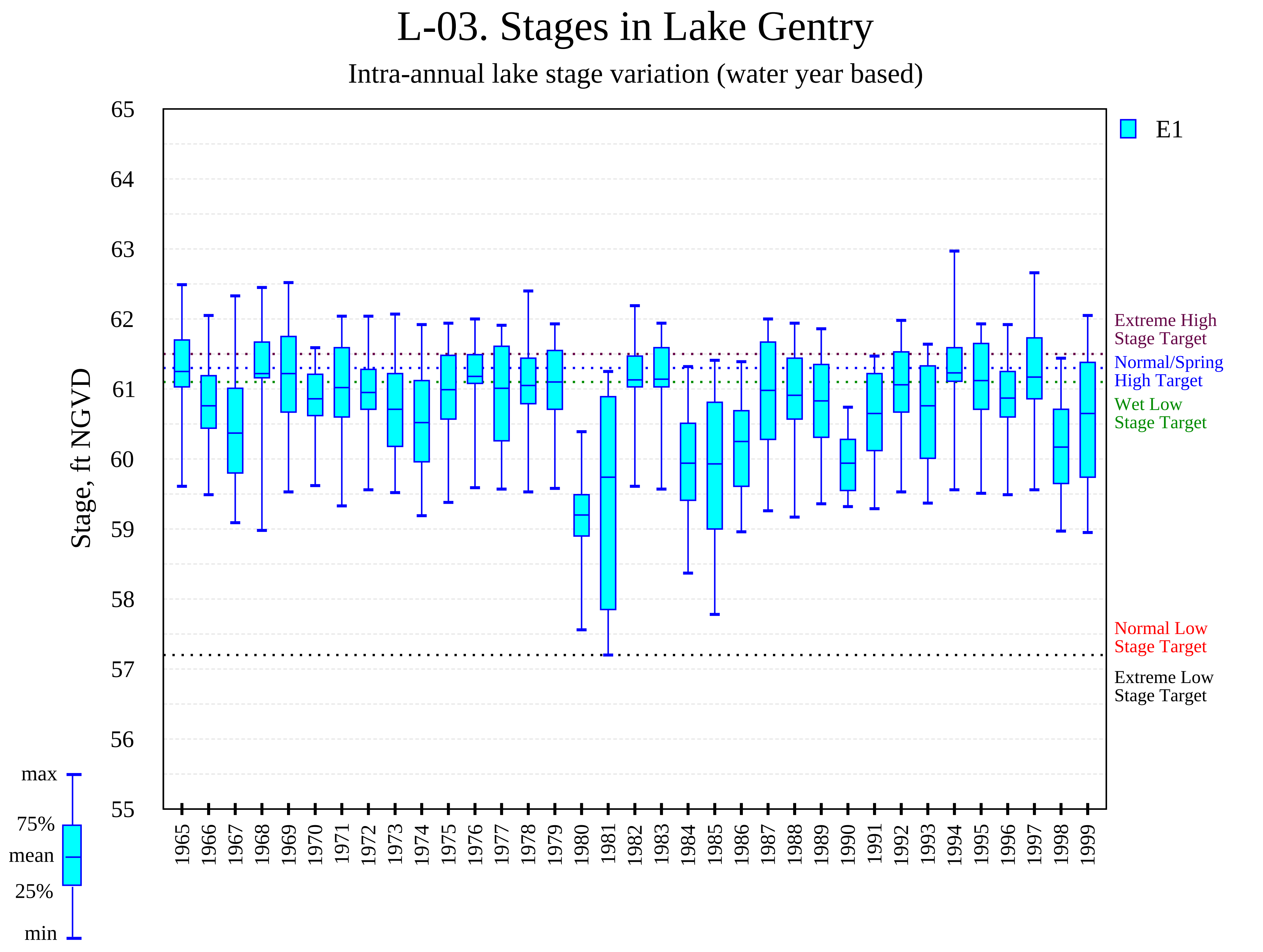
Stage Hydrograph of mean daily stages



L-03. Stages in Lake Gentry

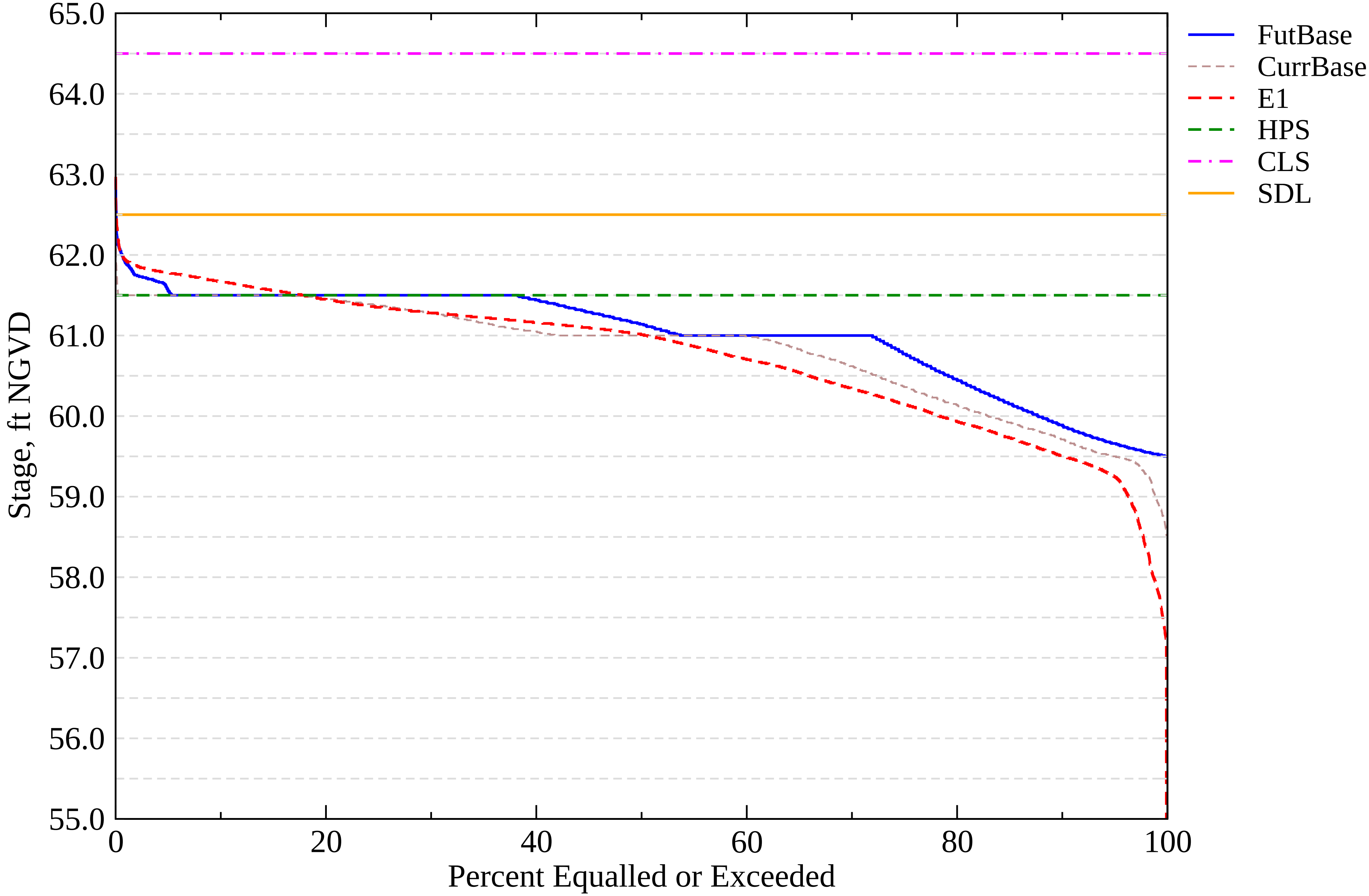
Daily Stage Hydrograph with Water Level recession windows (Sept-June)




L-03. Stages in Lake Gentry
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
E1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
65
64
63
62
61
60
59
58
57
56
55
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

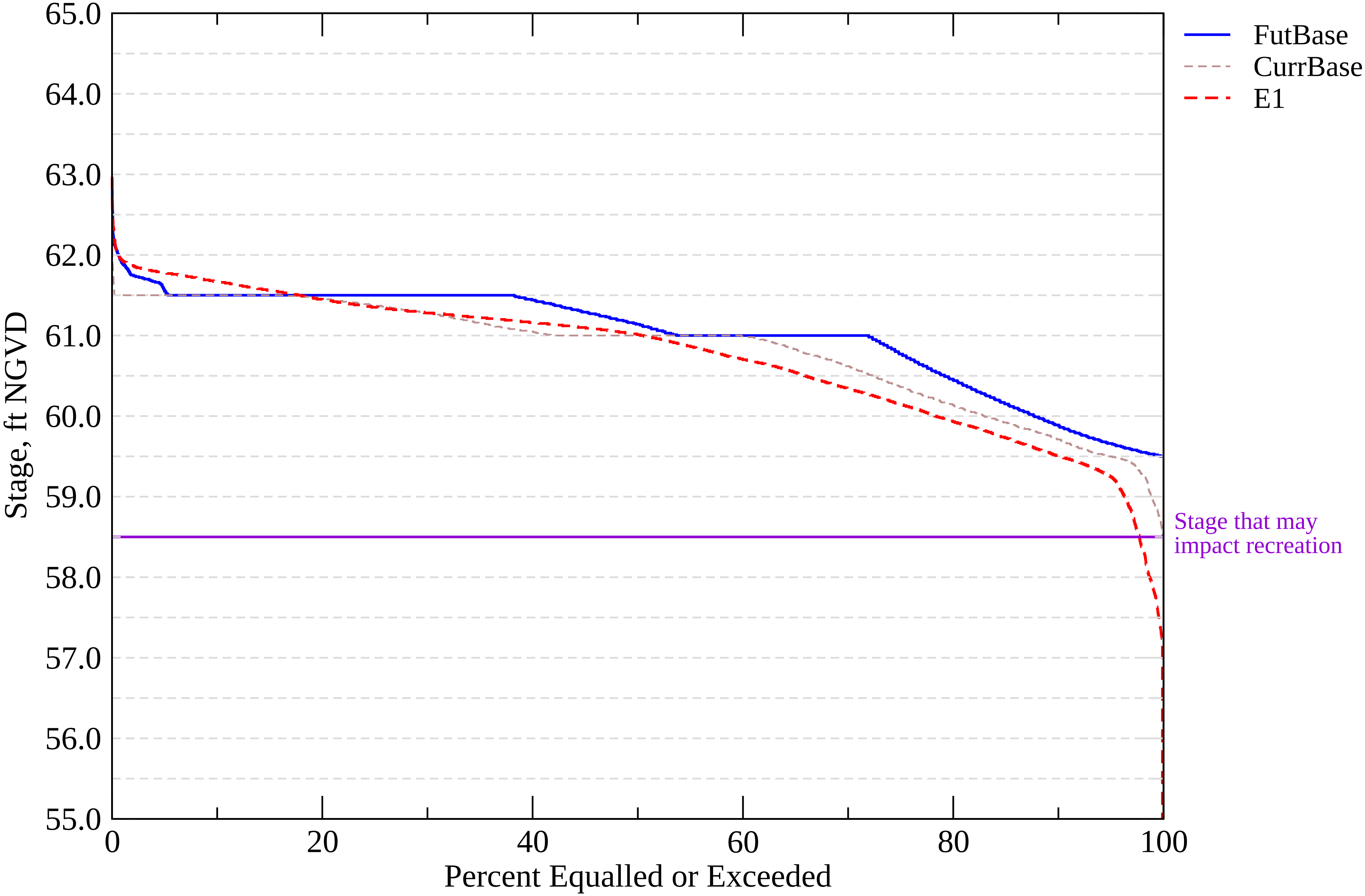
I-01. Probable High Lake Stage Performance Indicator

Lake Gentry (S63)



I-07. Stage Duration for Navigation and Recreation

Lake Gentry (S63)



Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

Alternative Description : Uncertainty Analysis - Simulation E1

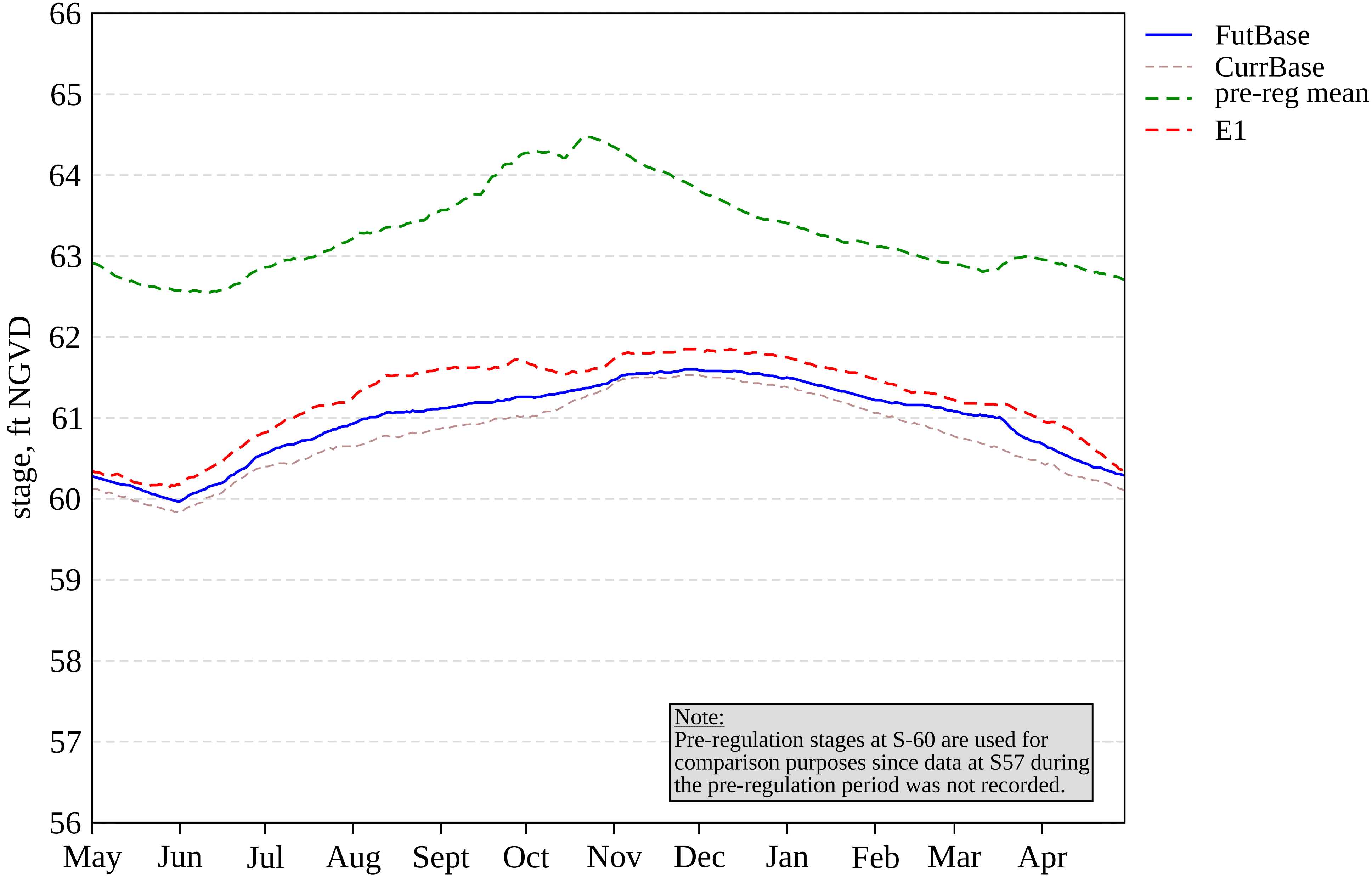
Run ID : Variation of Kv_ICU - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	94.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	23.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	57.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	22.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	74.3
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.5
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	5.6

Tier 2 Report

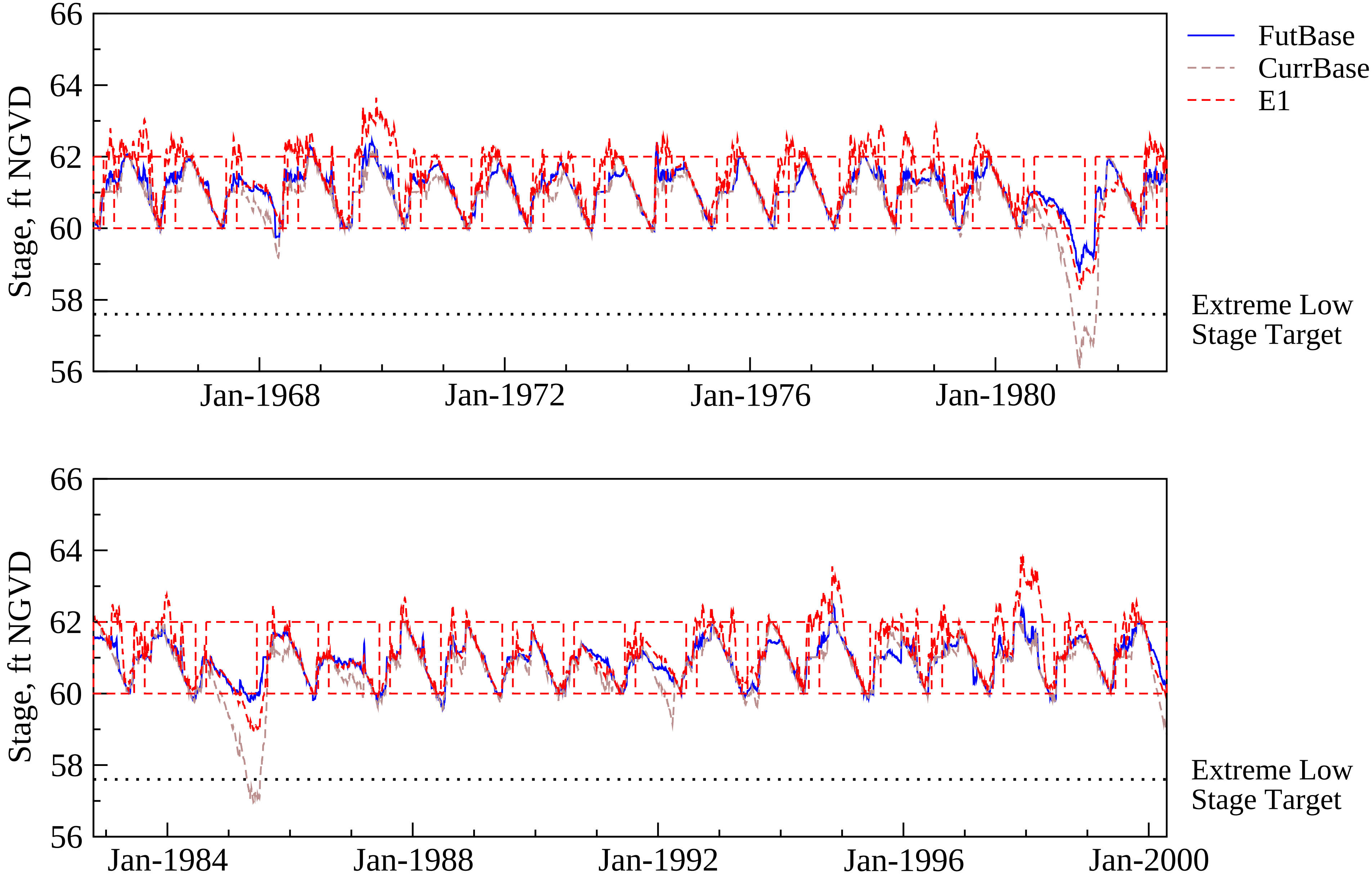
L-04. Stages in Lakes Joel, Myrtle, and Preston

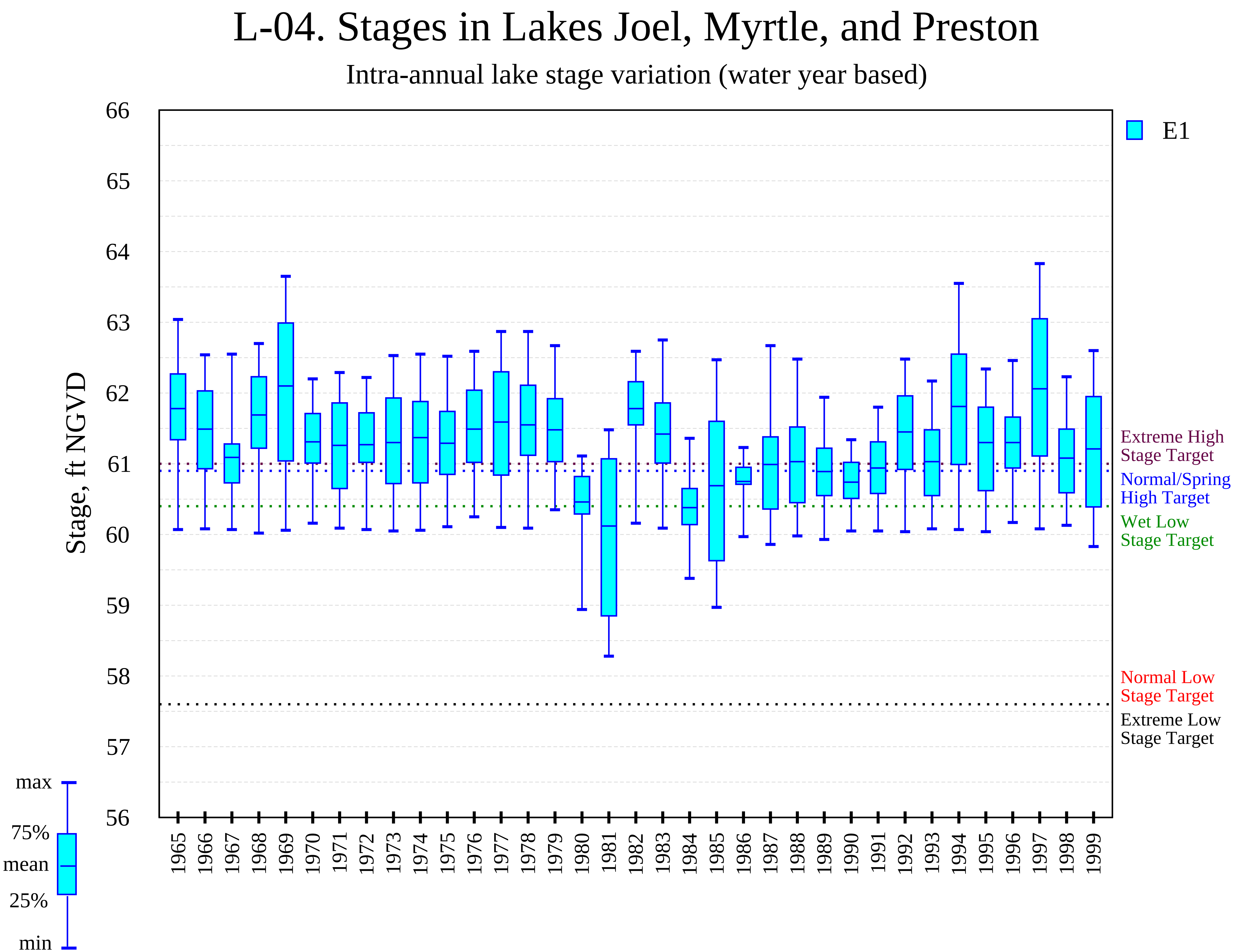
Stage Hydrograph of mean daily stages



L-04. Stages in Lakes Joel, Myrtle, and Preston

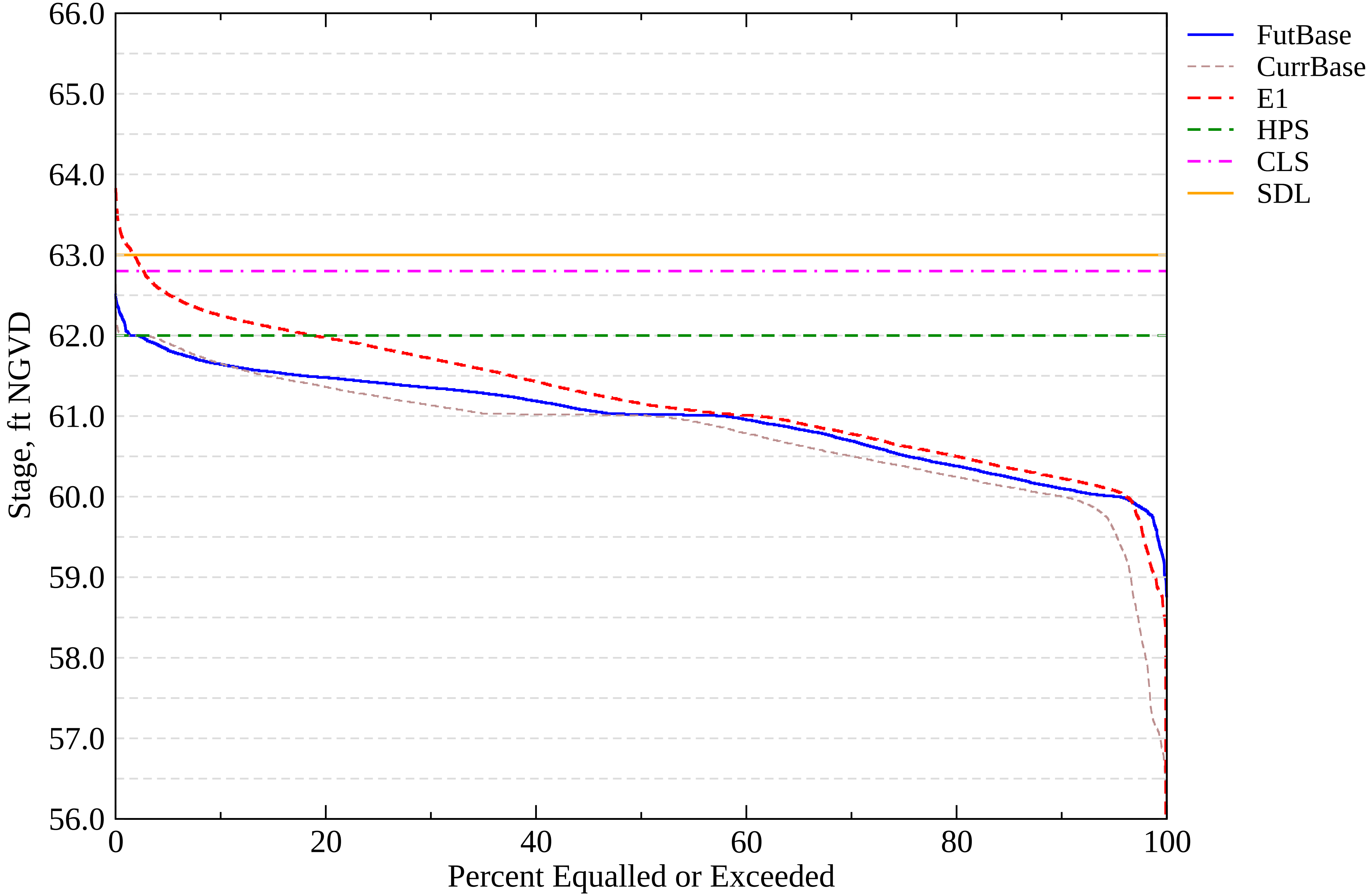
Daily Stage Hydrograph with Water Level recession windows (Sept-June)




L-04. Stages in Lakes Joel, Myrtle, and Preston
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
66
65
64
63
62
61
60
59
58
57
56
E1
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

I-01. Probable High Lake Stage Performance Indicator

Lake Myrtle, Joel, and Preston (S57)



Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation E1

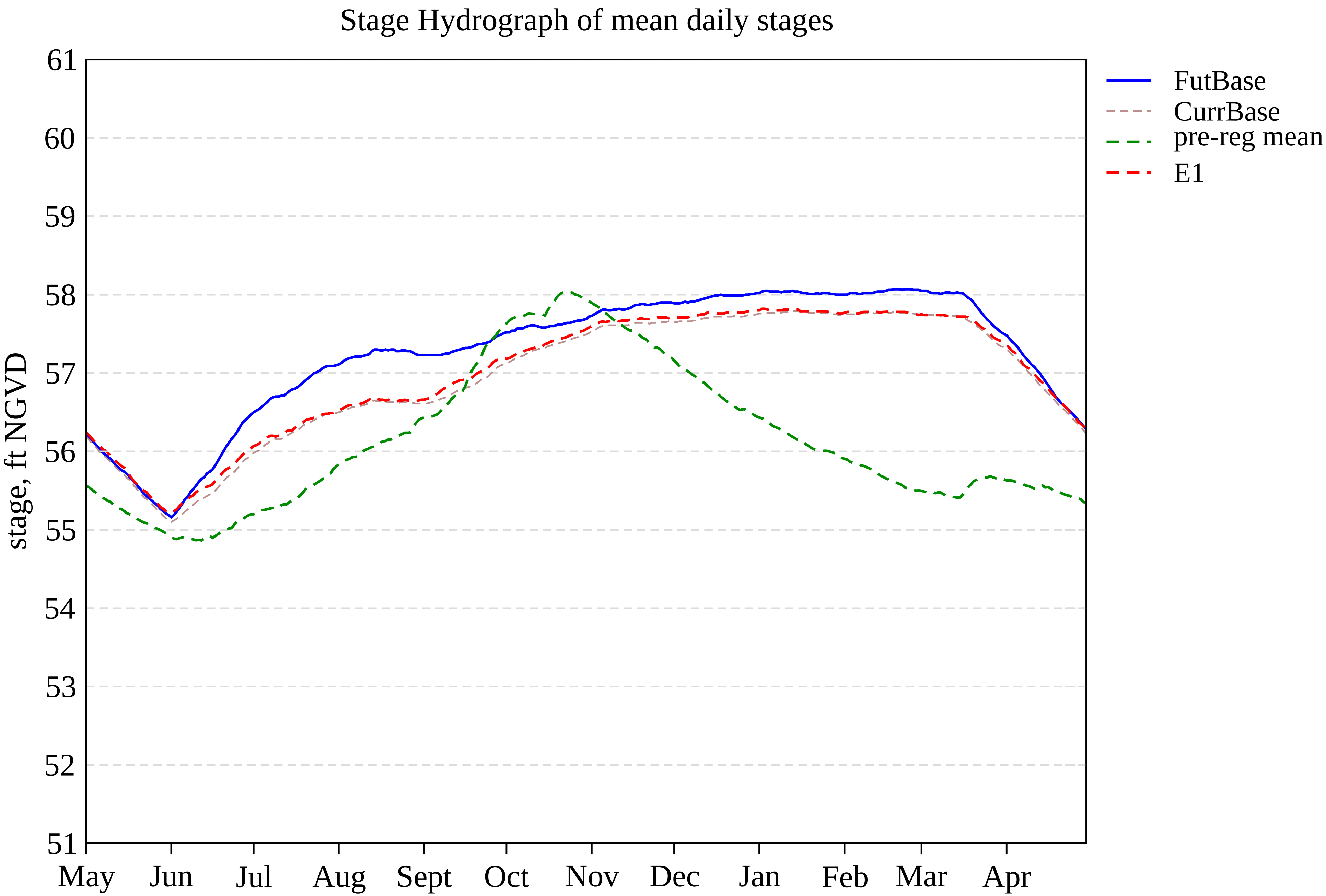
Run ID : Variation of Kv_ICU - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	60.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	60.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	25.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	91.4
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.0
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.4

Tier 2 Report

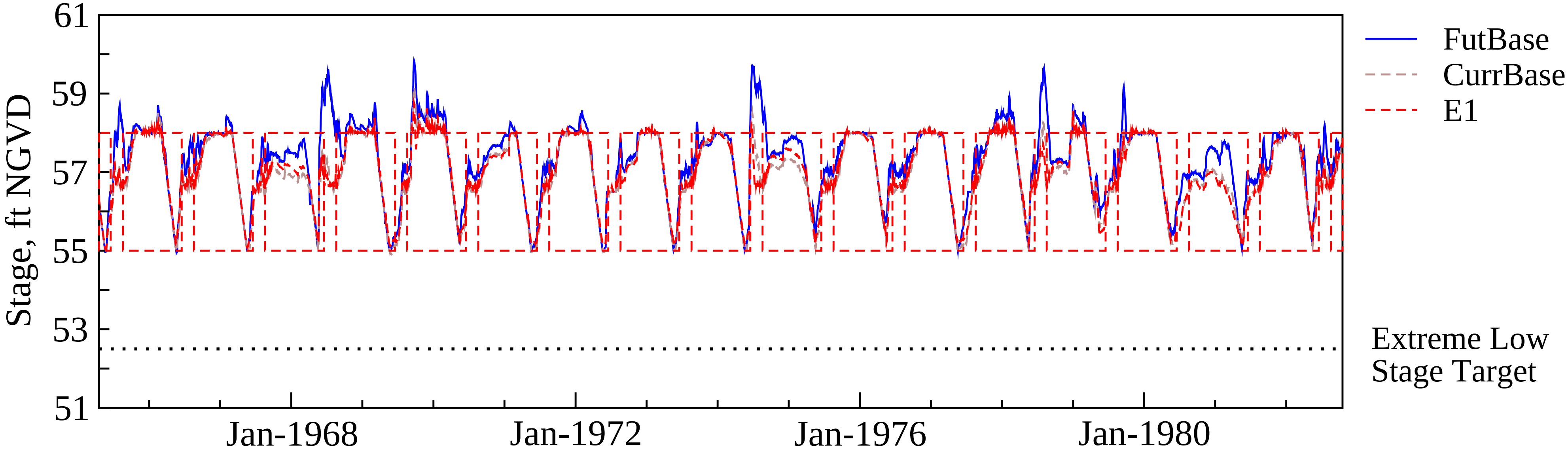
PDF Report for L05

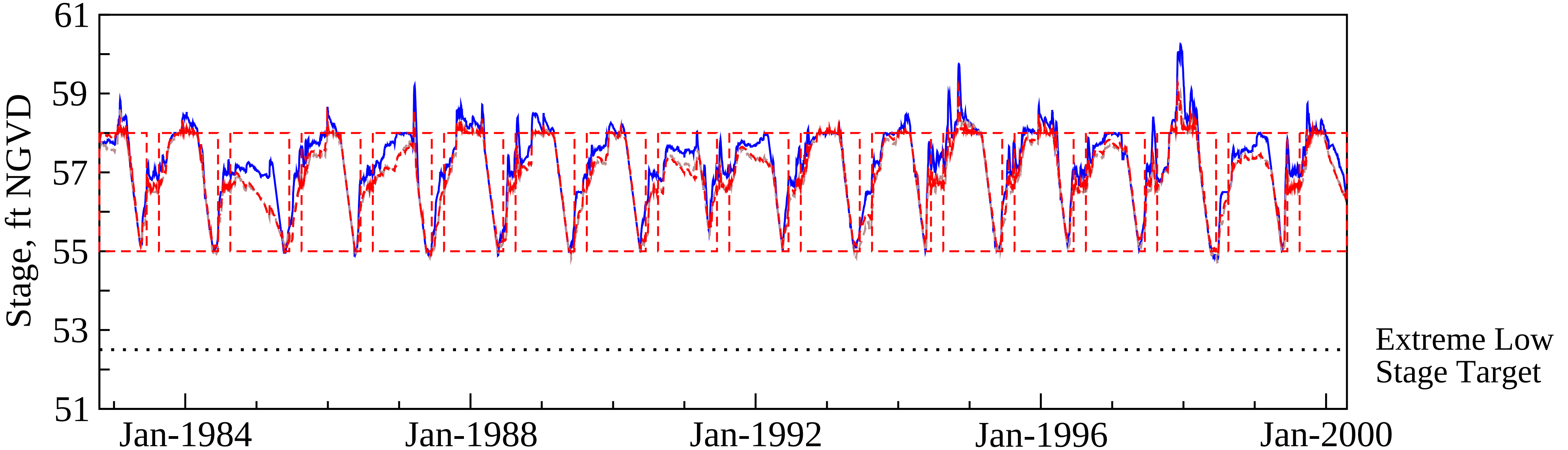
L-05. Stages in East Lake Toho, Fell’s Cove, and Lake Ajay



L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

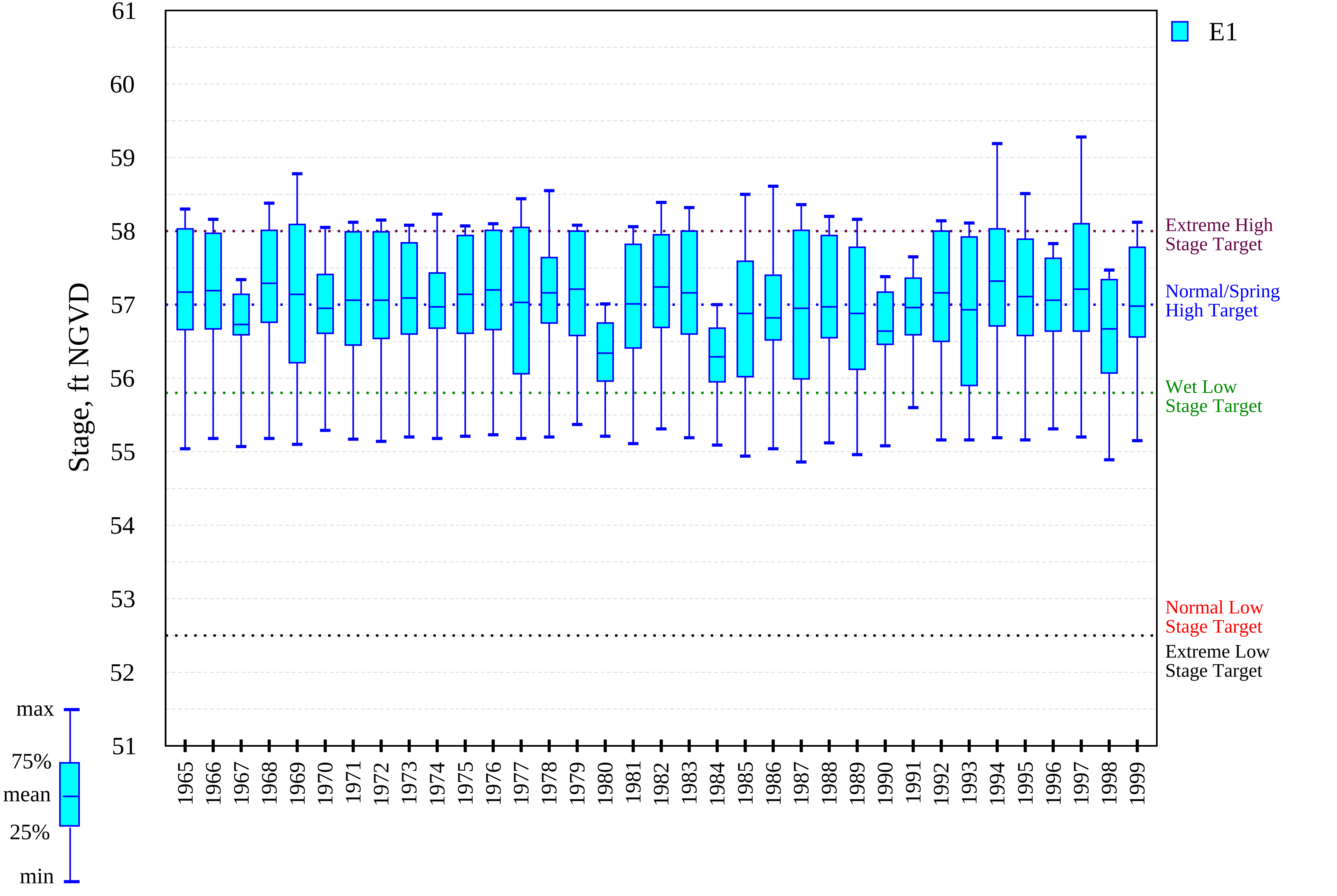
Daily Stage Hydrograph with Water Level recession windows (Sept-June)





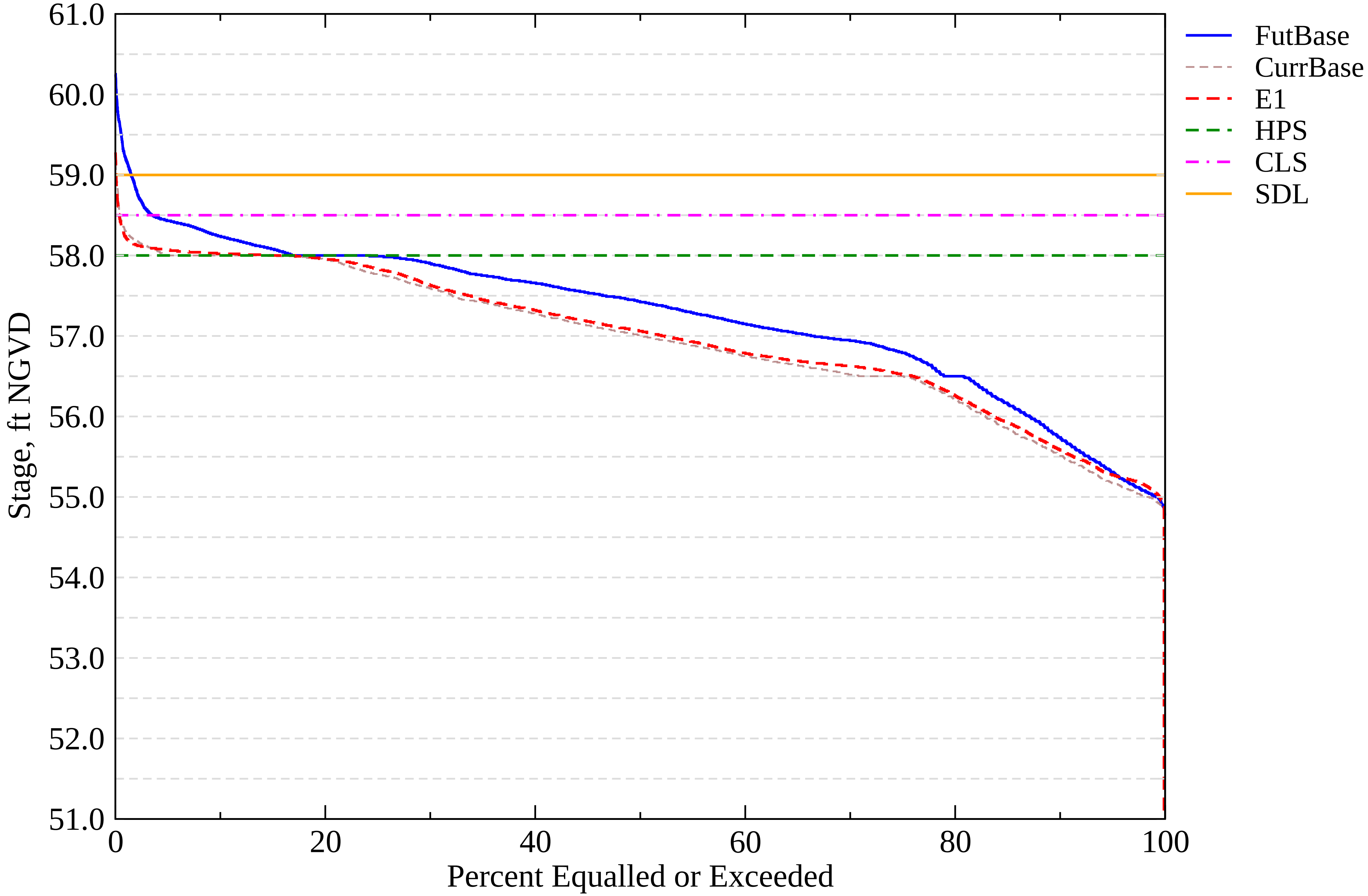
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

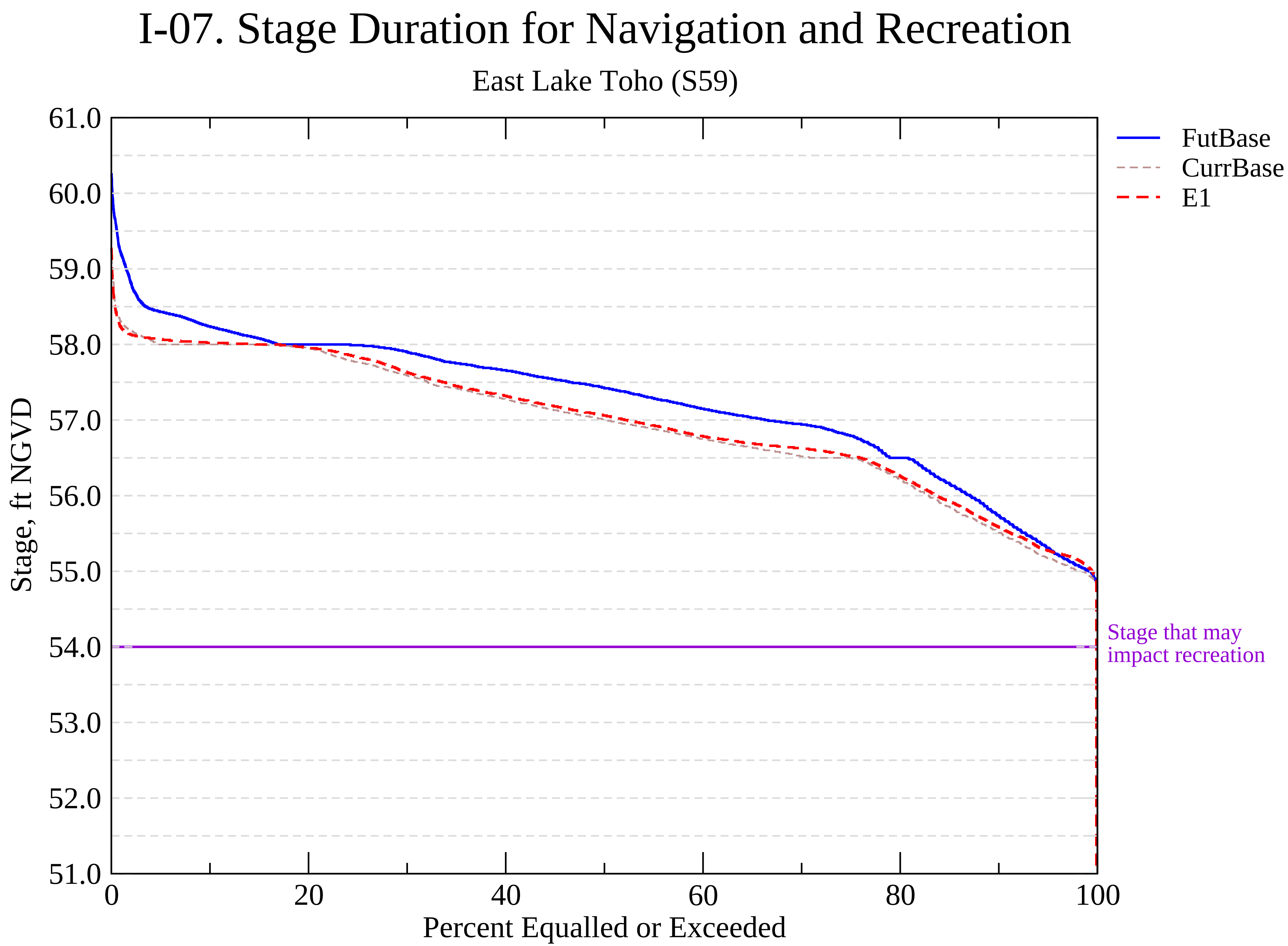
Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

East Lake Toho (S59)




I-07. Stage Duration for Navigation and Recreation
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E1
Stage that may impact recreation

Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

Alternative Description : Uncertainty Analysis - Simulation E1

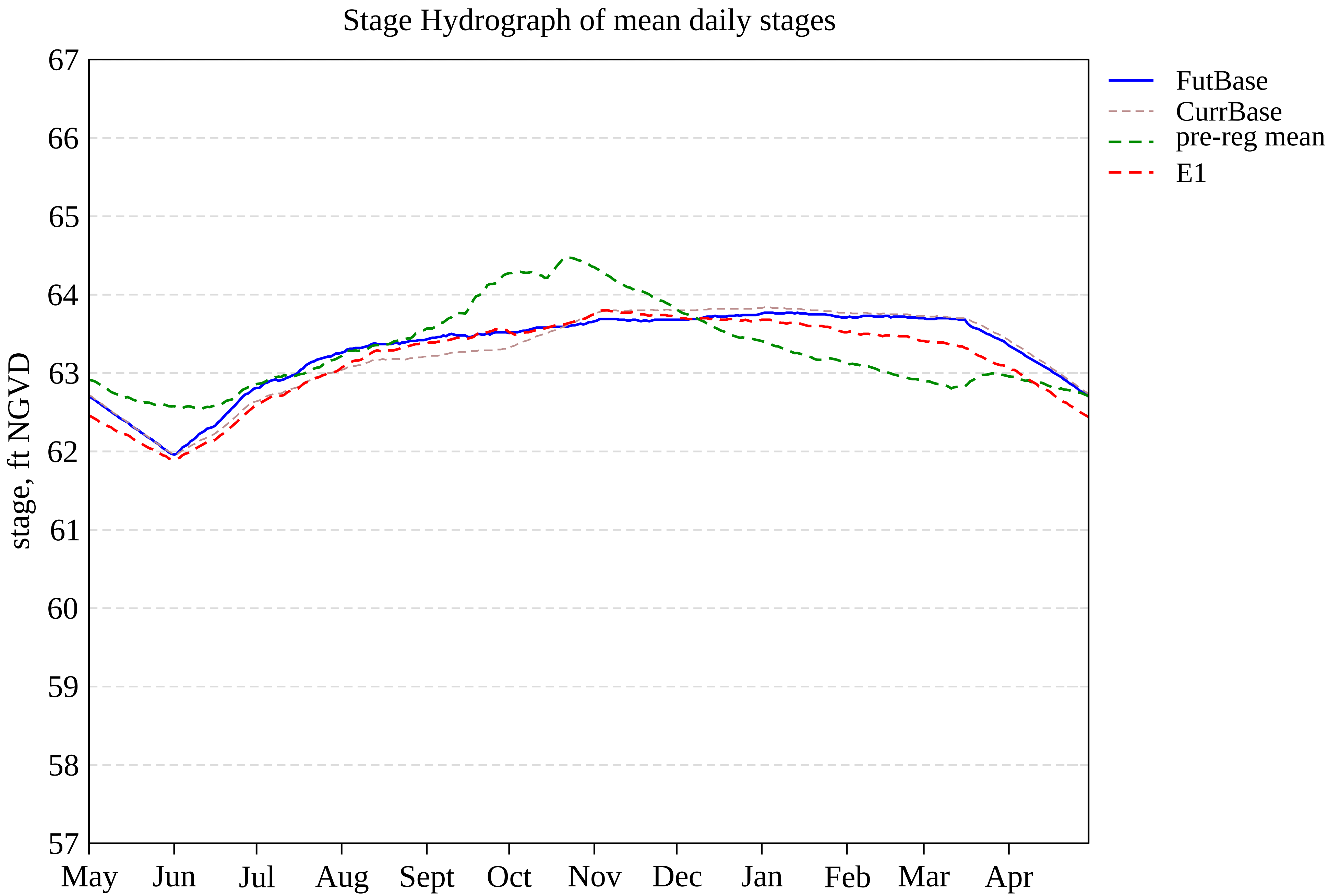
Run ID : Variation of Kv_ICU - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	3.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	97.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	88.6
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	6.3

Tier 2 Report

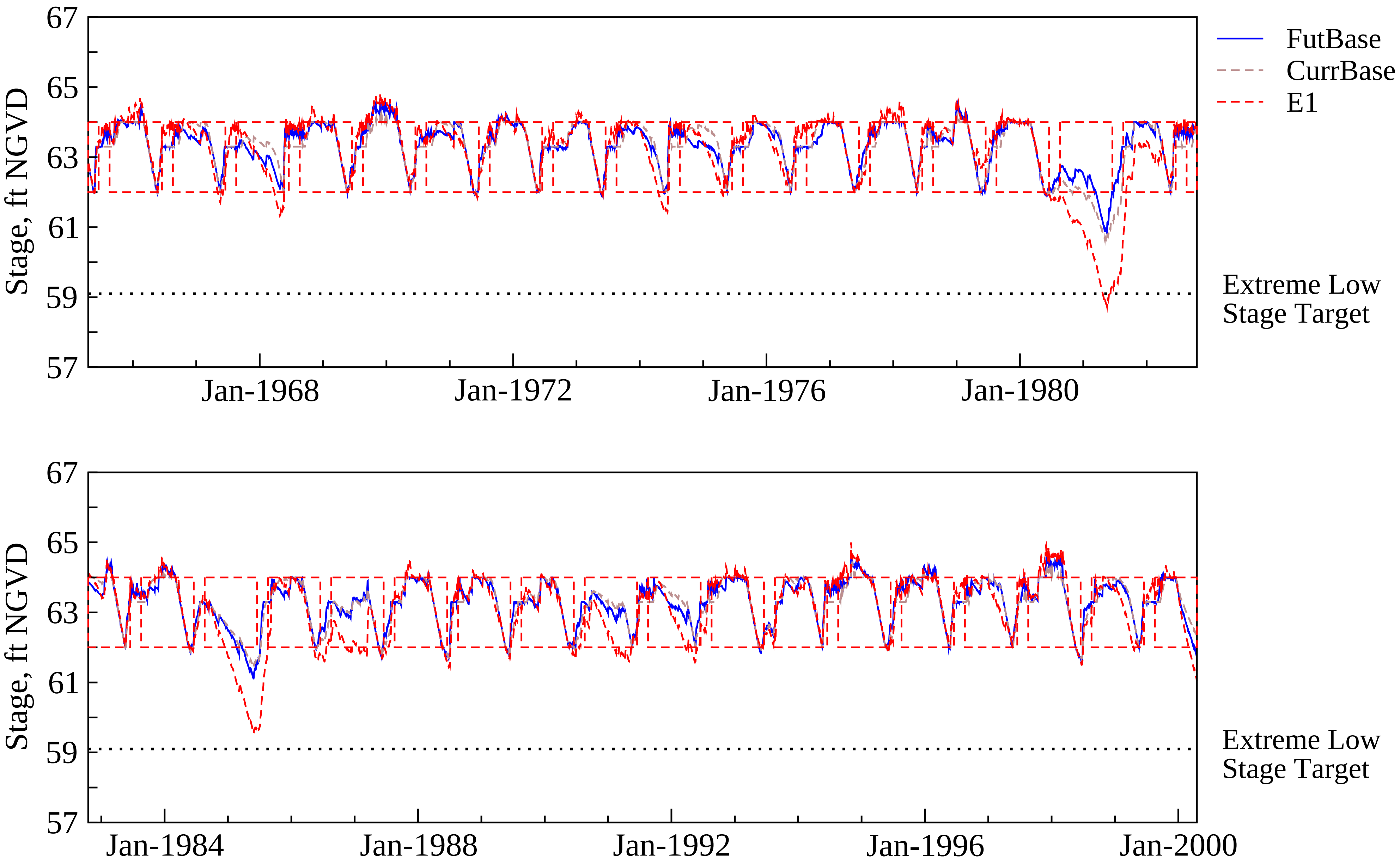
PDF Report for L06

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout



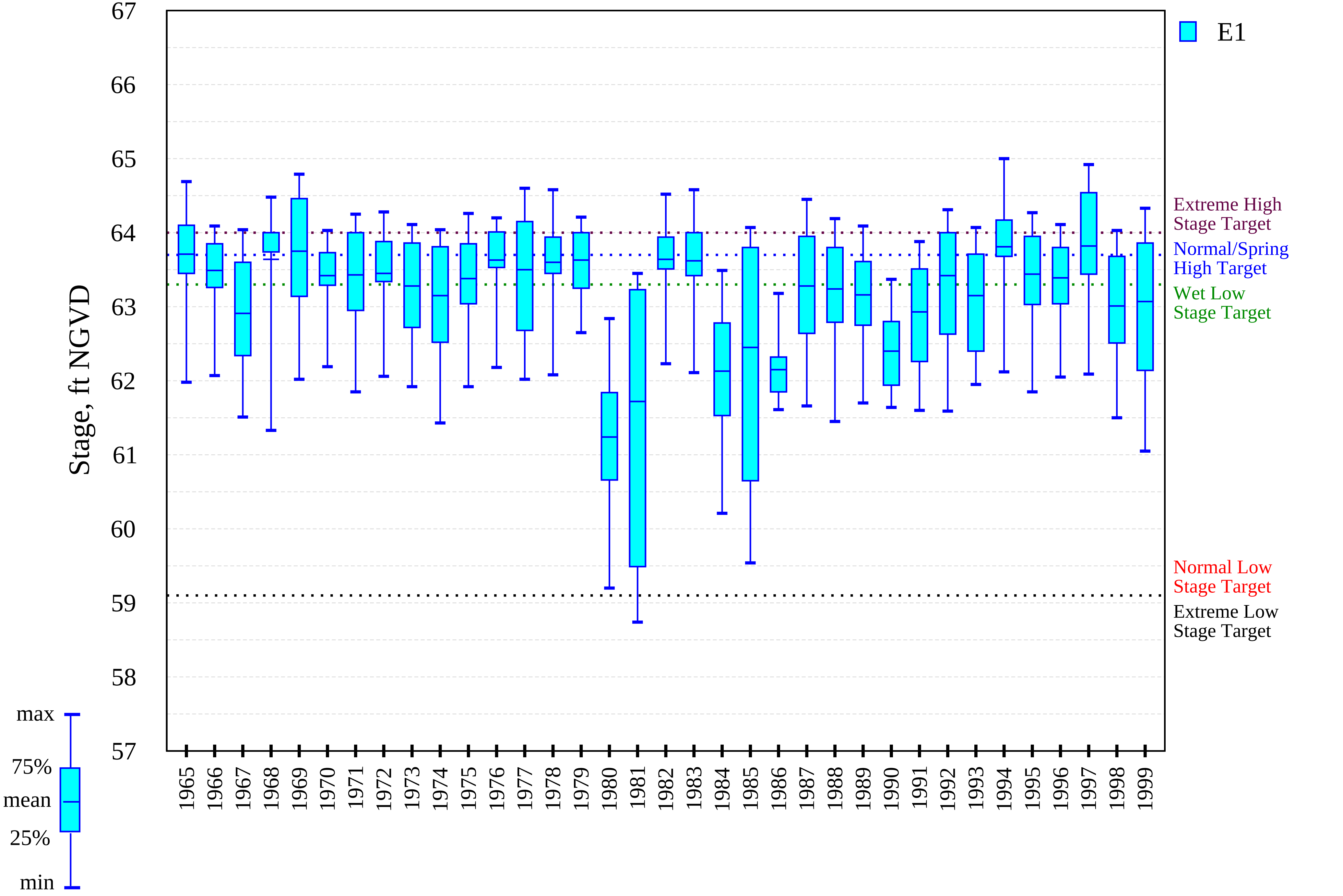
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



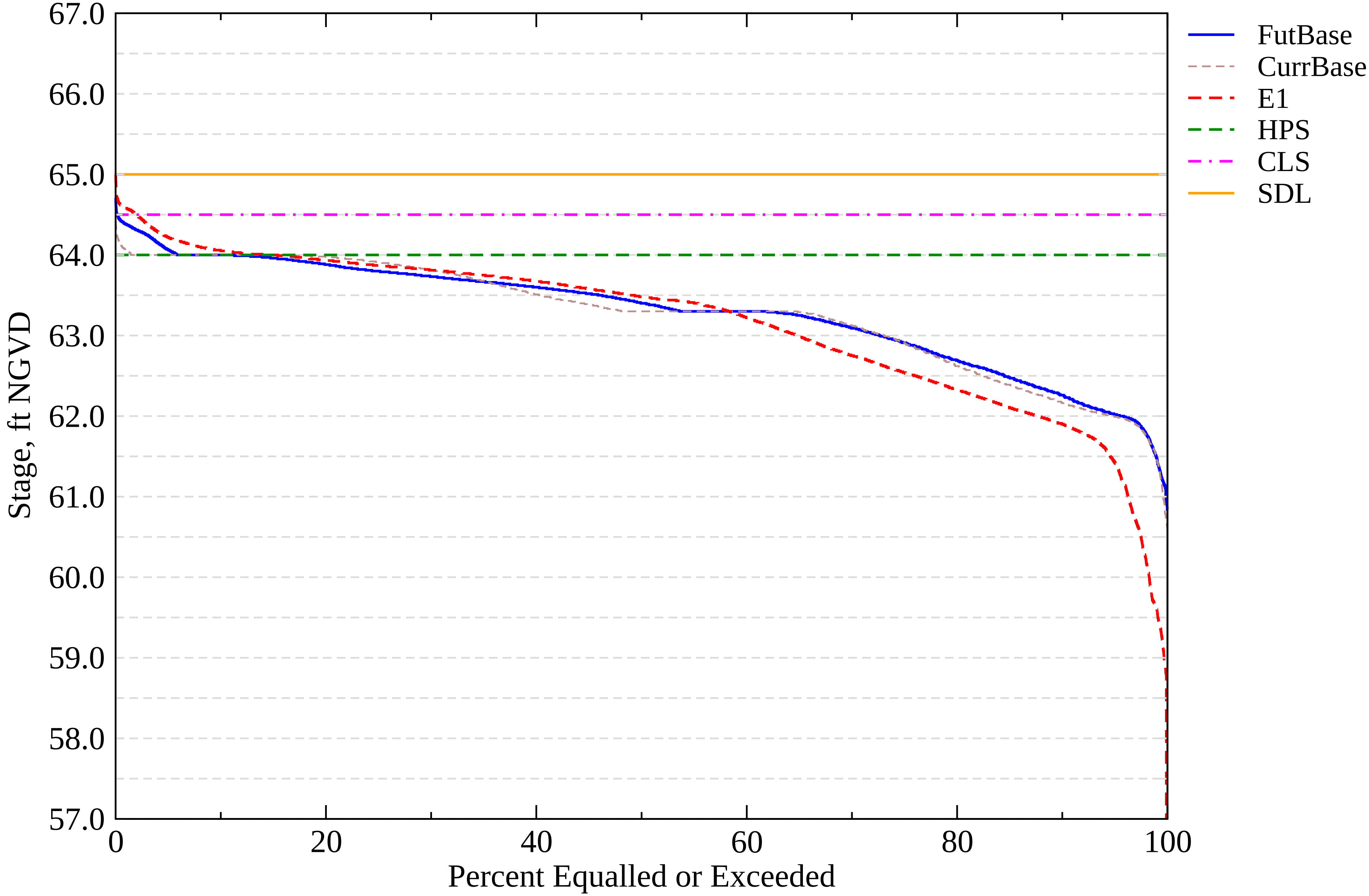
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Intra-annual lake stage variation (water year based)



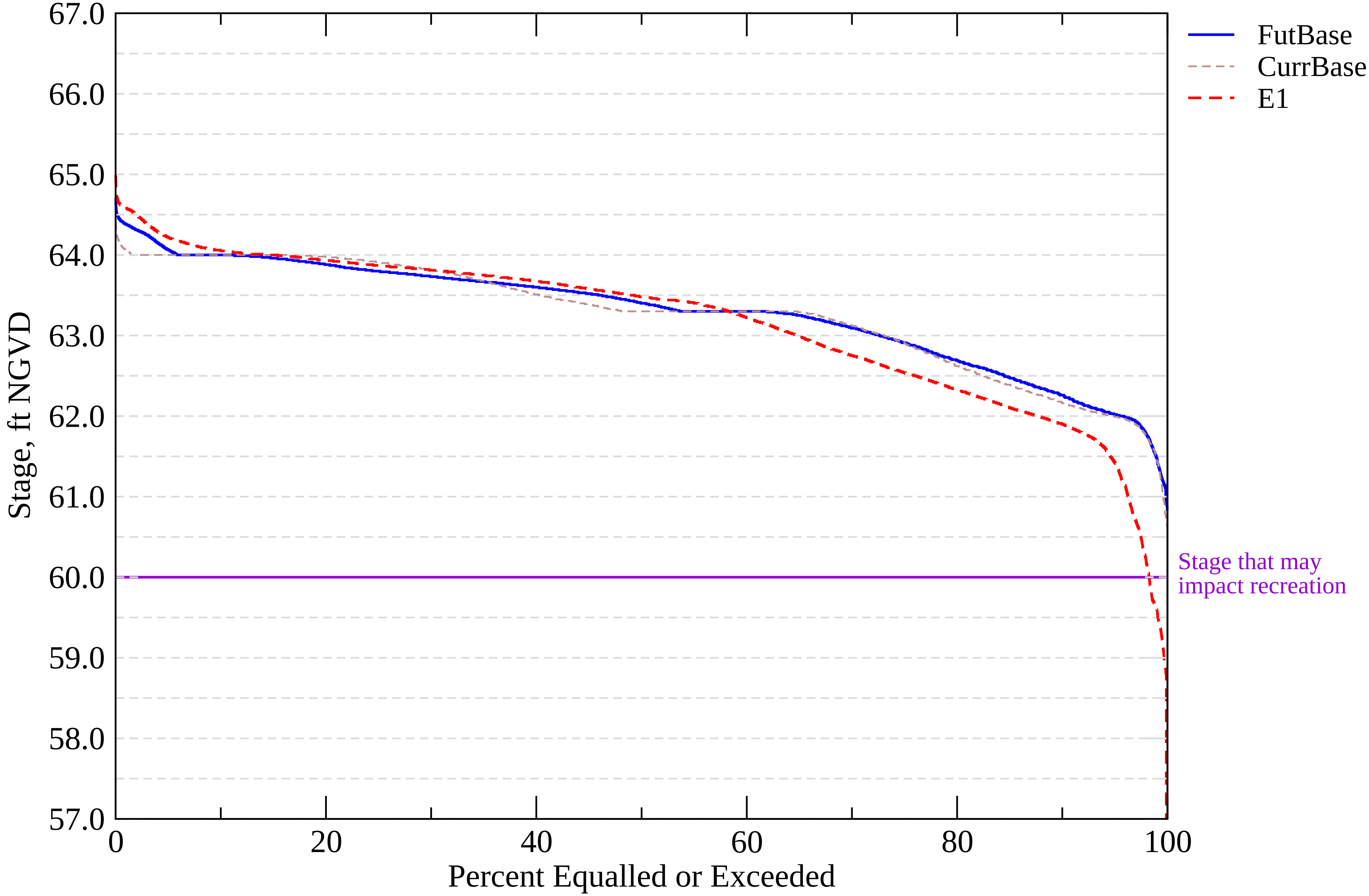
I-01. Probable High Lake Stage Performance Indicator

Alligator Chain of Lakes (S60)



I-07. Stage Duration for Navigation and Recreation

Alligator Chain of Lakes (S60)



Evaluation Performance Measure Score for S-62

L-07. Stages in Lake Hart and Mary Jane

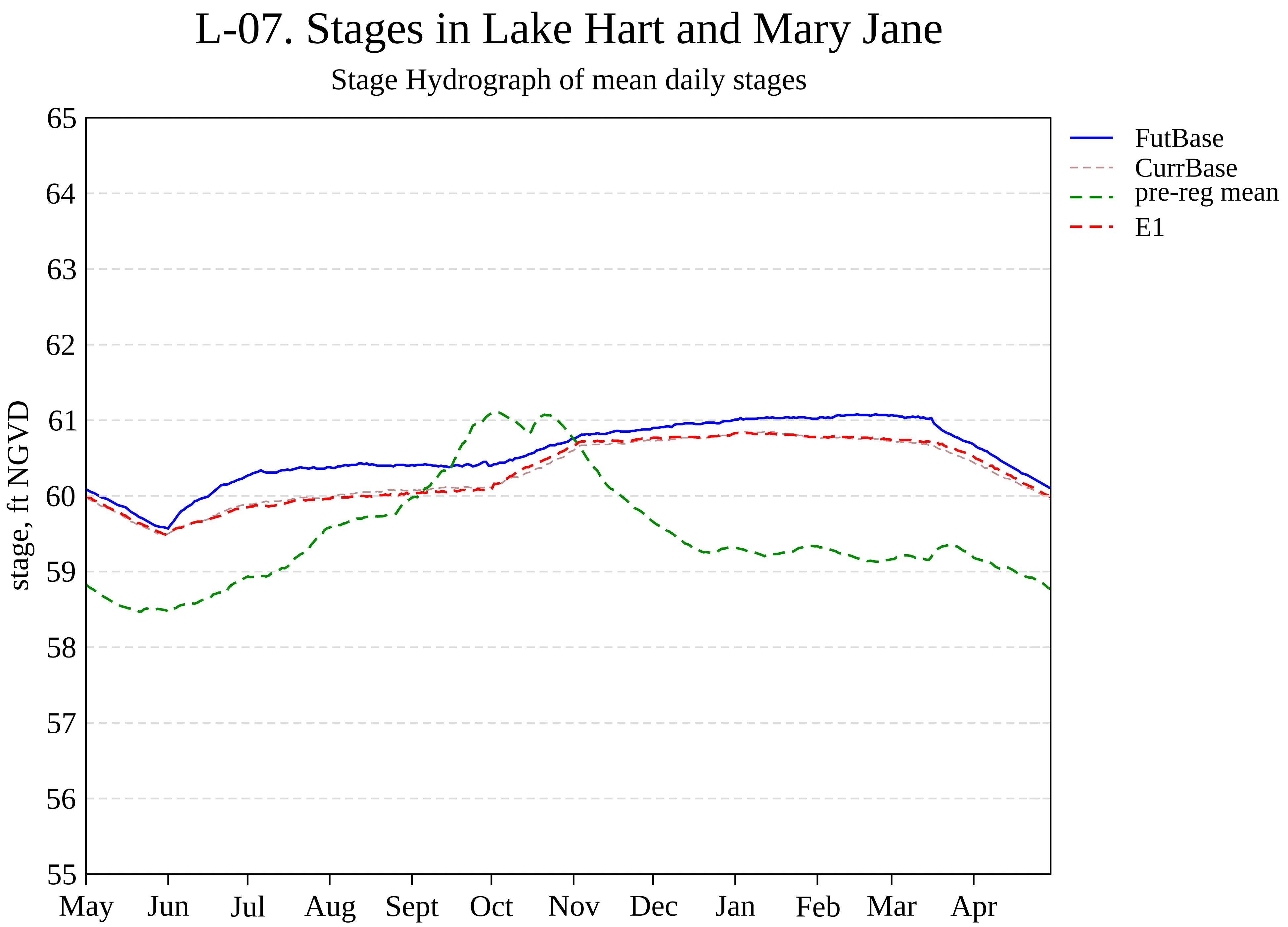
Alternative Description : Uncertainty Analysis - Simulation E1

Run ID : Variation of Kv_ICU - LOW

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	69.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	71.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	46.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	25.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	3.5
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	63.0

Tier 2 Report

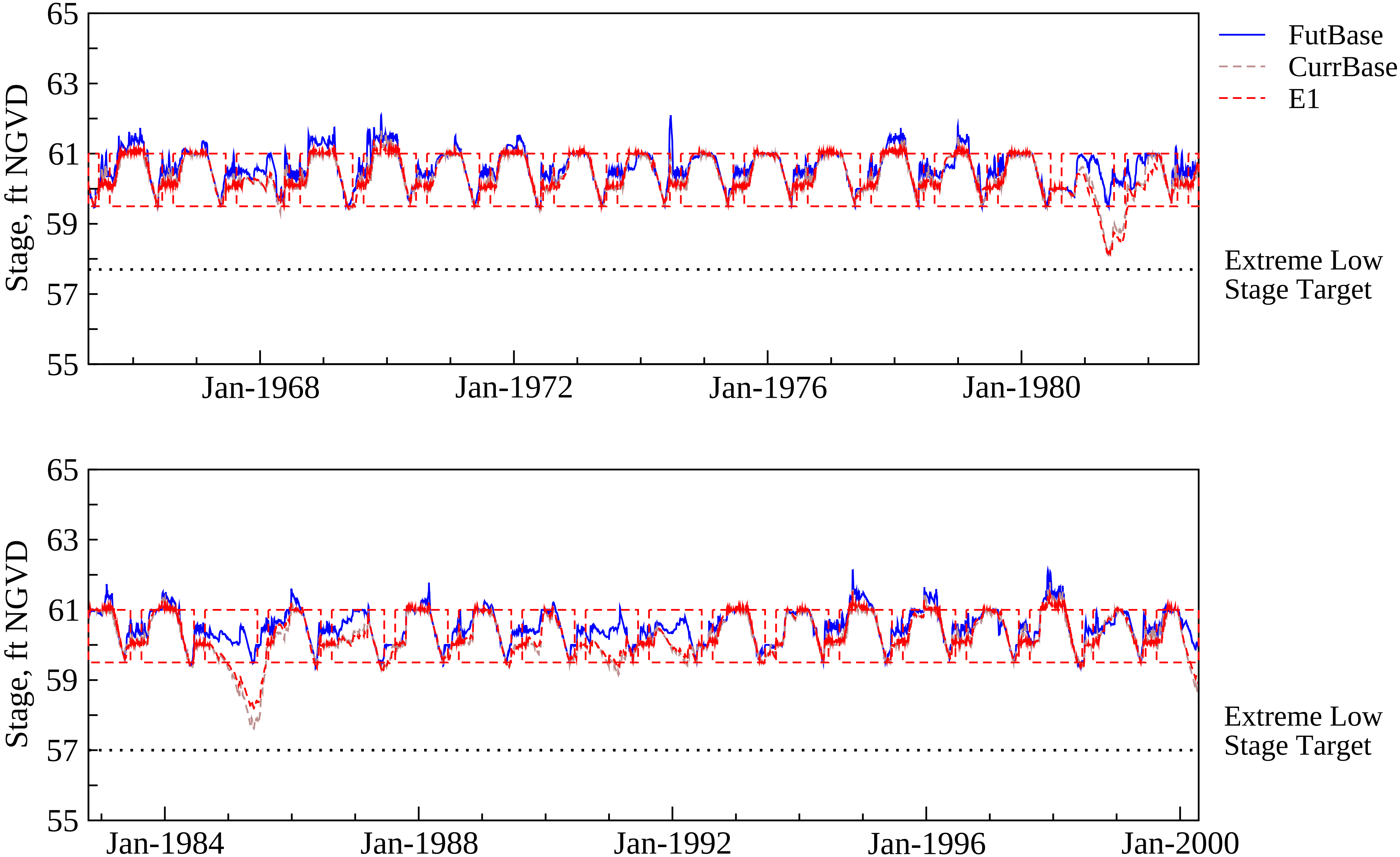
PDF Report for L07



L-07. Stages in Lake Hart and Mary Jane
Stage Hydrograph of mean daily stages
stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
E1

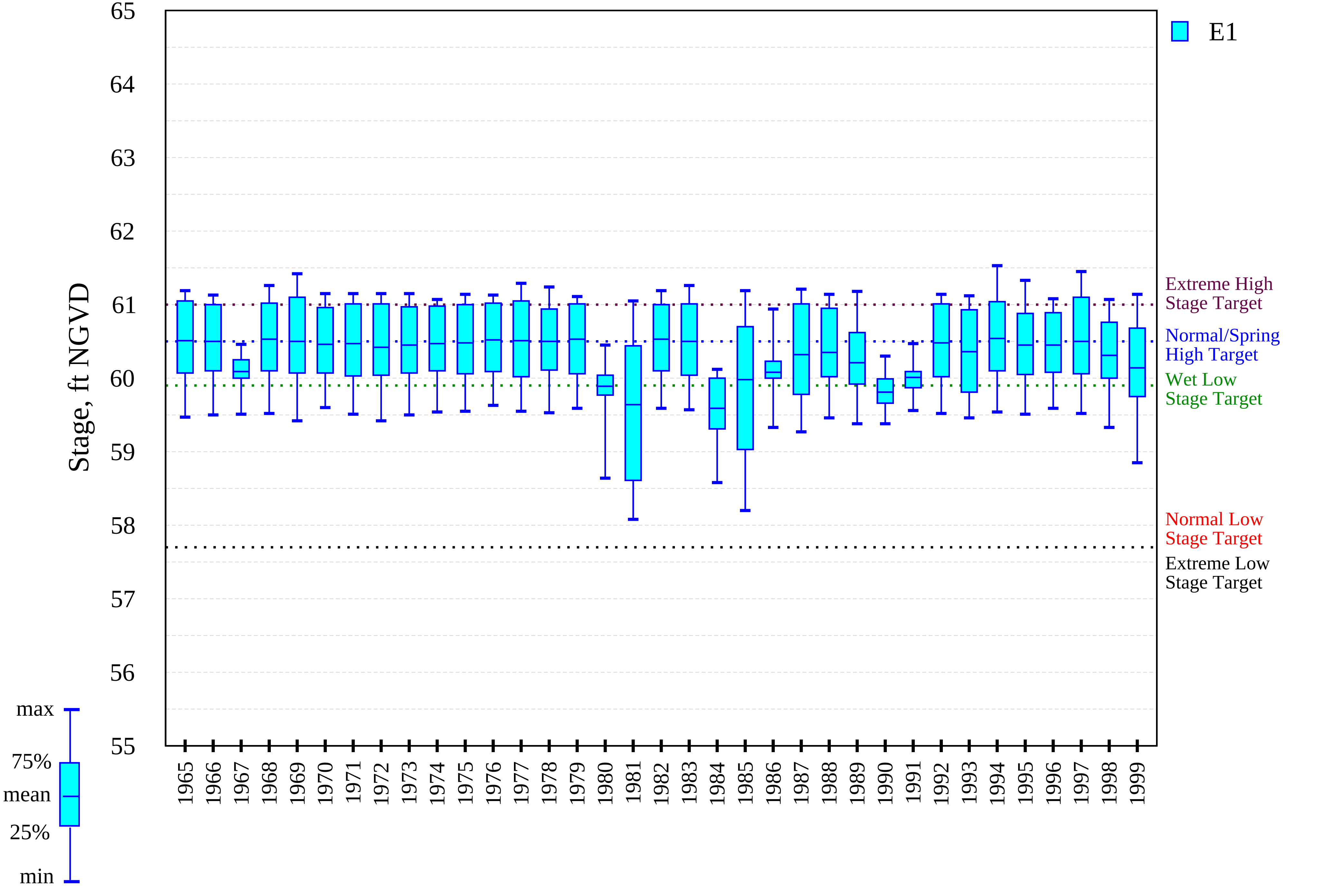
L-07. Stages in Lakes Hart and Mary Jane

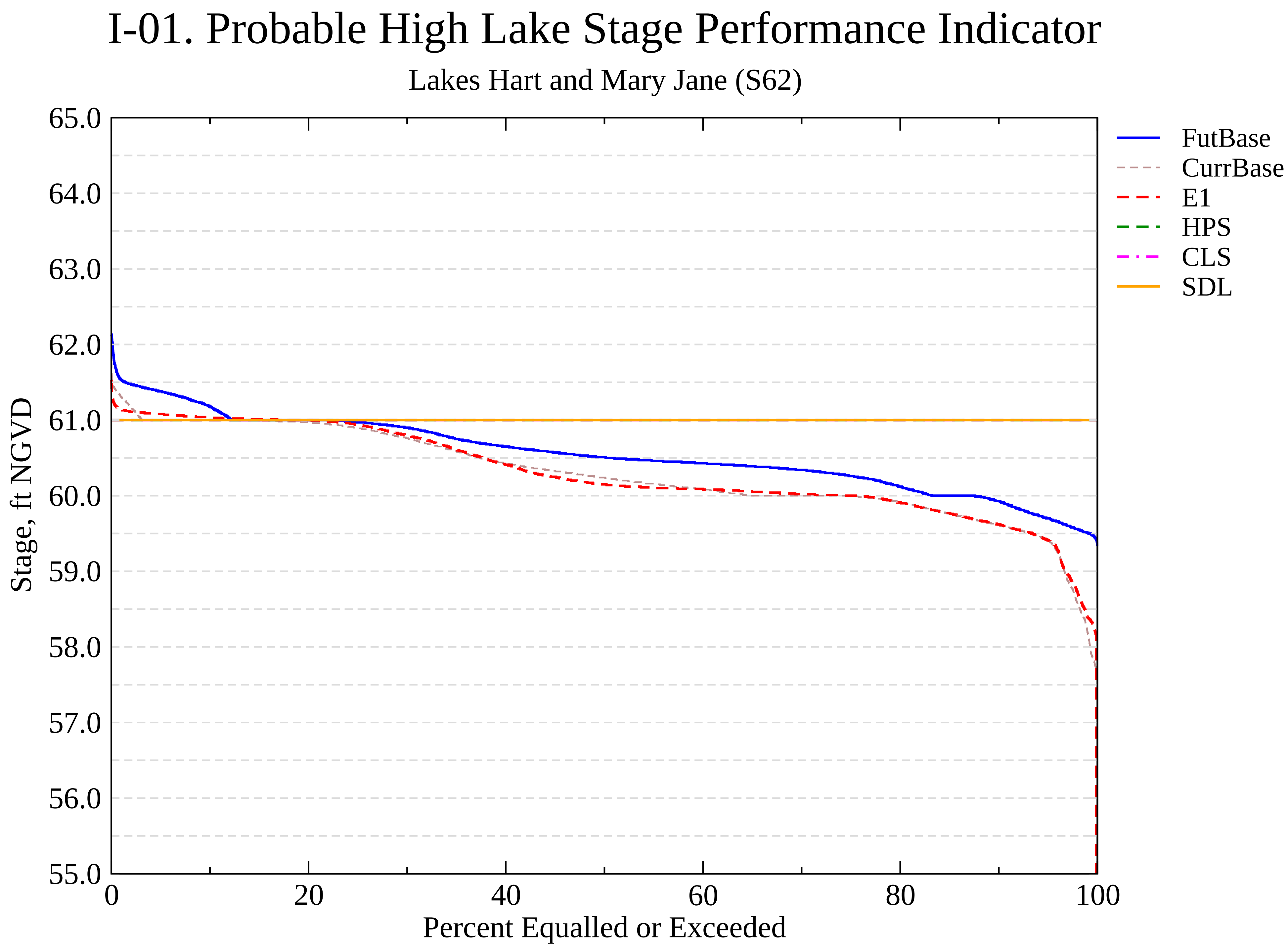
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

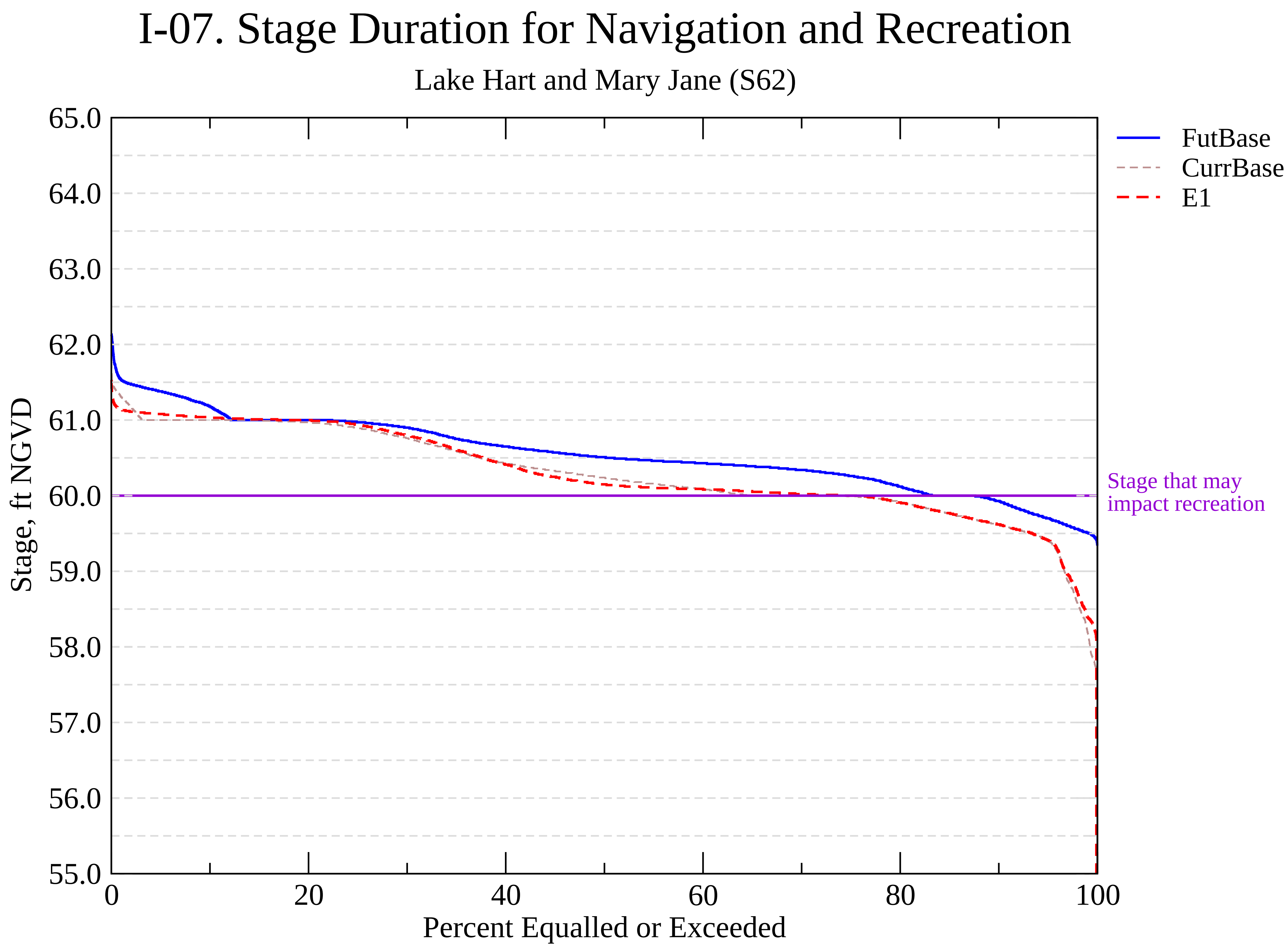


L-07. Stages in Lakes Hart and Mary Jane

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Lakes Hart and Mary Jane (S62)
Stage, ft NGVD
Percent Equalled or Exceeded
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
FutBase
CurrBase
E1
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
Lake Hart and Mary Jane (S62)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E1
Stage that may
impact recreation

Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

Alternative Description : Uncertainty Analysis - Simulation E1

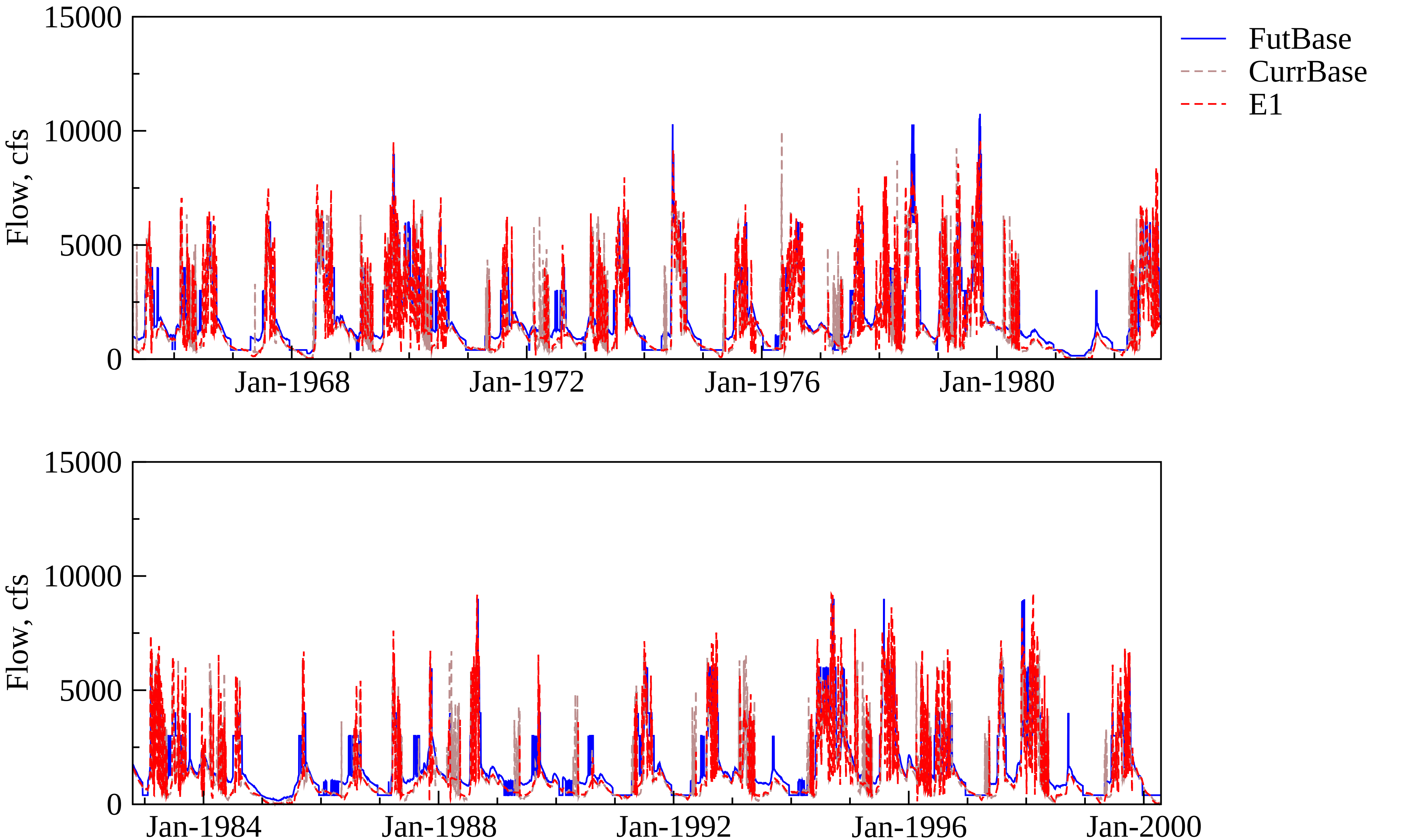
Run ID : Variation of Kv_ICU - LOW

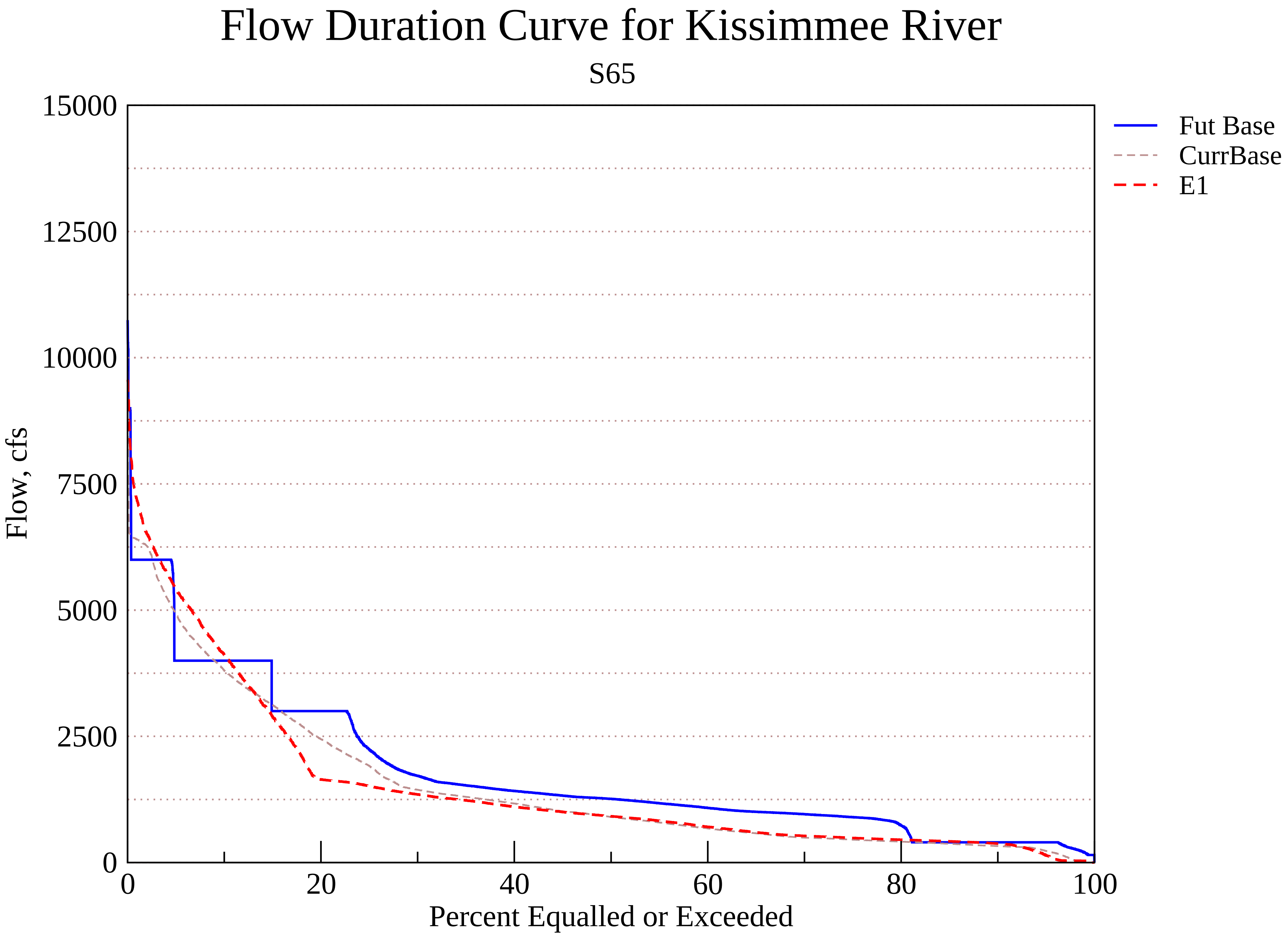
Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	25.7	40.0
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	57.1	54.3
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	88.6	85.7
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	5.7	5.7
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	200.0	262.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	428.0	572.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	2.6	4.2
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tier 2 Report

PDF Report for R01

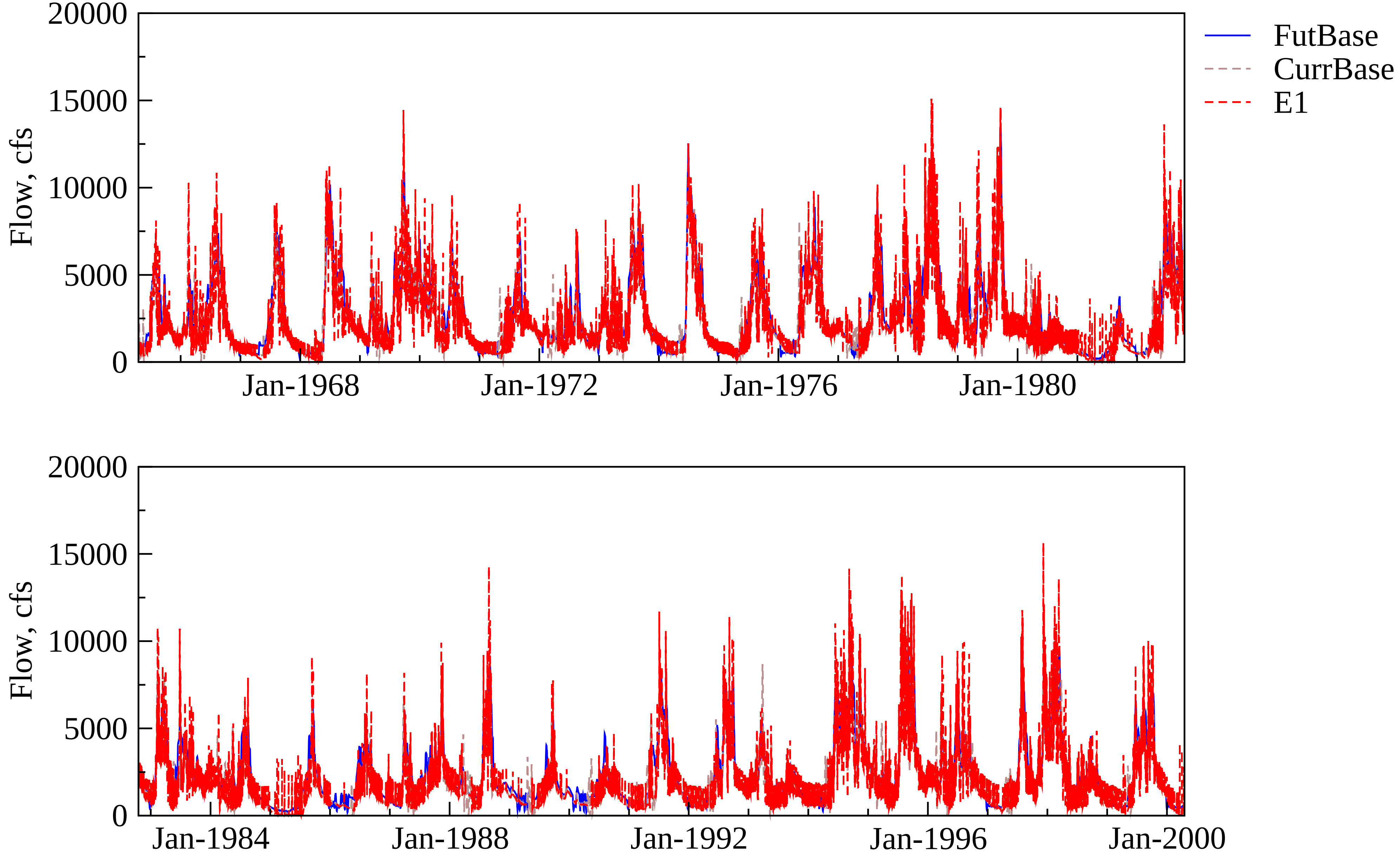
Flow Hydrograph at S65

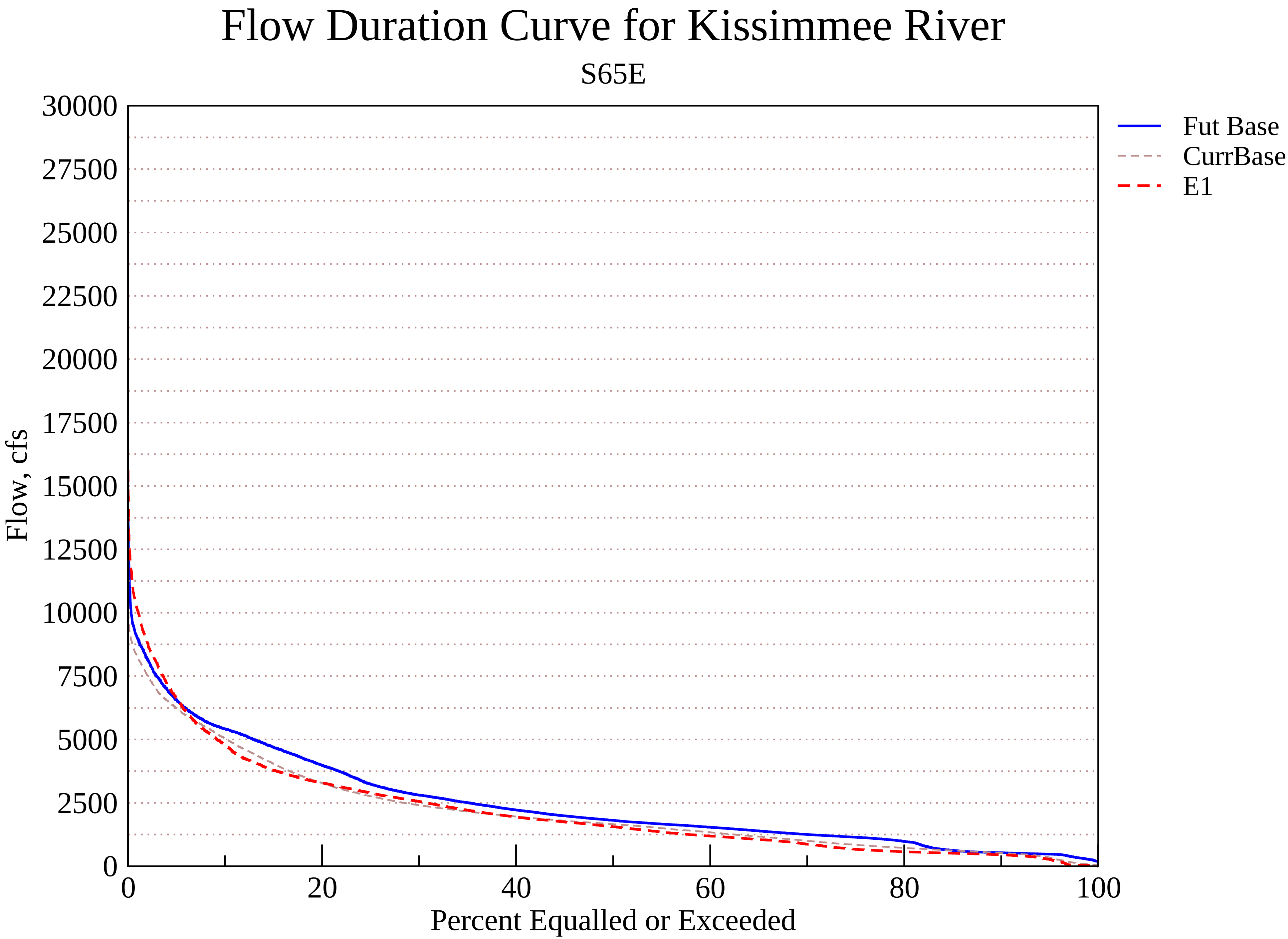




Flow Duration Curve for Kissimmee River
S65
Flow, cfs
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
E1

Flow Hydrograph at S65E




Flow Duration Curve for Kissimmee River
S65E
Flow, cfs
Percent Equalled or Exceeded
30000
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Fut Base
CurrBase
E1

Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation E1

Run ID : Variation of Kv_ICU - LOW

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Number of days per water year that river channel depth is greater than average floodplain ground elelvation (average).	252.0	250.0	203.0	299.0
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	64.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	5.6
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	9.1

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

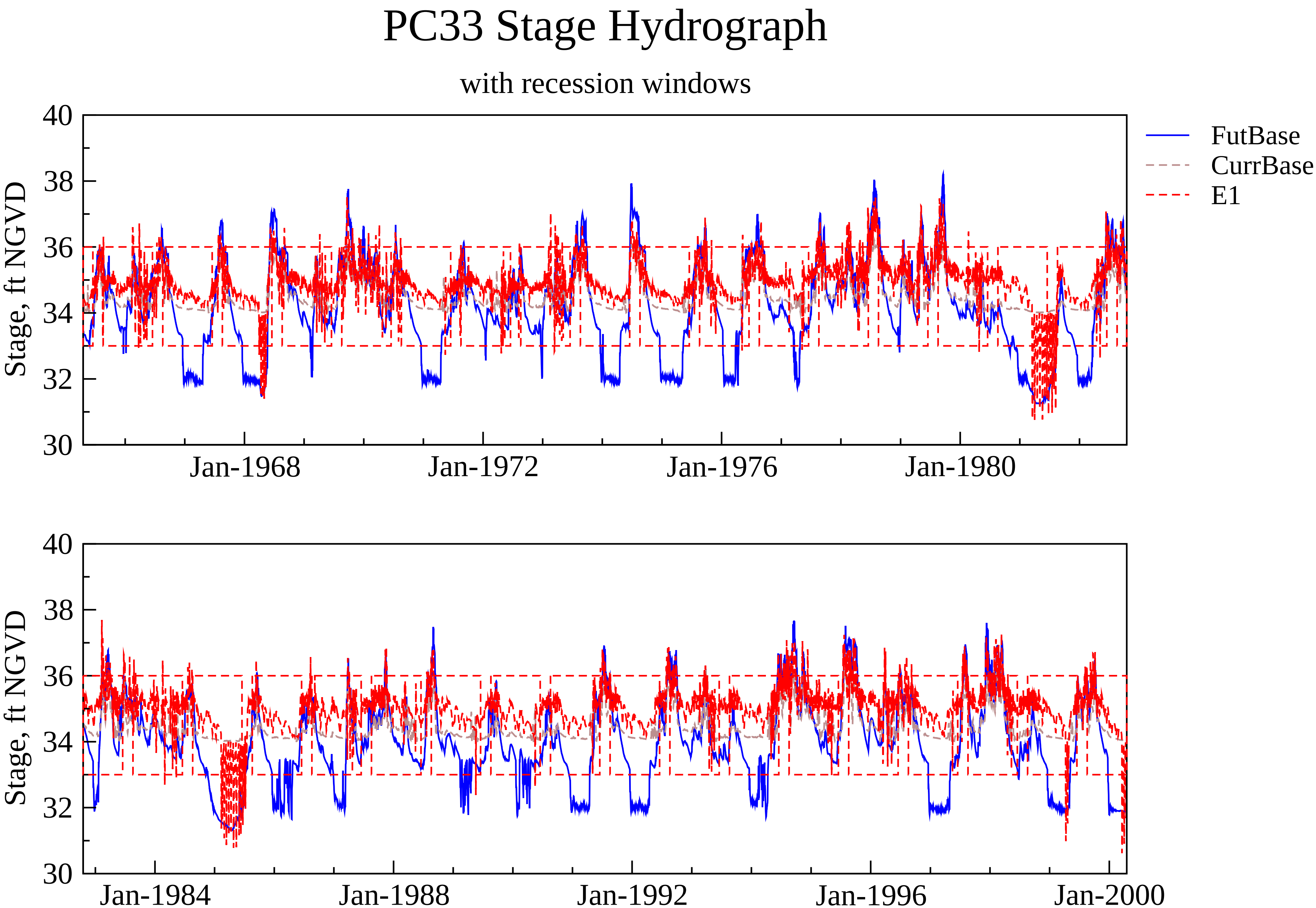
Alternative Description : Uncertainty Analysis - Simulation E1

Run ID : Variation of Kv_ICU - LOW

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	45.7
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	88.6
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	22.9

Tier 2 Report

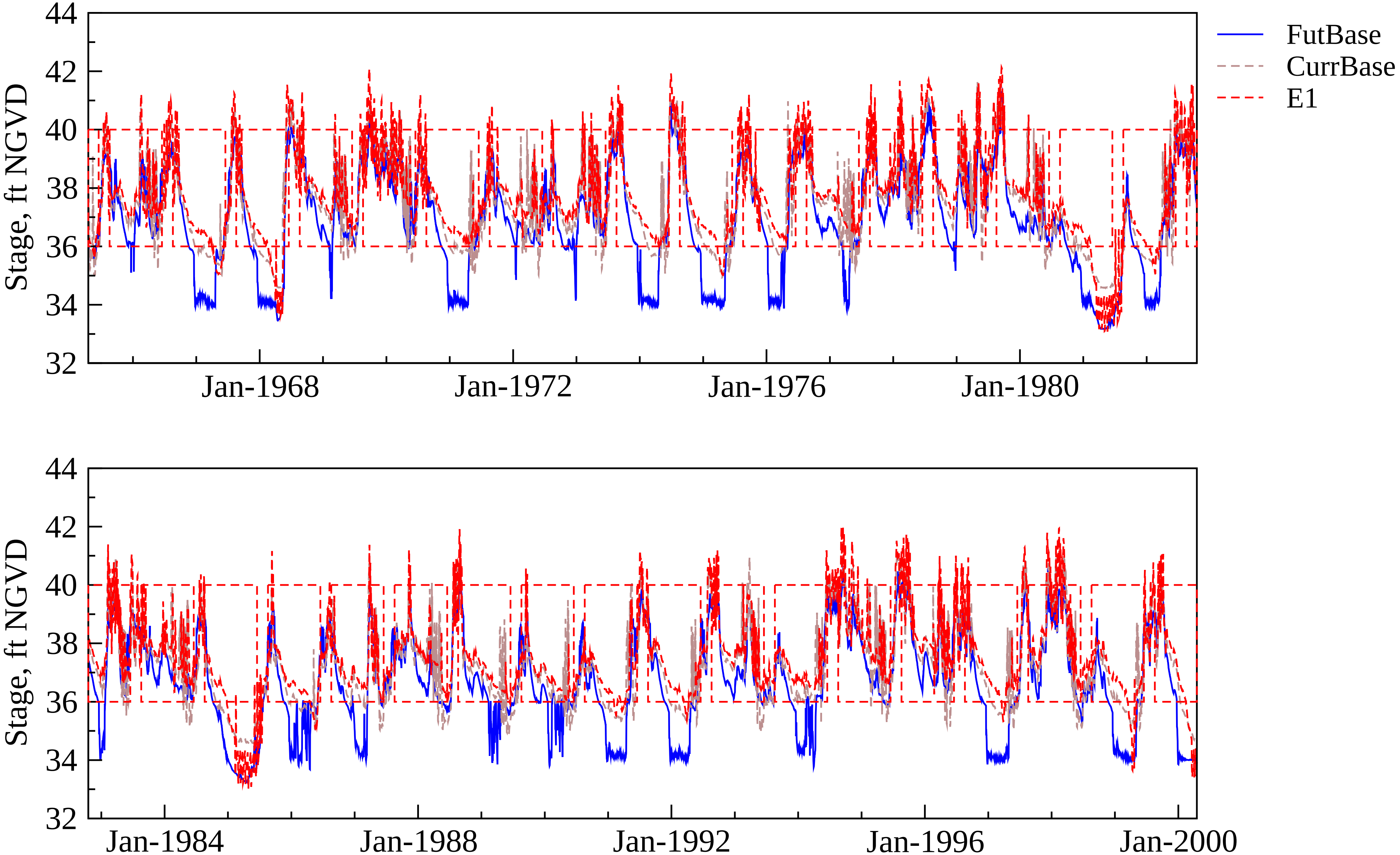
PDF Report for R03



PC33 Stage Hydrograph
with recession windows
FutBase
CurrBase
E1
Stage, ft NGVD
40
38
36
34
32
30
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

PC52 Stage Hydrograph

with recession windows



KISSIMMEE BASIN MODELING AND OPERATIONS STUDY - KBMOS

PERFORMANCE MEASURE EVALUATION TOOL REPORT

ALTERNATIVE DESCRIPTION

Uncertainty Analysis - Simulation E2

Variation of Kv_ICU - HIGH

Prepared for:

3301 Gun Club Road
West Palm Beach, FL 33406
(561) 686-8800

Prepared by:

EarthTech
A tyco International Ltd. Company

3750 NW 87th Avenue, Suite 300
Miami, FL 33178

Earth Tech Project No. 100819
Mar-08

Evaluation Performance Measure Score for S-65

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Alternative Description : Uncertainty Analysis - Simulation E2

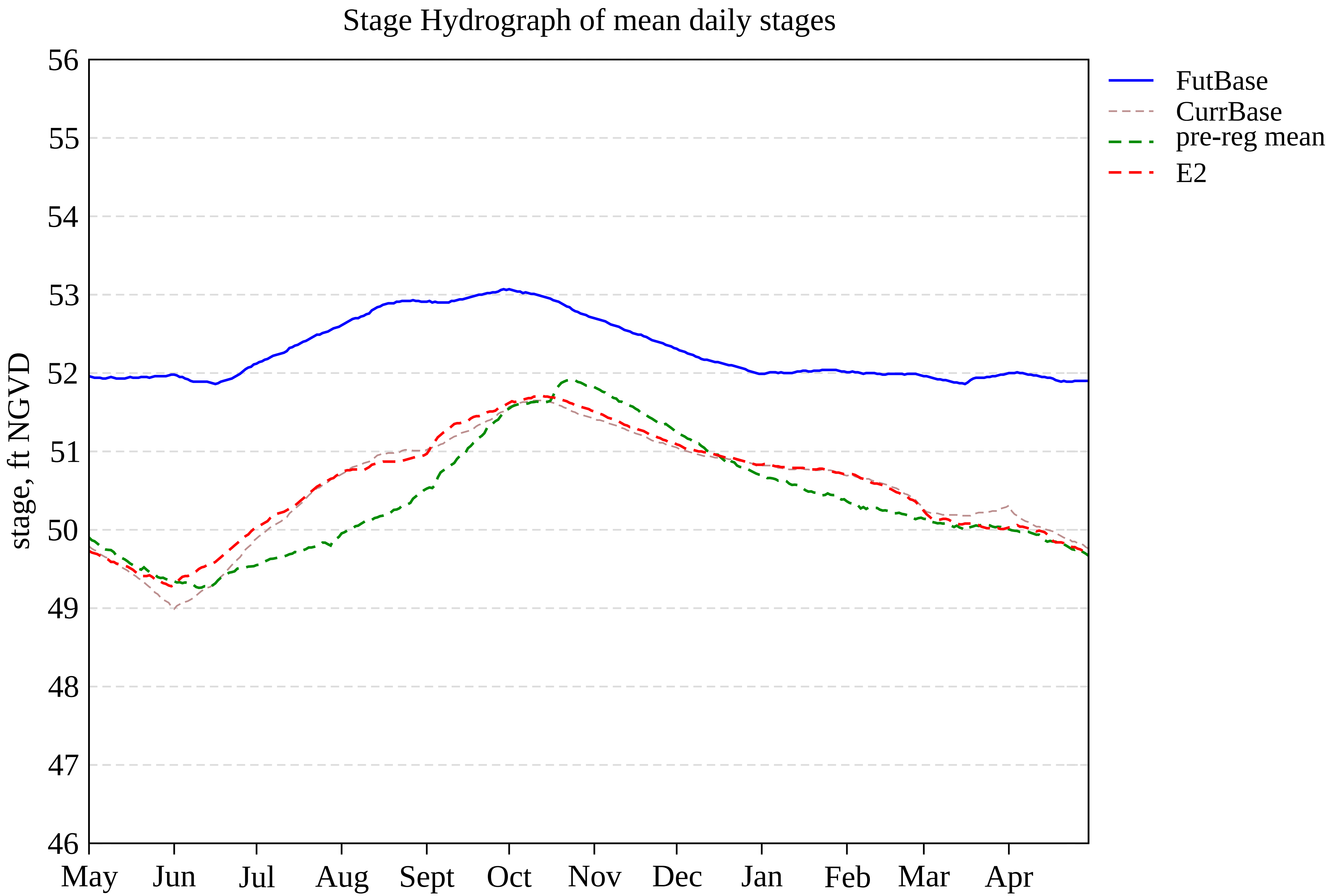
Run ID : Variation of Kv_ICU - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	0.0	0.0	0.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	80.0	20.0	86.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	6.0	0.0	20.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	54.3	68.6
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	22.9	25.7	14.3
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	77.1	60.0	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	5.0	3.2	2.6	3.3
L. Maximum Inter-annual Lake stage Amplitude (ft)	12.0	5.0	5.5	5.6

Tier 2 Report

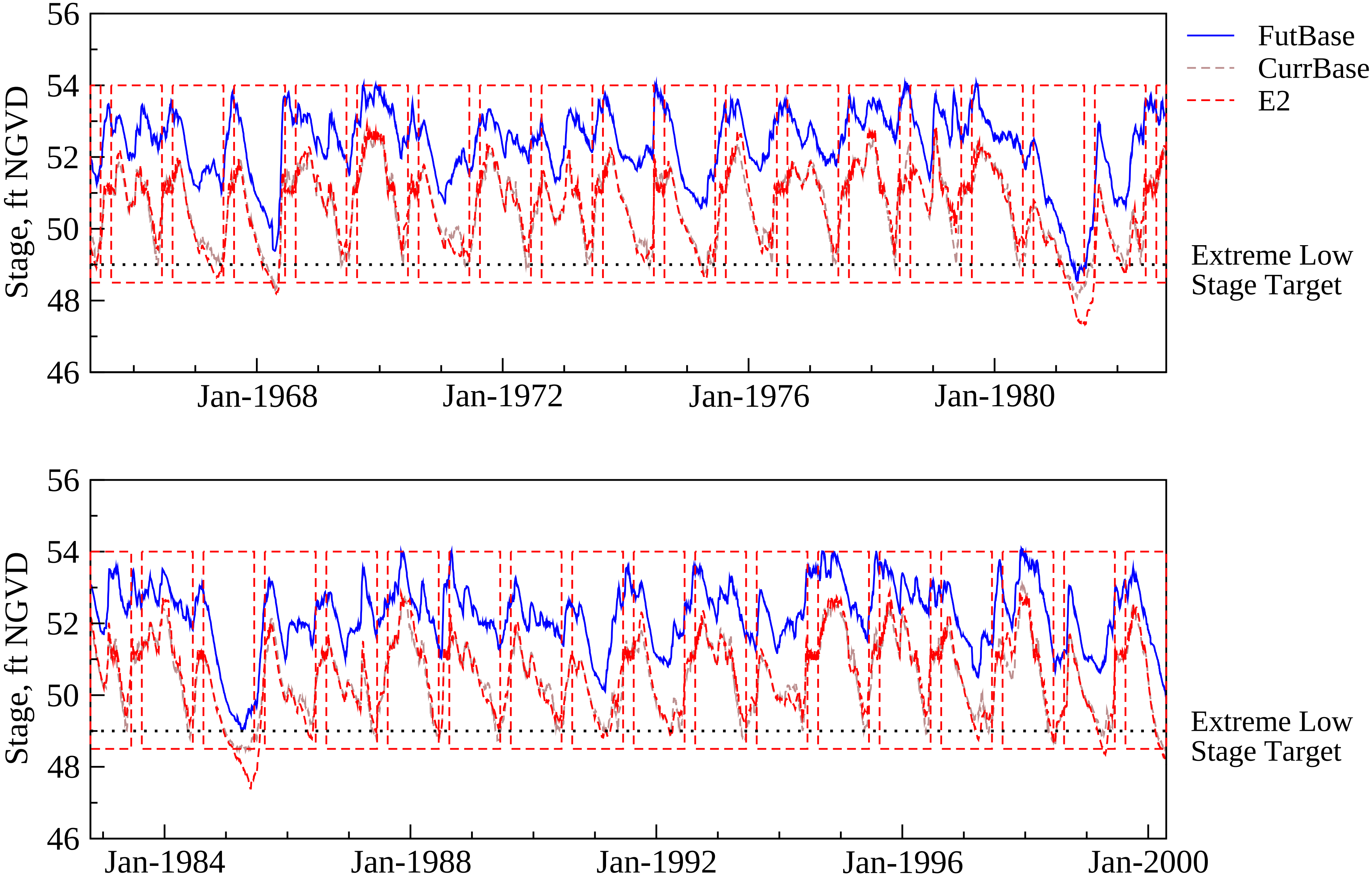
PDF Report for L01

L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger



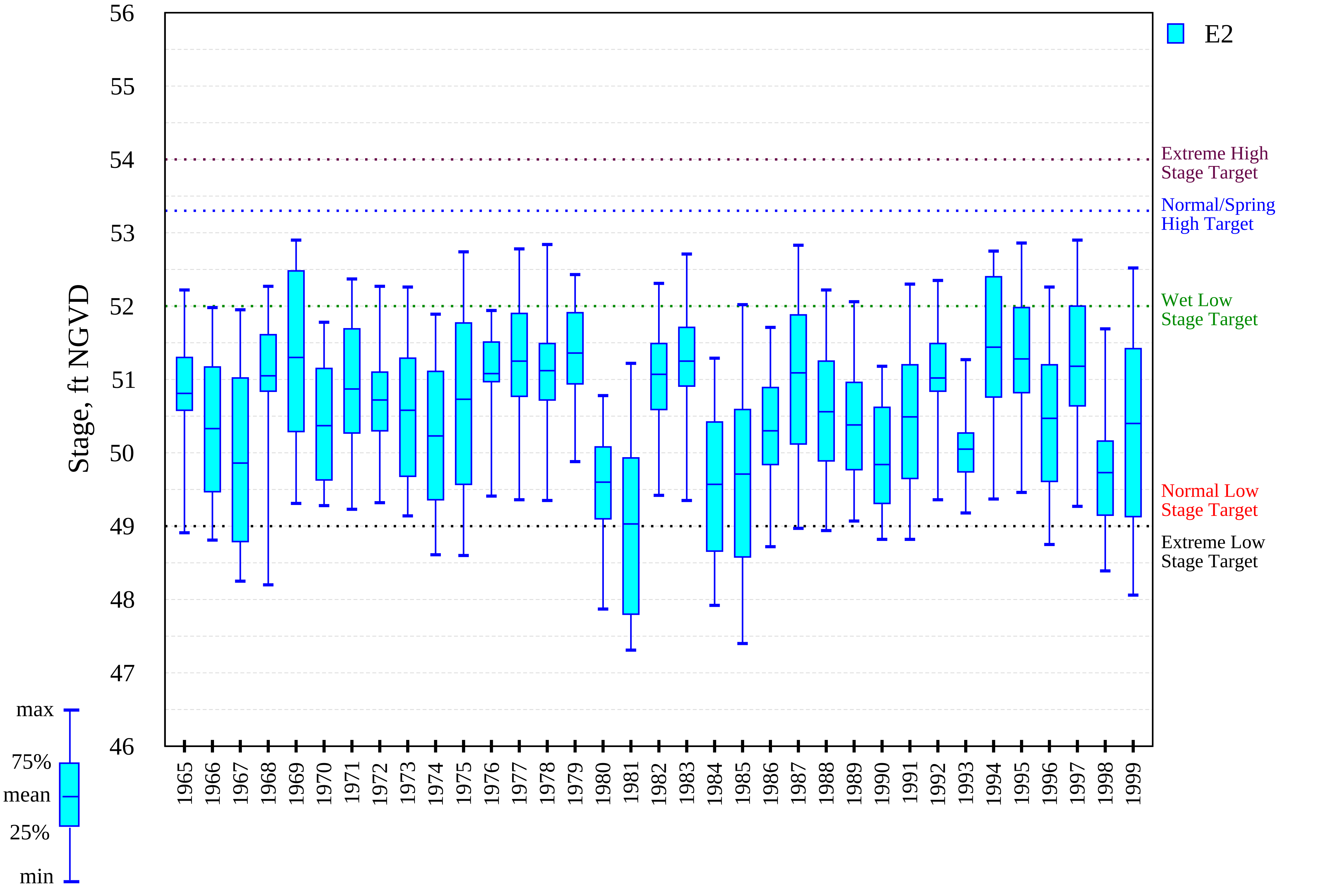
L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

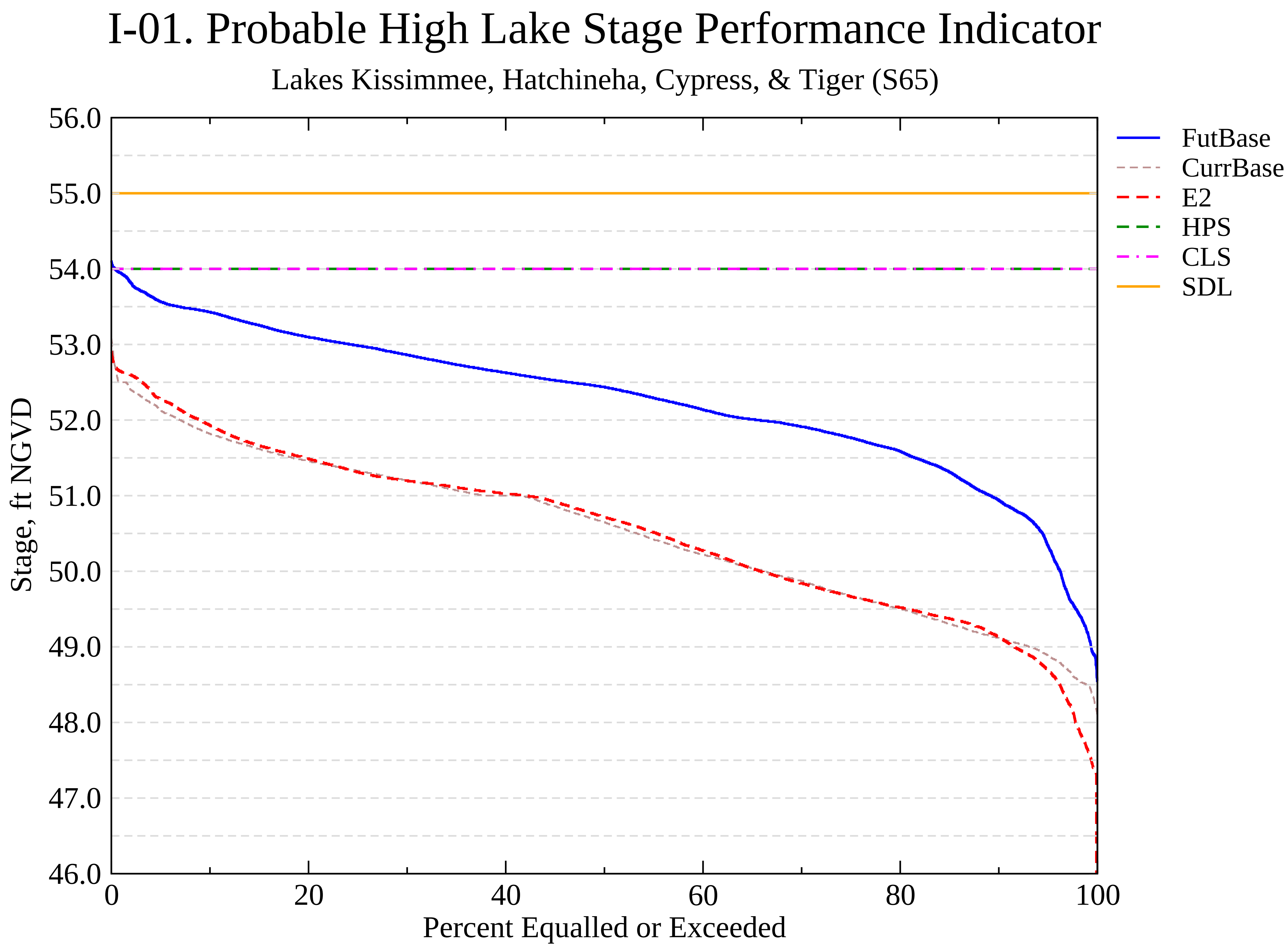
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

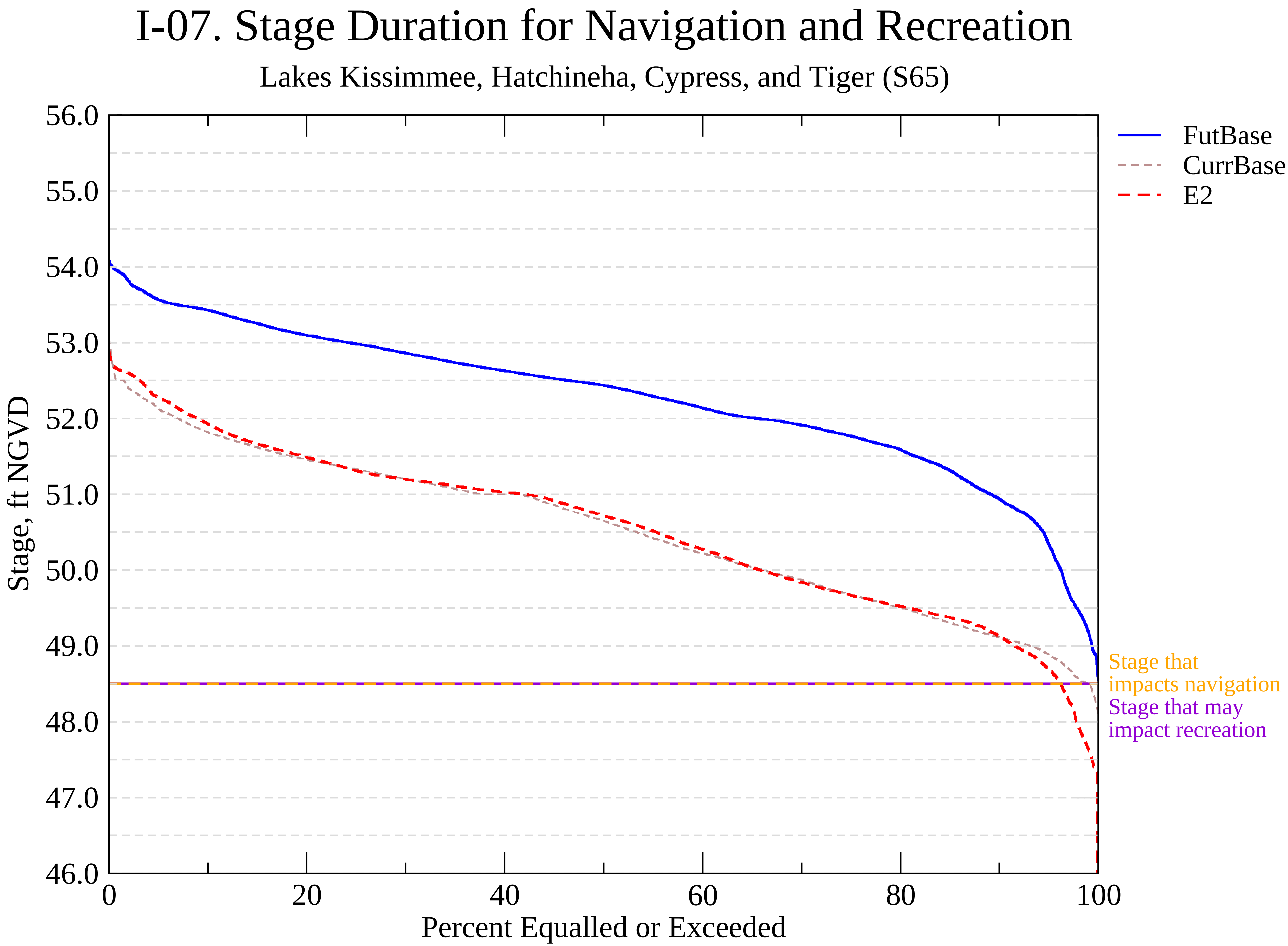


L-01. Stages in Lakes Kissimmee, Hatchineha, Cypress, and Tiger

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Lakes Kissimmee, Hatchineha, Cypress, & Tiger (S65)
Stage, ft NGVD
Percent Equalled or Exceeded
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
FutBase
CurrBase
E2
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
Lakes Kissimmee, Hatchineha, Cypress, and Tiger (S65)
Stage, ft NGVD
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E2
Stage that impacts navigation
Stage that may impact recreation

Evaluation Performance Measure Score for S-61

L-02. Stages in Lake Tohopekaliga

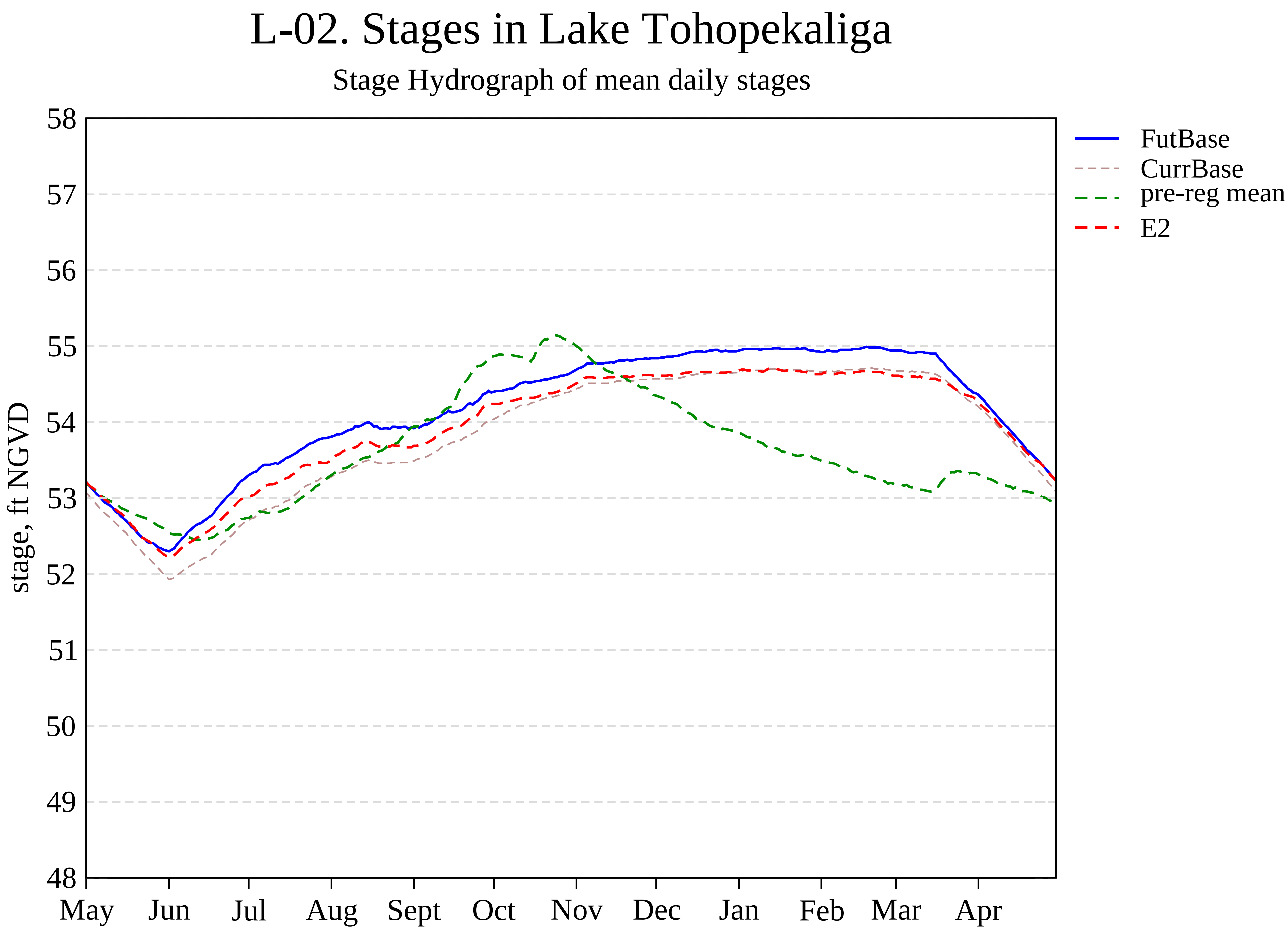
Alternative Description : Uncertainty Analysis - Simulation E2

Run ID : Variation of Kv_ICU - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	54.0	57.0	54.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	34.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	60.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	3.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	70.5	40.0	31.4	42.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.5	0.0	2.9	5.7
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	50.0	88.6	91.4	85.7
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	3.2	3.2	3.1
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.2	6.3	4.8	5.7

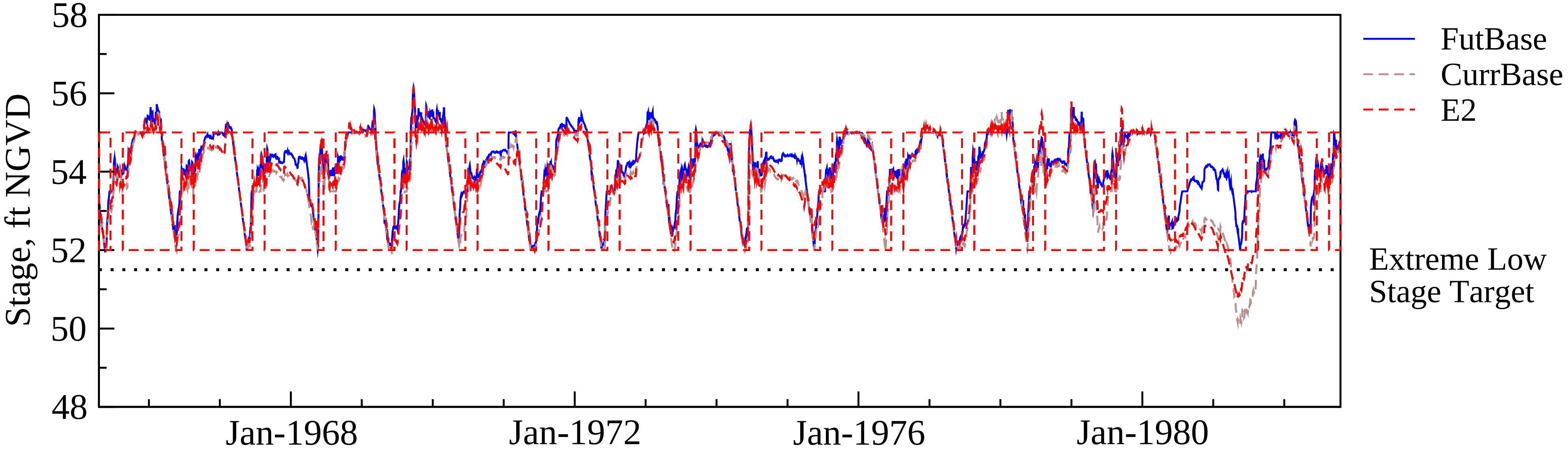
Tier 2 Report

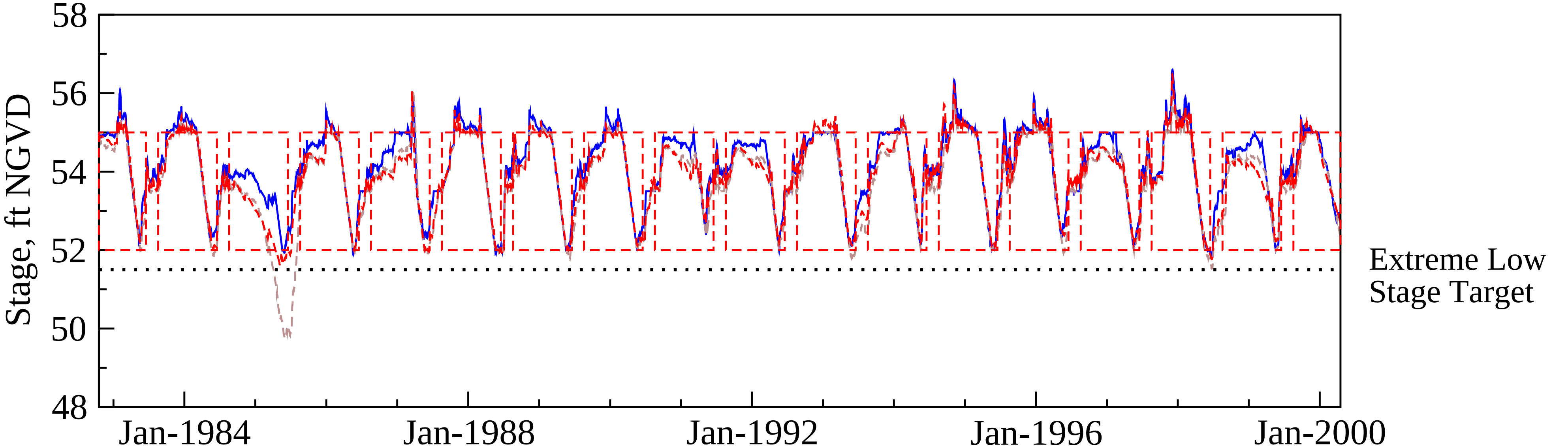
PDF Report for L02

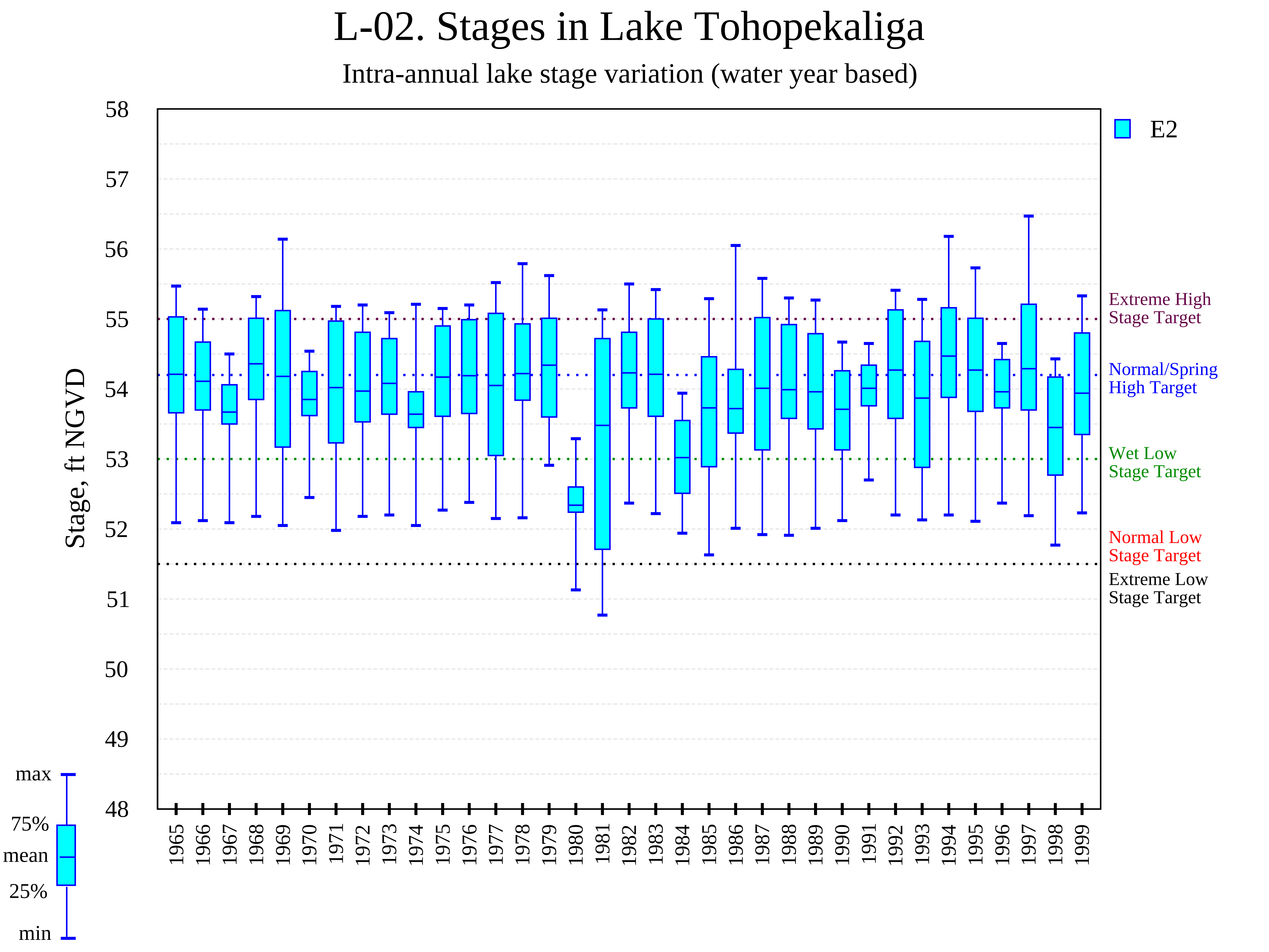

L-02. Stages in Lake Tohopekaliga
Stage Hydrograph of mean daily stages
stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
FutBase
CurrBase
pre-reg mean
E2

L-02. Stages in Lake Tohopekaliga

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



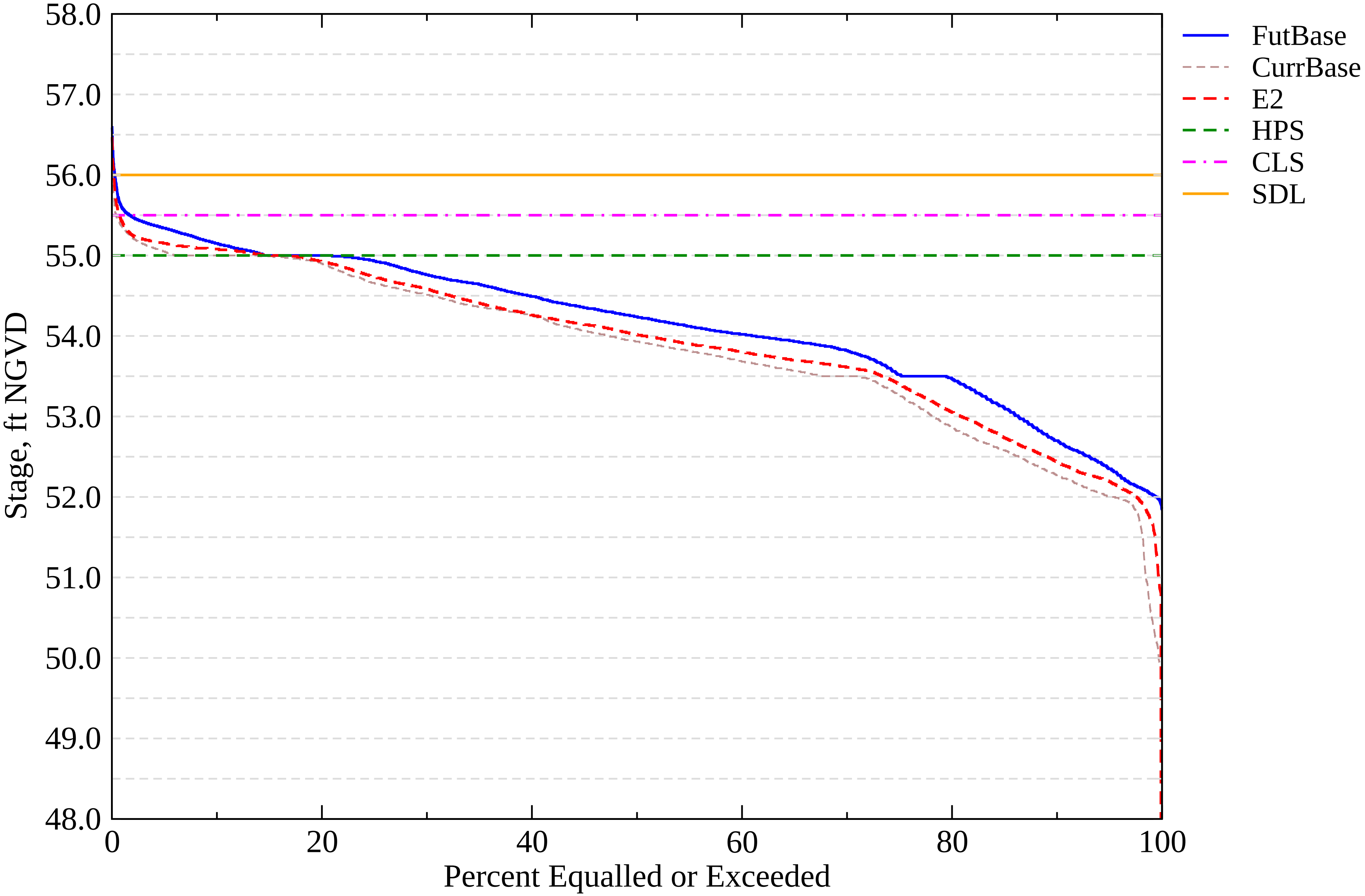




L-02. Stages in Lake Tohopekaliga
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
58
57
56
55
54
53
52
51
50
49
48
E2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
max
75%
mean
25%
min

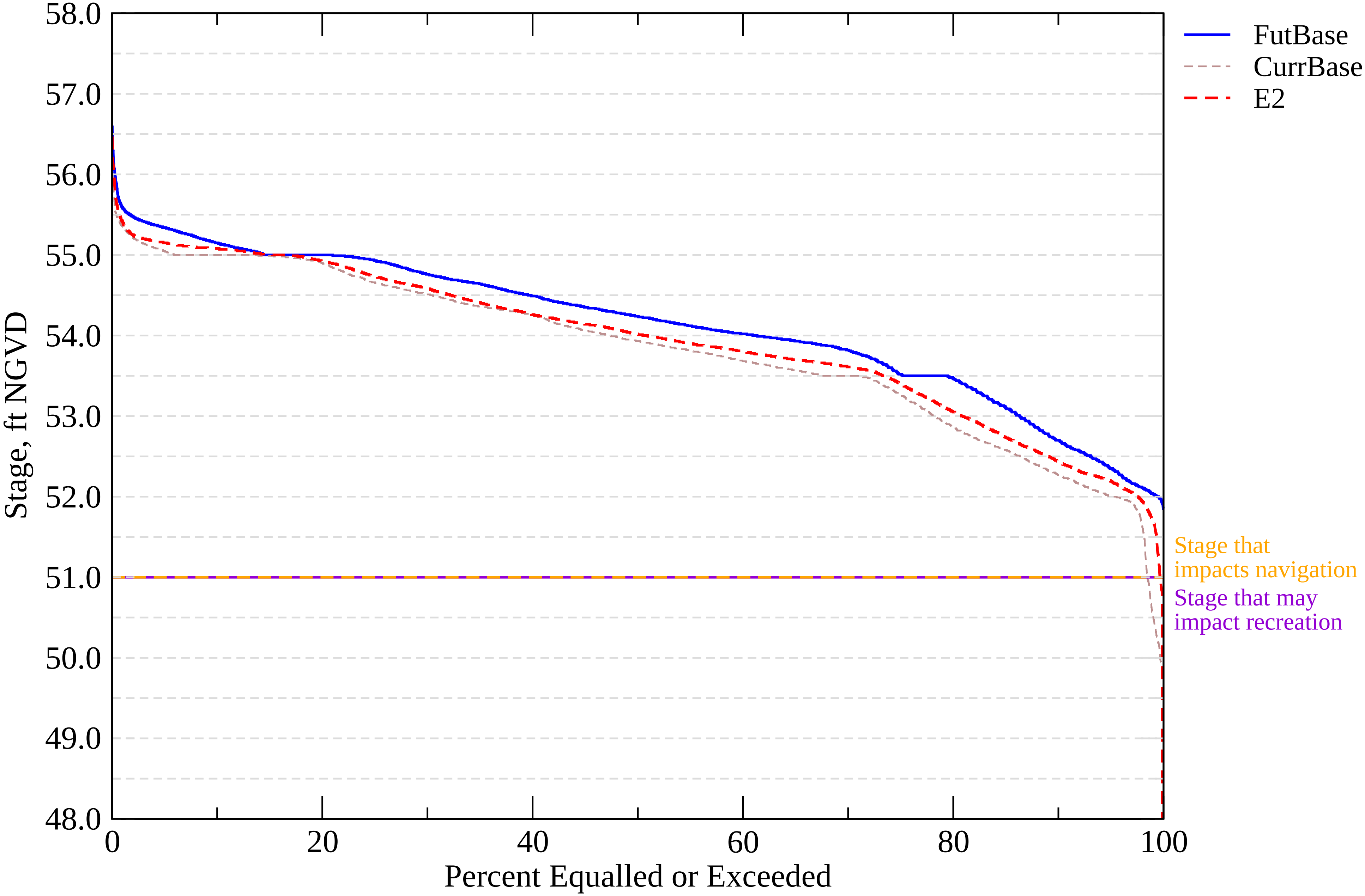
I-01. Probable High Lake Stage Performance Indicator

Lake Tohopekaliga (S61)



I-07. Stage Duration for Navigation and Recreation

Lake Tohopekaliga (S61)



Evaluation Performance Measure Score for S-63

L-03. Stages in Lake Gentry

Alternative Description : Uncertainty Analysis - Simulation E2

Run ID : Variation of Kv_ICU - HIGH

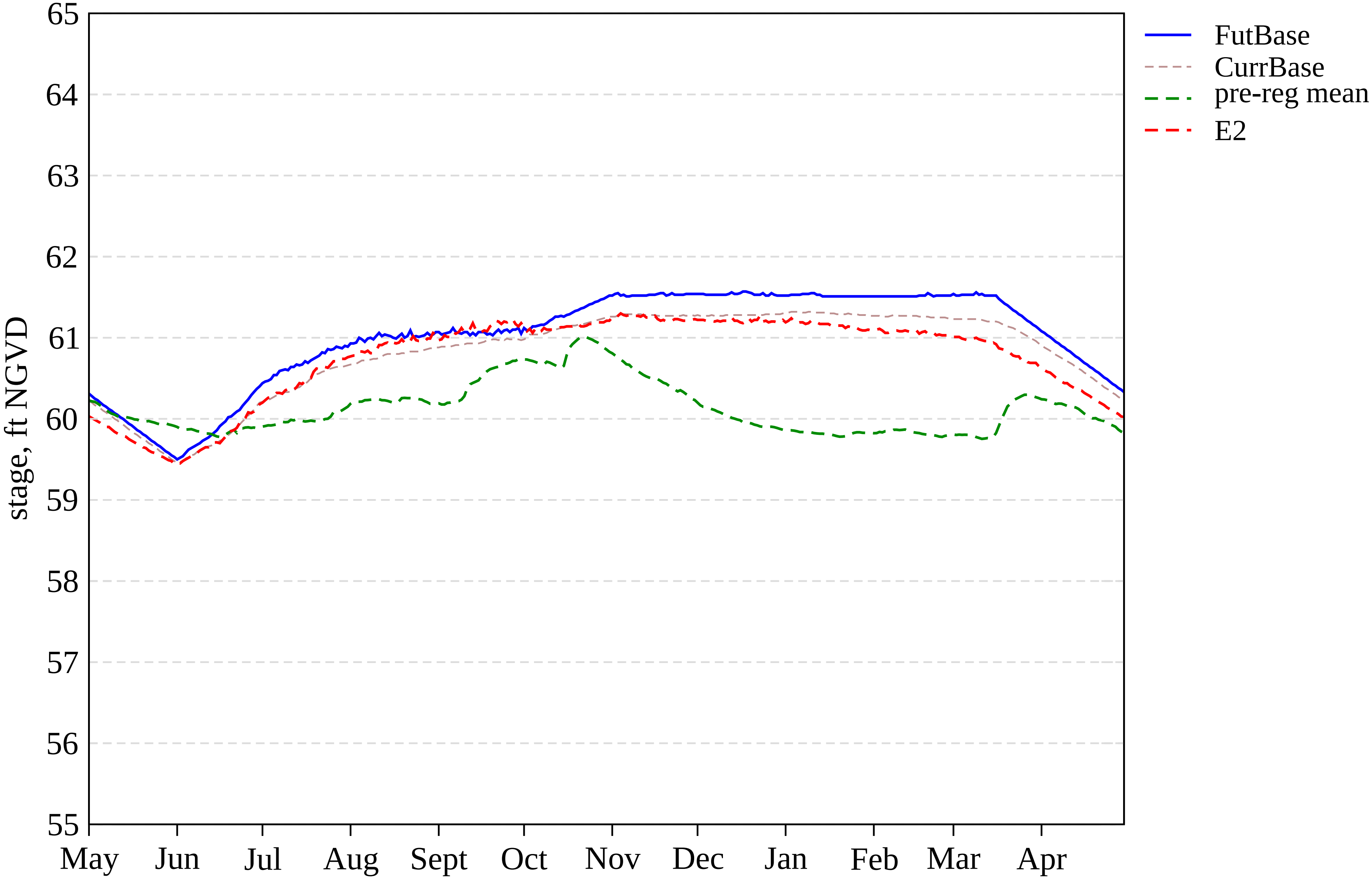
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	69.0	100.0	51.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	0.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	97.0	97.0	100.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	91.4	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	5.7	22.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	88.6	88.6	68.6
K. Mean Intra-annual Lake Stage Variation (ft)	2.8	2.1	2.3	2.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	3.9	3.4	5.6

Tier 2 Report

PDF Report for L03

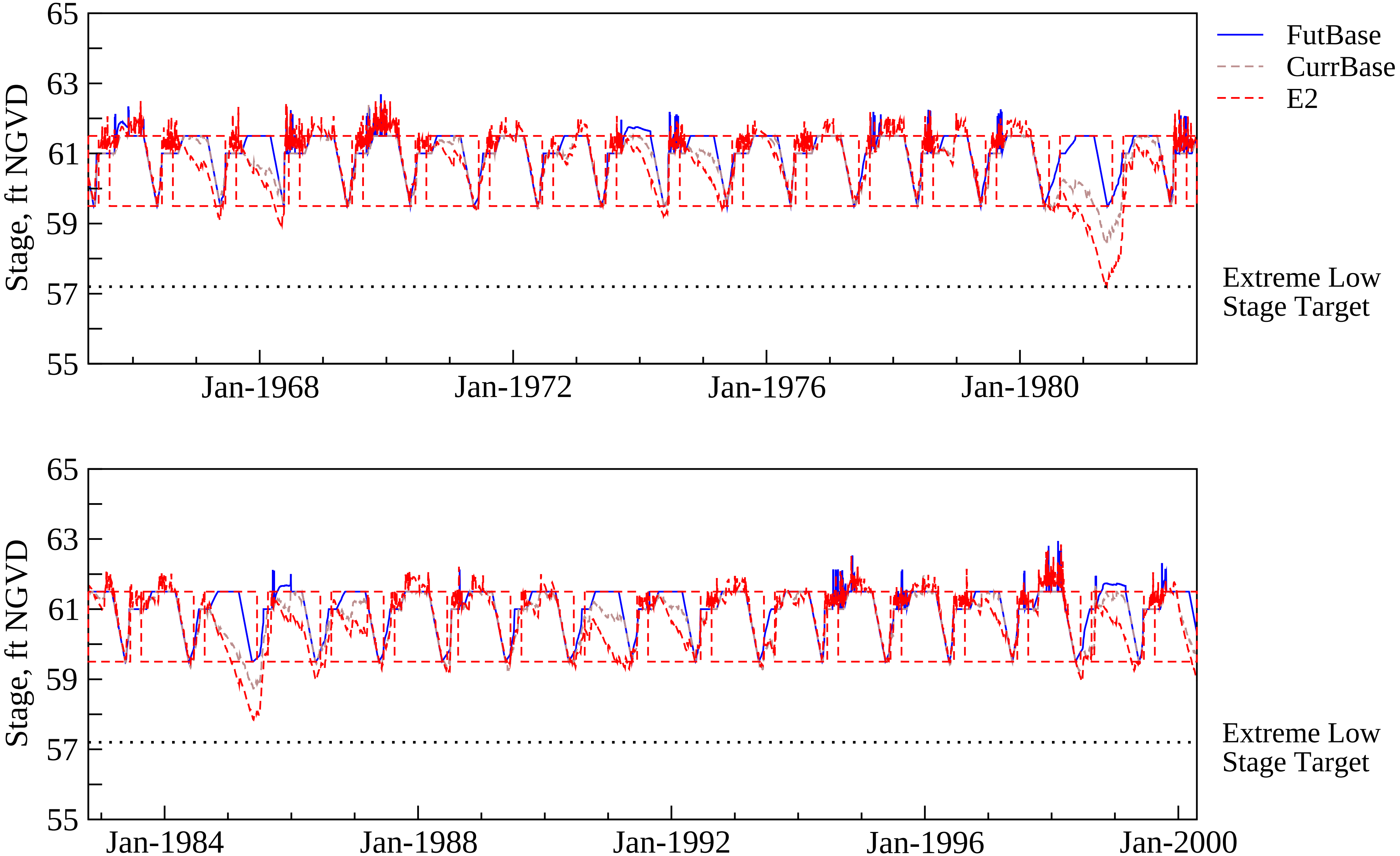
L-03. Stages in Lake Gentry

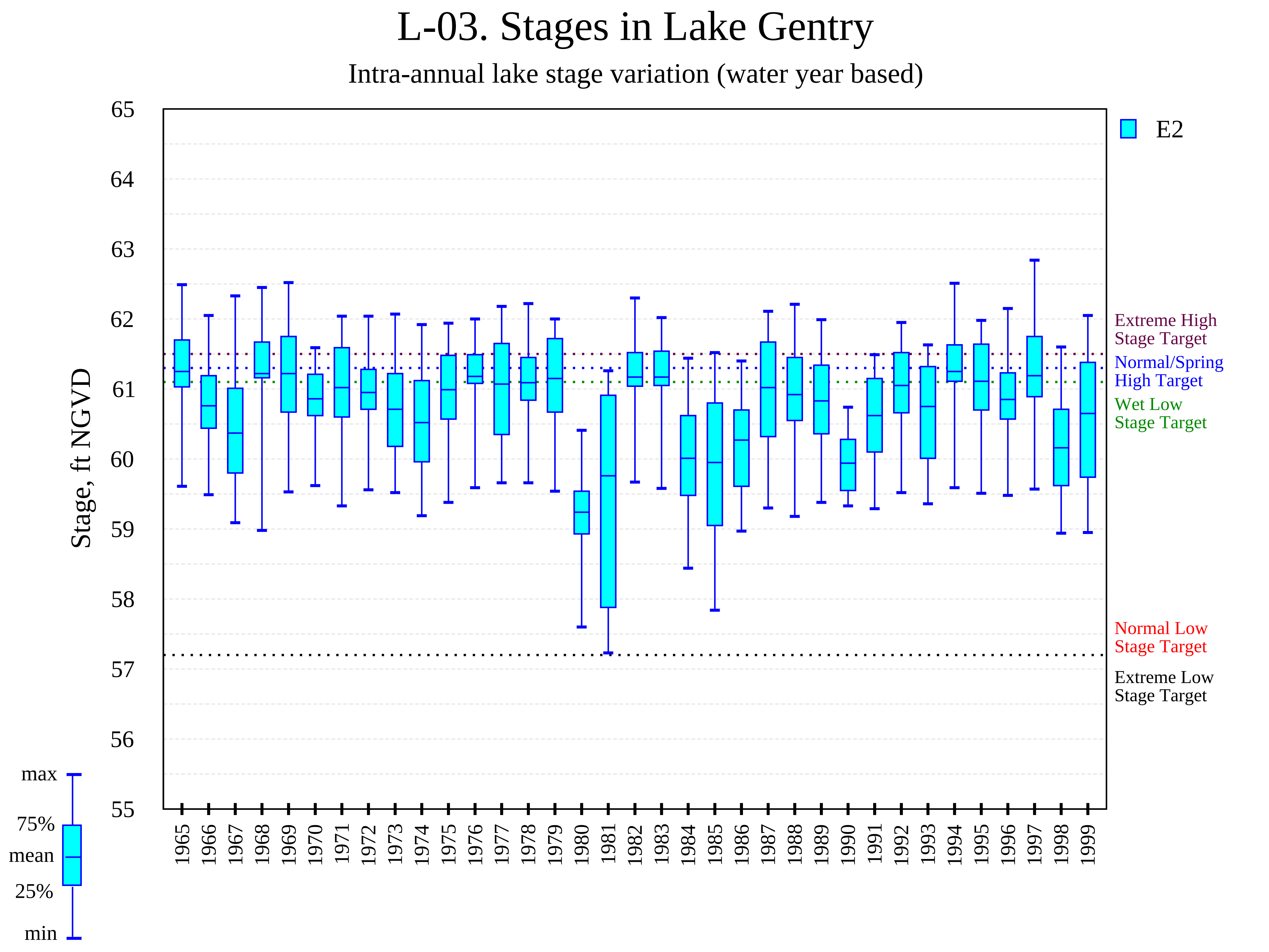
Stage Hydrograph of mean daily stages



L-03. Stages in Lake Gentry

Daily Stage Hydrograph with Water Level recession windows (Sept-June)

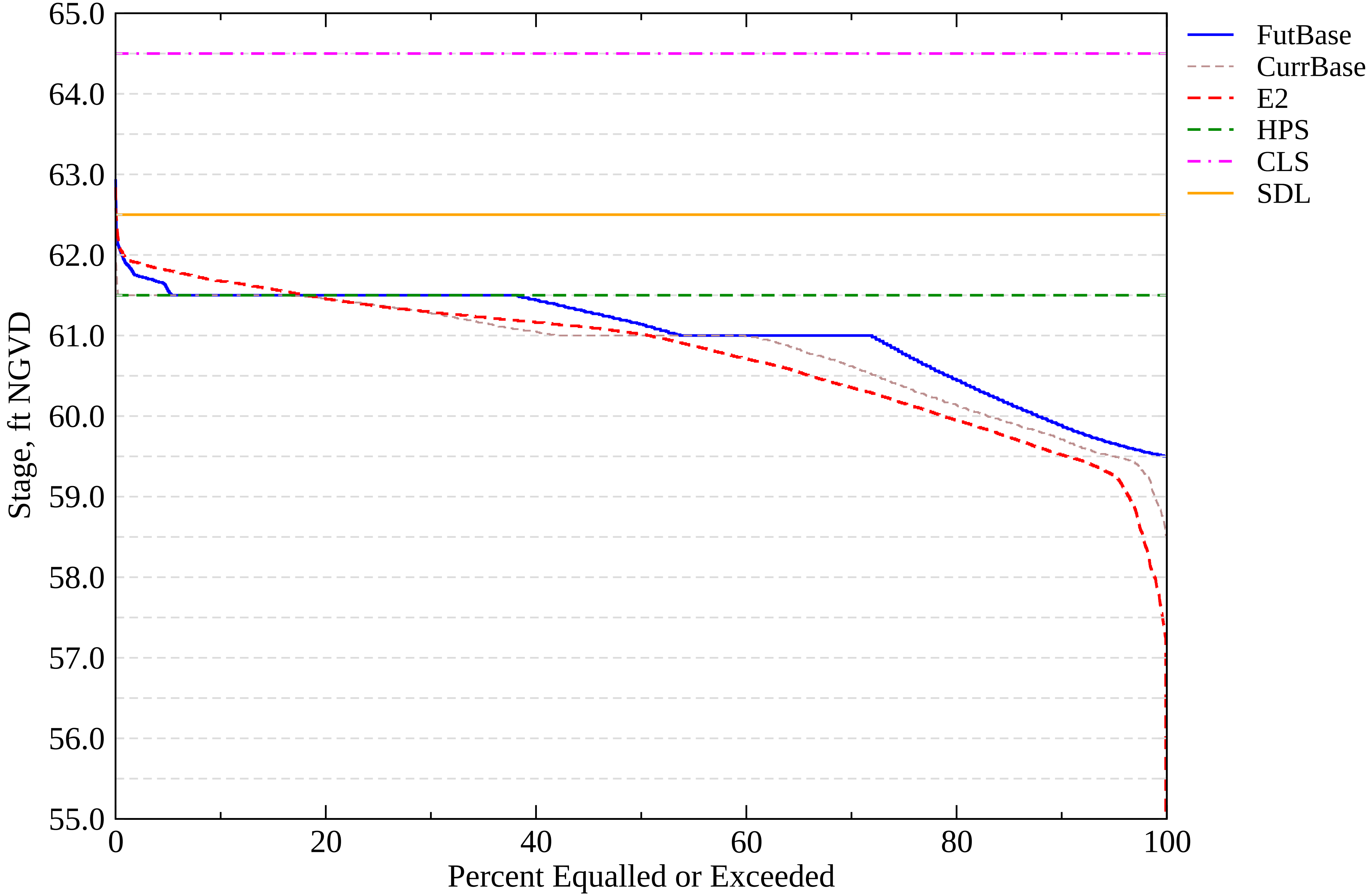




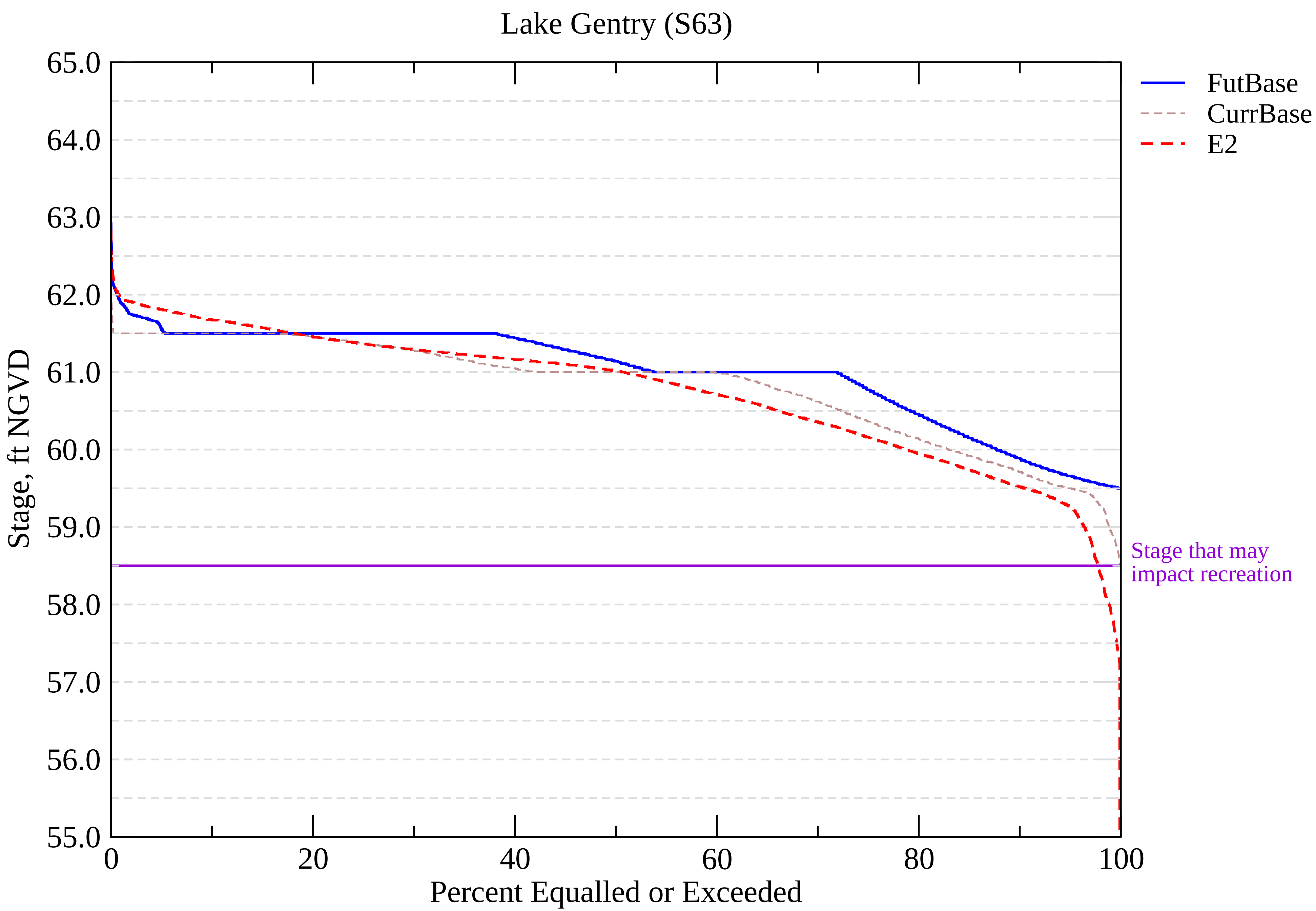
L-03. Stages in Lake Gentry
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
E2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

I-01. Probable High Lake Stage Performance Indicator

Lake Gentry (S63)



I-07. Stage Duration for Navigation and Recreation



Evaluation Performance Measure Score for S-57

L-04. Stages in Lakes Joel, Myrtle, and Preston

Alternative Description : Uncertainty Analysis - Simulation E2

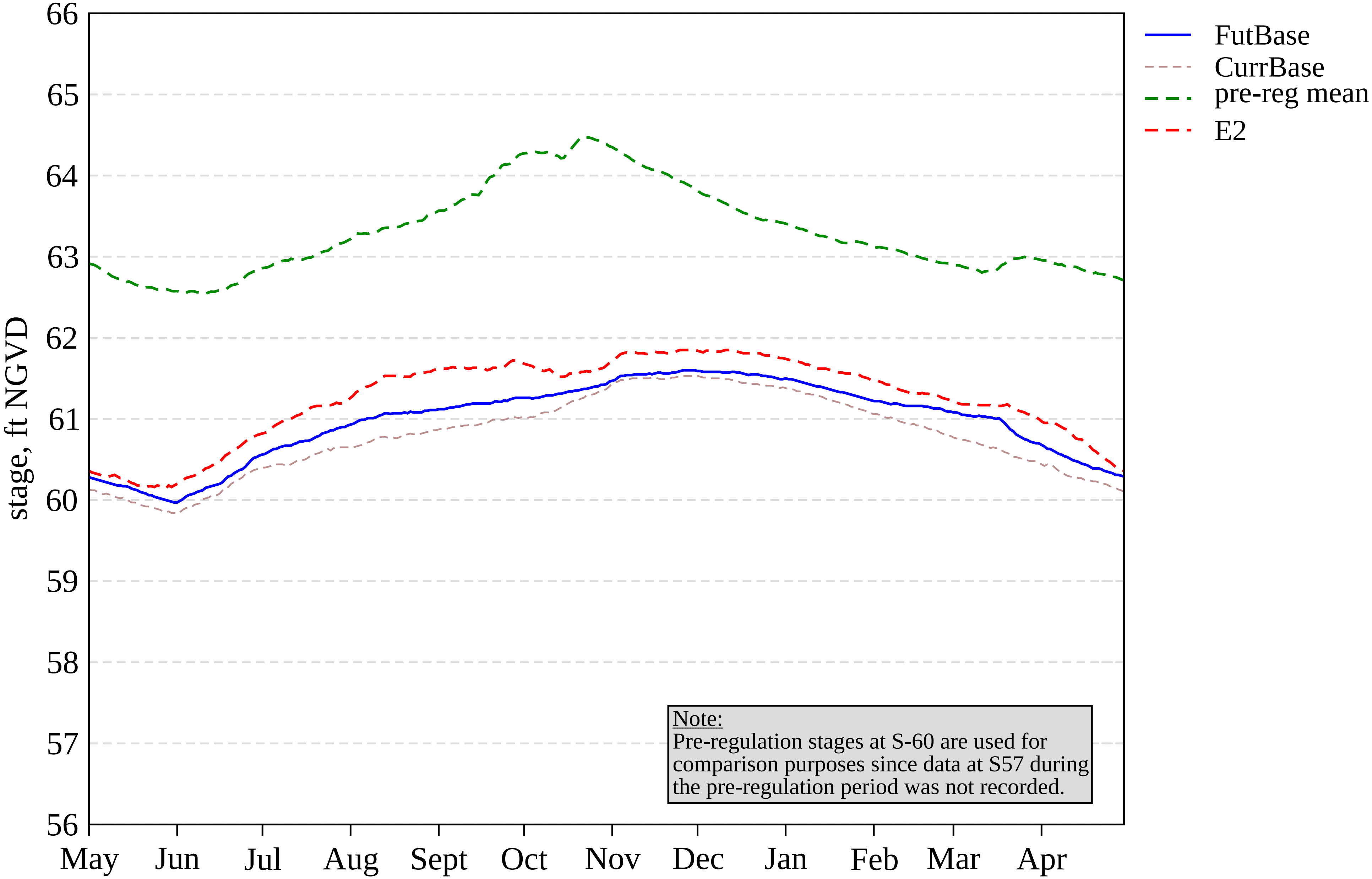
Run ID : Variation of Kv_ICU - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	100.0	100.0	91.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	23.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	6.0	6.0	54.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	71.4	62.9	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	22.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	80.0	85.7	74.3
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.3	1.9	2.5
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.4	6.6	3.8	5.5

Tier 2 Report

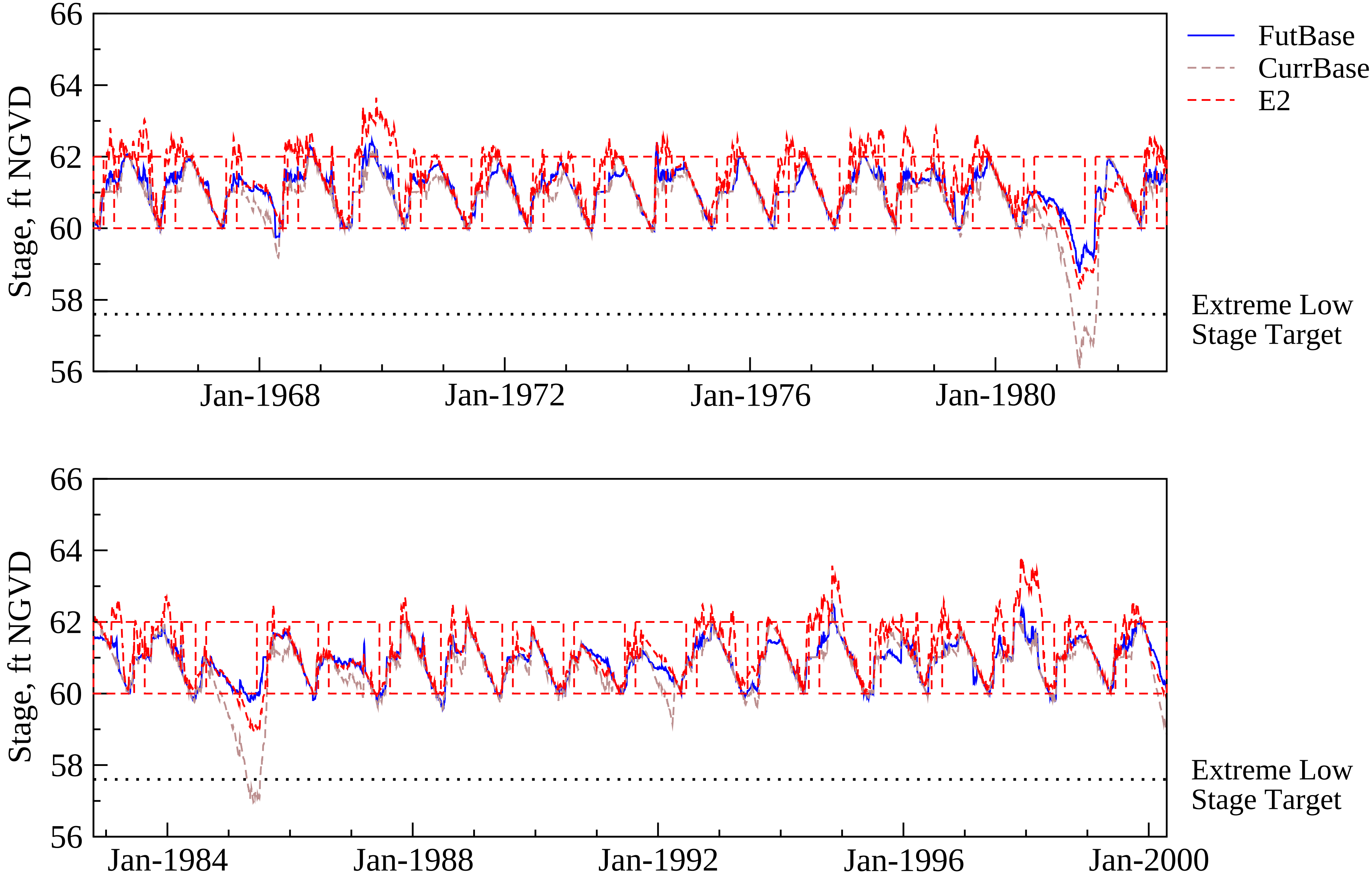
L-04. Stages in Lakes Joel, Myrtle, and Preston

Stage Hydrograph of mean daily stages



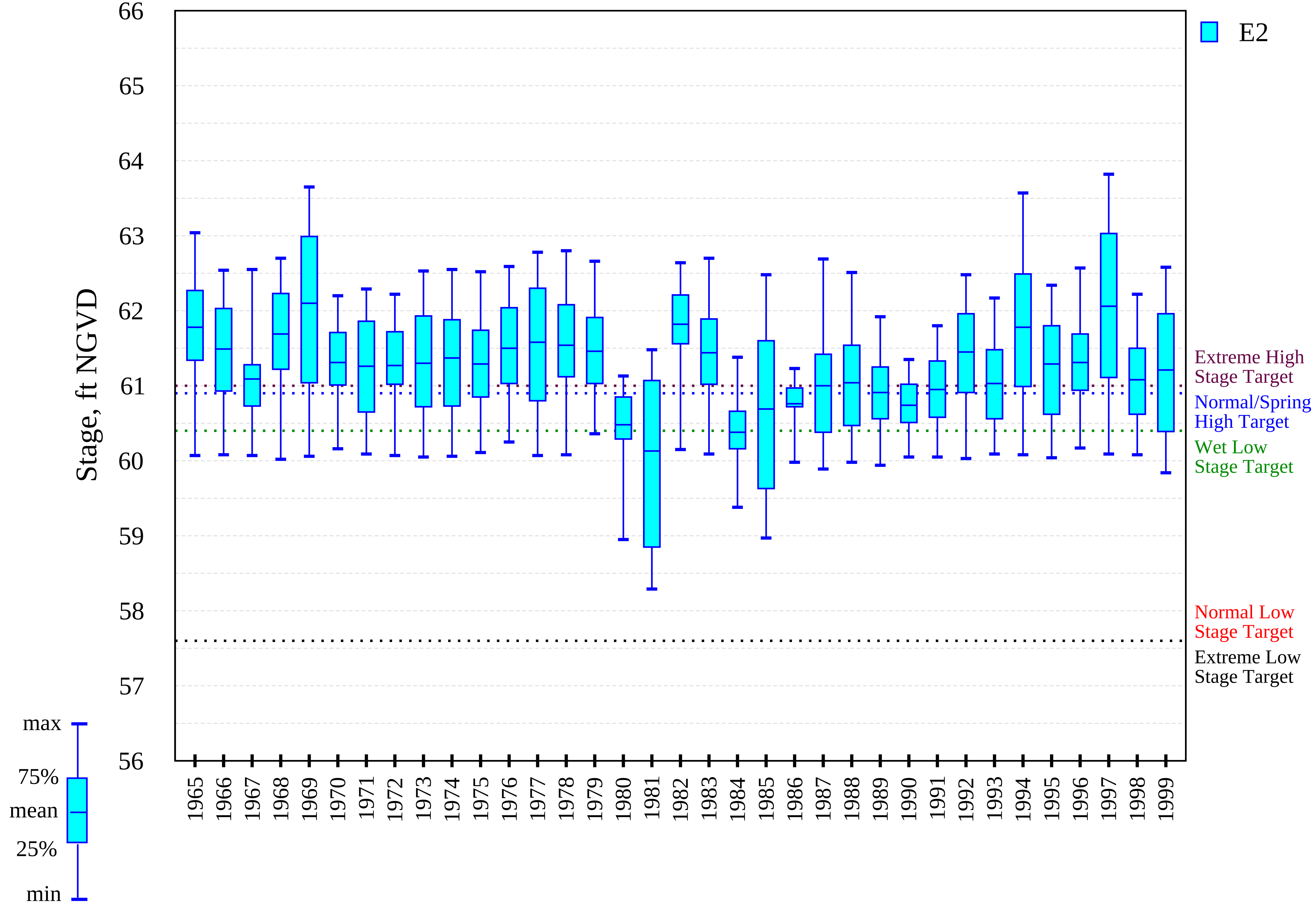
L-04. Stages in Lakes Joel, Myrtle, and Preston

Daily Stage Hydrograph with Water Level recession windows (Sept-June)



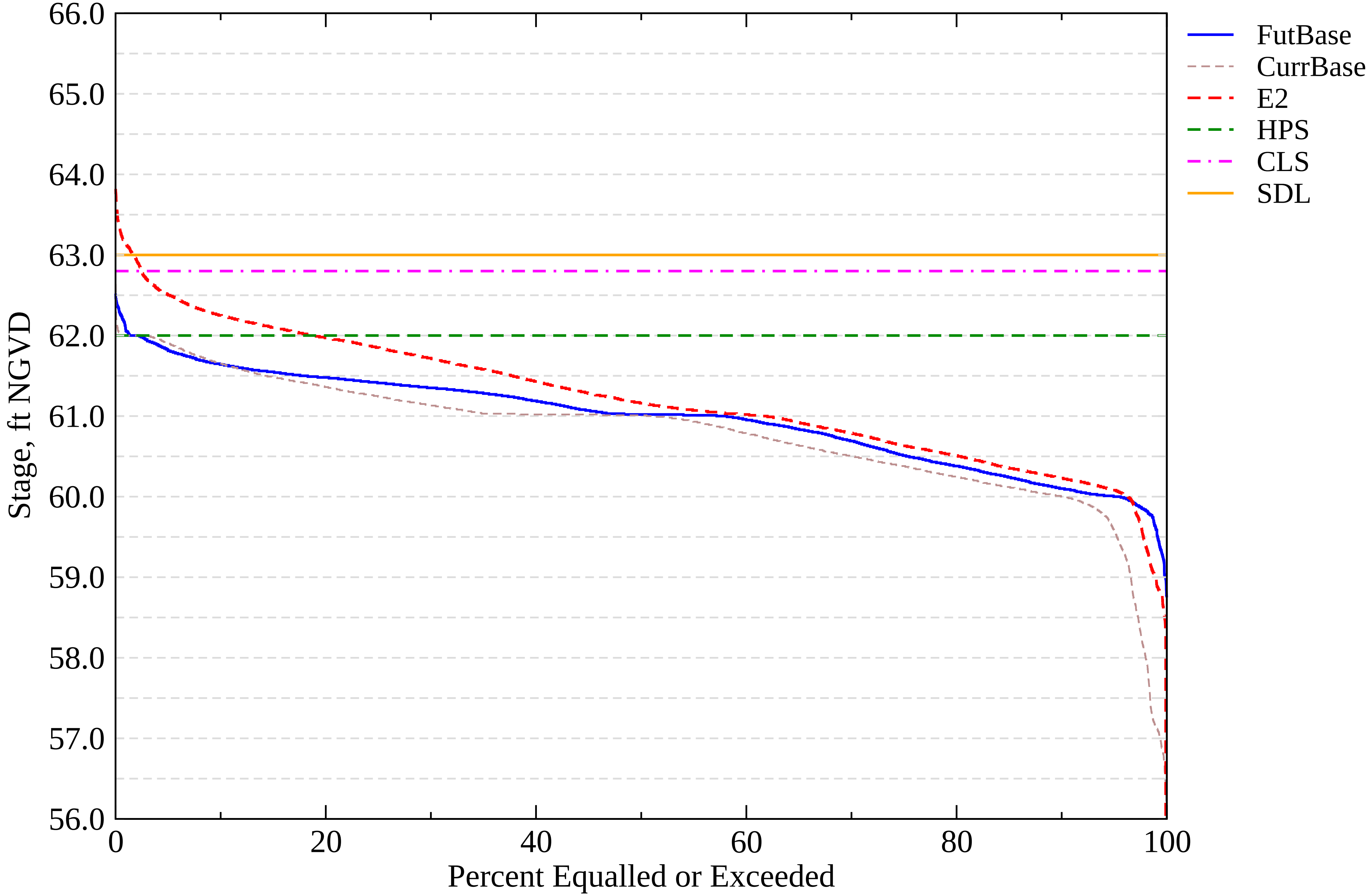
L-04. Stages in Lakes Joel, Myrtle, and Preston

Intra-annual lake stage variation (water year based)



I-01. Probable High Lake Stage Performance Indicator

Lake Myrtle, Joel, and Preston (S57)



Evaluation Performance Measure Score for S-59

L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Alternative Description : Uncertainty Analysis - Simulation E2

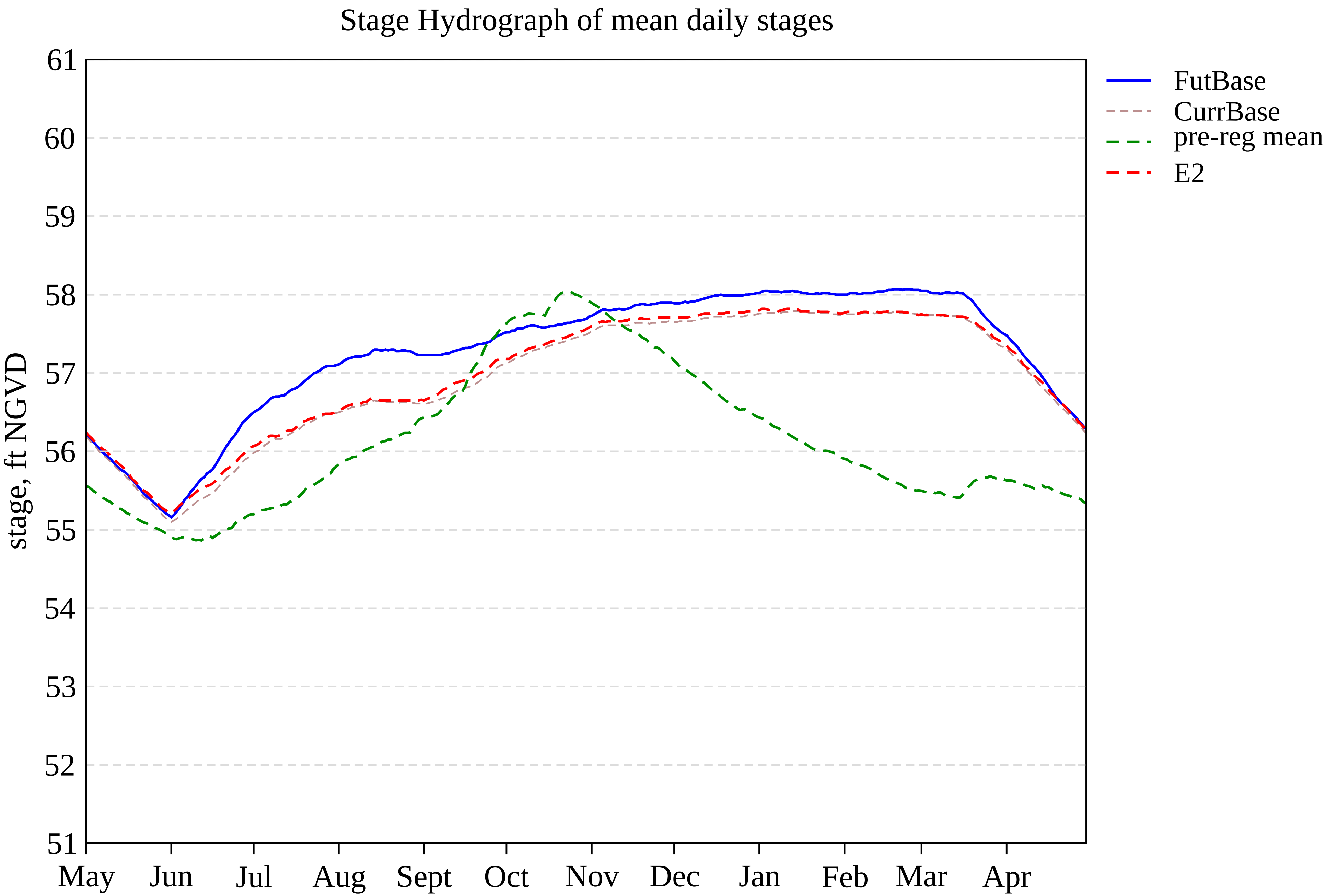
Run ID : Variation of Kv_ICU - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	51.0	60.0	57.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	63.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	66.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	37.1	34.3	22.9
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	0.0	11.4	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	91.4	91.4
K. Mean Intra-annual Lake Stage Variation (ft)	4.7	3.1	3.5	3.0
L. Maximum Inter-annual Lake stage Amplitude (ft)	10.3	4.5	5.5	4.4

Tier 2 Report

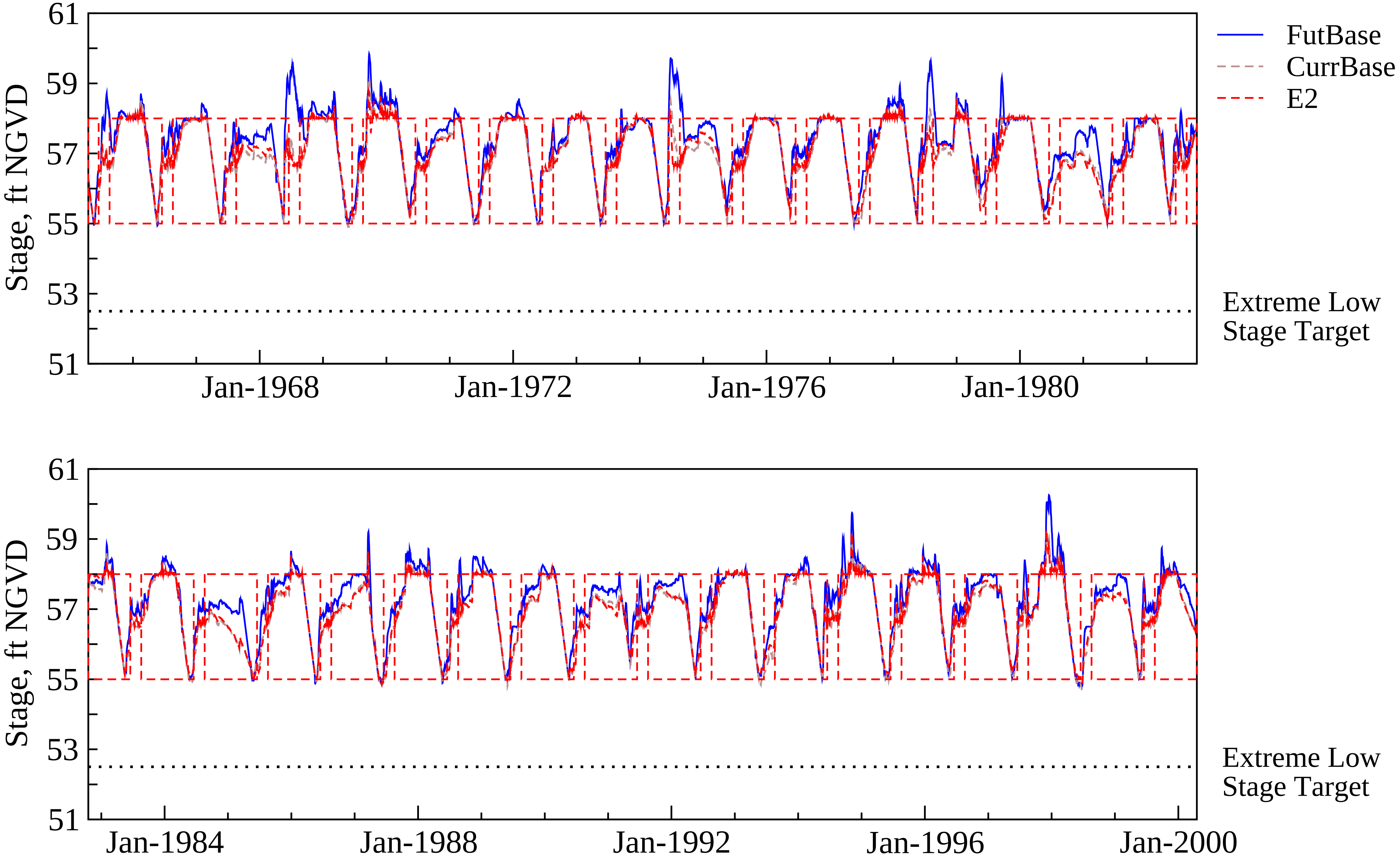
PDF Report for L05

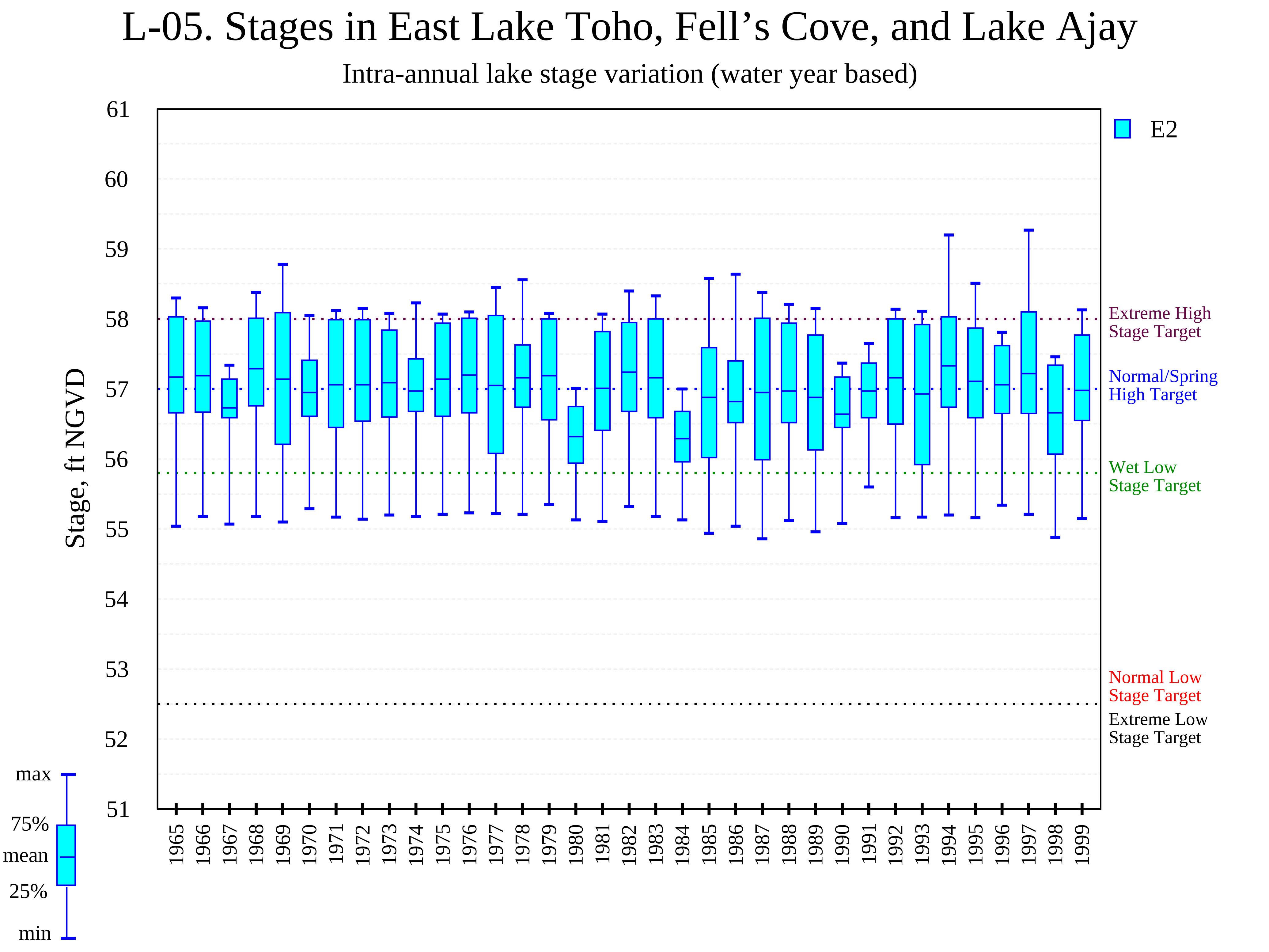
L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay



L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay

Daily Stage Hydrograph with Water Level recession windows (Sept-June)





L-05. Stages in East Lake Toho, Fell's Cove, and Lake Ajay
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
61
60
59
58
57
56
55
54
53
52
51
E2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
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1987
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1989
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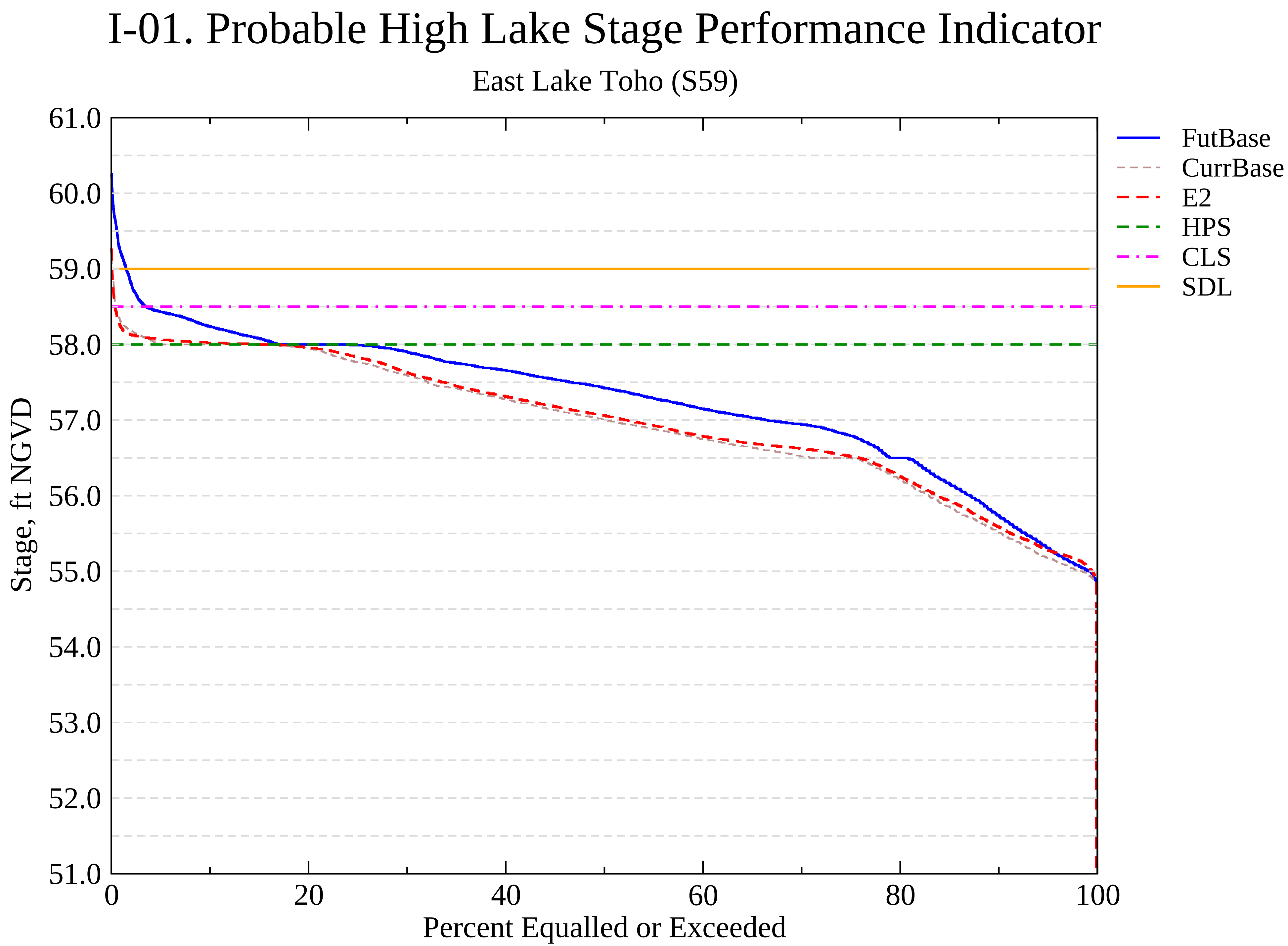
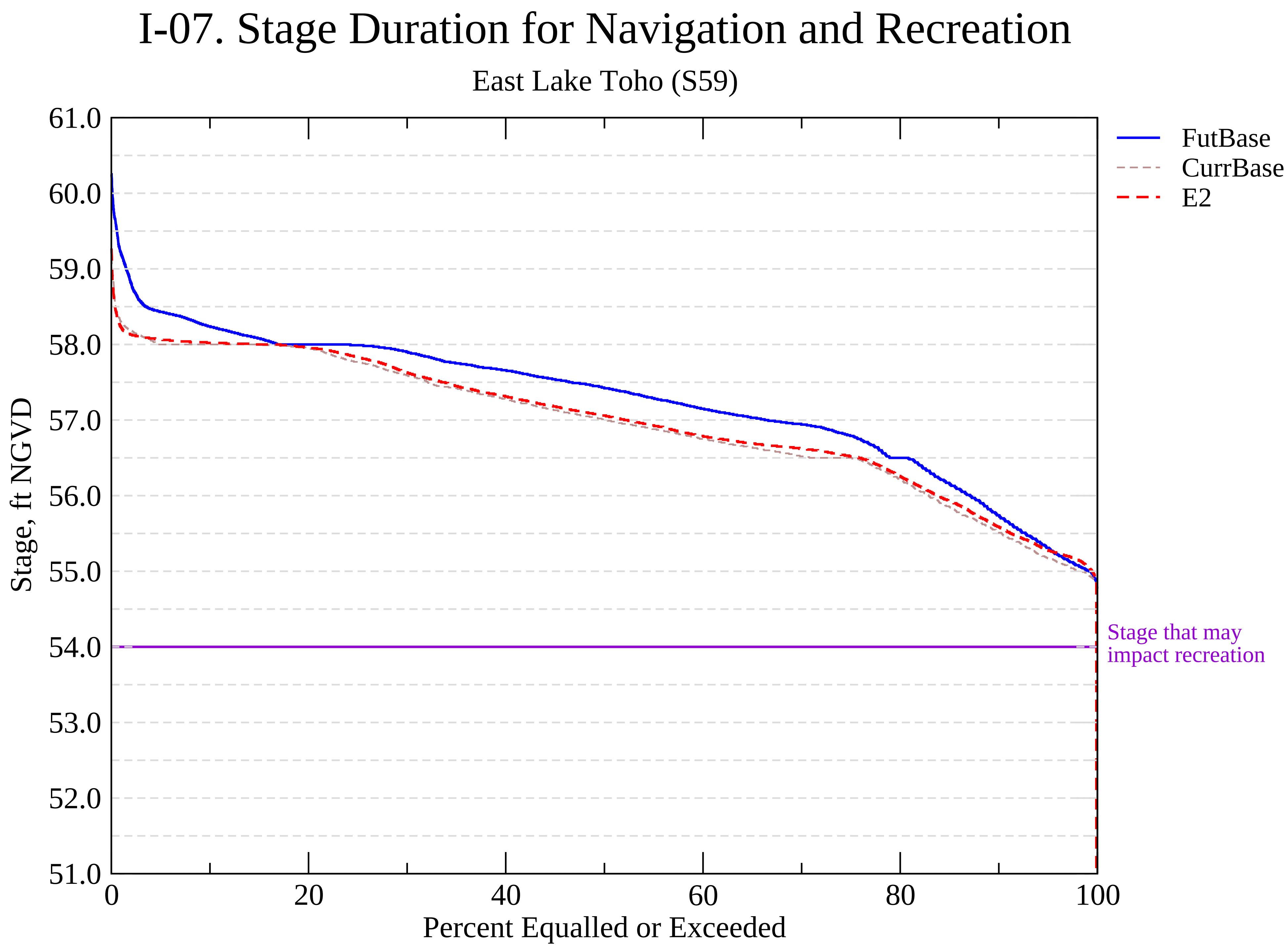
1995
1996
1997
1998
1999


I-01. Probable High Lake Stage Performance Indicator
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E2
HPS
CLS
SDL


I-07. Stage Duration for Navigation and Recreation
East Lake Toho (S59)
Stage, ft NGVD
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E2
Stage that may
impact recreation

Evaluation Performance Measure Score for S-60

L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center & Trout

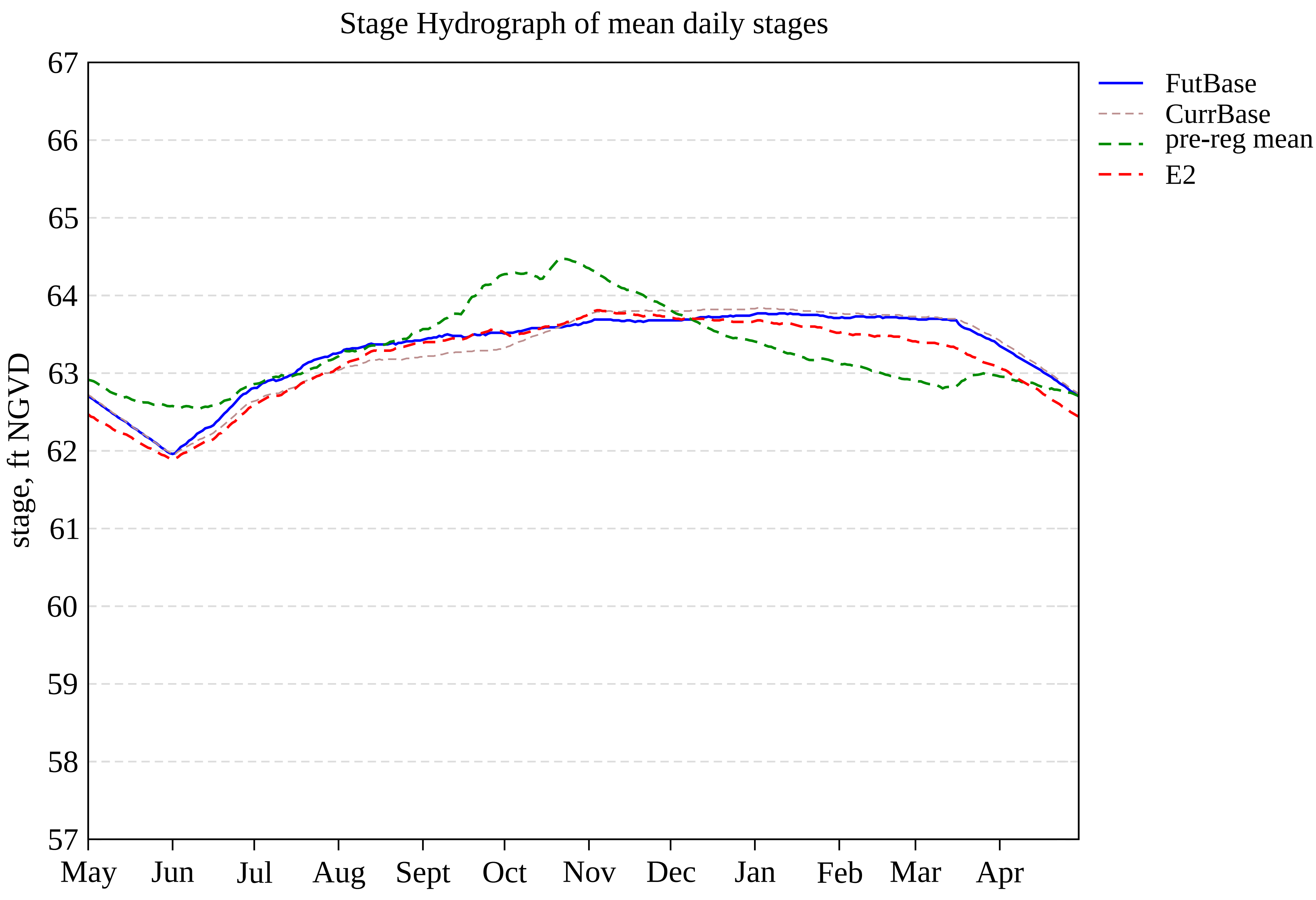
Alternative Description : Uncertainty Analysis - Simulation E2
Run ID : Variation of Kv_ICU - HIGH

Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	80.0	49.0	51.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	3.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	14.0	20.0	97.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	65.7	51.4	65.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	2.9	0.0	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	91.4	85.7	88.6
K. Mean Intra-annual Lake Stage Variation (ft)	3.3	2.1	2.2	2.6
L. Maximum Inter-annual Lake stage Amplitude (ft)	7.2	3.8	3.9	6.2

Tier 2 Report

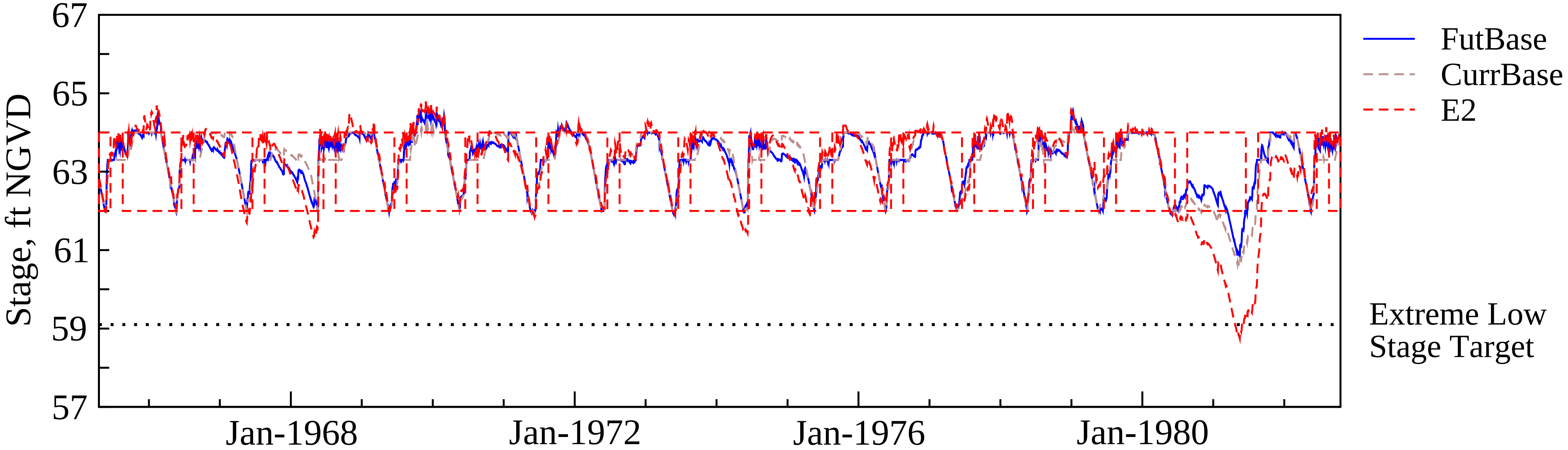
PDF Report for L06

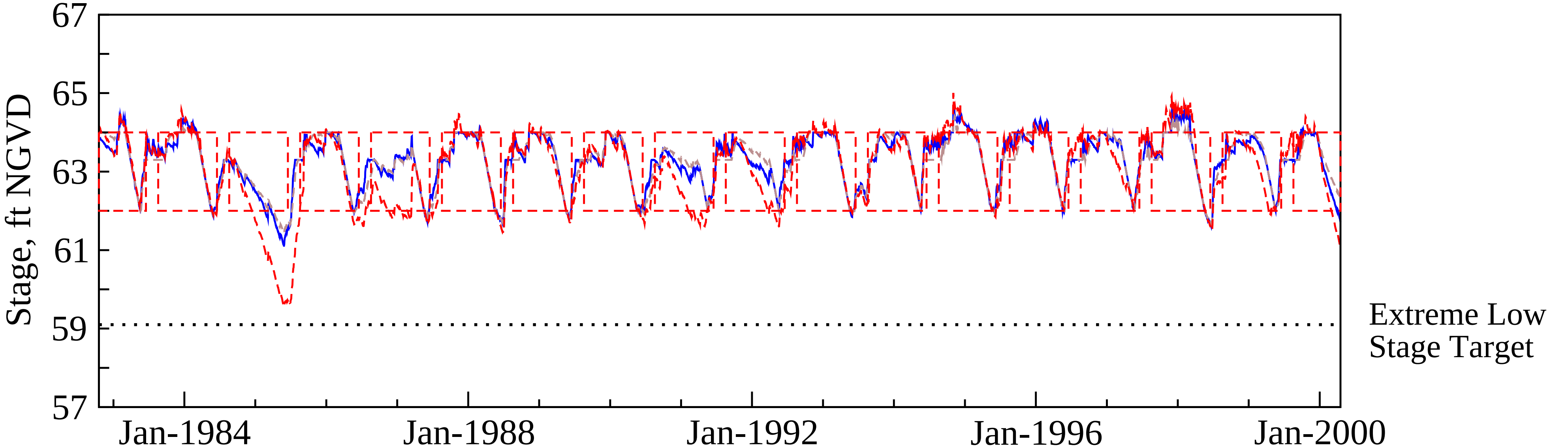
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, & Trout



L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

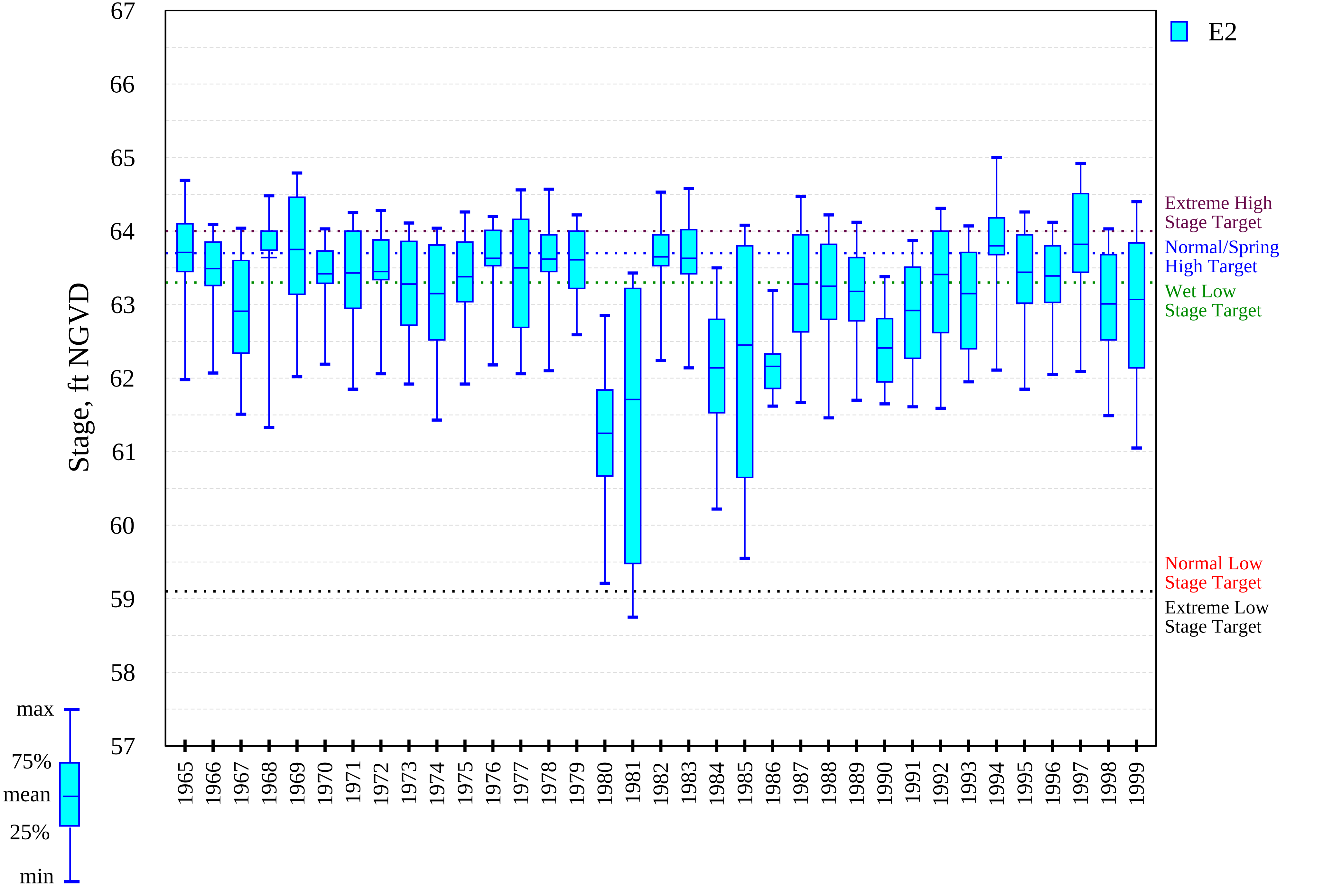
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

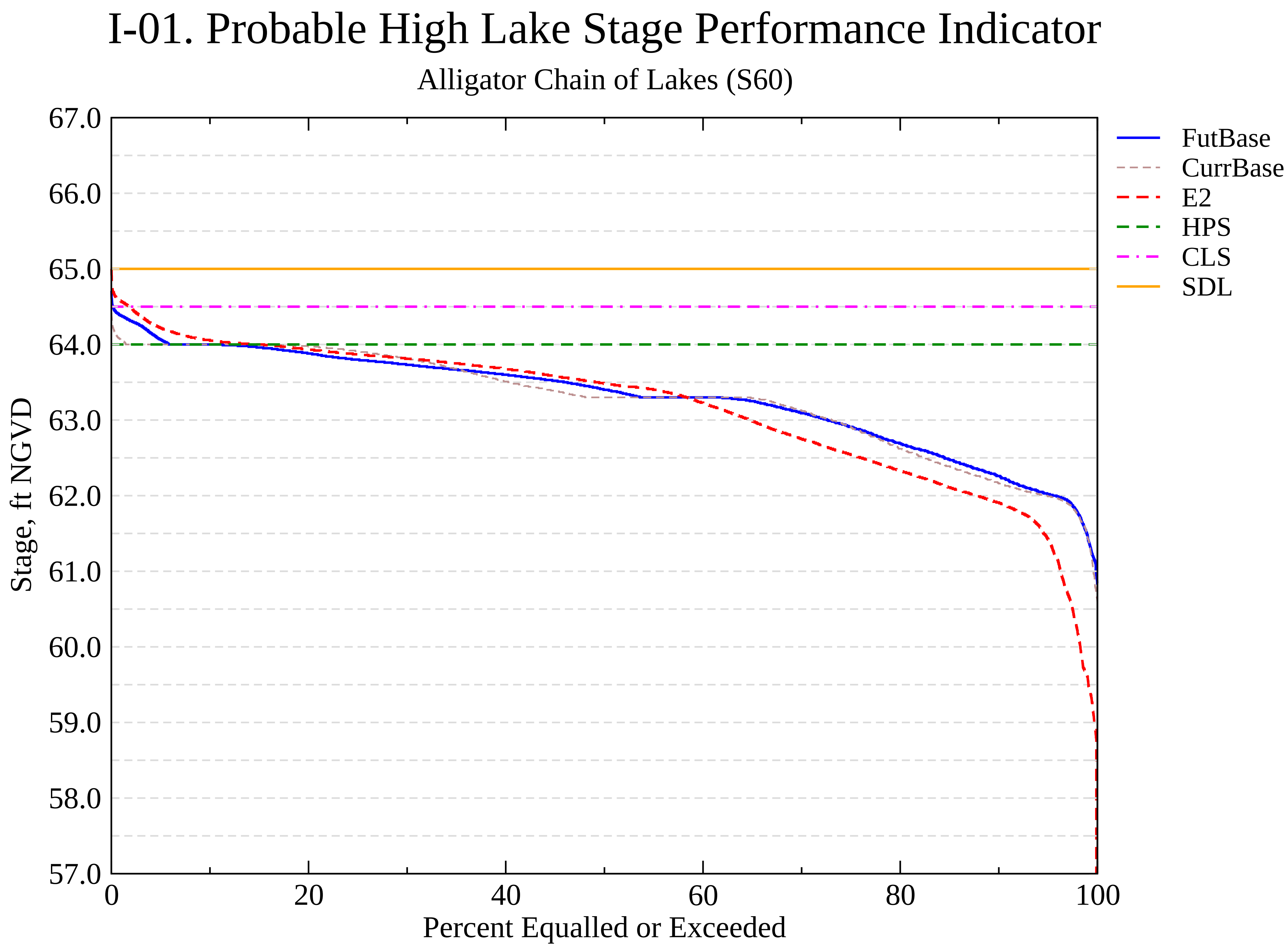




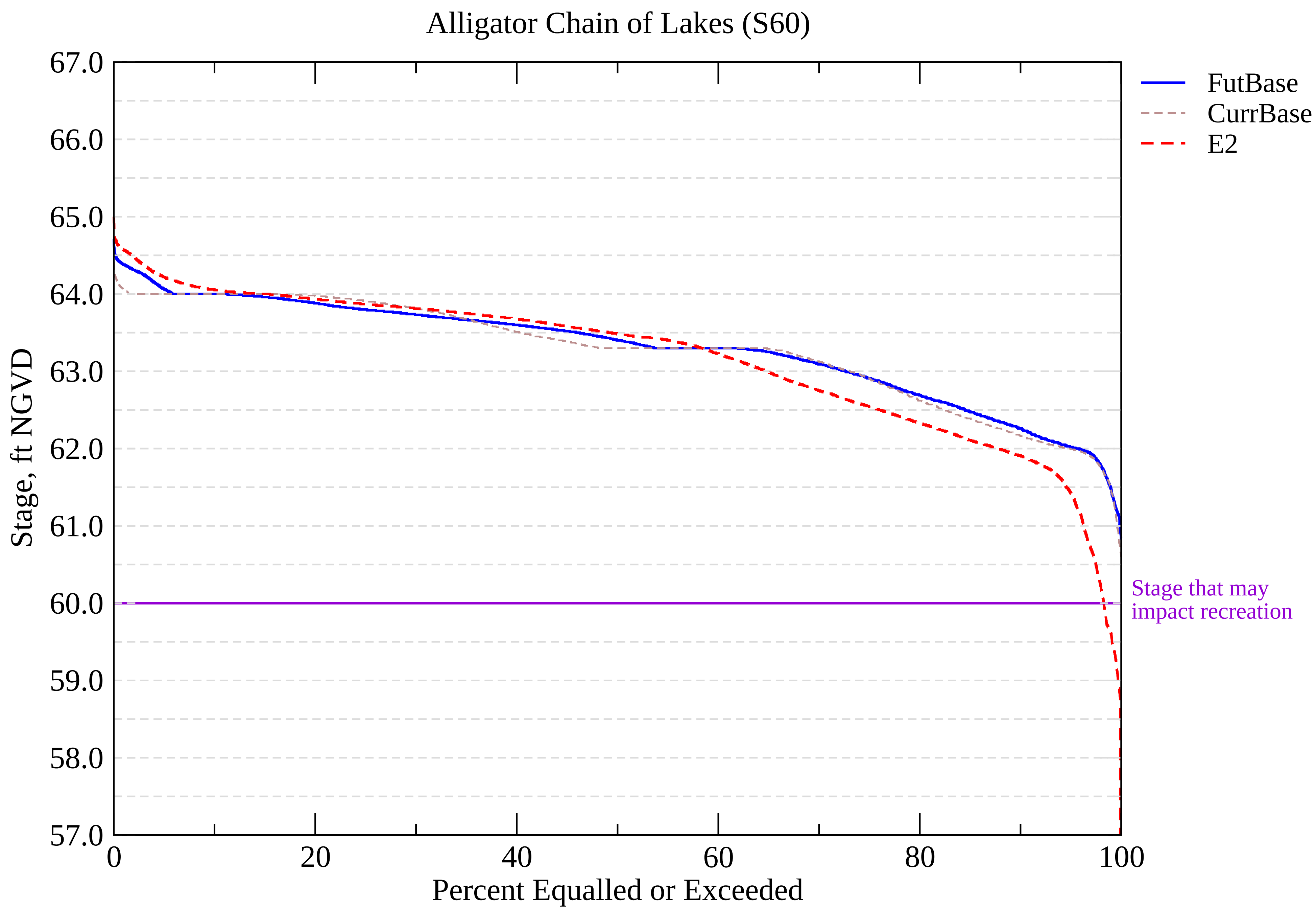
L-06. Stages in Lakes Alligator, Brick, Lizzie, Coon, Center, and Trout

Intra-annual lake stage variation (water year based)




I-01. Probable High Lake Stage Performance Indicator
Alligator Chain of Lakes (S60)
Stage, ft NGVD
67.0
66.0
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E2
HPS
CLS
SDL

I-07. Stage Duration for Navigation and Recreation



Evaluation Performance Measure Score for S-62
L-07. Stages in Lake Hart and Mary Jane
Alternative Description : Uncertainty Analysis - Simulation E2
Run ID : Variation of Kv_ICU - HIGH

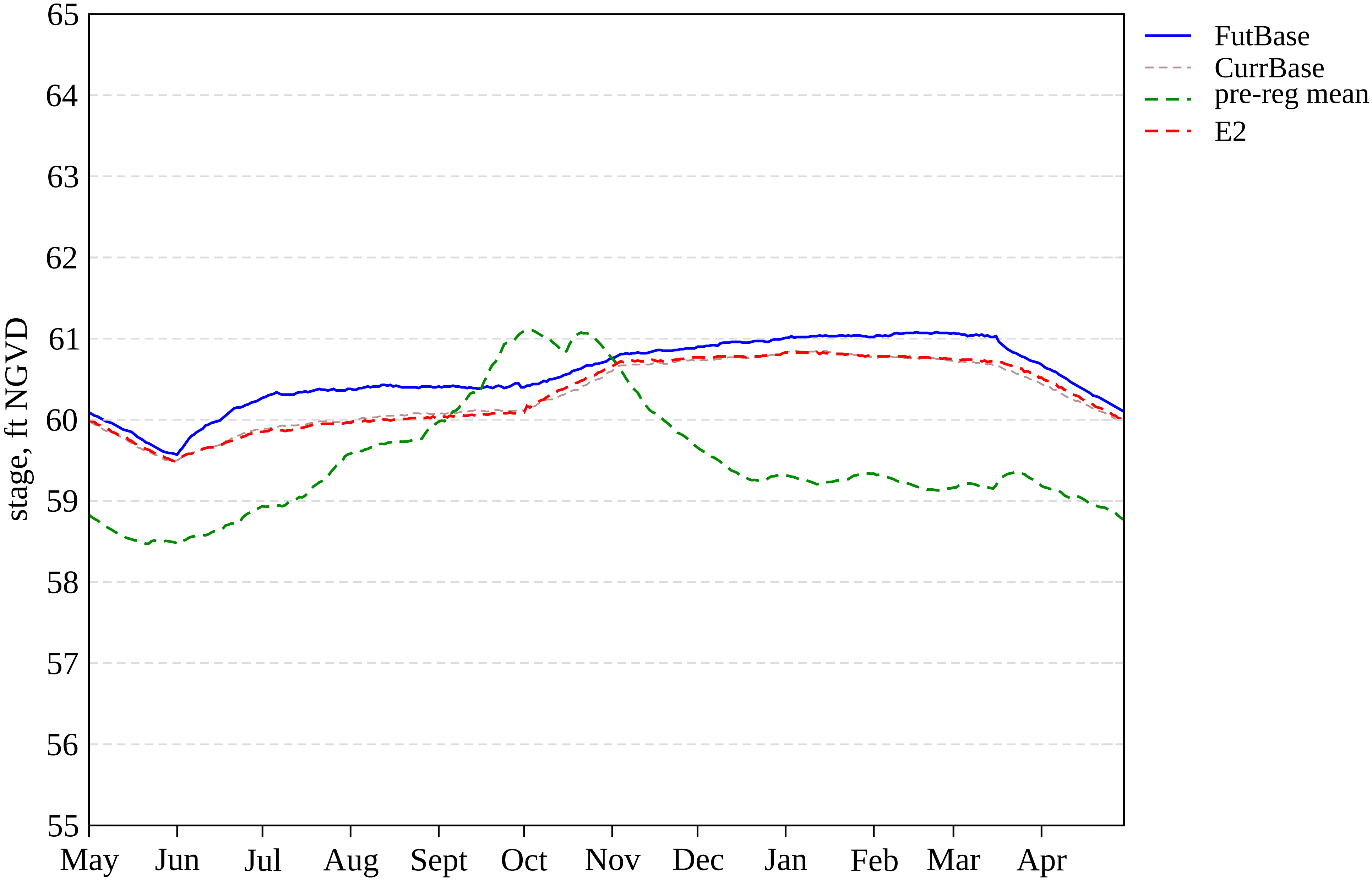
Evaluation Component	Target All locations	Current Base Conditions	Future Base Conditions	Calculated Component Value
A. Percent of years that Extreme High stages occur for 30 or more consecutive days during Sept - January.	30.0	77.0	80.0	69.0
B. Percent of years that Normal High stages occur for 90 or more consecutive days during Sept - January.	70.0	100.0	100.0	100.0
C. Percent of years that Spring High stages occur for 100 or more consecutive days during January - June.	10.0	0.0	0.0	71.0
E. Percent of years that Wet Low stages occur for 40 or more consecutive days during April - June.	40.0	0.0	0.0	0.0
F. Percent of years that Normal Low stages occur for 40 or more consecutive days during April - June.	40.0	3.0	0.0	46.0
G. Percent of years that Extreme Low stages occur for 60 or more consecutive days during February - June.	10.0	0.0	0.0	0.0
H. Percent of years with a stage recession event of 176 days or more during September - June with an overall recession rate <= 1.4 ft/30 days.	60.0	40.0	25.7	25.7
I. Percent of years with stage reversals > 0.5 ft and < 1.5ft during December-June.	20.0	5.7	5.7	2.9
J. Percent of years with a stage ascension event during May-October with an overall ascension rate <= 1.6 ft/30 days.	31.0	82.9	94.3	82.9
K. Mean Intra-annual Lake Stage Variation (ft)	4.5	1.8	1.9	1.7
L. Maximum Inter-annual Lake stage Amplitude (ft)	8.0	4.2	2.8	3.4
M. Percent of years that Extreme High stages occur for 45 or more consecutive days during January-February.	90.0	26.0	63.0	63.0

Tier 2 Report

PDF Report for L07

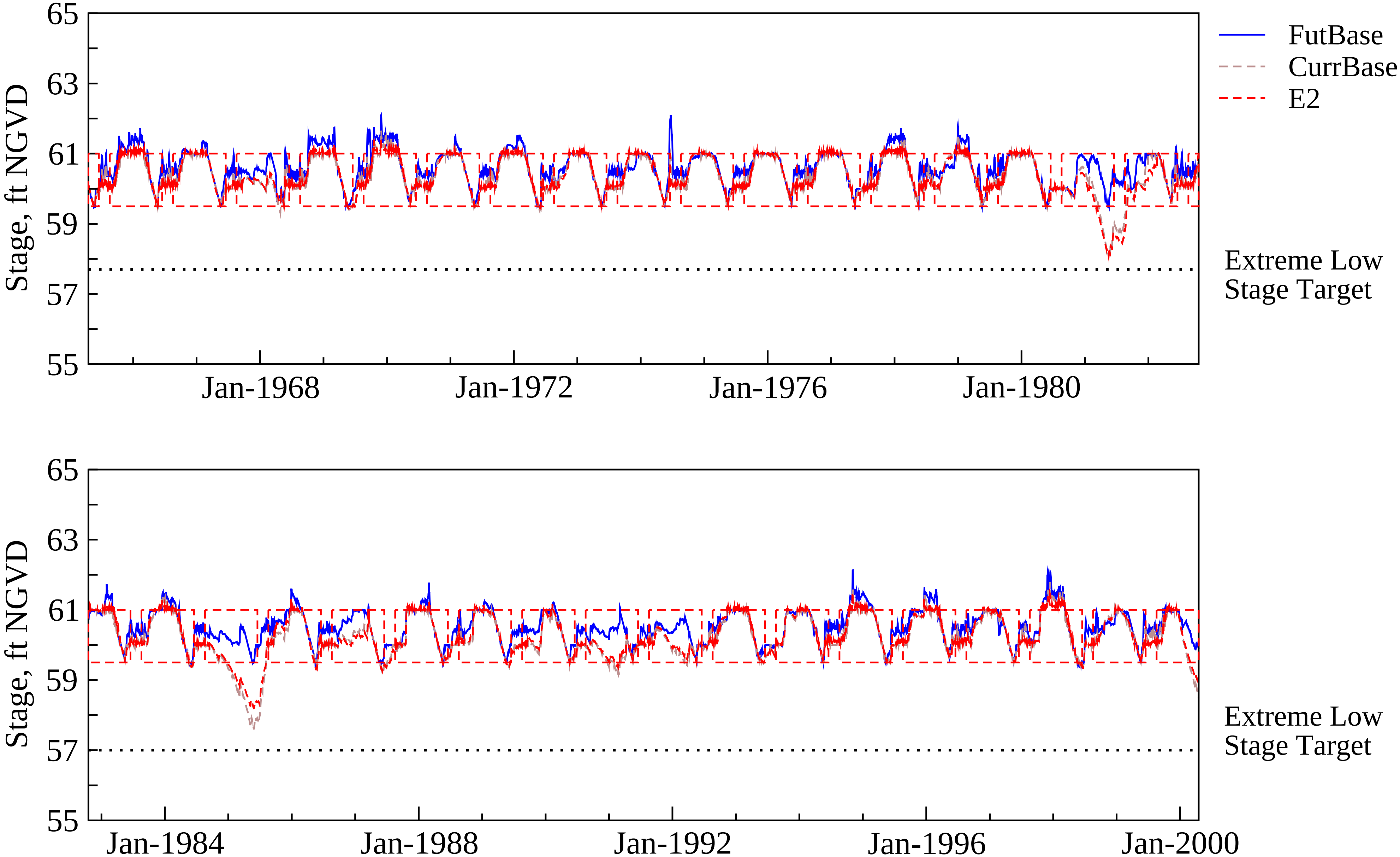
L-07. Stages in Lake Hart and Mary Jane

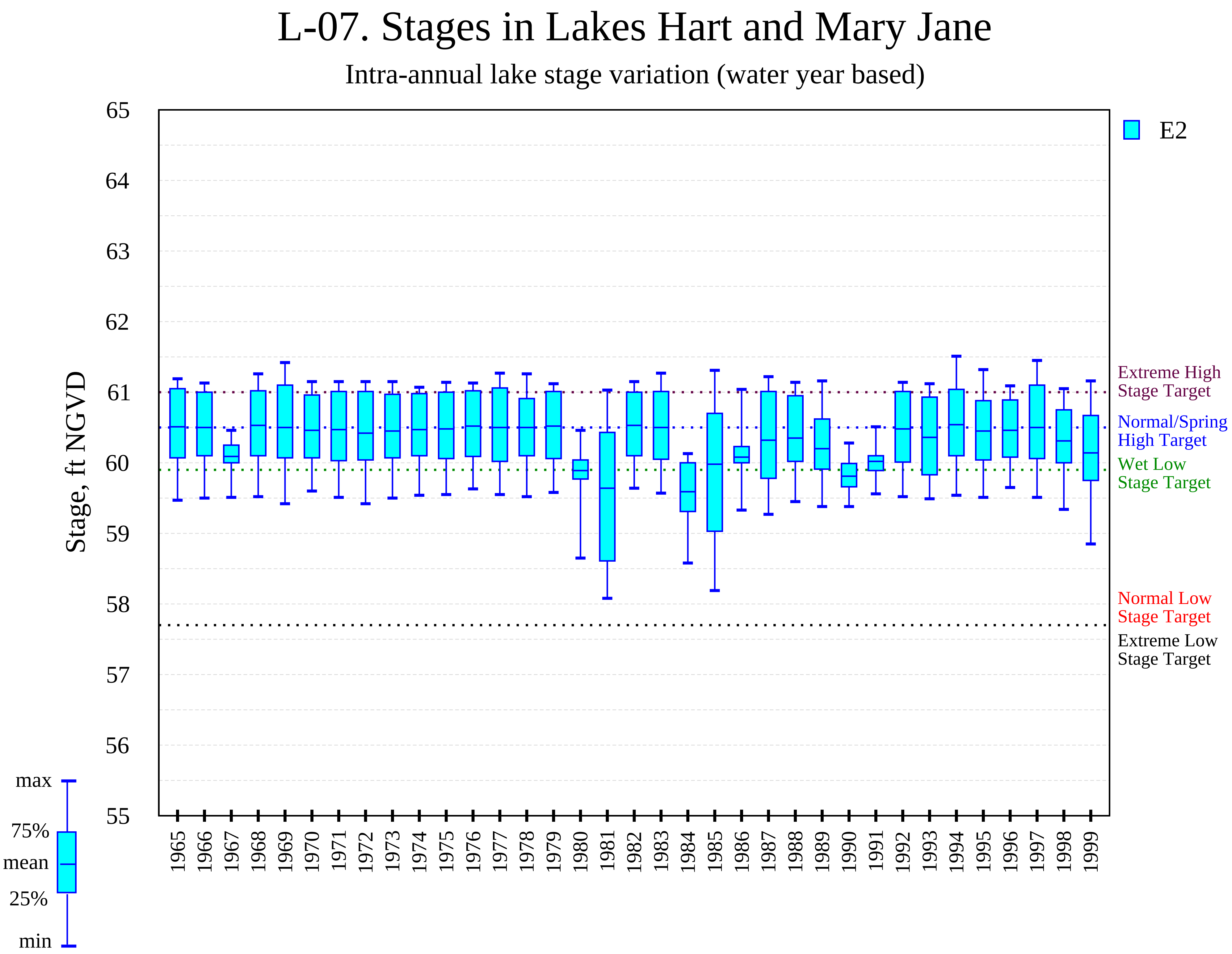
Stage Hydrograph of mean daily stages



L-07. Stages in Lakes Hart and Mary Jane

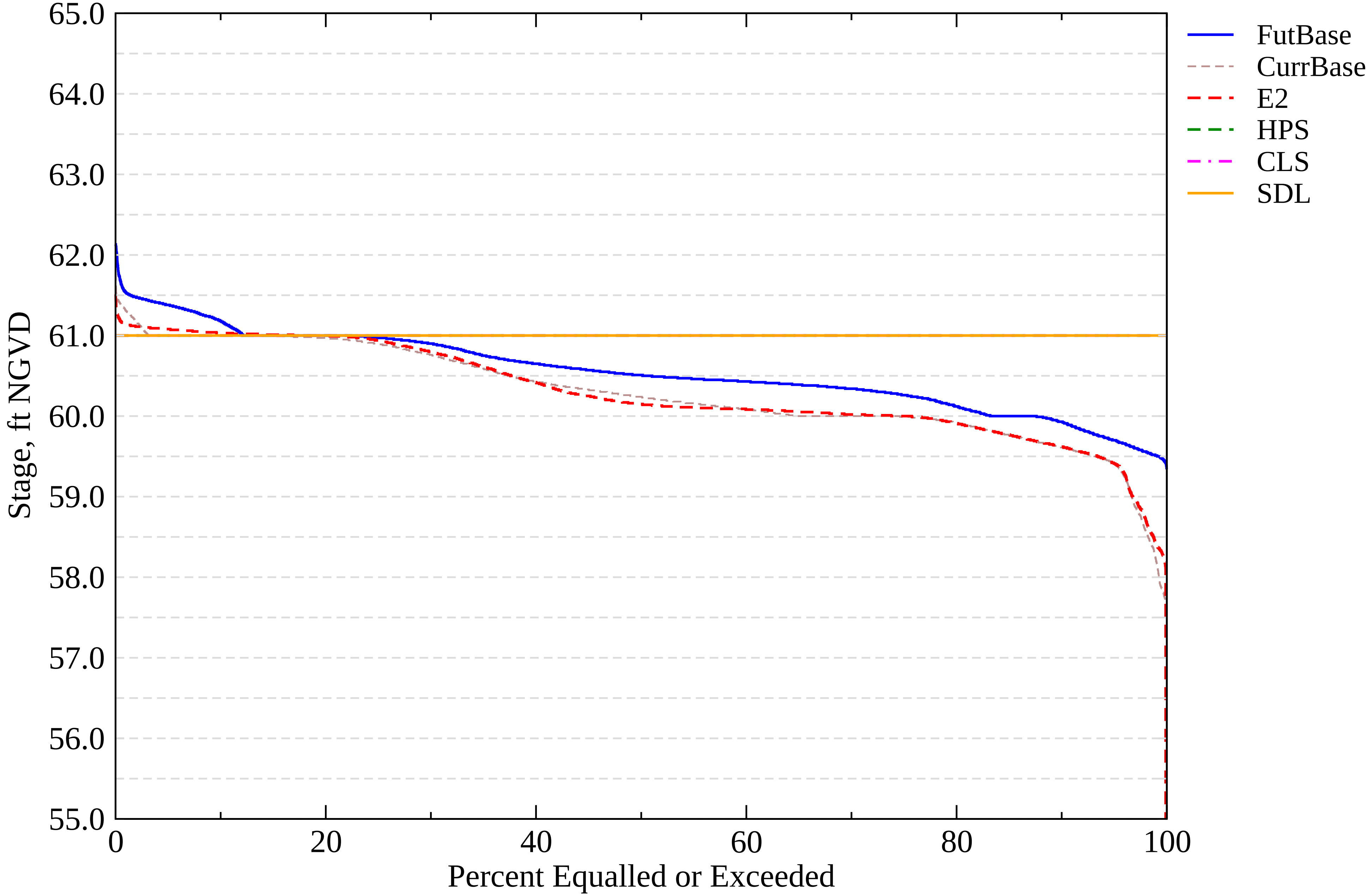
Daily Stage Hydrograph with Water Level recession windows (Sept-June)

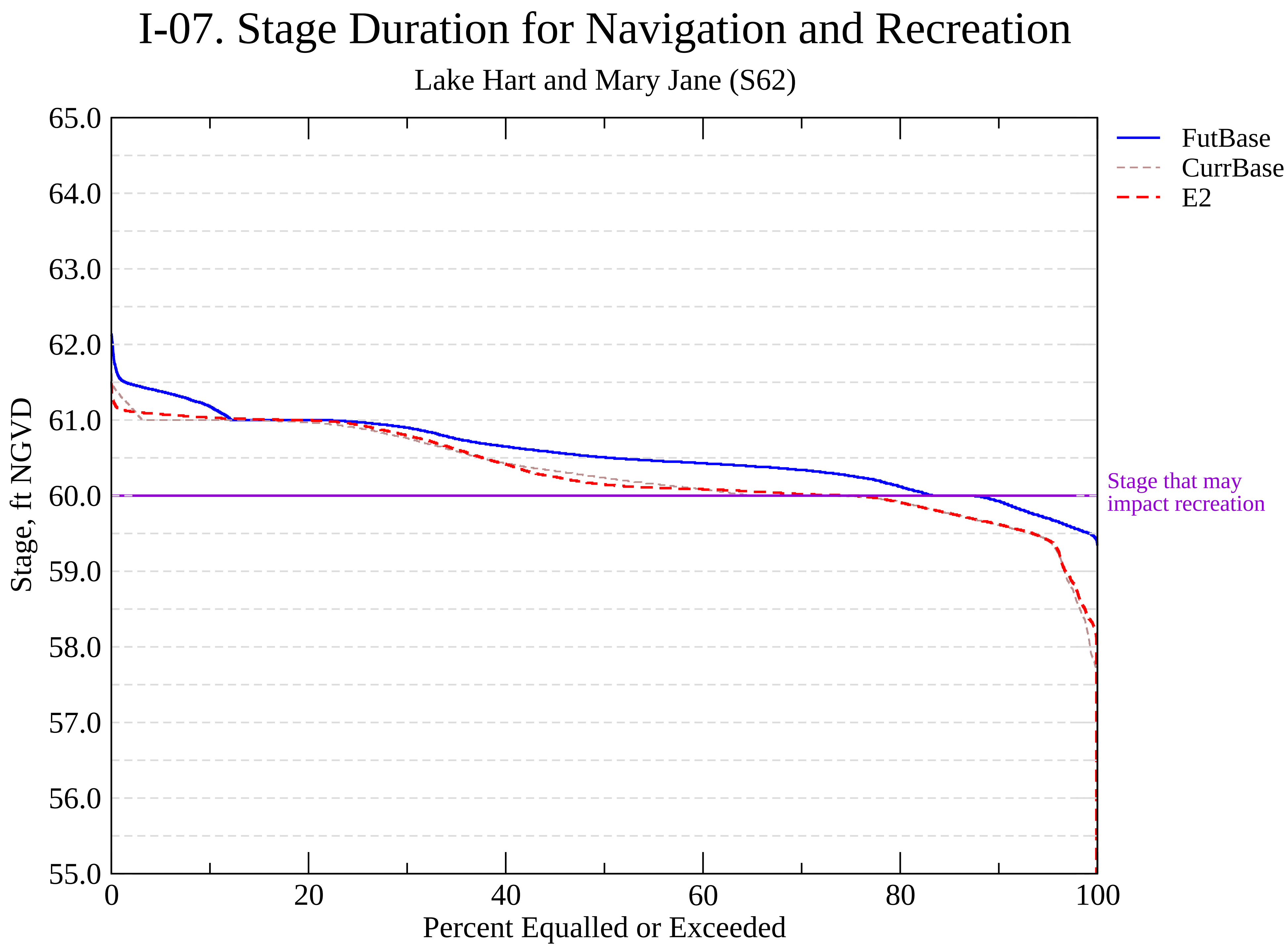



L-07. Stages in Lakes Hart and Mary Jane
Intra-annual lake stage variation (water year based)
Stage, ft NGVD
65
64
63
62
61
60
59
58
57
56
55
E2
Extreme High Stage Target
Normal/Spring High Target
Wet Low Stage Target
Normal Low Stage Target
Extreme Low Stage Target
max
75%
mean
25%
min
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

I-01. Probable High Lake Stage Performance Indicator

Lakes Hart and Mary Jane (S62)




I-07. Stage Duration for Navigation and Recreation
Lake Hart and Mary Jane (S62)
Stage, ft NGVD
65.0
64.0
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
0
20
40
60
80
100
Percent Equalled or Exceeded
FutBase
CurrBase
E2
Stage that may
impact recreation

Evaluation Performance Measure Score for S-65 and S-65E

R-01. Kissimmee River Flow

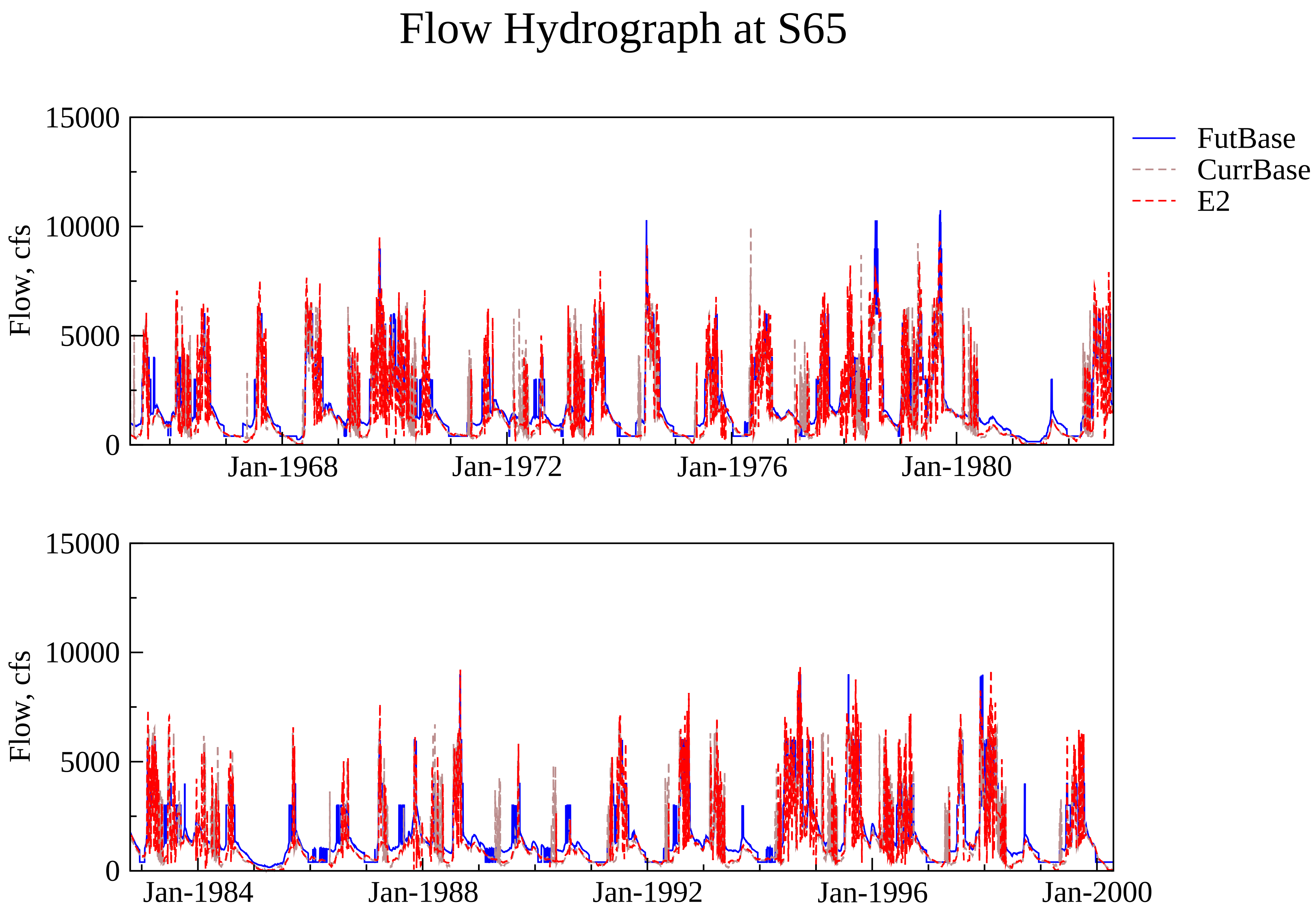
Alternative Description : Uncertainty Analysis - Simulation E2

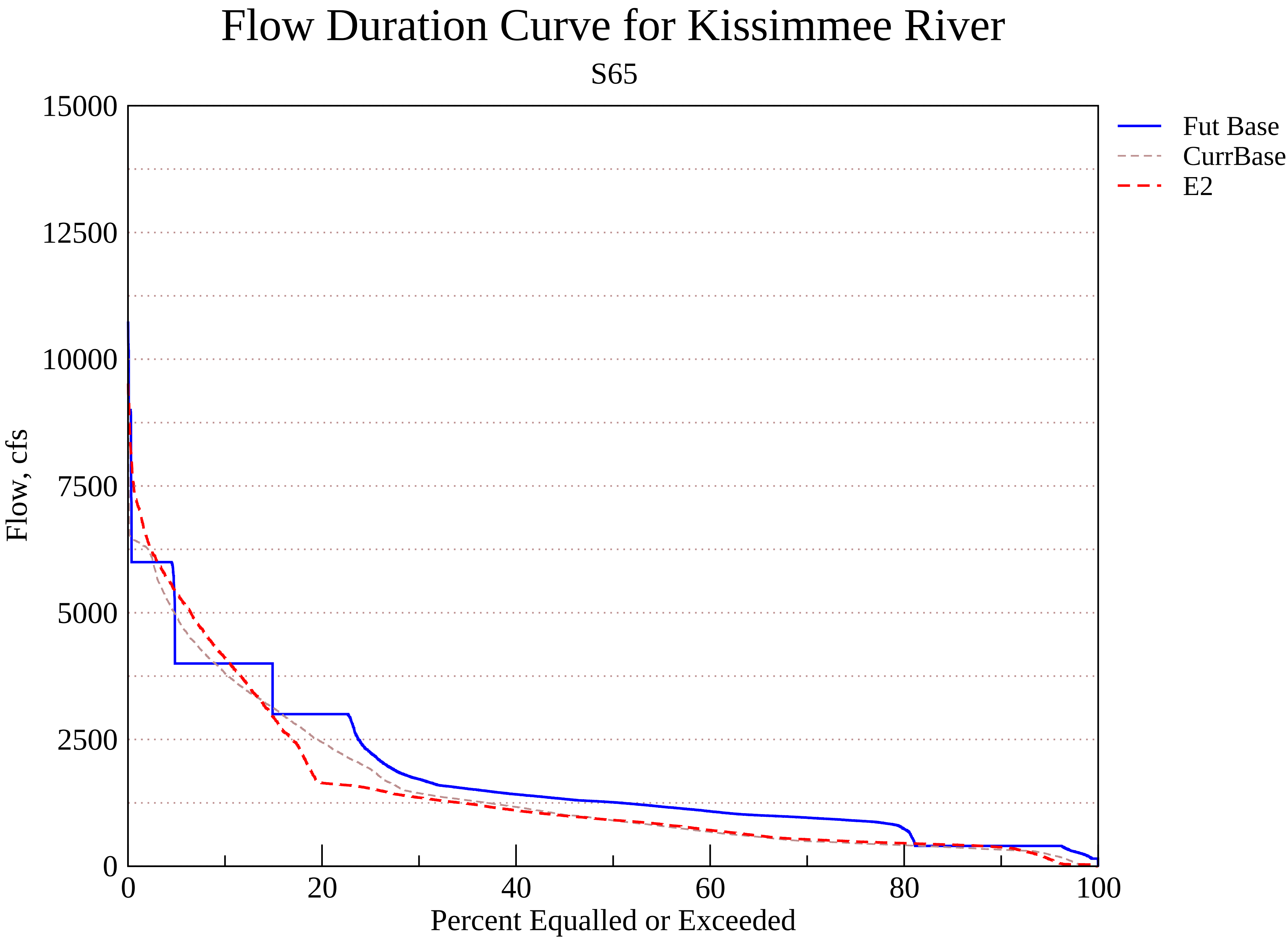
Run ID : Variation of Kv_ICU - HIGH

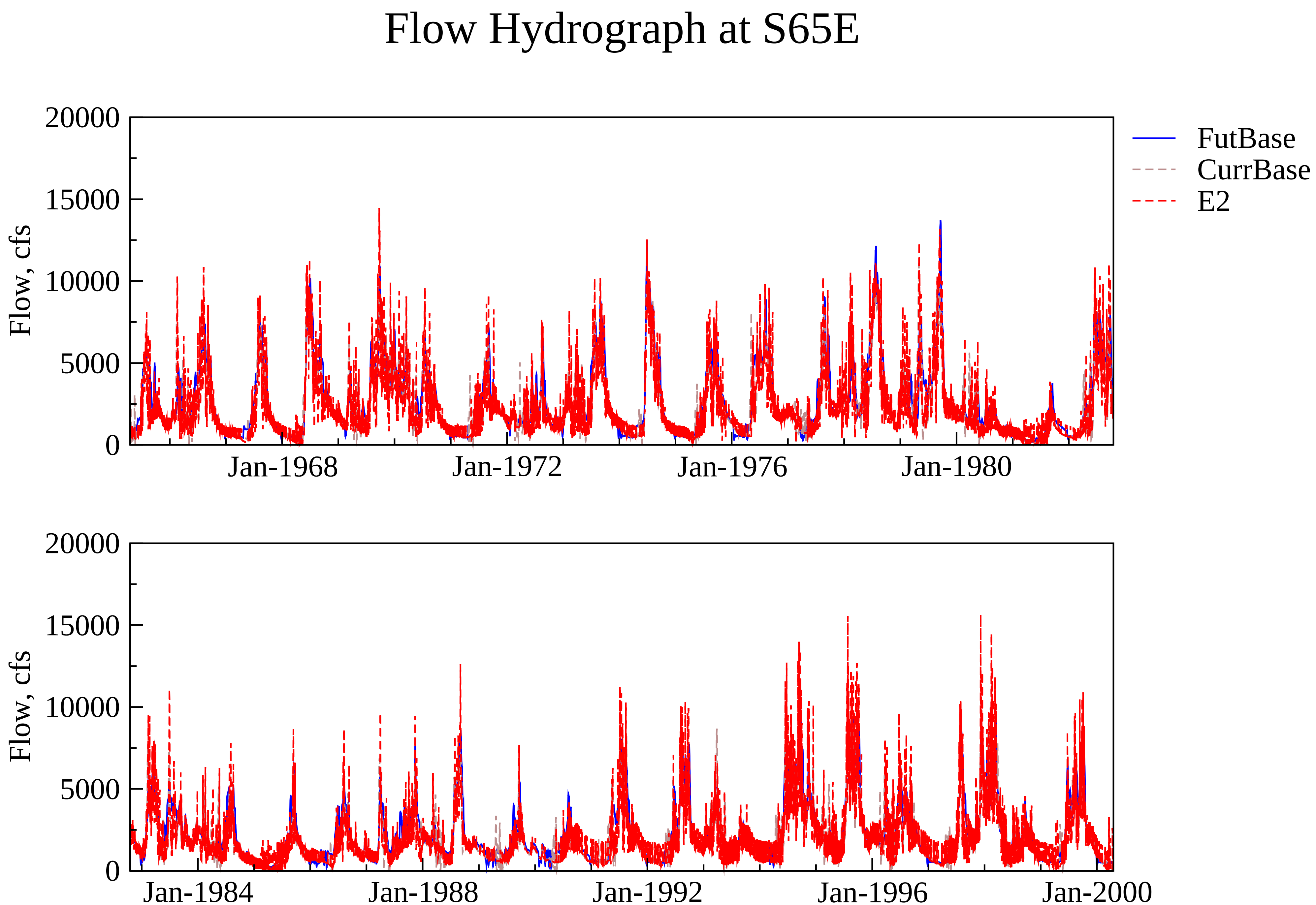
Evaluation Component	Target		Current Base Conditions		Future Base Conditions		Calculated Component Value	
	S65	S65E	S65	S65E	S65	S65E	S65	S65E
A. Percent of years that the maximum mean monthly flow occurs in September, October or November.	57.0	67.0	22.9	37.1	40.0	48.6	25.7	40.0
B. Percent of years that the maximum mean monthly flow occurs in July, August, December or January.	25.0	15.0	54.3	48.6	51.4	48.6	54.3	54.3
C. Percent of years that the minimum mean monthly flow occurs in April, May or June.	70.0	79.0	77.1	74.3	48.6	68.6	88.6	82.9
D. Percent of years that the minimum mean monthly flow occurs in February, March, July or August.	18.0	15.0	17.1	17.1	40.0	20.0	5.7	8.6
E. Average intra-annual (water year based) monthly flow variation (kac-ft/mth).	122.0	236.0	199.0	254.0	214.0	301.0	200.0	262.0
F. Maximum inter-annual (water year based) monthly flow variation (kac-ft/mth).	435.0	718.0	391.0	517.0	432.0	596.0	426.0	559.0
G. Return Frequency of 14-day low flow (Q<250 cfs) events (yrs).	4.9	8.7	2.4	3.6	5.6	9.2	2.7	4.2
H. Number of times that the maximum mean monthly flows occurs during February – June for more than 3 consecutive years.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tier 2 Report

PDF Report for R01

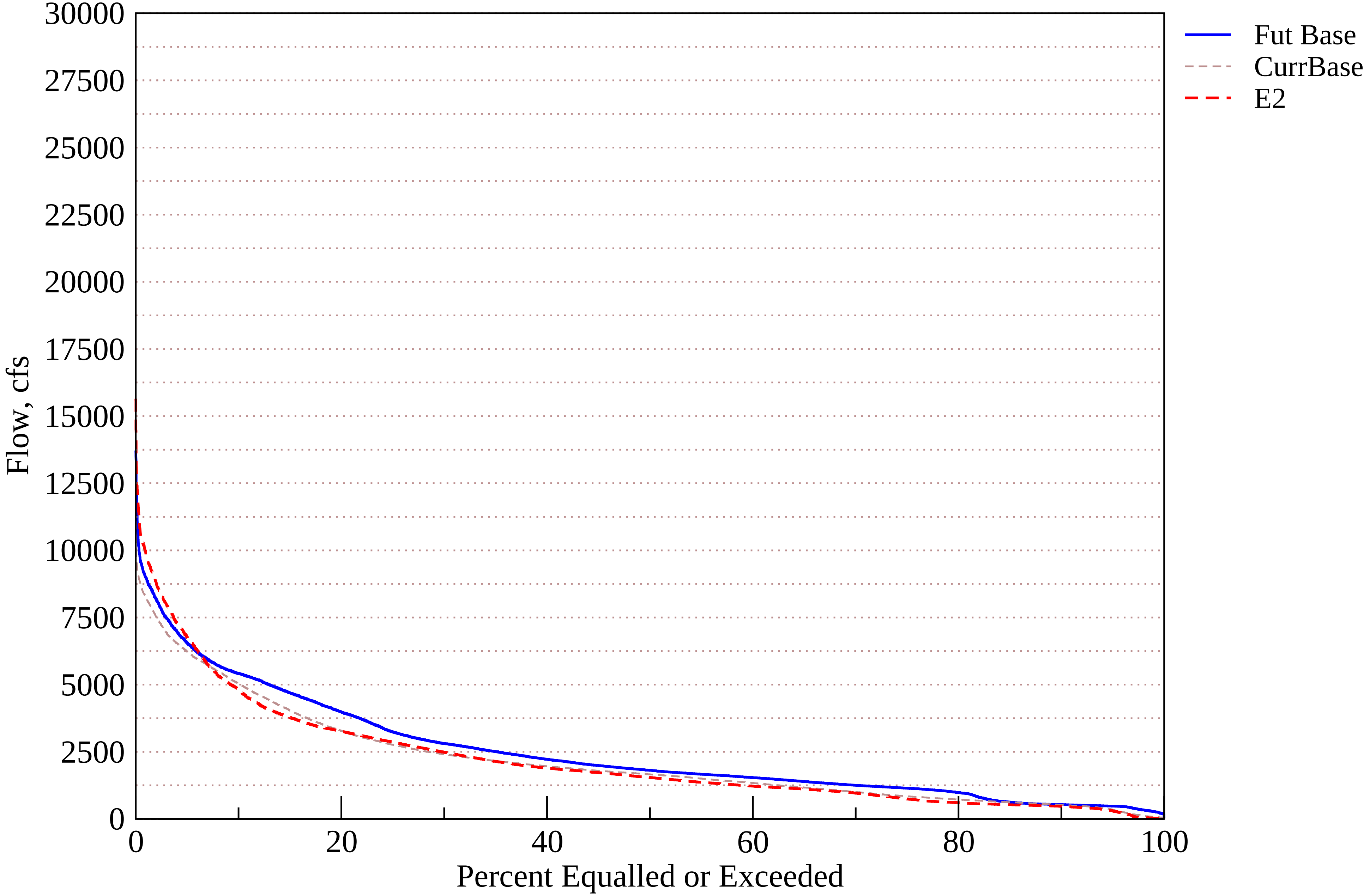

Flow Hydrograph at S65
Flow, cfs
15000
10000
5000
0
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000
FutBase
CurrBase
E2


Flow Duration Curve for Kissimmee River
S65
Flow, cfs
15000
12500
10000
7500
5000
2500
0
0
20
40
60
80
100
Percent Equalled or Exceeded
Fut Base
CurrBase
E2


Flow Hydrograph at S65E
FutBase
CurrBase
E2
Flow, cfs
20000
15000
10000
5000
0
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000

Flow Duration Curve for Kissimmee River

S65E



Evaluation Performance Measure Score for PC52

R-02. Kissimmee River Stage Hydrograph / Floodplain Hydroperiod

Alternative Description : Uncertainty Analysis - Simulation E2

Run ID : Variation of Kv_ICU - HIGH

Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Number of days per water year that river channel depth is greater than average floodplain ground elelvation (average).	252.0	250.0	203.0	300.0
B. Number of days per water year that river channel depth is greater than zero (standard deviation).	106.0	86.0	86.0	63.0
C. Mean intra-annual river channel stage fluctuation per water year (ft).	5.0	5.3	5.4	5.5
D. Maximum inter-annual river channel stage fluctuation (ft).	11.7	7.1	7.8	8.8

Tier 2 Report

PDF Report for R02

Evaluation Performance Measure Score for PC52

R-03. Kissimmee River Stage Recession / Ascension

Alternative Description : Uncertainty Analysis - Simulation E2

Run ID : Variation of Kv_ICU - HIGH

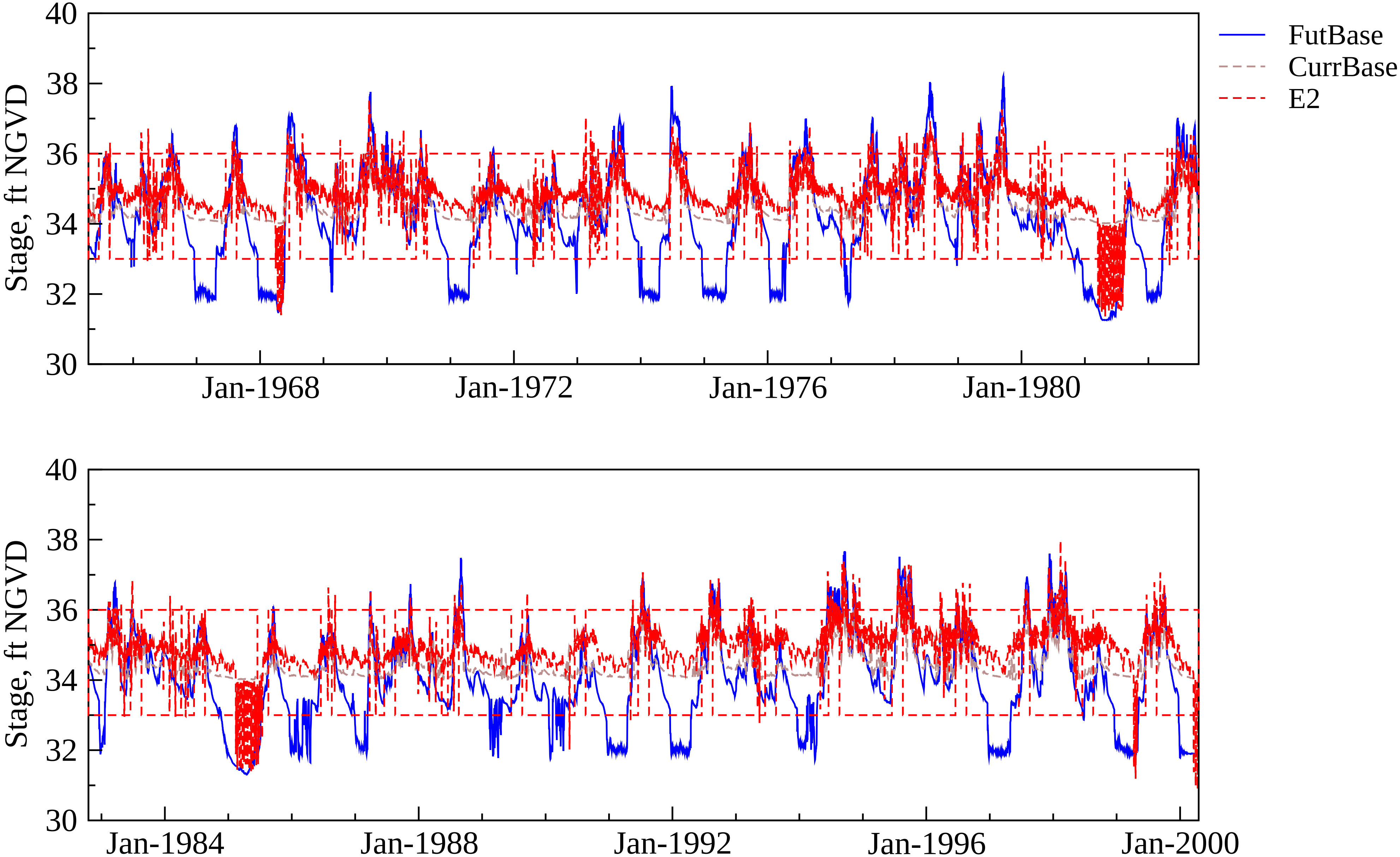
Evaluation Component	Target	Current Base Condition	Future Base Conditions	Calculated Component Value
A. Percent of years with a stage recession event of 173 days or more during September – June with an overall recession rate ≤ 1.0 ft/30 days.	65.0	51.4	42.9	42.9
B. Percent of years with stage reversals > 0.5 ft and < 1.5 ft during December – June.	41.0	94.3	71.4	88.6
C. Percent of years with a stage ascension event of 78 days or more during May – October with an overall ascension rate ≤ 2.7 ft/30 days.	53.0	60.0	31.4	25.7

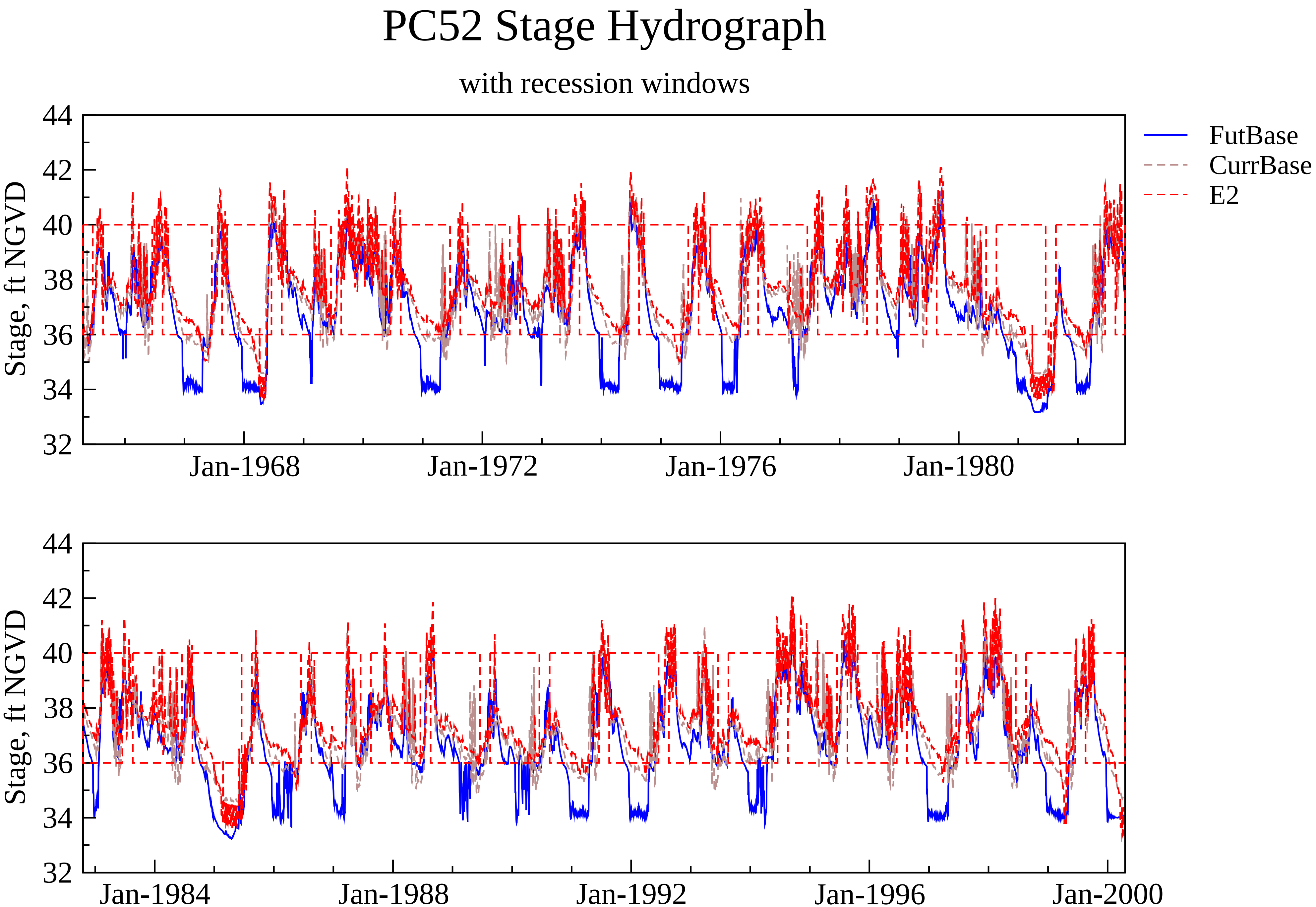
Tier 2 Report

PDF Report for R03

PC33 Stage Hydrograph

with recession windows




PC52 Stage Hydrograph
with recession windows
Stage, ft NGVD
44
42
40
38
36
34
32
Jan-1968
Jan-1972
Jan-1976
Jan-1980
Jan-1984
Jan-1988
Jan-1992
Jan-1996
Jan-2000
FutBase
CurrBase
E2