

# RMC-RFA Simulations

## DLS-114, Module 2.15



**U.S. ARMY**



**US Army Corps  
of Engineers®**

Dam and Levee  
Safety Programs

March 2026 / Version 1

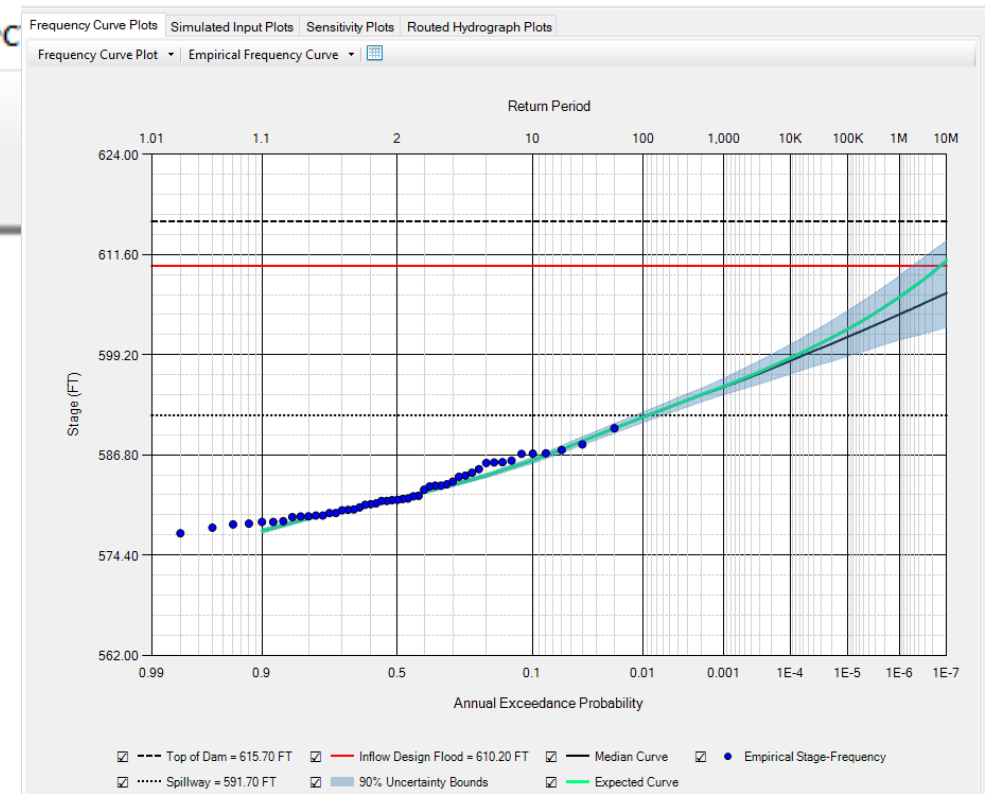
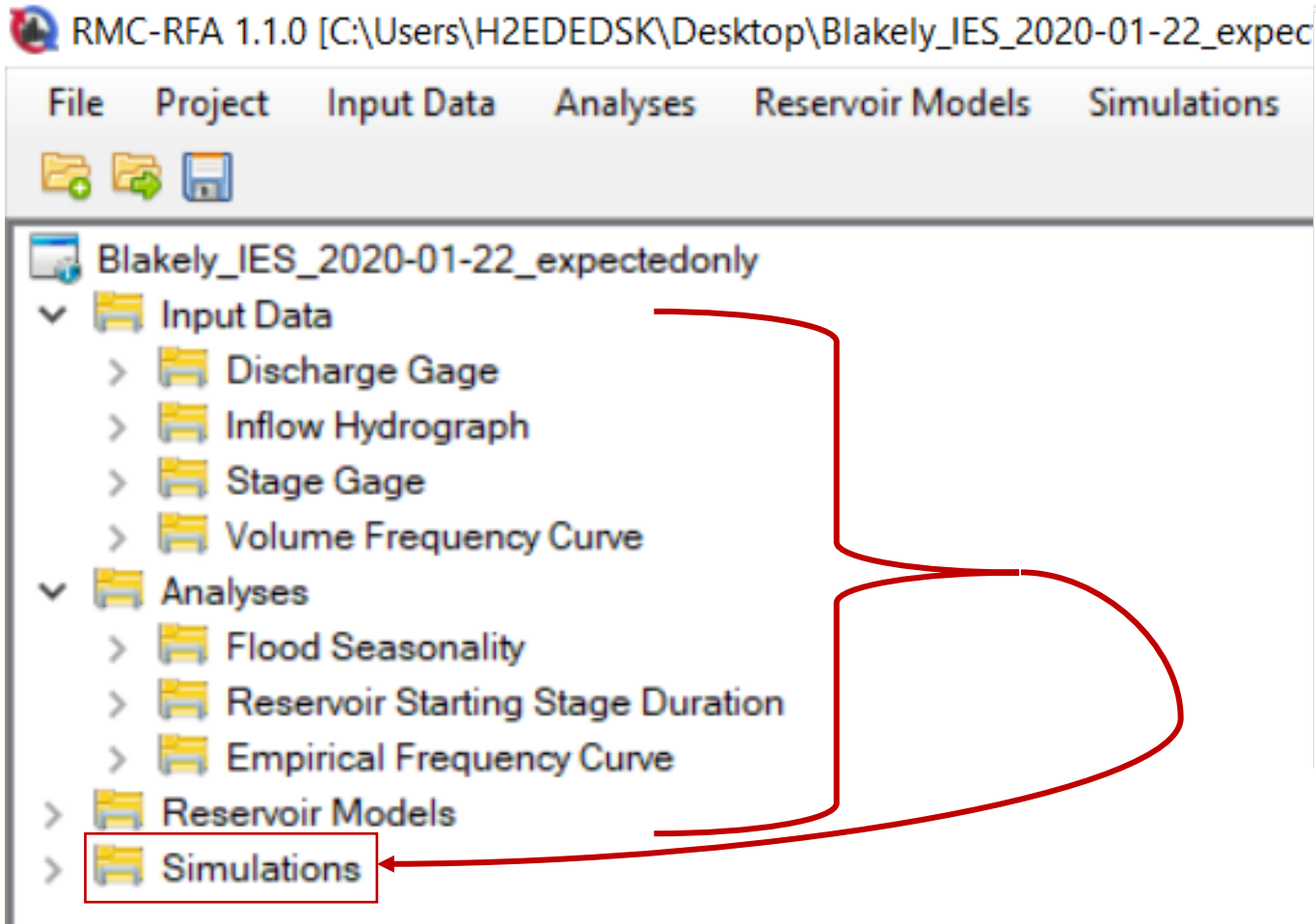
LONDON DAM, WV (SOURCE: USACE)

# Learning Objectives

- Provide an overview of RMC-RFA simulations
- Discuss simulation parameters
  - Input parameters
  - Simulation settings
  - Output options
- Demonstrate how to complete a simulation
- Show simulation results
  - Tabular results
  - Plots

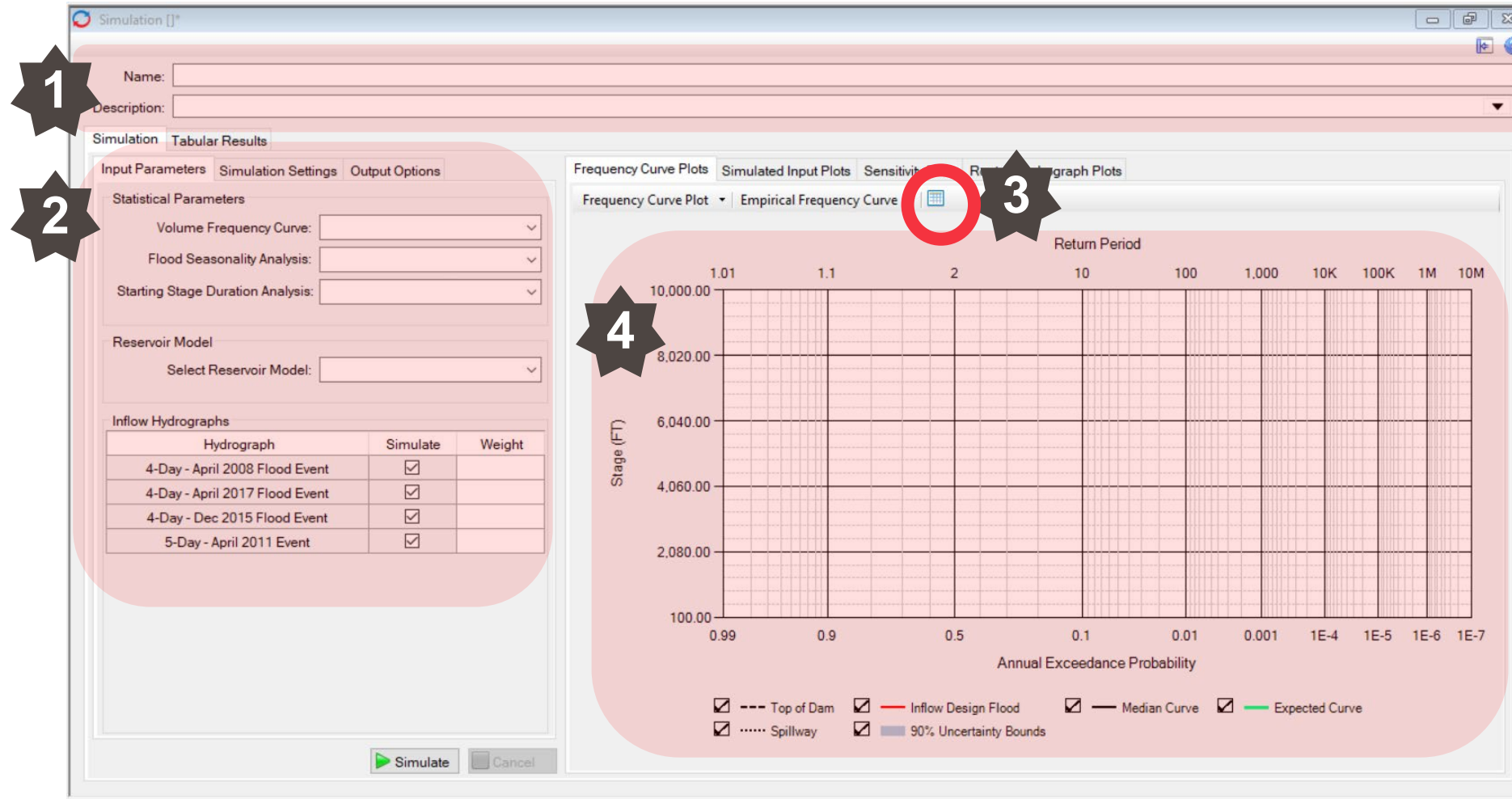


# RMC-RFA Simulations (1 of 2)





# RMC-RFA Simulations (2 of 2)



# Simulation Parameters – Input Parameters

Simulation Tabular Results

Input Parameters Simulation Settings Output Options

Statistical Parameters

Volume Frequency Curve:

Flood Seasonality Analysis:

Starting Stage Duration Analysis:

Reservoir Model

Select Reservoir Model:

Inflow Hydrographs

Hydrograph	Simulate	Weight
1927 Flood	<input checked="" type="checkbox"/>	
1982 Flood	<input checked="" type="checkbox"/>	
2015 Flood	<input checked="" type="checkbox"/>	
PMF Inflow Hydrograph	<input checked="" type="checkbox"/>	

Simulation Tabular Results

Input Parameters Simulation Settings Output Options

Statistical Parameters

Volume Frequency Curve: -FINAL BestFit

Flood Seasonality Analysis: -FINAL Stage Seasonality - Annu

Starting Stage Duration Analysis: -FINAL Stage Duration

Reservoir Model

Select Reservoir Model: -FINAL Calibrated Operations\_Ac

Inflow Hydrographs

Hydrograph	Simulate	Weight
1927 Flood	<input checked="" type="checkbox"/>	1.00
1982 Flood	<input checked="" type="checkbox"/>	1.00
2015 Flood	<input checked="" type="checkbox"/>	1.00
PMF Inflow Hydrograph	<input checked="" type="checkbox"/>	1.00

# Simulation Parameters – Simulation Settings

Simulation Tabular Results

Input Parameters Simulation Settings Output Options

Simulation Type

☒ Simulate Full Uncertainty

☐ Simulate Expected Frequency Curve Only

☐ Simulate Median Frequency Curve Only

Routing Options

Routing Time Window (DAYS): 6


Routing Time Step: 1-Hr

Sampling Options

Number of Realizations: 1,000

Skip Inflow Events With AEP >: 0.99

PRNG Seed: Auto 12345

 Simulate Cancel

Sampling Options

Number of Realizations: 1,000

Skip Inflow Events With AEP >: 100  
500  
1,000  
5,000  
10,000

PRNG Seed: 1,000  
5,000  
10,000

Sampling Options

Number of Realizations: 100

Skip Inflow Events With AEP >: 0.10  
0.99  
0.90  
0.50  
0.10

PRNG Seed: 0.90  
0.50  
0.10

Sampling Options

Number of Realizations: 100

Skip Inflow Events With AEP >: 0.10

PRNG Seed: Auto 12345

Auto  
Auto  
User-Defined

# Simulation Parameters – Output Options

Input Parameters   Simulation Settings   **Output Options**

Frequency Curves

- ☒ Develop Stage-Frequency Curve
- ☐ Develop Peak Discharge-Frequency Curve
- ☐ Develop Discharge-Duration-Frequency Curve

Duration (DAYS):

Uncertainty Bounds

Uncertainty Limits:

Uncertainty Bounds

Uncertainty Limits:

- 90%
- 95%
- 99%

# Run Simulation

Simulation Tabular Results

Input Parameters Simulation Settings Output Options

Simulation Type

- ☒ Simulate Full Uncertainty
- ☐ Simulate Expected Frequency Curve Only
- ☐ Simulate Median Frequency Curve Only

Routing Options

Routing Time Window (DAYS): 6

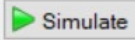
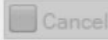
Routing Time Step: 1-Hr

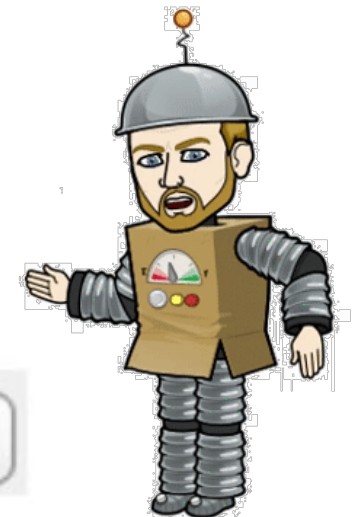
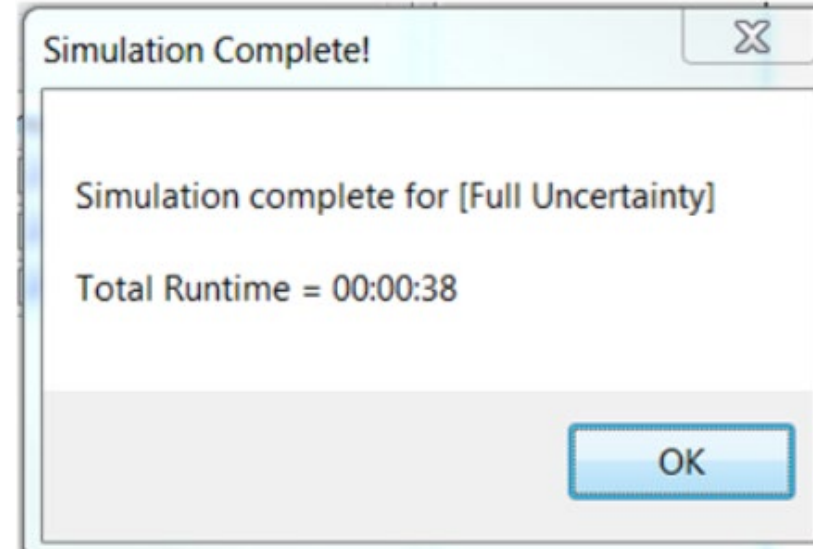
Sampling Options

Number of Realizations: 1,000

Skip Inflow Events With AEP >: 0.99

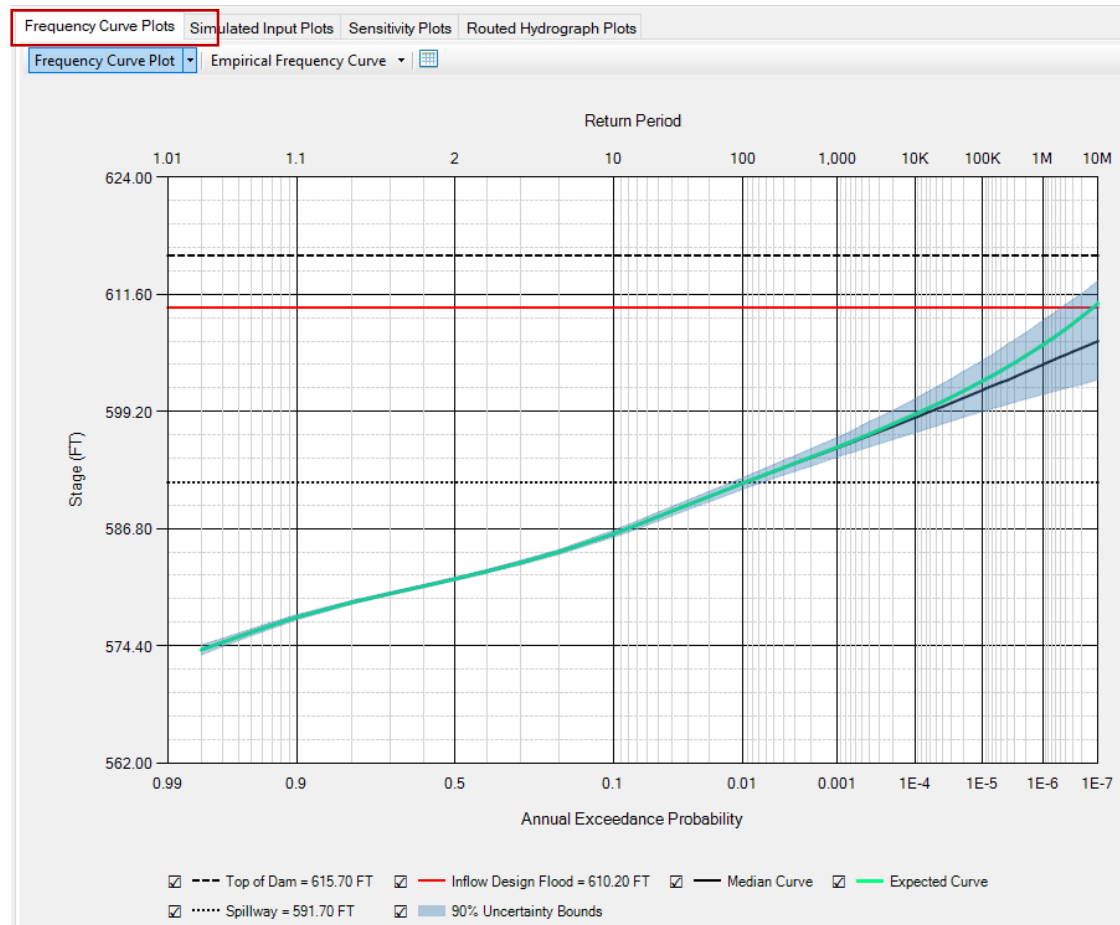
PRNG Seed: Auto 12345

 Simulate 

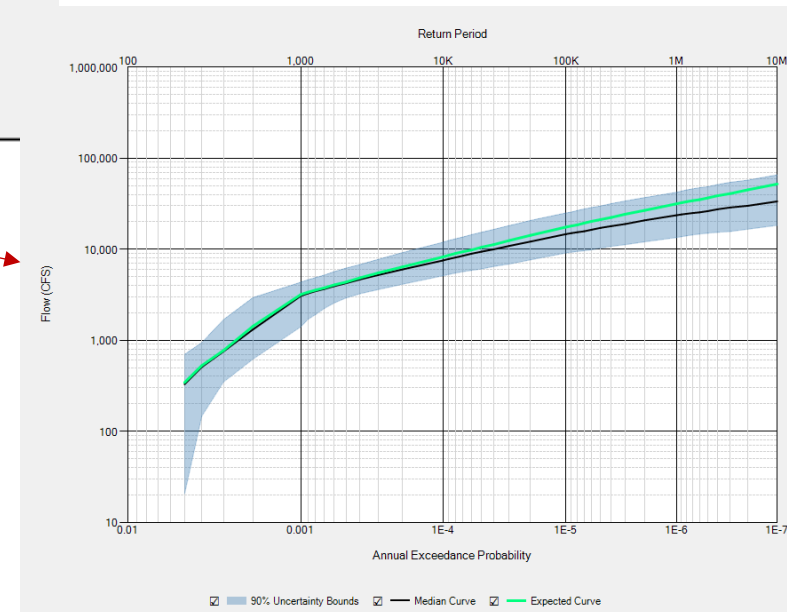
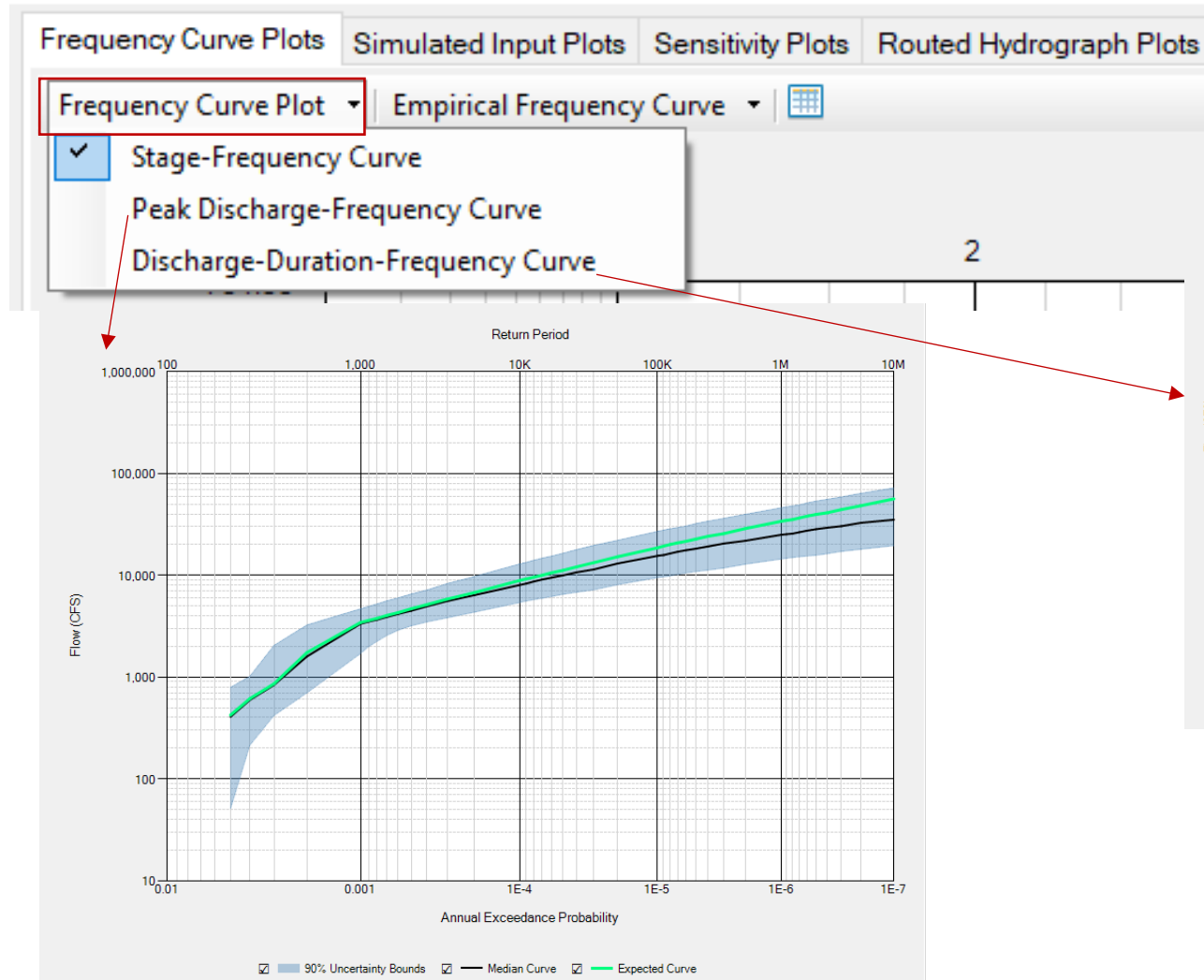




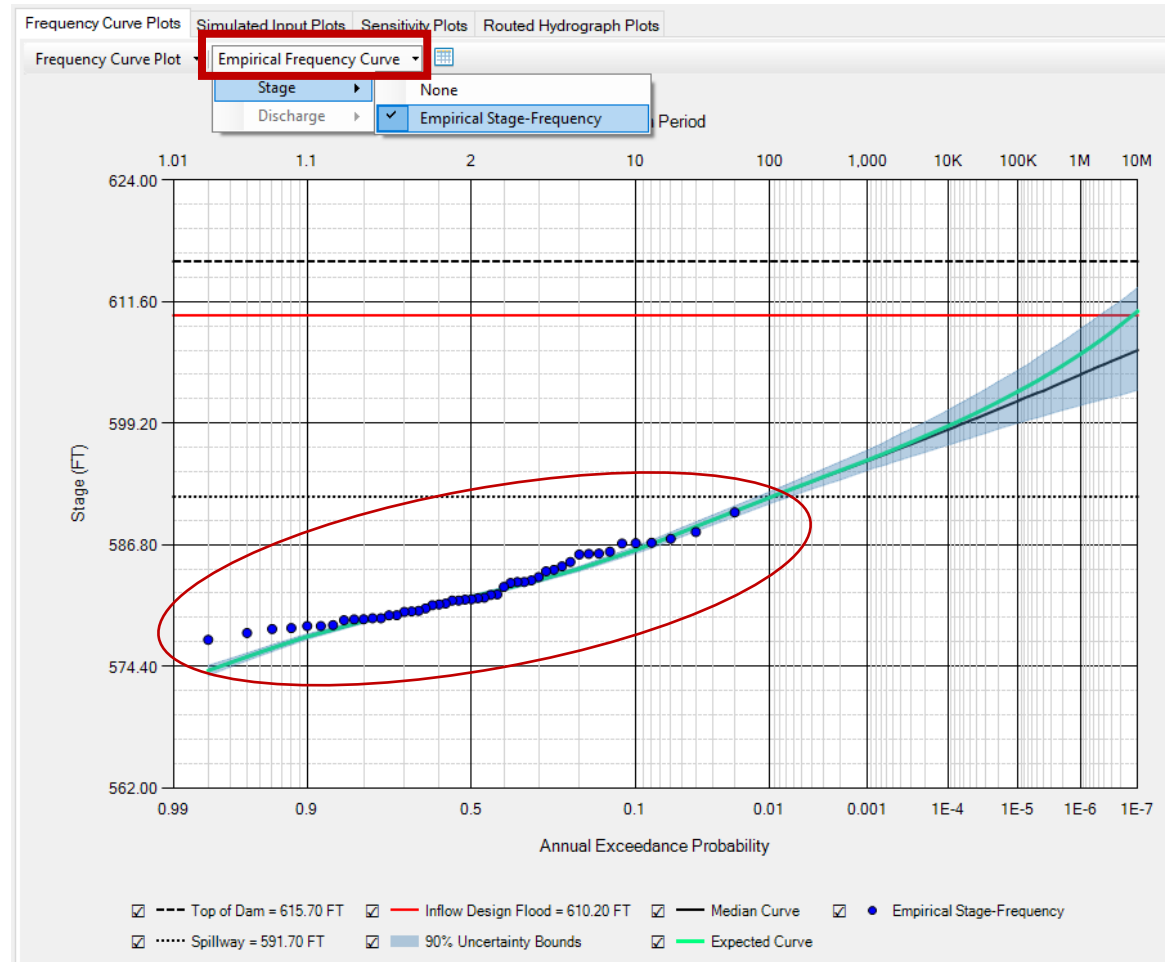
# Frequency Curve Plots (1 of 2)



# Frequency Curve Plots (2 of 2)




# Empirical Frequency Curve



# Tabular Output

Frequency Curve Plots | Simulated Input Plots | Sensitivity Plots | Routed Hydrograph Plots

Frequency Curve Plot ▾ | Empirical Frequency Curve ▾ 

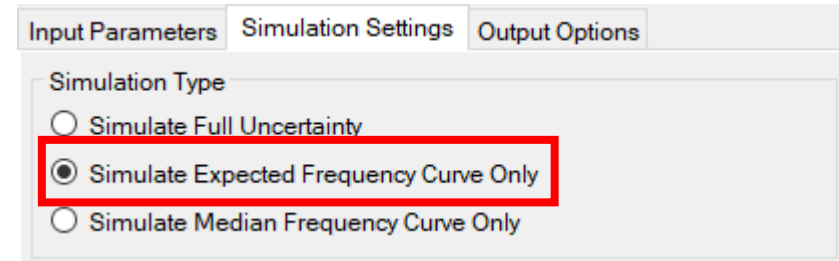
Stage-Frequency Curve

AEP	Upper	Lower	Expected	Median
9.80E-001	574.49	573.43	573.96	573.97
9.70E-001	575.20	574.32	574.77	574.78
9.60E-001	575.76	574.96	575.37	575.38
9.50E-001	576.21	575.48	575.85	575.85
9.40E-001	576.60	575.89	576.25	576.25
9.30E-001	576.93	576.25	576.59	576.61
9.20E-001	577.22	576.58	576.90	576.91
9.10E-001	577.48	576.87	577.18	577.18
9.00E-001	577.71	577.13	577.42	577.42
8.00E-001	579.19	578.78	578.98	578.98
7.00E-001	580.11	579.76	579.94	579.94
6.00E-001	580.91	580.55	580.73	580.73
5.00E-001	581.68	581.29	581.48	581.48
4.00E-001	582.48	582.07	582.28	582.28
3.00E-001	583.42	582.95	583.18	583.18
2.00E-001	584.61	584.08	584.35	584.35
1.00E-001	586.64	585.90	586.25	586.24
9.00E-002	586.94	586.16	586.55	586.54
8.00E-002	587.27	586.45	586.86	586.86
7.00E-002	587.65	586.78	587.22	587.22
6.00E-002	588.00	587.18	587.62	587.62



# Helpful Tips

- Calibration or sensitivity simulations
  - Expected only
- **Final** RMC-RFA stage-frequency curve
  - Full uncertainty
  - **Minimum of 1,000 realizations**



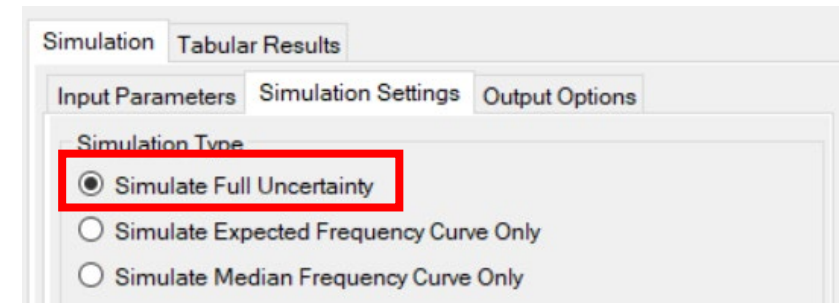
Input Parameters Simulation Settings Output Options

Simulation Type

☐ Simulate Full Uncertainty

☒ Simulate Expected Frequency Curve Only

☐ Simulate Median Frequency Curve Only



Simulation Tabular Results

Input Parameters Simulation Settings Output Options

Simulation Type

☒ Simulate Full Uncertainty

☐ Simulate Expected Frequency Curve Only

☐ Simulate Median Frequency Curve Only

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# ? Questions