

Lake Okeechobee System Operating Manual

Iteration 3 - Phase 2 Batch Analysis

Sanibel-Captiva Conservation Foundation

Conservancy of Southwest Florida

DRAFT - October 22, 2021
(Updated: October 26, 2021)



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Iteration 3 Goals

- Goals presented by USACE focused on water supply (tribal, LOSA and LECSA), estuary and lake health, and moving more water to the southern Everglades (see USACE Technical Stakeholder Engagement - 16-17 Sept 2021 meeting presentation).
- For purposes of this analysis we focused on:
 - *Reduce stress to the Caloosahatchee River and Estuary*
 - *Help Lake ecology by addressing the duration and number of events above 17 feet*
- Initially CC was used as the foundation (Phase 1 of Iteration 3)
- After the initial alternative sensitivity runs (i.e. Iteration 3, Phase 1), alternative CCR1 was considered for the next phase of Iteration 3 to build "CCR2B"

Iteration 3 - Run Screening

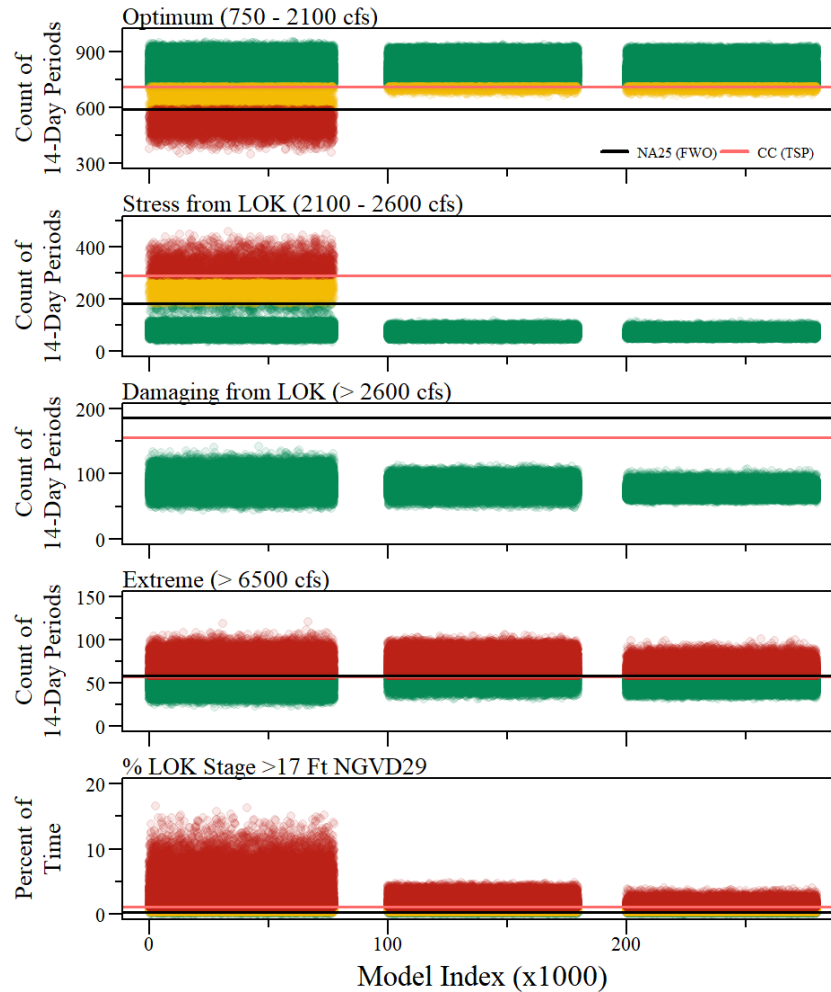
Using the RSM-BN Batch Runs spreadsheets (~240,000 runs)

- Runs were initially screened based on PM values relative to CC and NA25 (FWO)
 - Caloosahatchee optimal discharge (PM31)
 - Caloosahatchee stress discharge from LOK (PM37)
 - Caloosahatchee damaging discharge from LOK (PM38)
 - Caloosahatchee extreme discharge (PM36)
 - Percent LOK Stage >17 Ft NGVD29 (PM5)
- To narrow the data down, runs were subsetting based on PMs listed above relative to the CC value $\pm 5\%$ (i.e. CC PM31 + 5%, CC PM37 - 5%, etc) then sorted and the 1st eight of each batch were retained

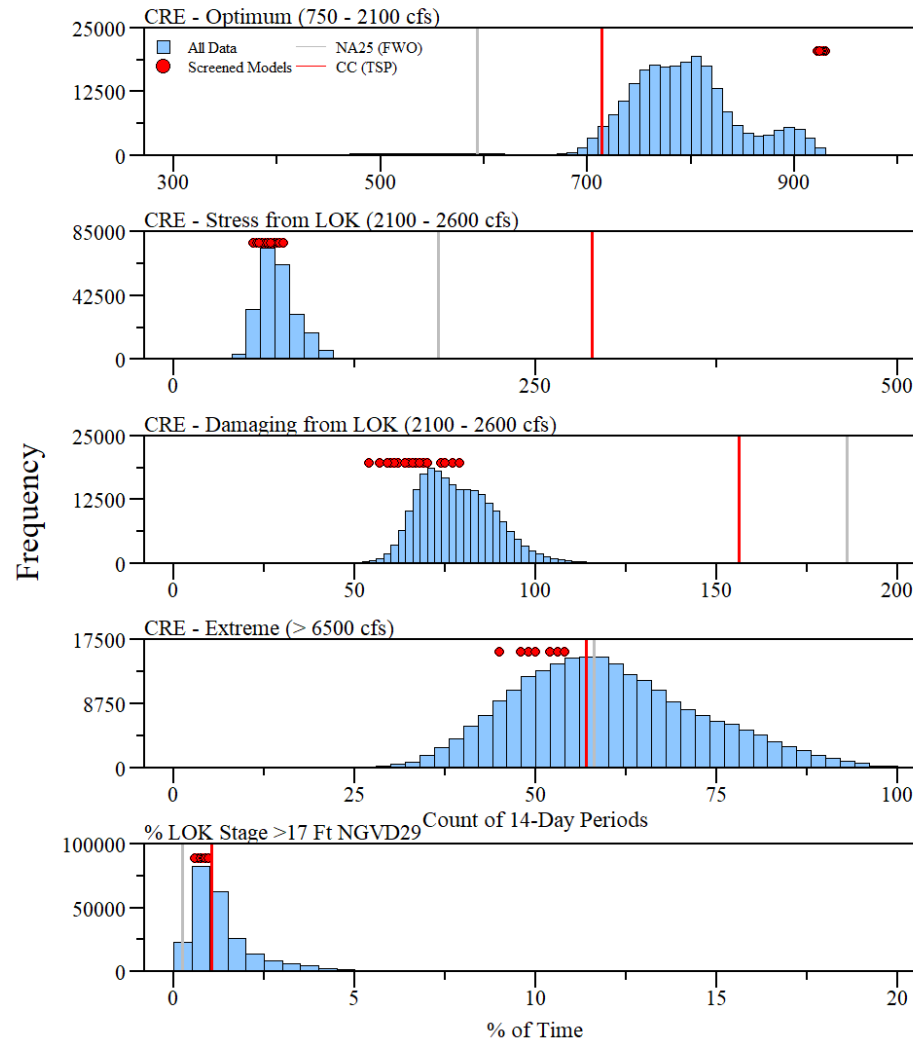
Example R Code

```
b1.screen<-subset(dat,  
  PM31>CC.val$PM31*1.05&  
  PM37<CC.val$PM37*0.95&  
  PM38<CC.val$PM38*0.95&  
  PM36<CC.val$PM36*0.95&  
  PM5<CC.val$PM5*0.95&  
  batch==1)  
b1.screen<-b1.screen[order(-b1.screen$PM31,b1.screen$PM37,  
  b1.screen$PM38,b1.screen$PM36,  
  b1.screen$PM5),]  
b1.screen<-b1.screen[1:8,]
```

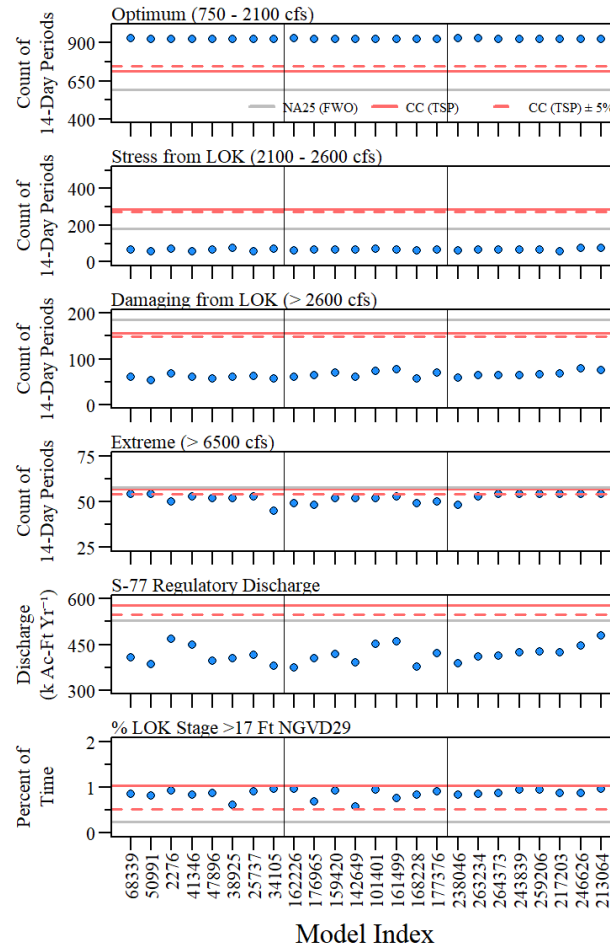
Iteration 3 - Phase 2 (Initial Screening)



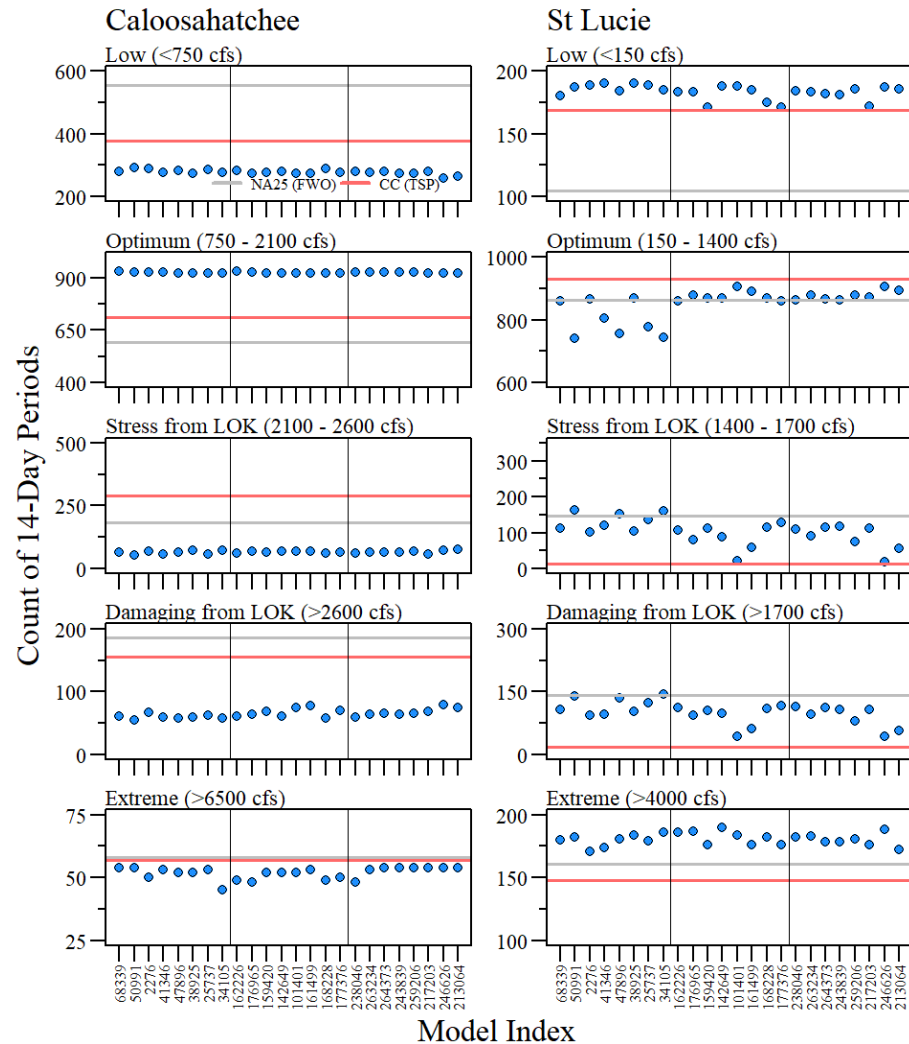
Iteration 3 - Phase 2 (Initial Screening)



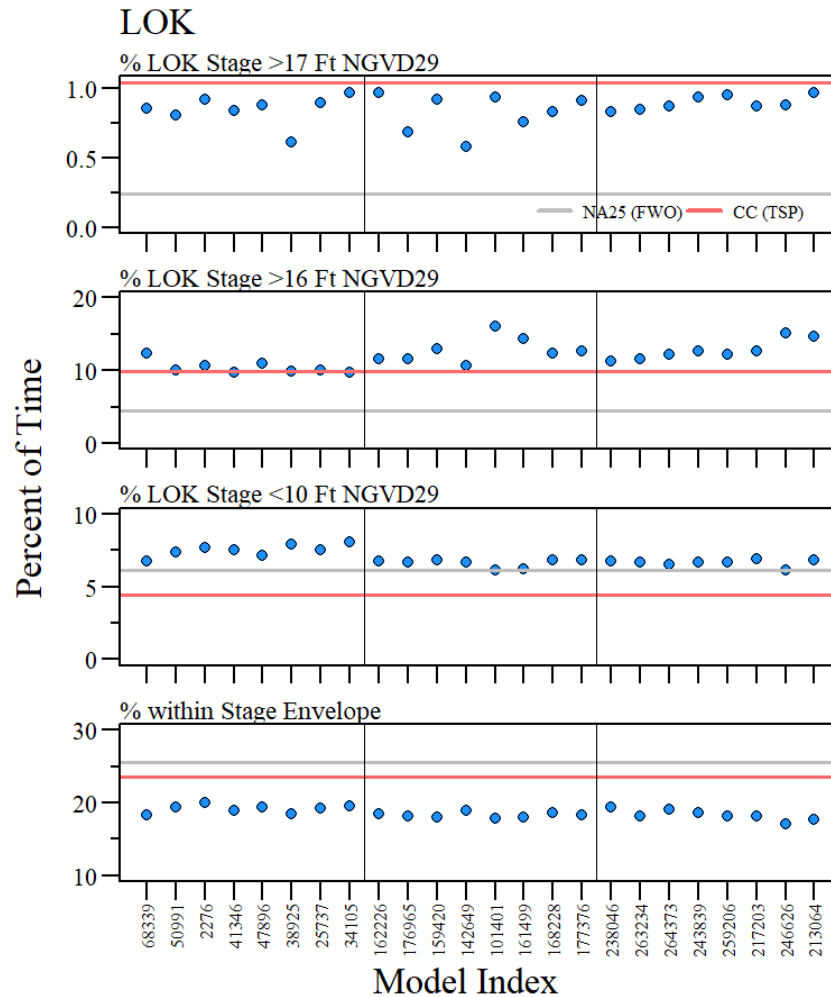
Iteration 3 - Phase 2



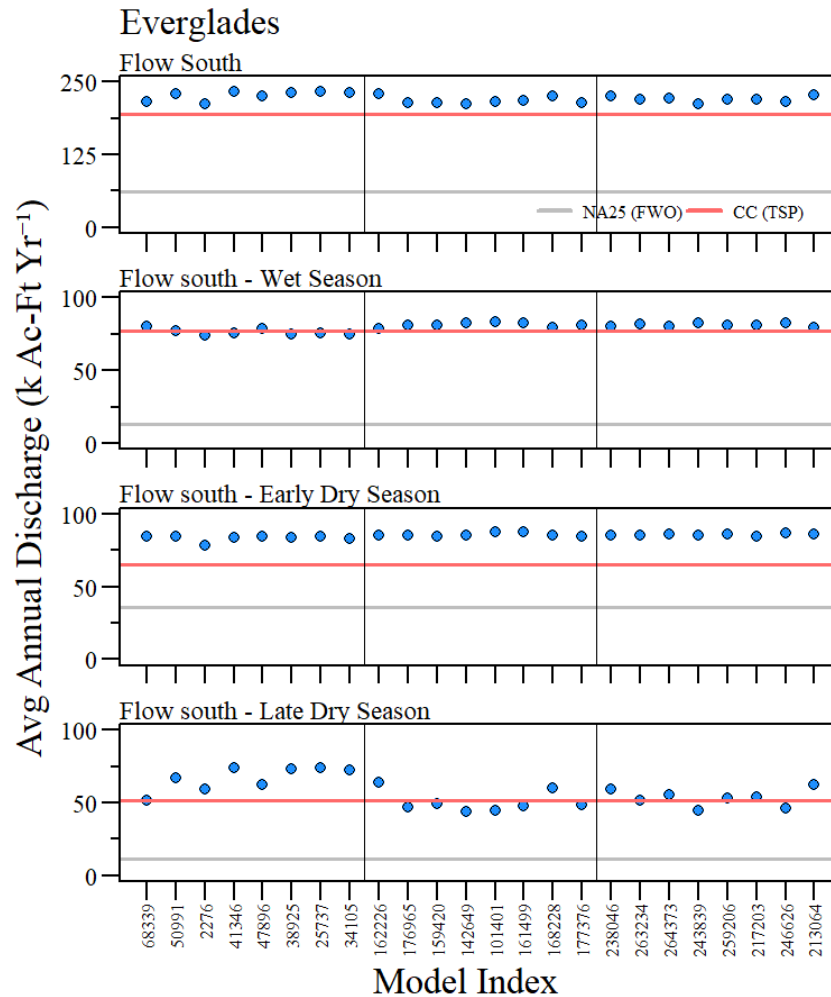
Iteration 3 - Phase 2



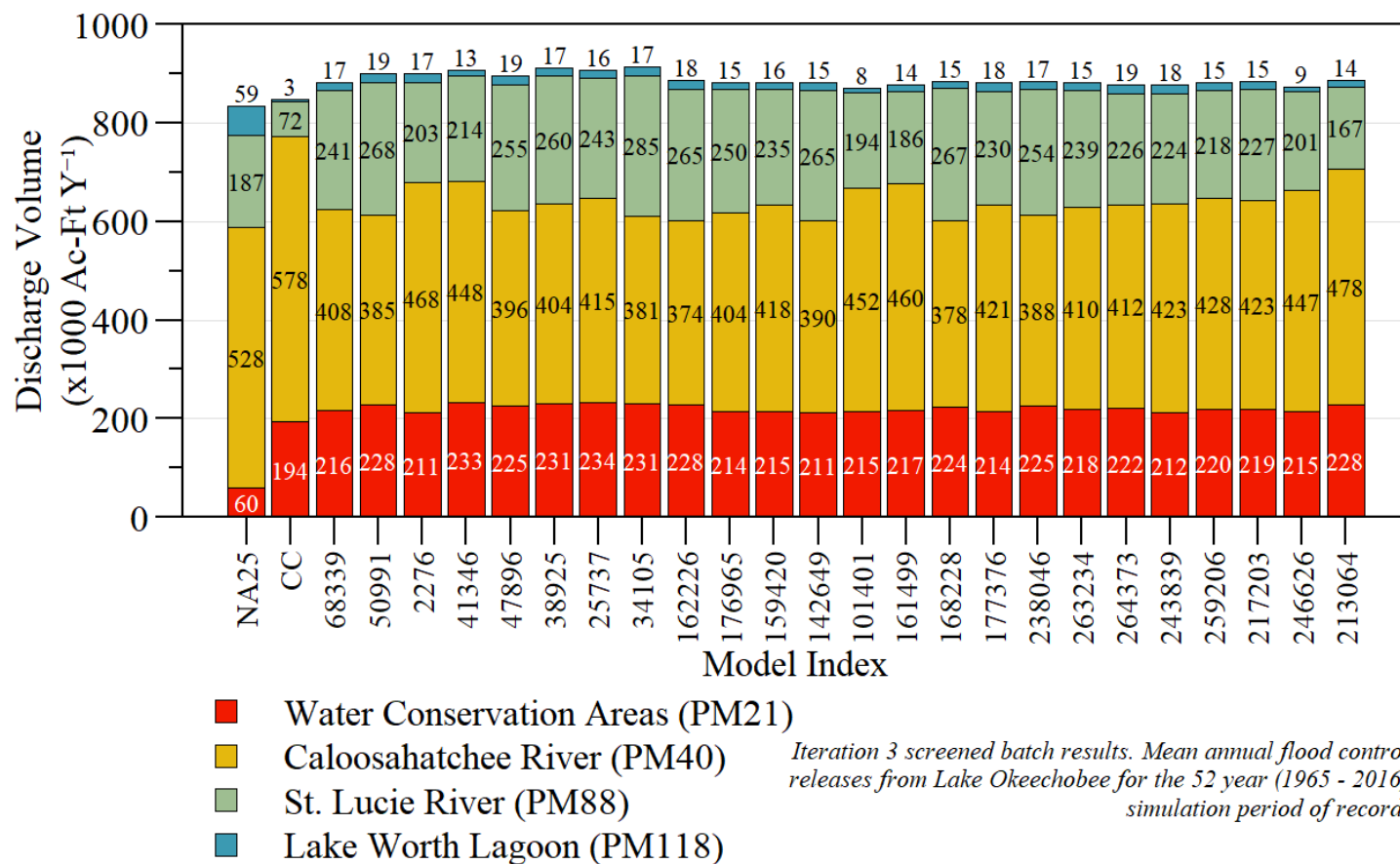
Iteration 3 - Phase 2



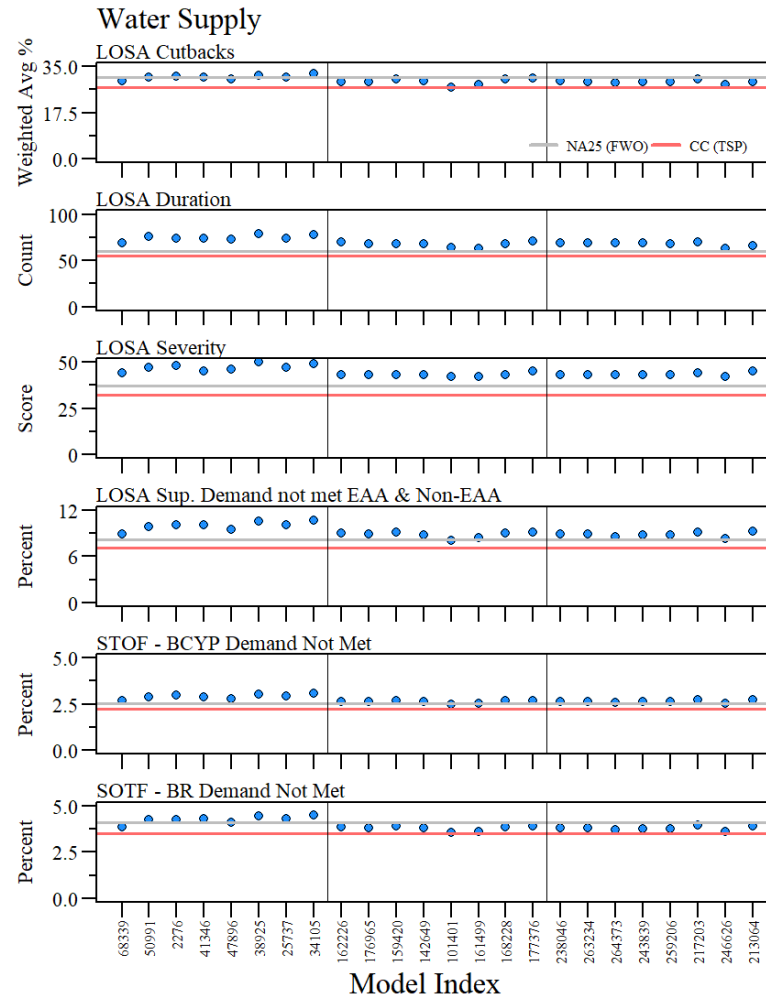
Iteration 3 - Phase 2



Iteration 3 - Phase 2



Iteration 3 - Phase 2




Iteration 3 - Run Screening Part II

Using the RSM-BN Batch Runs spreadsheets (~240,000 runs)

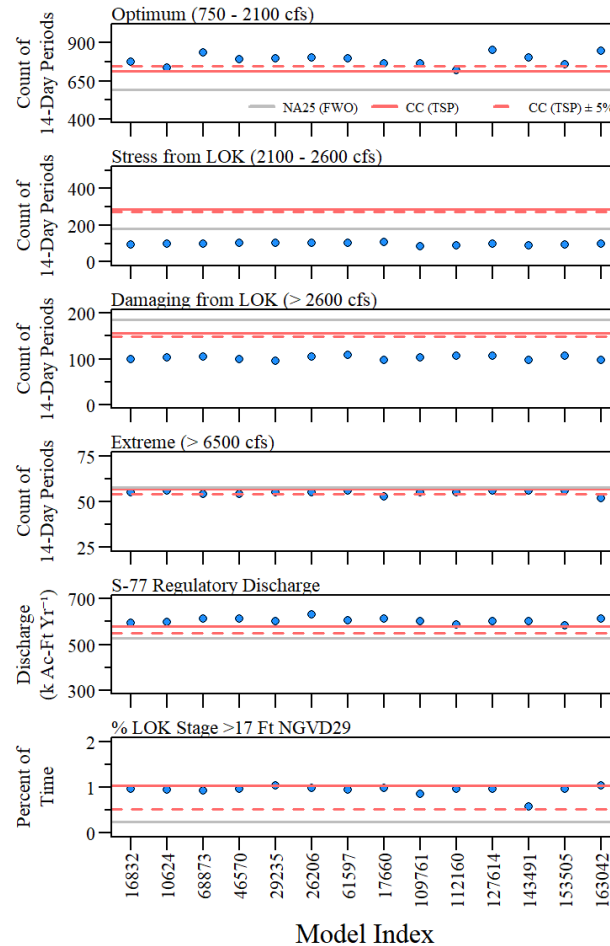
- Runs were initially screened based on PM values relative to CC and NA25 (FWO)
 - Caloosahatchee stress discharge from LOK (PM37)
 - Caloosahatchee damaging discharge from LOK (PM38)
 - Caloosahatchee extreme discharge (PM36)
 - St Lucie extreme discharges (PM85)
 - Percent LOK Stage >17 Ft NGVD29 (PM5)

Example R Code

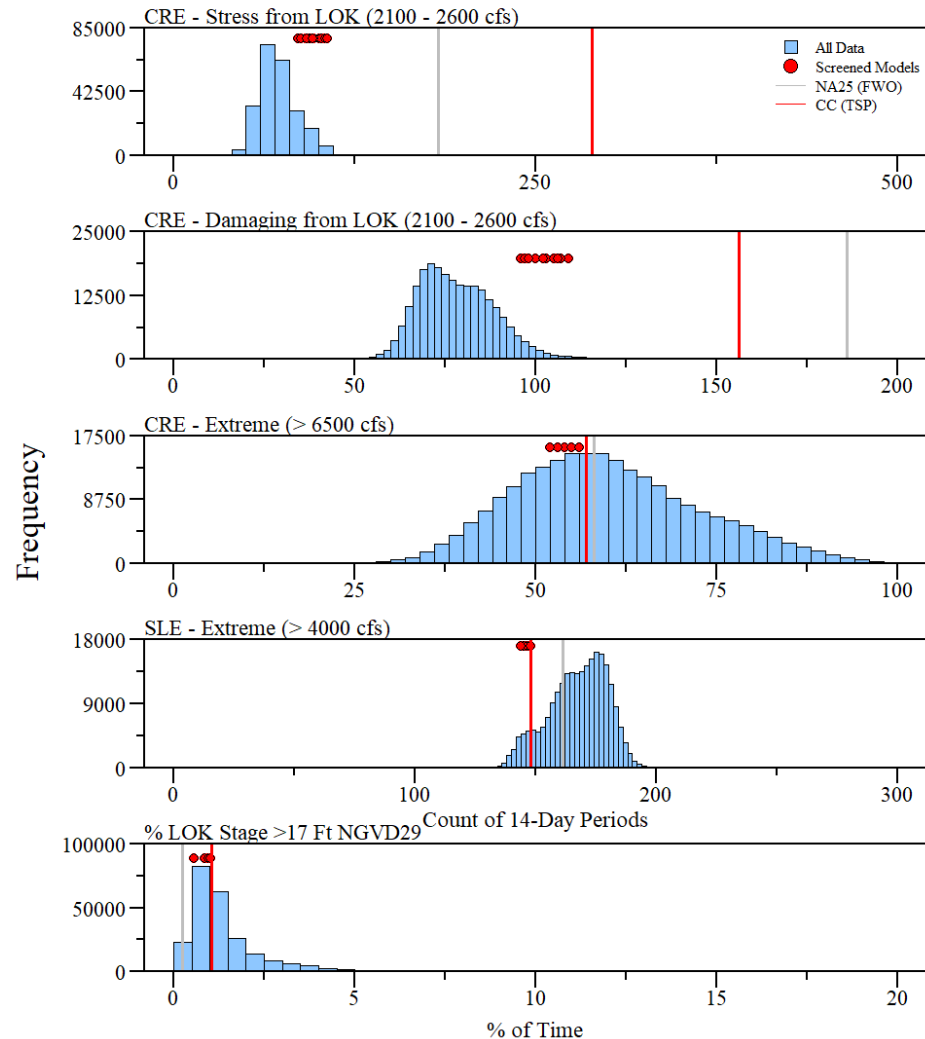
```
b1.screen2=subset(dat,  
                  PM37<CC.val$PM37&  
                  PM38<CC.val$PM38&  
                  PM36<CC.val$PM36&  
                  PM85<=CC.val$PM85&  
                  PM5<CC.val$PM5&  
                  batch==1)  
b1.screen2=b1.screen2[order(b1.screen2$PM37,  
                             b1.screen2$PM38,  
                             b1.screen2$PM36,  
                             b1.screen2$PM85,  
                             b1.screen2$PM5),]  
b1.screen2=b1.screen2[1:8,]
```

 Download Screened Data #2

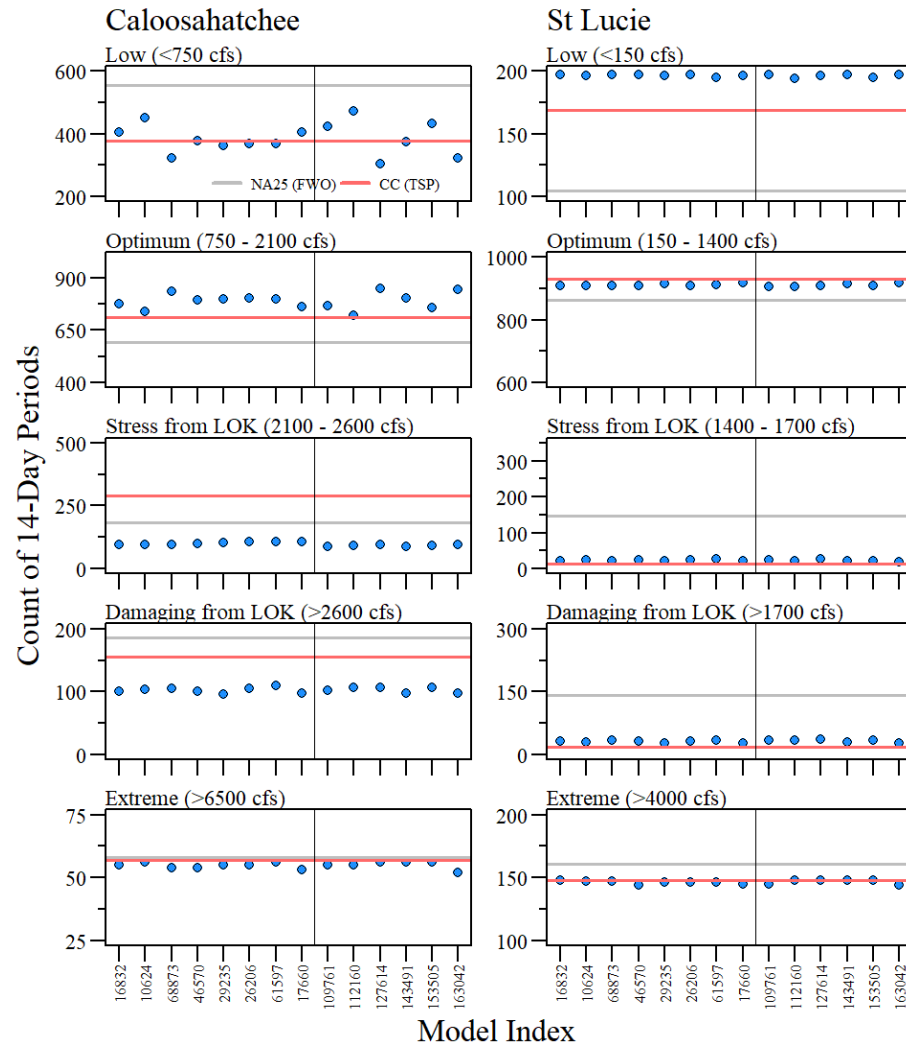
Iteration 3 - Phase 2



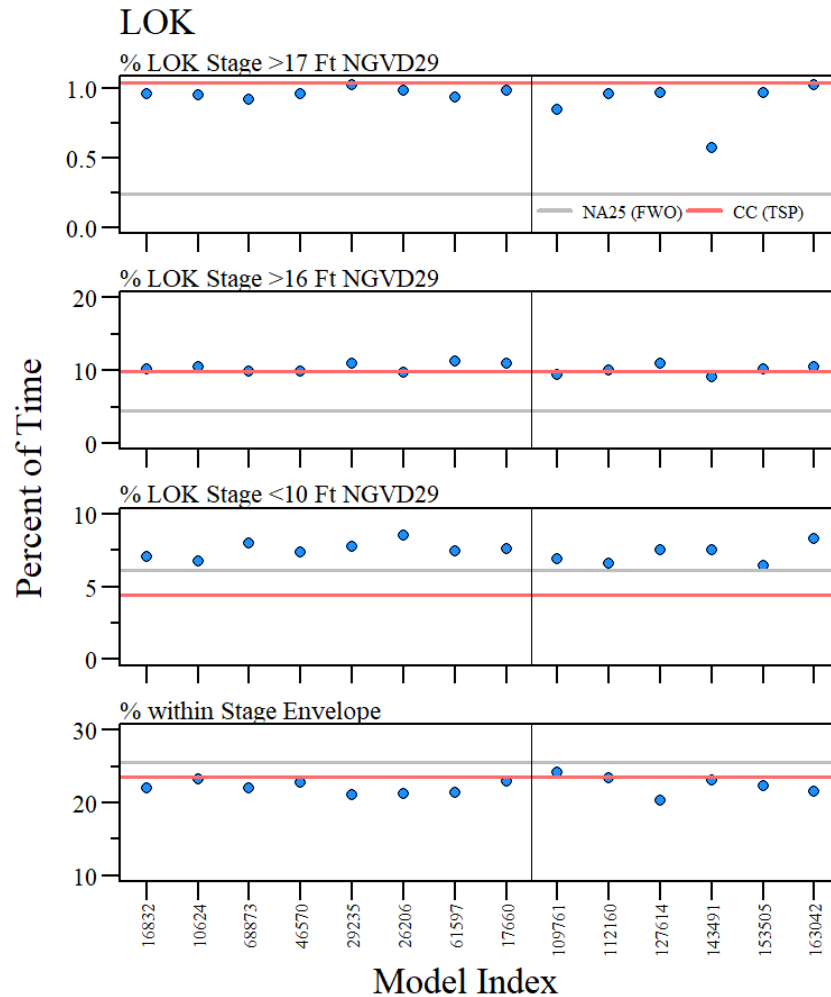
Iteration 3 - Phase 2 (Initial Screening)



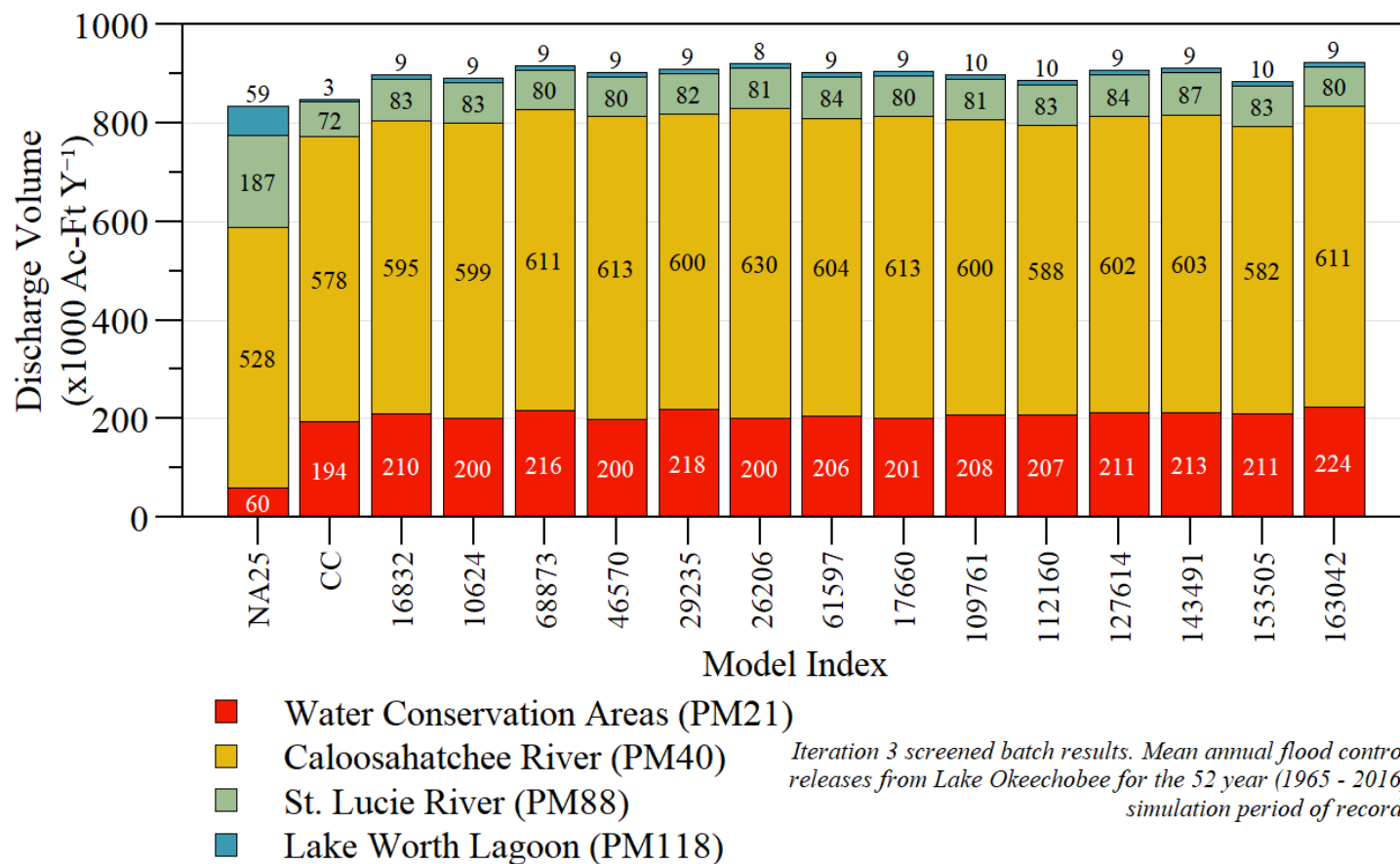
Iteration 3 - Phase 2



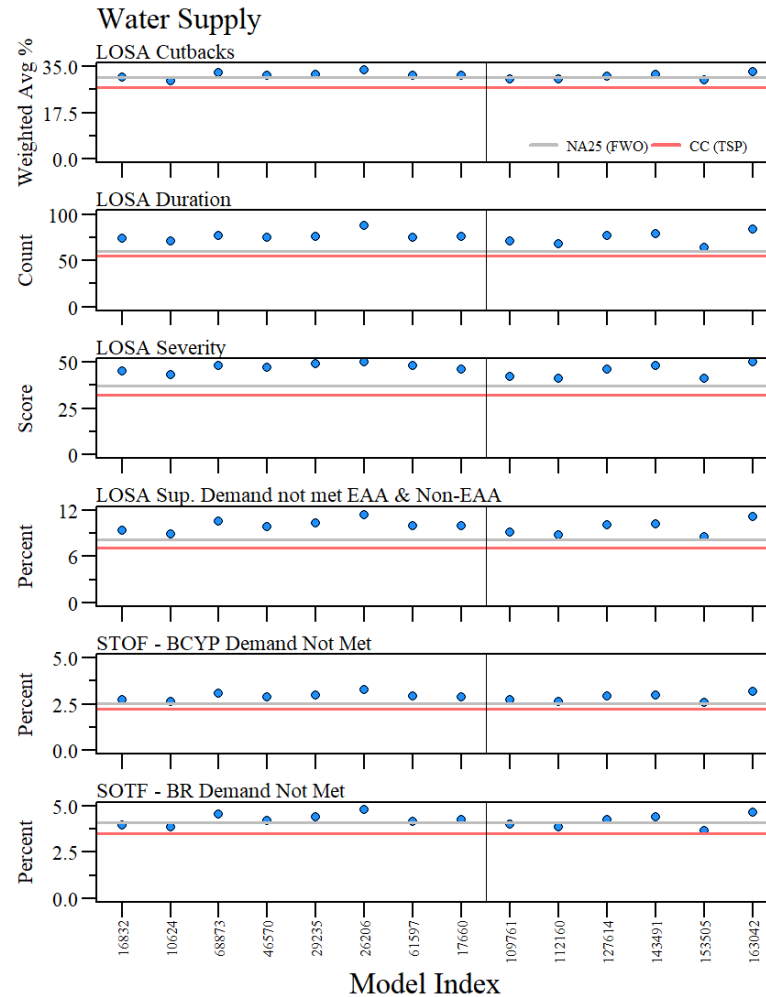
Iteration 3 - Phase 2



Iteration 3 - Phase 2



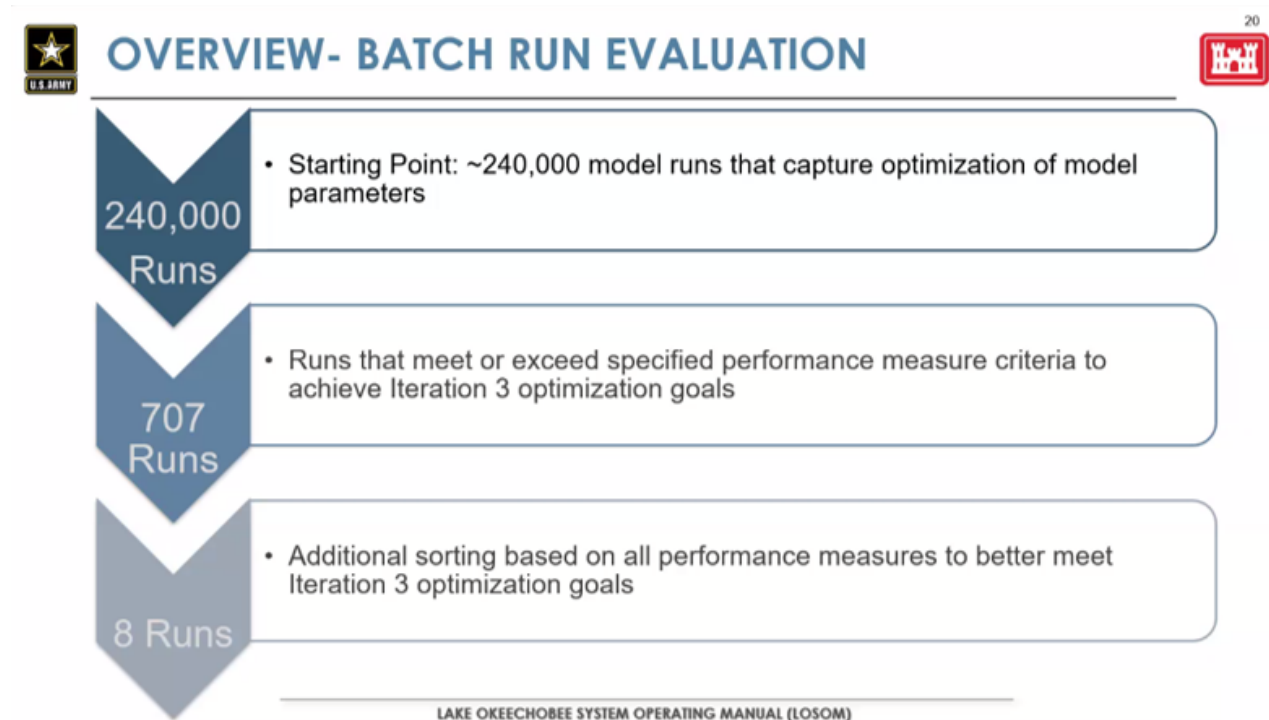
Iteration 3 - Phase 2



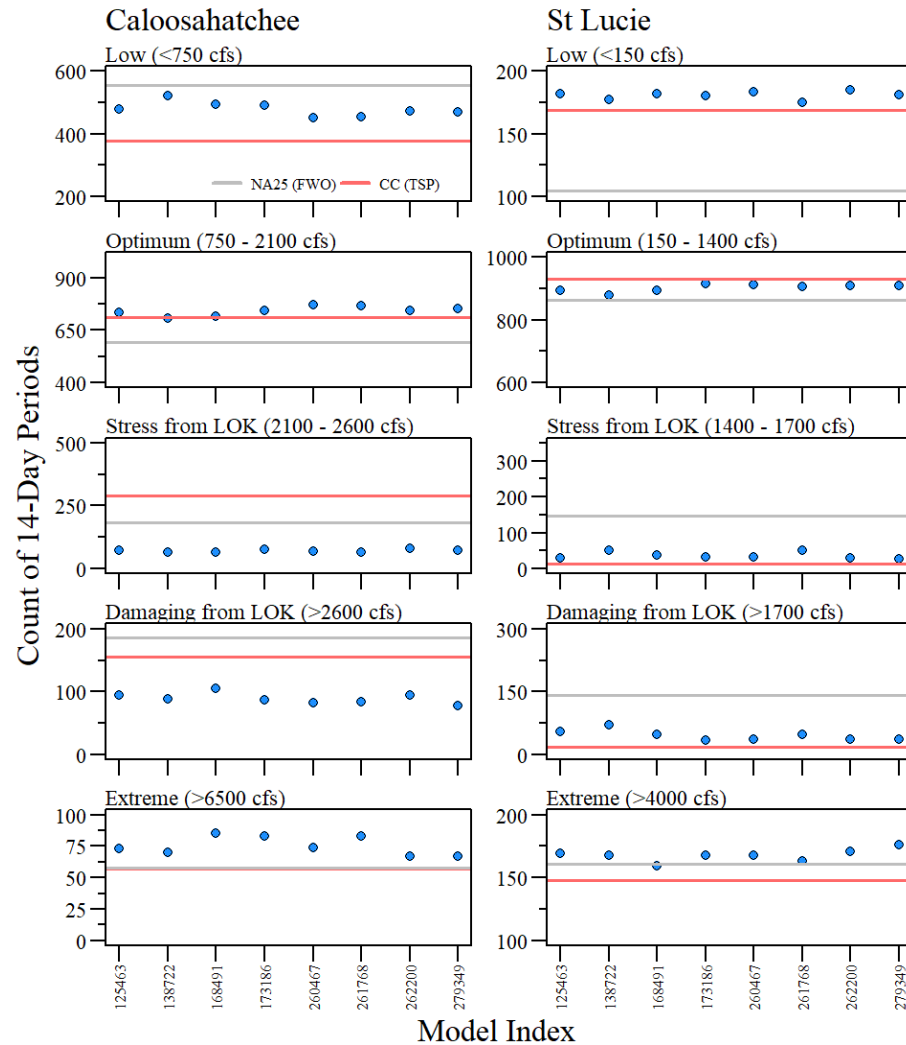
Iteration 3 - Phase 2

- This is an initial look at the batch results and expect our evaluation to evolve with greater understanding.
 - Screening is sensitive to the criteria in-which you focus on as exemplified by the two screening attempts presented here.
- 1st screening focuses on CRE and Lake resulting in a completely different set of models when including SLE extreme flows (i.e. 2nd screening exercise).
- 2nd screening, when focused on reducing CRE Stress, Damaging and Extreme, SLE extreme and Lake high stages results in a model that looks very similar to the original CC model with slight changes to PM values.

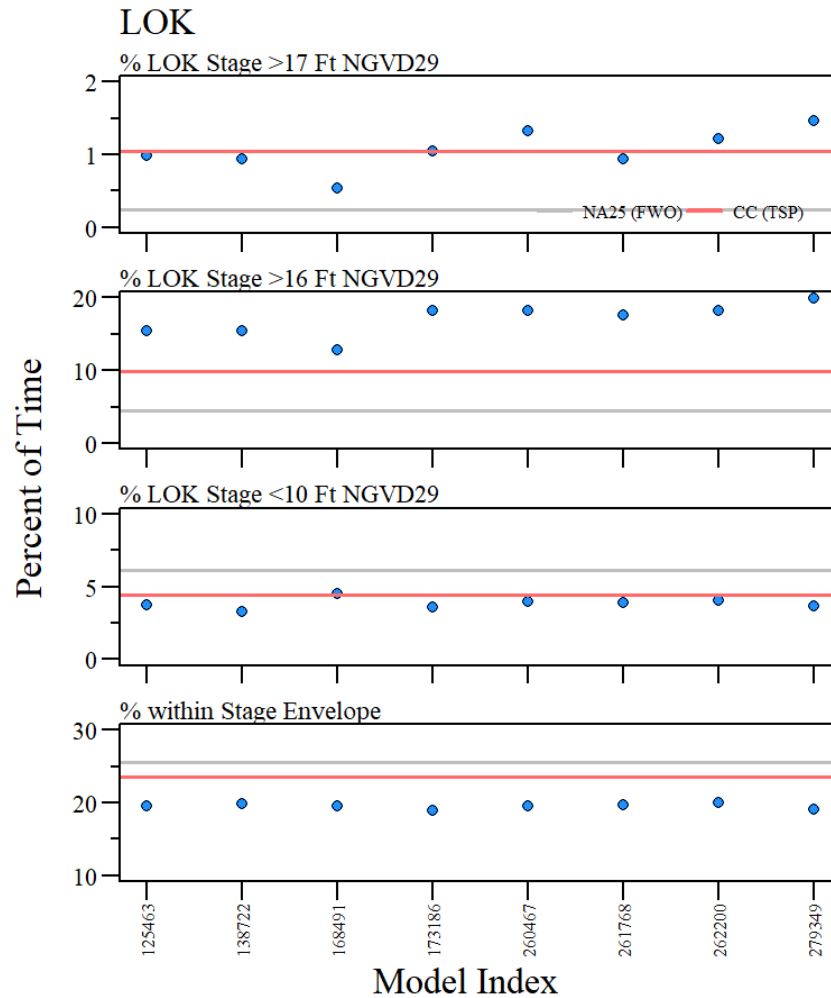
Evaluation of model runs presented to PDT by USACE 2021-10-26



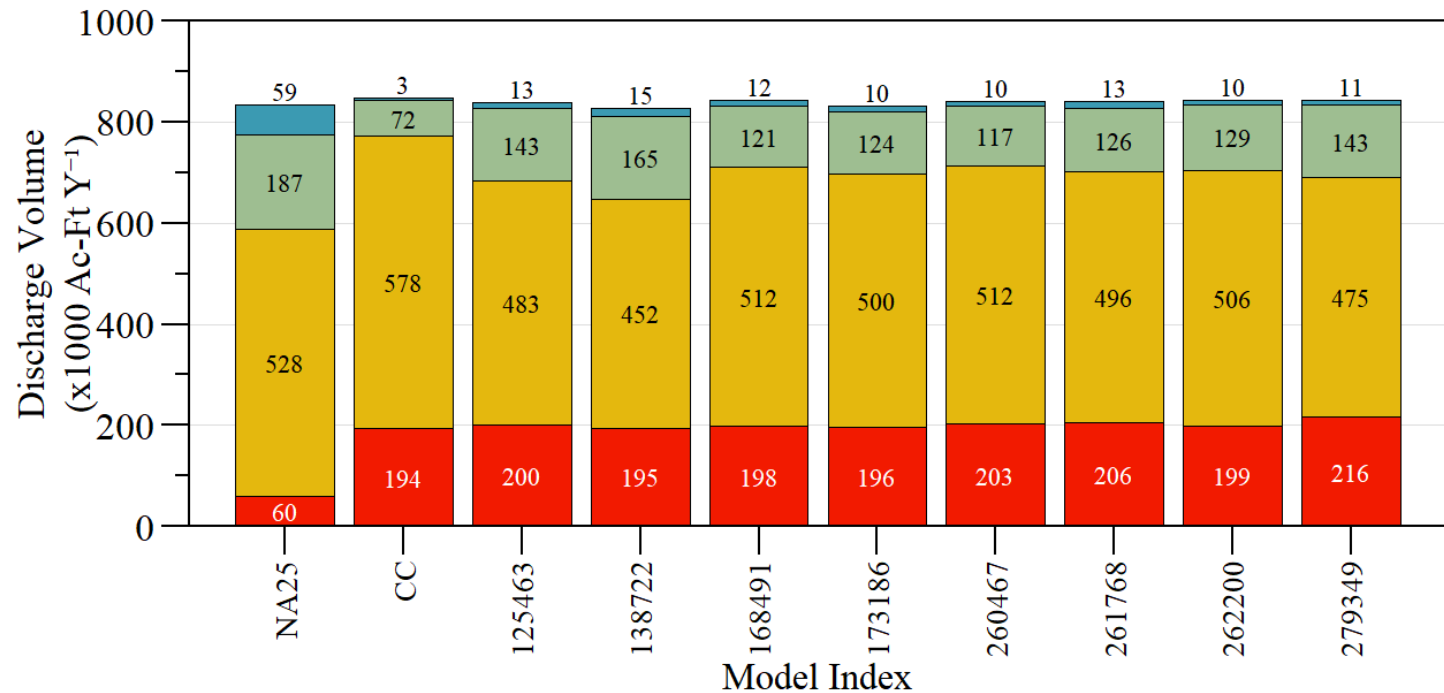
Iteration 3 - Phase 2



Iteration 3 - Phase 2



Iteration 3 - Phase 2



- Water Conservation Areas (PM21)
- Caloosahatchee River (PM40)
- St. Lucie River (PM88)
- Lake Worth Lagoon (PM118)

Iteration 3 screened batch results. Mean annual flood control releases from Lake Okeechobee for the 52 year (1965 - 2016) simulation period of record.

Iteration 3 - Phase 2

