

# Delaware River Basin Commission

**Update on  
PST model and  
inflow file extension**

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# A Team Effort

## **NYC DEP**

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## **DRBC**

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## History

- 1981 – DRBC Daily Flow Model
- 2002 – DRBC OASIS model
- 2012 – NYC OST beta version
- 2012 – PST prototype testing begins
- 2014 – DRB inflow file extended to Sep. 2012
- 2015 – PST model released



## Need for a Revised Model

- Incorporate weekly calculation of PCN conservation releases as in FFMP-OST; release rates calculated with Forecast-based Available Water (FAW)
- Use simulated forecasts based on past inflows to calculate the FAW
- Use a PCN diversion time series from OST output, run in a planning mode, to reflect the amount of water NYC is using from the DRB while also reflecting out-of-basin operations [other diversion time series or constant diversions may also be used]



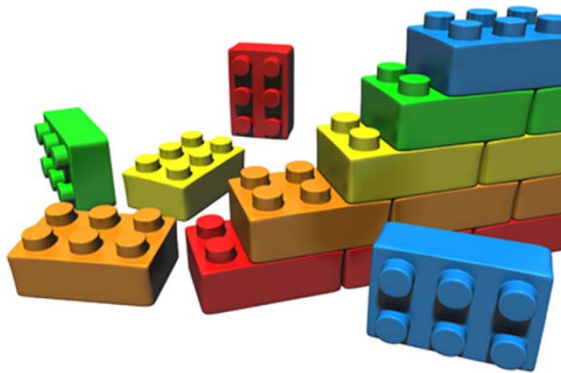
# PST Review Project

## GOALS

1. Verify that PST can simulate FFMP-2008 as well as the existing DRB reference model
2. Verify that PST can reproduce OST results so that PST can be used to assess adjustments and alternatives to the FFMP-OST program



# PST review project



## PST vs DRB-Reference Model Comparison

**Approach:** compare model outputs for model runs driven by the same inputs, under FFMP-2008 operations

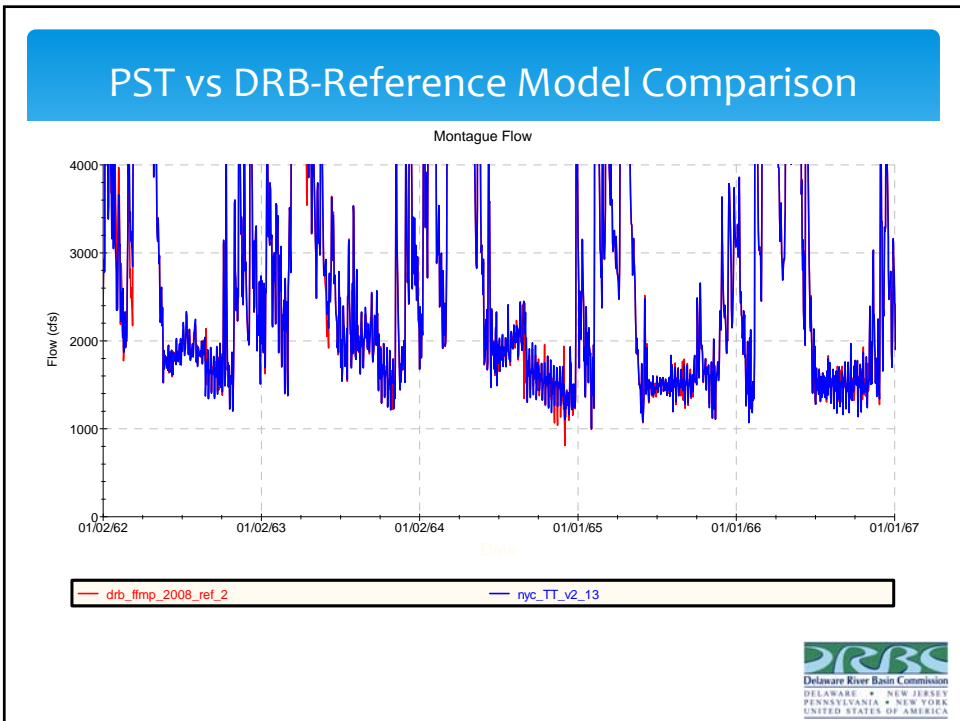
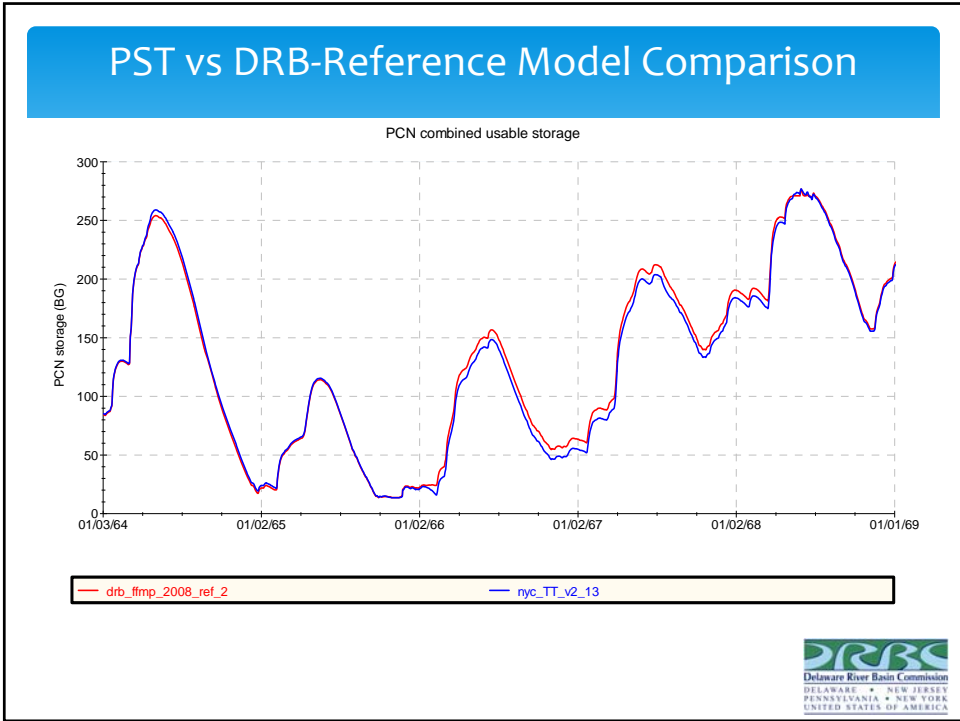
**Key Feature:** combined PCN diversions (OST output) used as PST input (PCN combined demand time series)

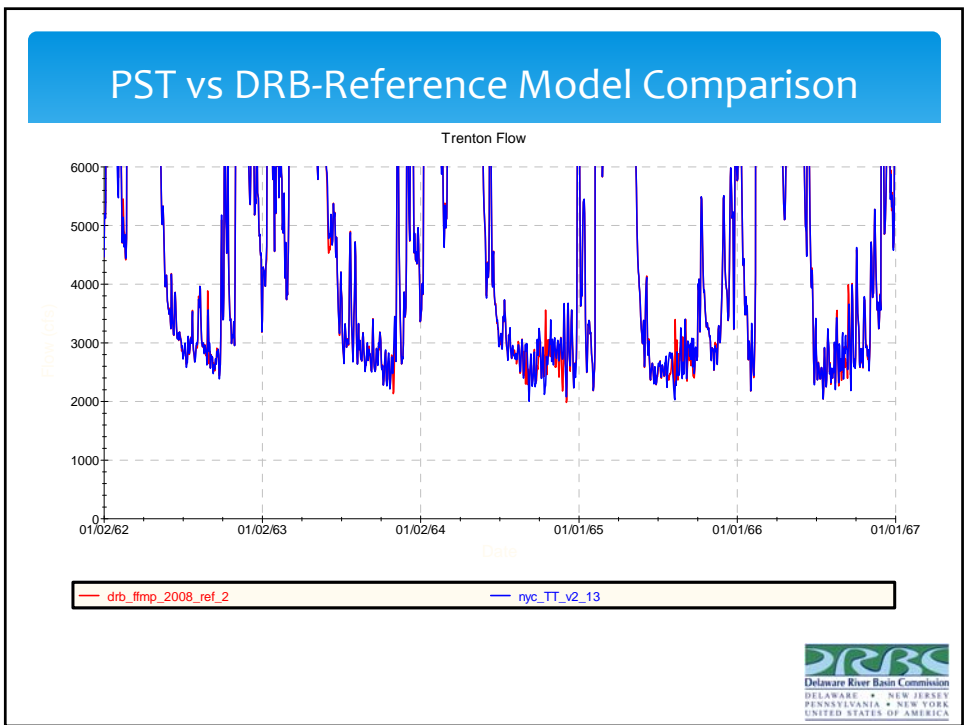
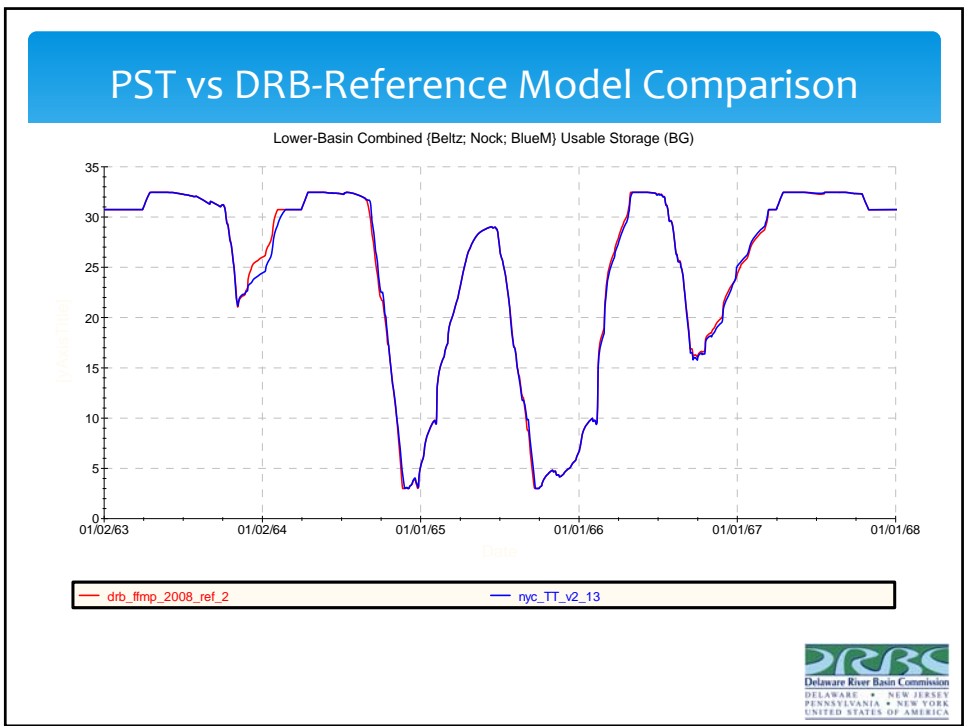


## PST vs DRB-Reference Model Comparison

| Metric                                       | PST  | Reference Model |
|--|------|-----------------|
| <b>Basin-wide Drought Condition (# days)</b> |      |                 |
| Drought Watch                                | 812  | 629             |
| Drought Warning                              | 700  | 859             |
| Drought Emergency                            | 1573 | 1540            |
| Combined Total                               | 3085 | 3028            |
| <b>Average Flows cfs)</b>                    |      |                 |
| Montague [Aug-Nov'64]                        | 1705 | 1669            |
| Montague [Jun-Sep'65]                        | 1519 | 1521            |
| Trenton [Aug-Nov'64]                         | 2760 | 2726            |
| Trenton [Jun-Sep'65]                         | 2688 | 2691            |







## PST vs DRB-Reference Model Comparison

### CONCLUSIONS

- ❑ Model outputs for major metrics compare well, both for single-number metrics and time series plots.
- ❑ Only a few metrics show non-negligible but explainable differences. This is acceptable, given known differences between the models (e.g., updated NYC operations: diversion hydraulics and limitations; reservoir balancing; spill calcs.).
- ❑ DRB-PST can be used as the reference model.



## PST vs OST Comparison

**Approach:** Compare model outputs for model runs driven by the same inputs, under FFMP-OST operations

**Key feature:** Combined PCN diversions (OST output) used as PST input


### Key Inputs:

- ❑ Combined PCN diversions (daily time series)
- ❑ Combined PCN inflow hindcasts (daily time series)
- ❑ Catskills turbidity index (daily time series)

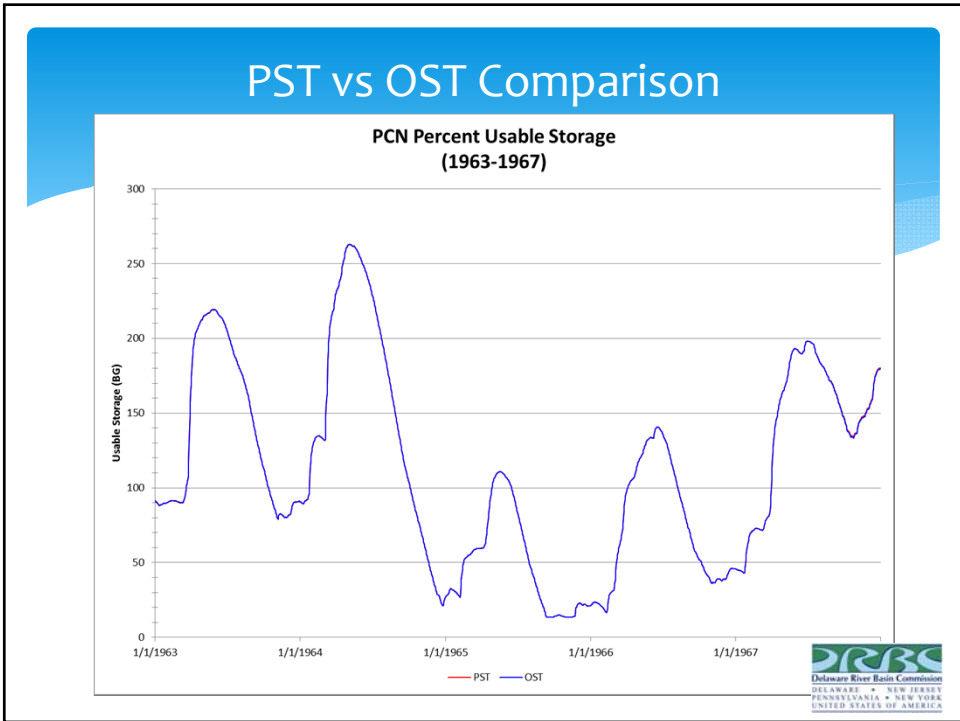


### PST vs OST Comparison

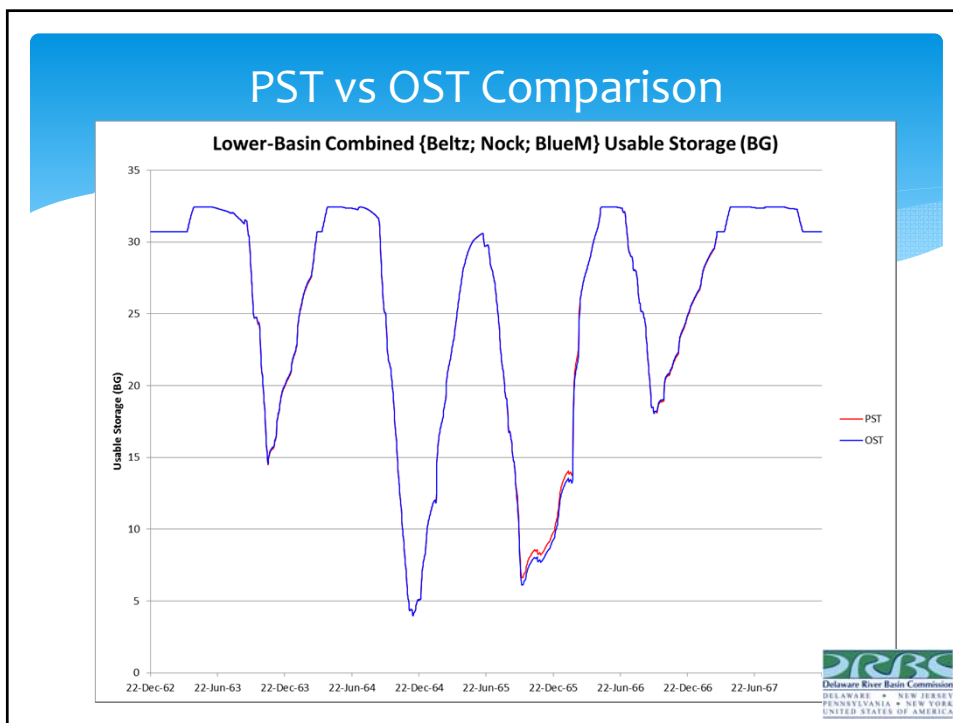
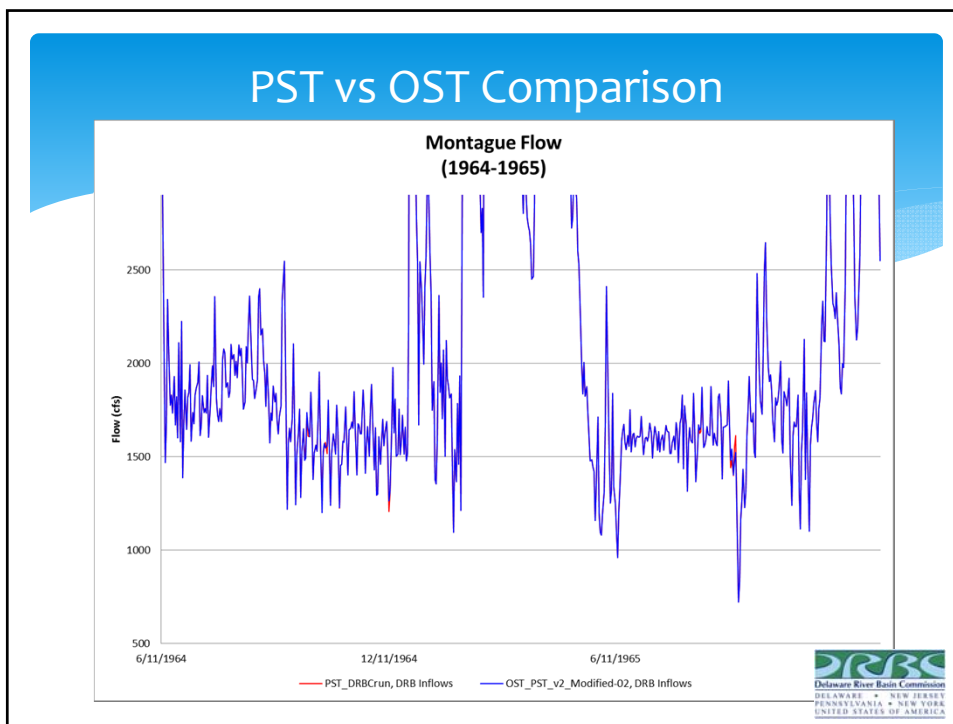
| Metric                                       | PST  | OST  |
|--|------|------|
| <b>Basin-wide Drought Condition (# days)</b> |      |      |
| Drought Watch                                | 557  | 560  |
| Drought Warning                              | 931  | 914  |
| Drought Emergency                            | 1629 | 1626 |
| Combined Total                               | 3117 | 3100 |
| <b>Average Flows cfs)</b>                    |      |      |
| Montague [Aug-Nov'64]                        | 1748 | 1748 |
| Montague [Jun-Sep'65]                        | 1569 | 1568 |
| Trenton [Aug-Nov'64]                         | 2792 | 2792 |
| Trenton [Jun-Sep'65]                         | 2727 | 2733 |

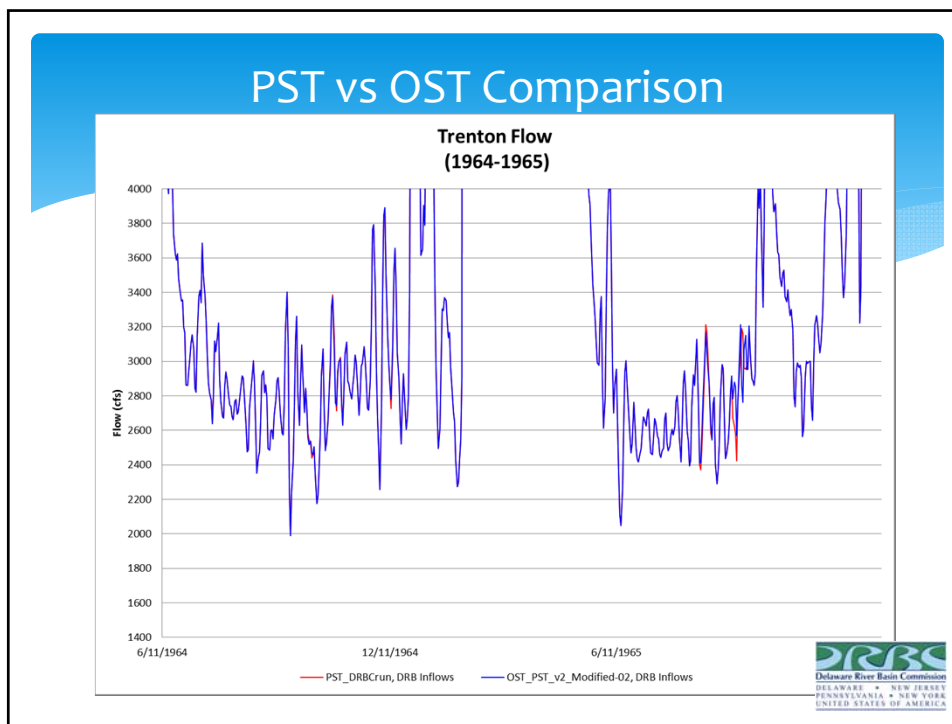


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## PST vs OST Comparison

### CONCLUSIONS

- Model outputs for most major metrics compare well, both for single-number metrics and time series plots
- A few metrics show minor but acceptable differences
- PST can be used as a planning tool for the DRB

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## Incremental Inflow File

The incremental inflow file, revised and extended to 2012, has incremental inflows that are:

- consistent across the period of record for each model node;
- more consistent with gage records; and
- more robust due to the lack of negative incremental inflows

The new file has been adopted as the standard inflow file for the DRB-PST model



## Summary

- ❑ DRB-PST adequately represents existing DRBC flow management rules and regulations, comparable to the existing DRB OASIS reference model
- ❑ DRB-PST incorporates current NYC reservoir management rules (including spill mitigation and habitat releases) according to current FFMP-OST
- ❑ Extended inflow file allows analyses through WY2012.
- ❑ DRB-PST model has been adopted as the current tool for daily flow modeling in the basin
- ❑ CDs were mailed to licensed users



## Future

- ❑ DRBC and NYC DEP plan to keep the OST and PST models in sync in future (periodic two-way updates)
- ❑ Code updates will be easier because now OST and PST share consistent computer code and data files
- ❑ Updated baseline runs will be released by DRBC as needed



## Questions

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