

# RMC-RFA Sensitivity Analysis

## DLS-114, Module 2.23



**U.S. ARMY**



**US Army Corps  
of Engineers®**

Dam and Levee  
Safety Programs

March 2026 / Version 1

BLUE RIVER, OR (SOURCE: USACE)

# Learning Objectives

---

- Define iterative sensitivity analyses for an RMC-RFA project
- Discuss reasons why we perform iterative sensitivity analysis
- Provide examples



# Iterative Sensitivity Analyses (1 of 3)

---

## Main Reason to Perform Sensitivity Analysis:

- Understand range of uncertainty
  - 1) A lot of uncertainty
  - 2) A lot of leverage



# Iterative Sensitivity Analyses (2 of 3)

---

- Critical duration
- Inflow hydrograph shapes
- Volume frequency curve
  - Skew
  - Effective record length (ERL)
  - Historic storms
  - Perception thresholds
- Seasonality analysis
- Reservoir starting stage duration
- Reservoir model

# Iterative Sensitivity Analyses (3 of 3)

---

## Risk Impacts at the Top of Dam

- 1) Primary (order of magnitude or greater)
- 2) Secondary (half to whole order of magnitude)
- 3) Tertiary (less than a half order of magnitude)

### 4 Sensitivity Analysis

#### ▲ 4.1 Primary Risk Impacts

4.1.1 Sensitivity: Skew

4.1.2 Sensitivity: Record Length

#### ▲ 4.2 Secondary Risk Impacts

4.2.1 Sensitivity: Critical Duration

#### ▲ 4.3 Tertiary Risk Impacts

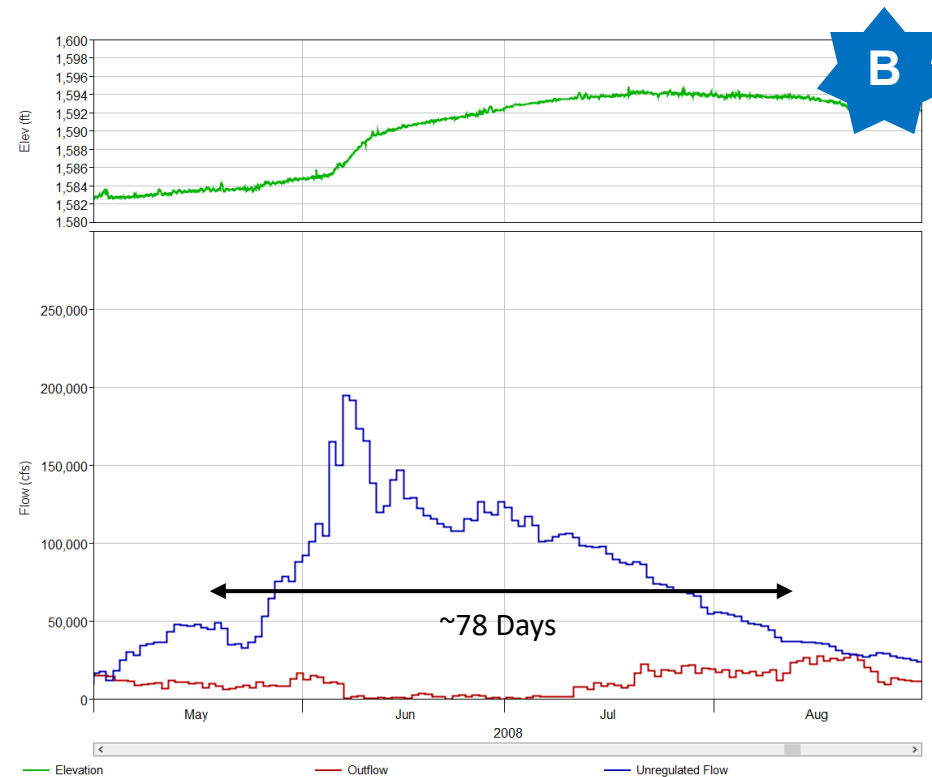
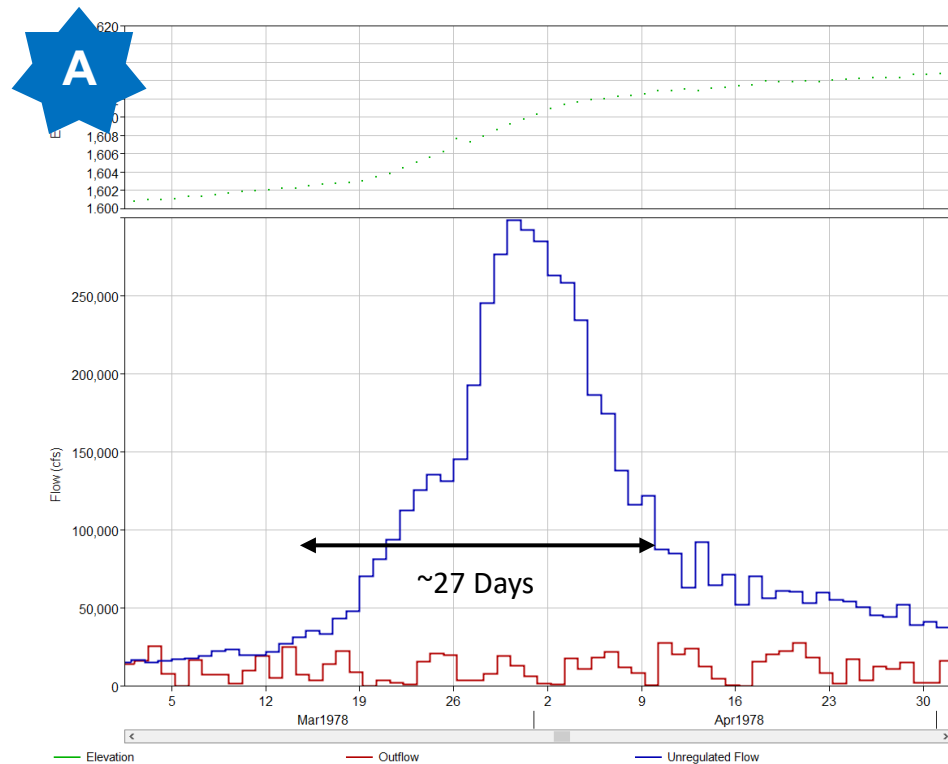
4.3.1 Sensitivity: Hydrograph Shape

4.3.2 Sensitivity: Starting Stage

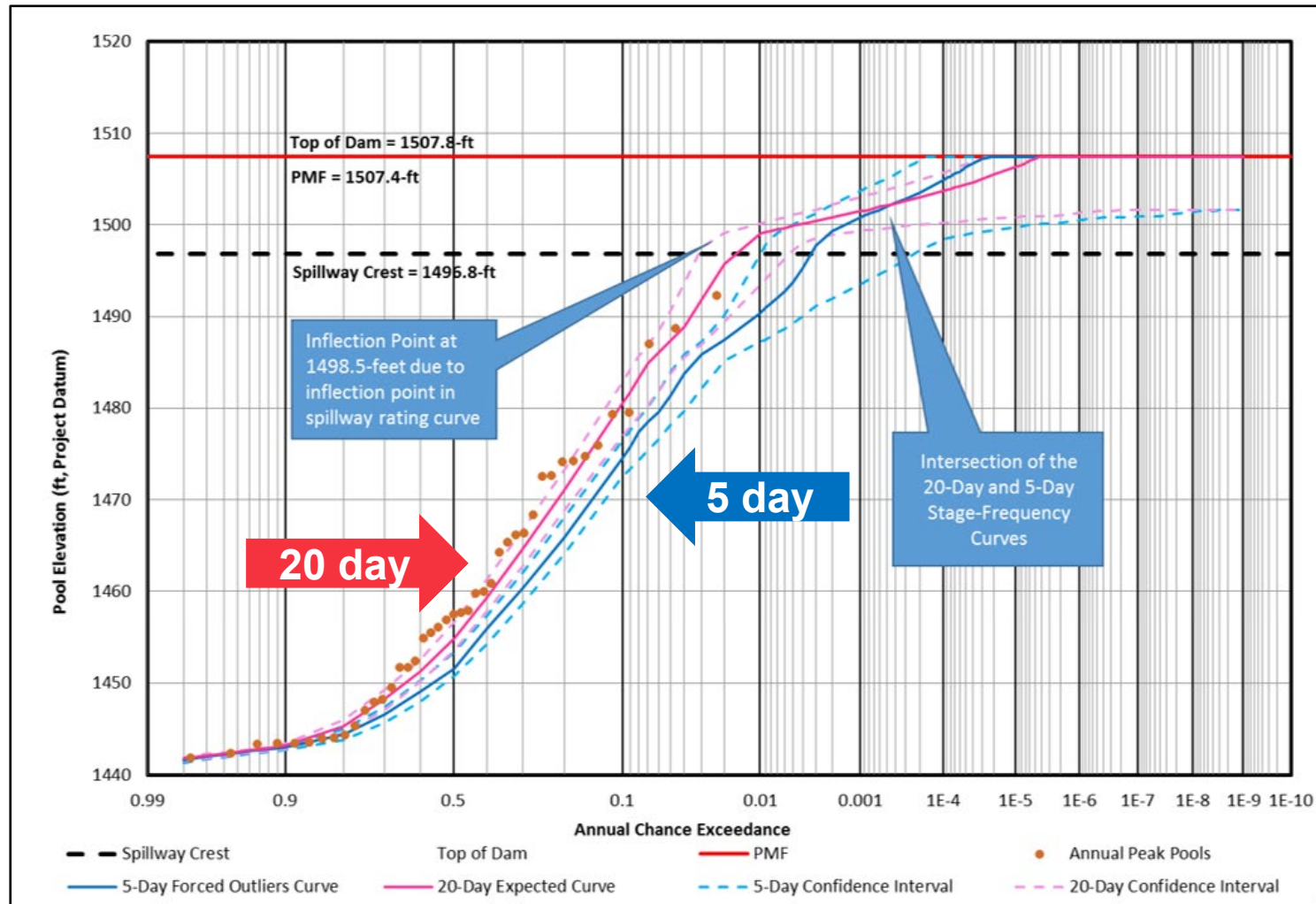
4.3.3 Sensitivity: Outflow Curve

# Critical Duration

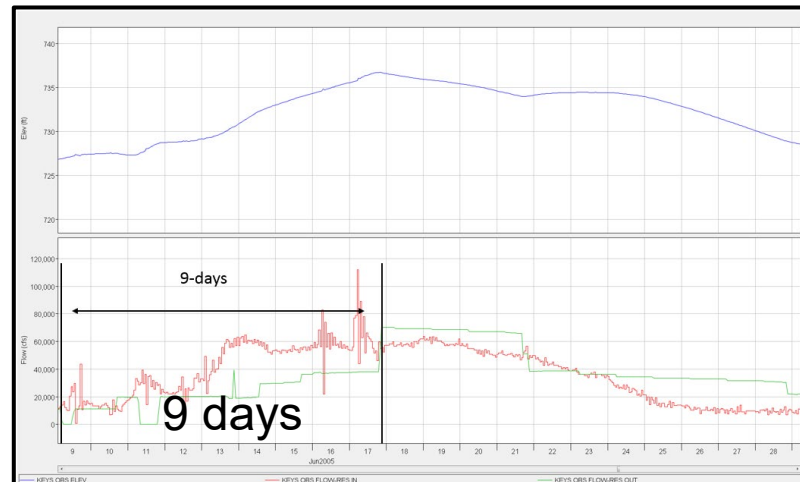
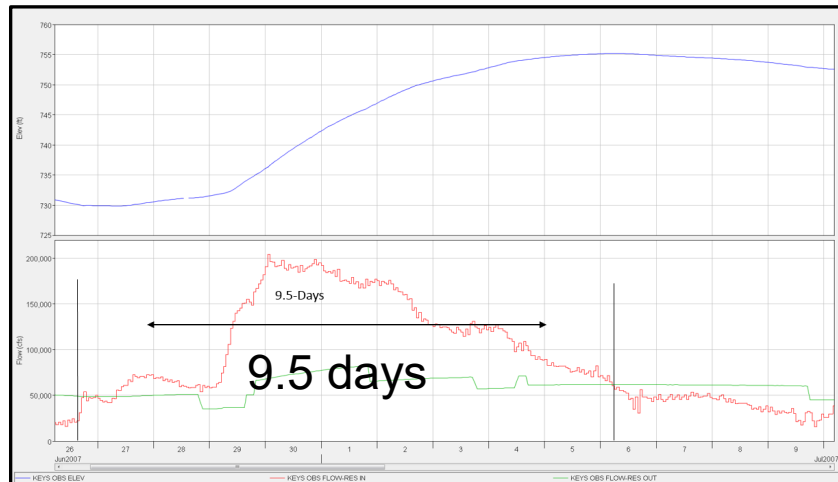
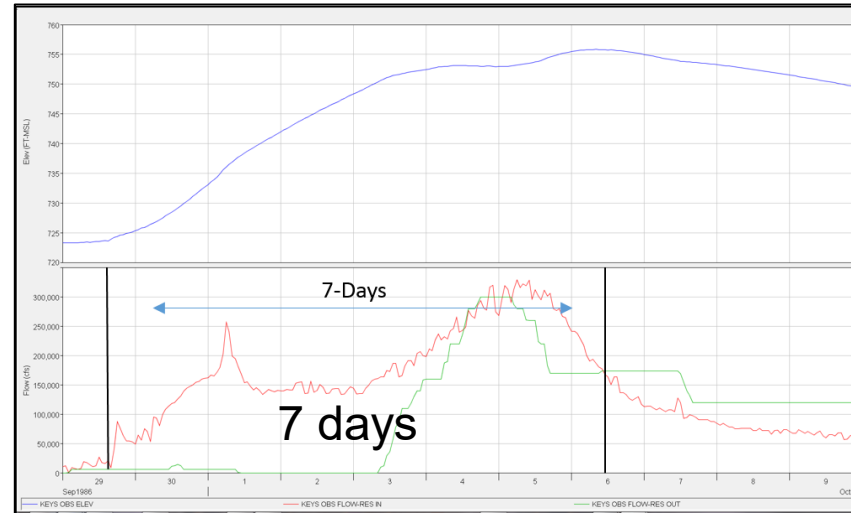
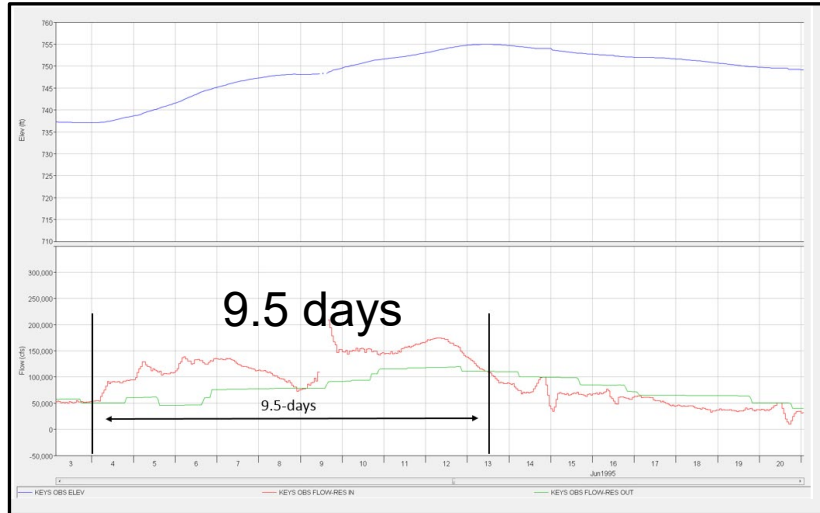
- What should you do if you have observed events with different critical durations?



# Critical Duration

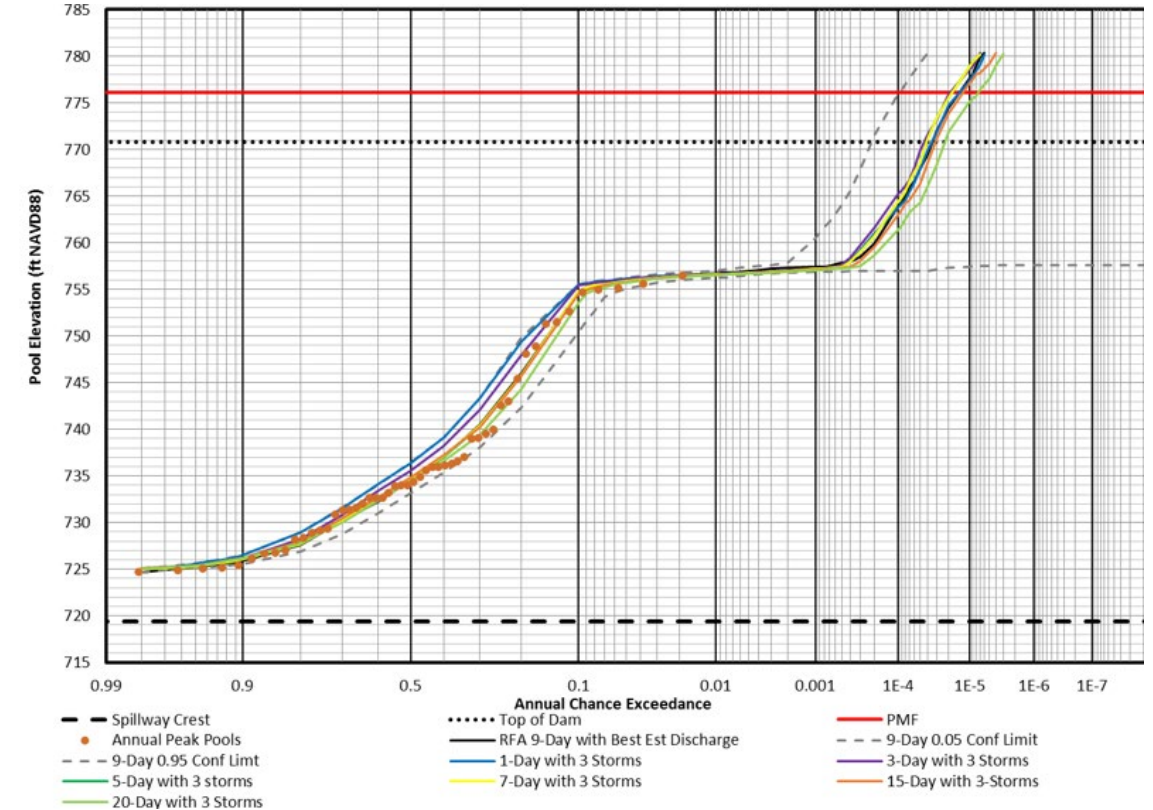
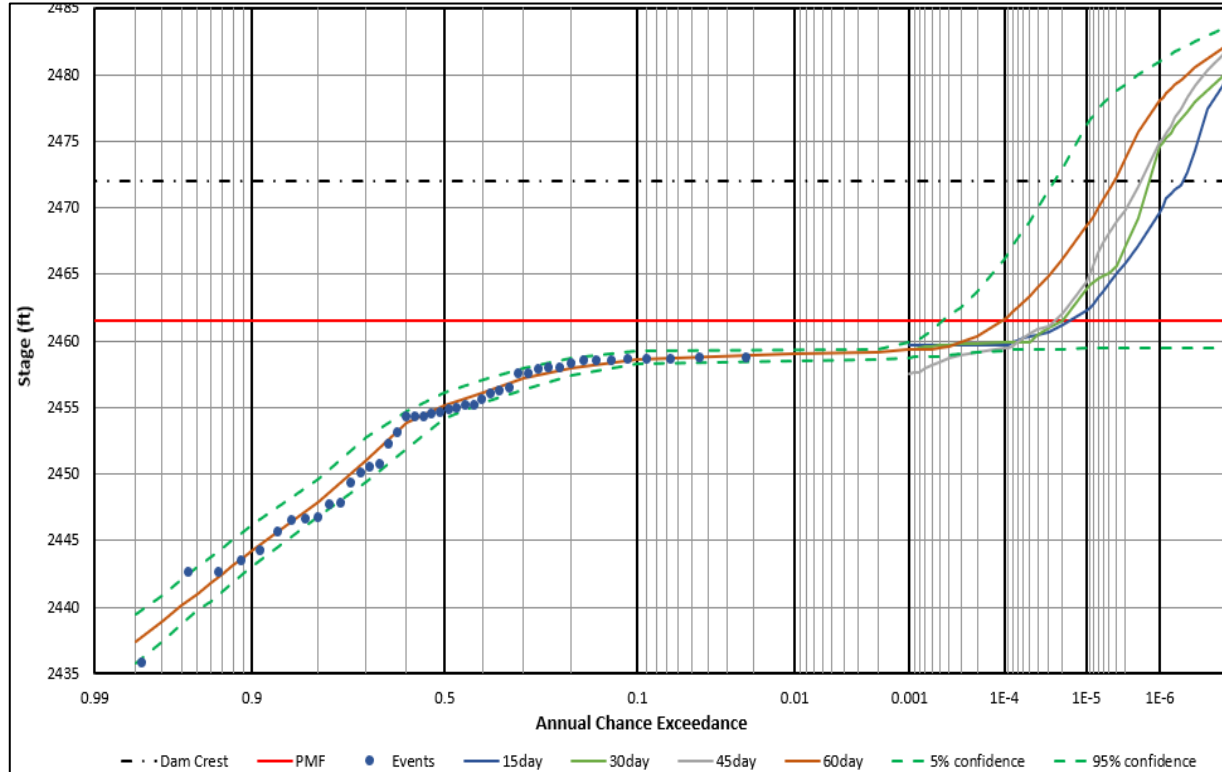


# Critical Duration

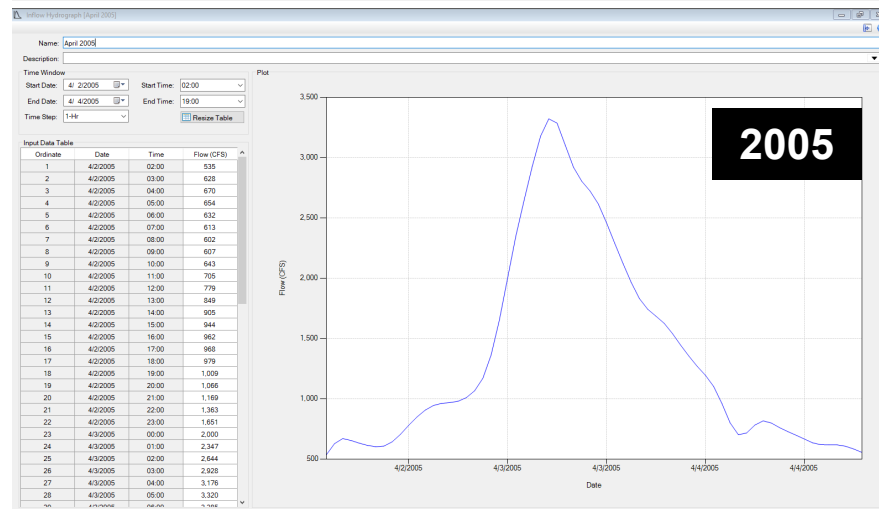
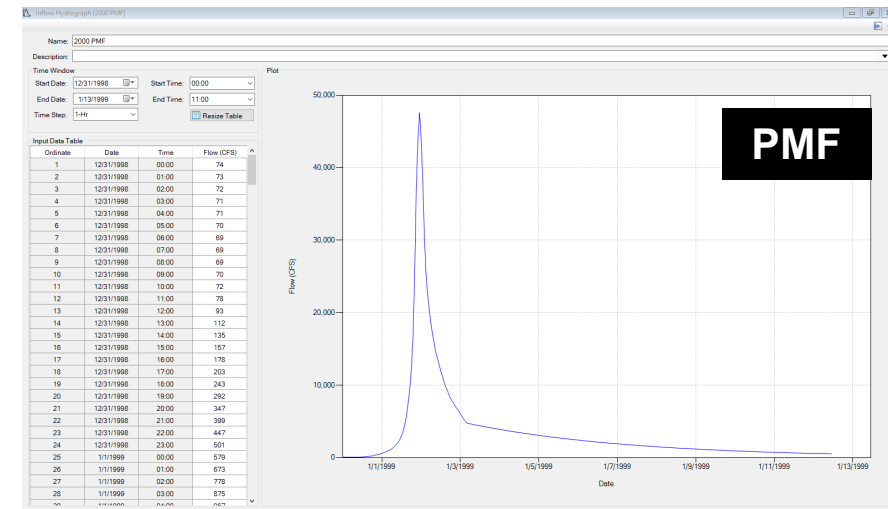
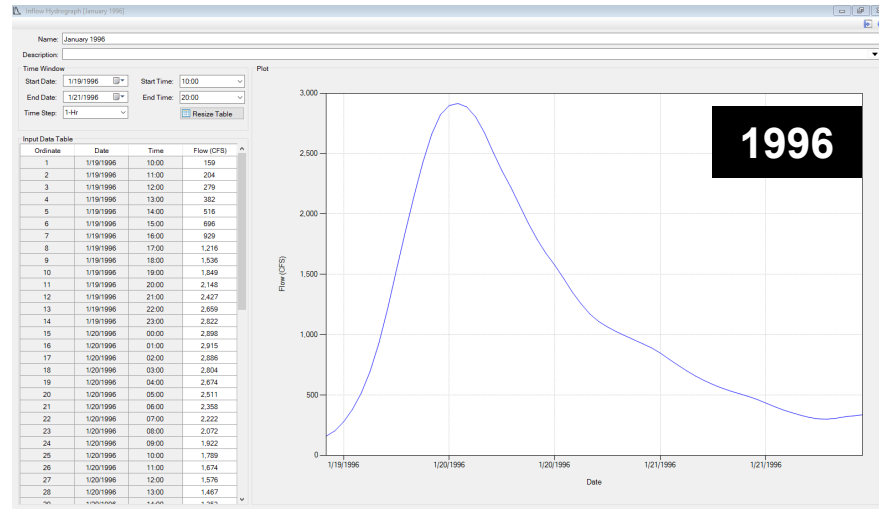




# Critical Duration



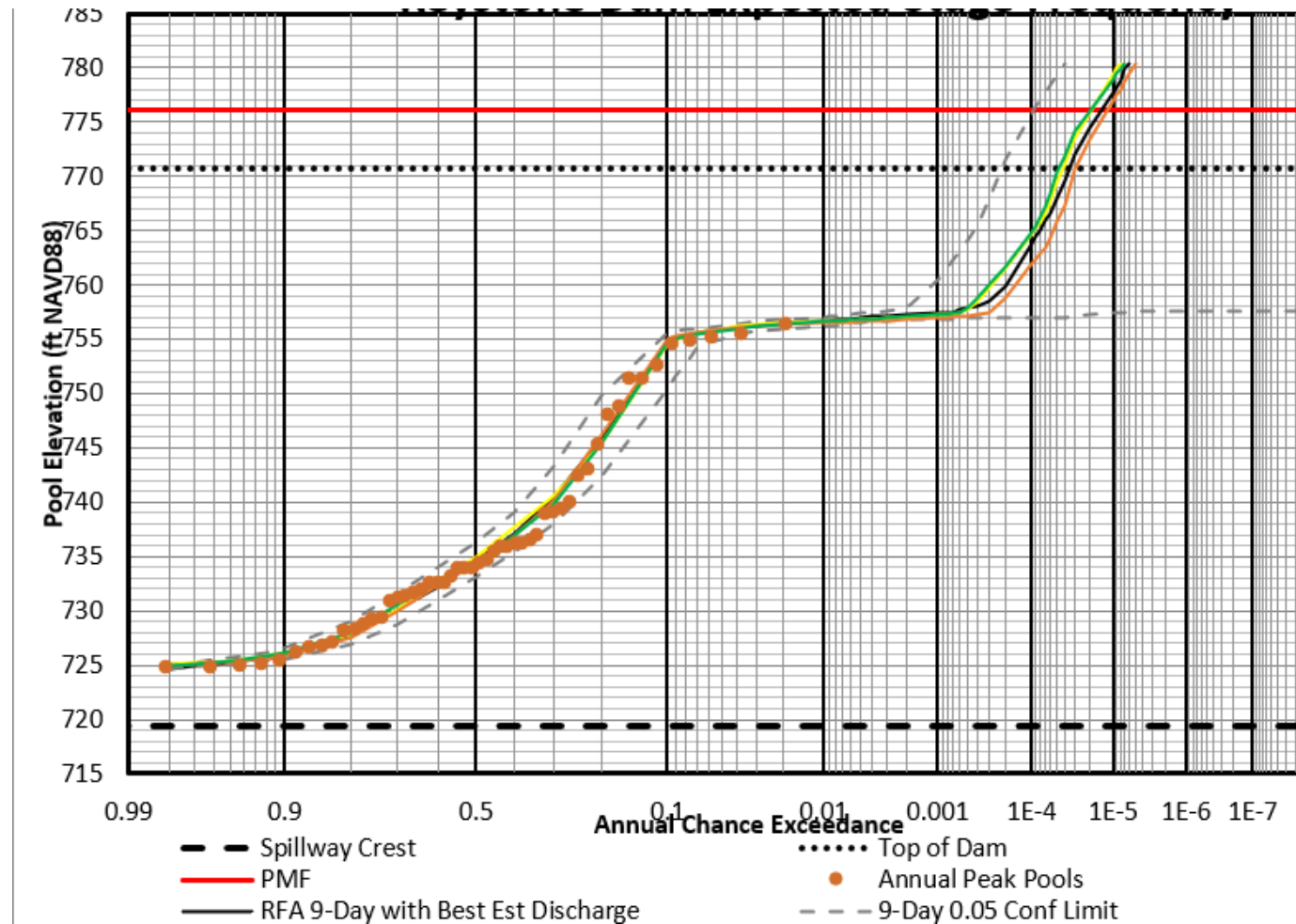
# Inflow Hydrograph Shapes



Why include a synthetic PMF hydrograph?



# Inflow Hydrograph Shapes

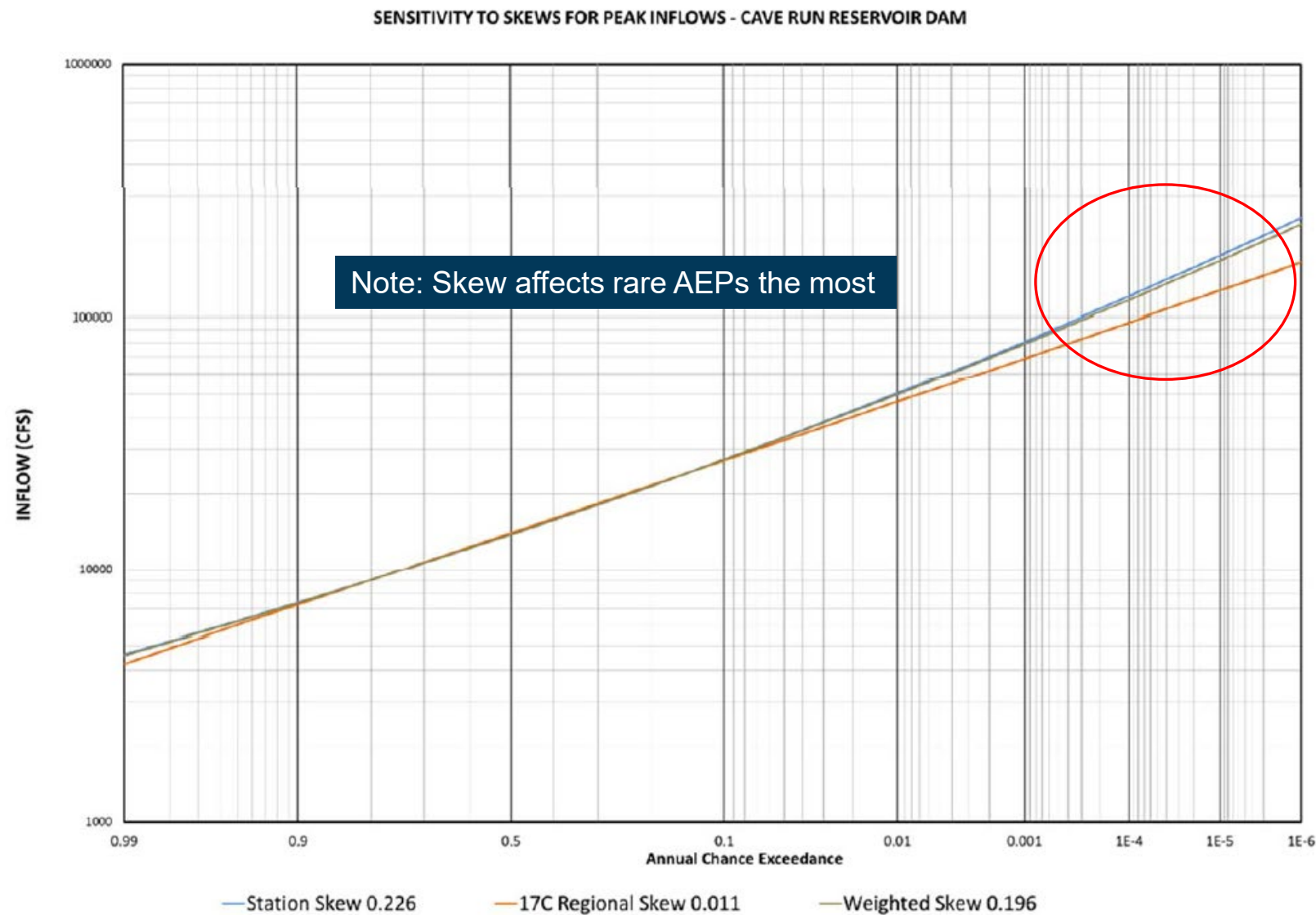


# Volume-Frequency Curve Parameters

---

- Skew
- Effective record length (ERL)
- Historic storms
- Perception thresholds

# Skew



U.S. ARMY

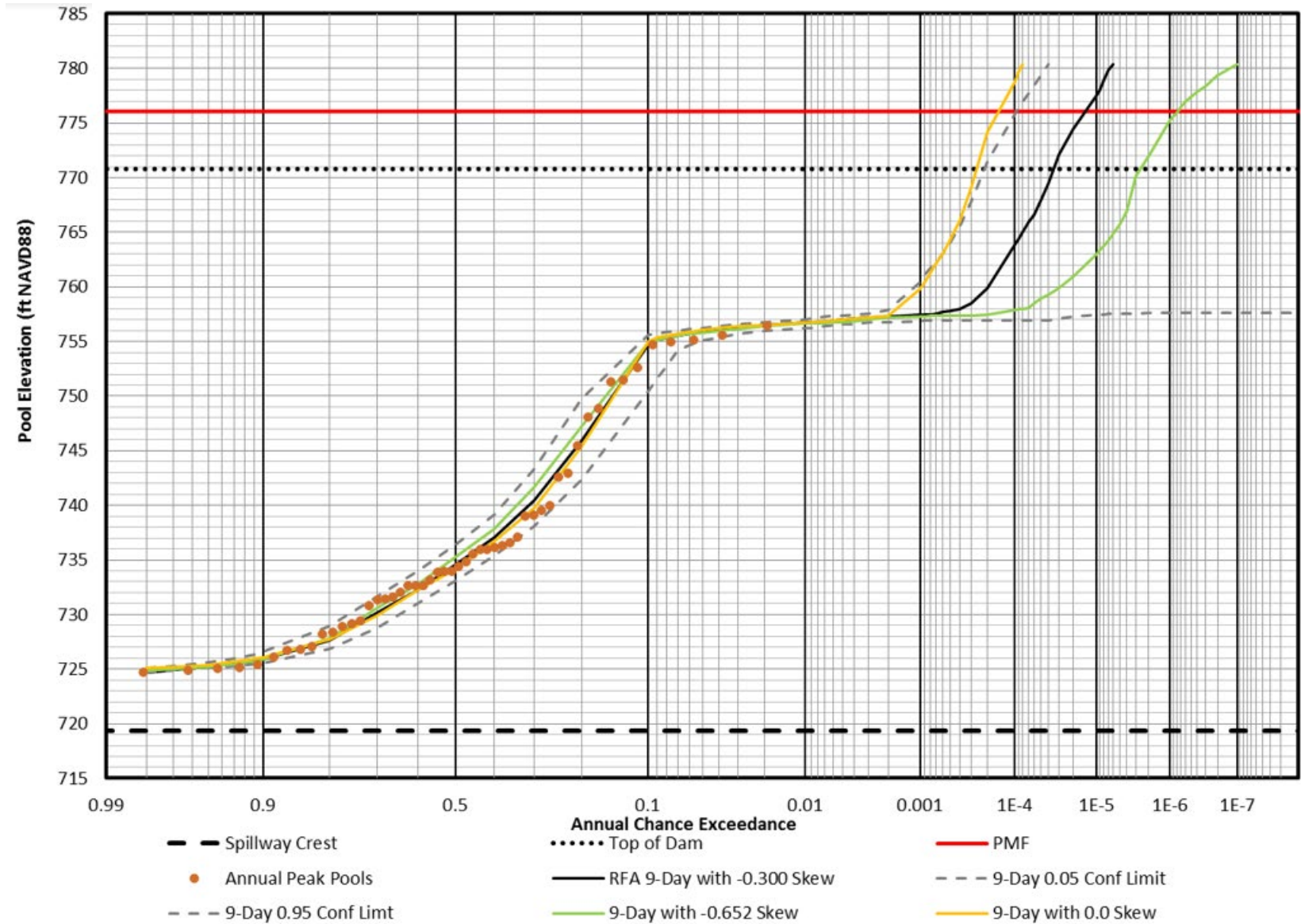


US Army Corps  
of Engineers®  
Dam and Levee  
Safety Programs

13



# Skew

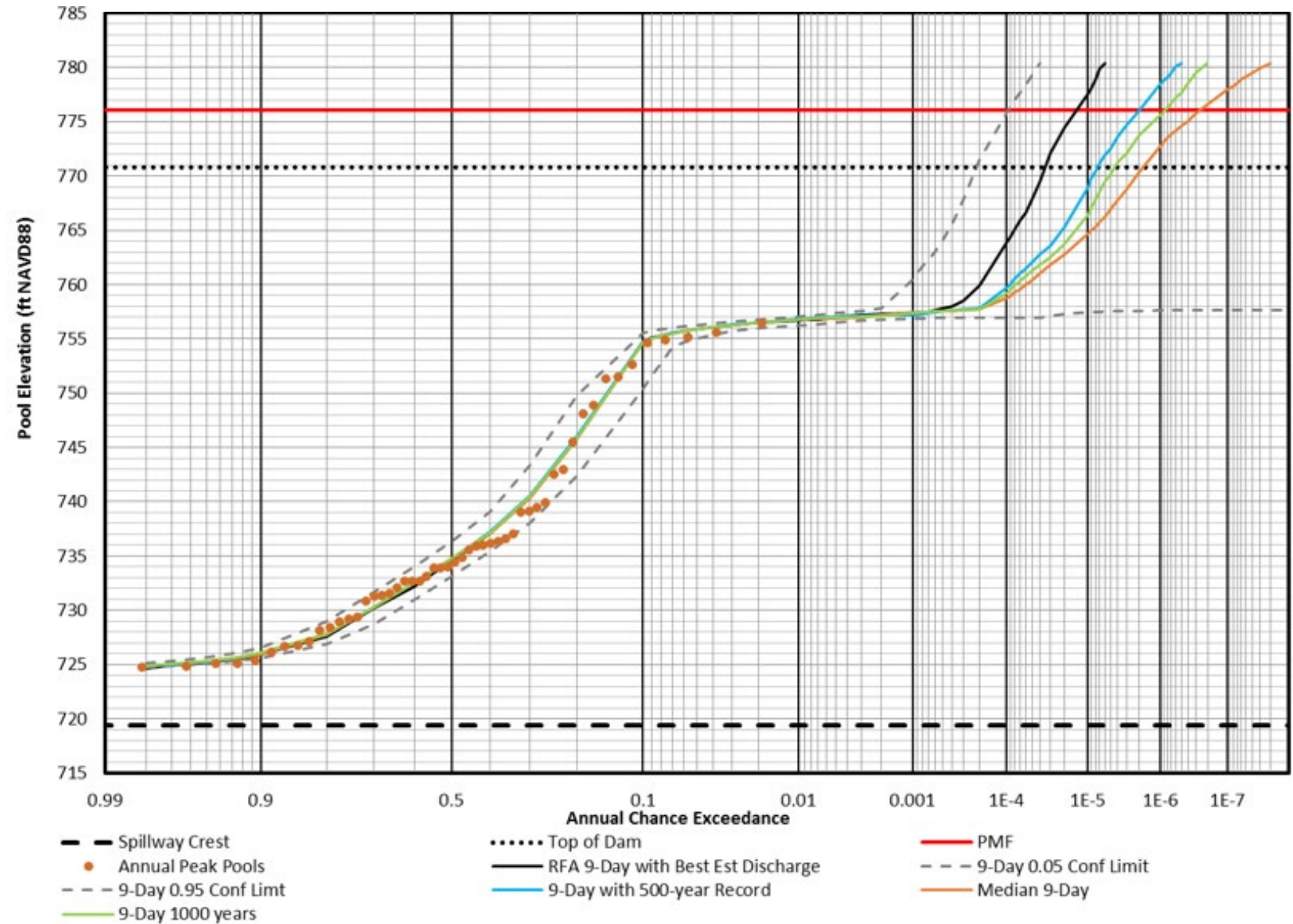


U.S. ARMY



US Army Corps  
of Engineers®  
Dam and Levee  
Safety Programs

# Effective Record Length



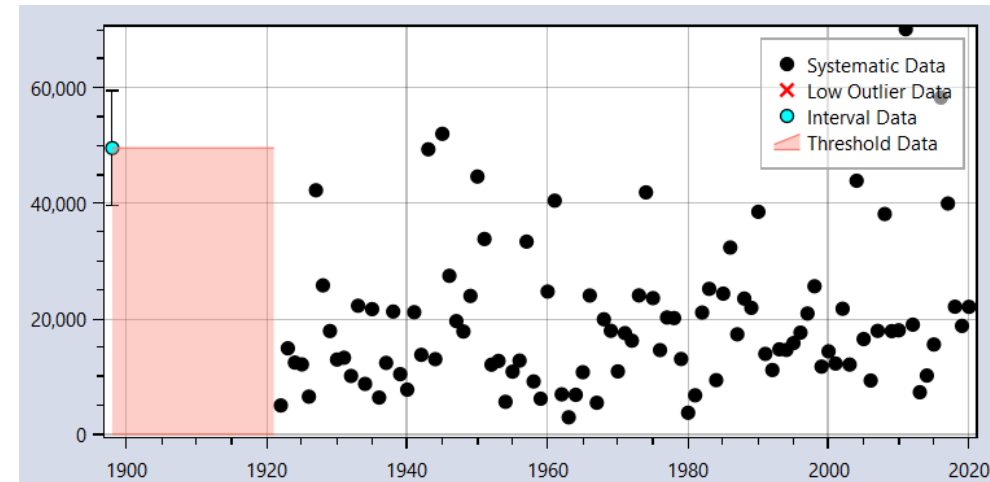
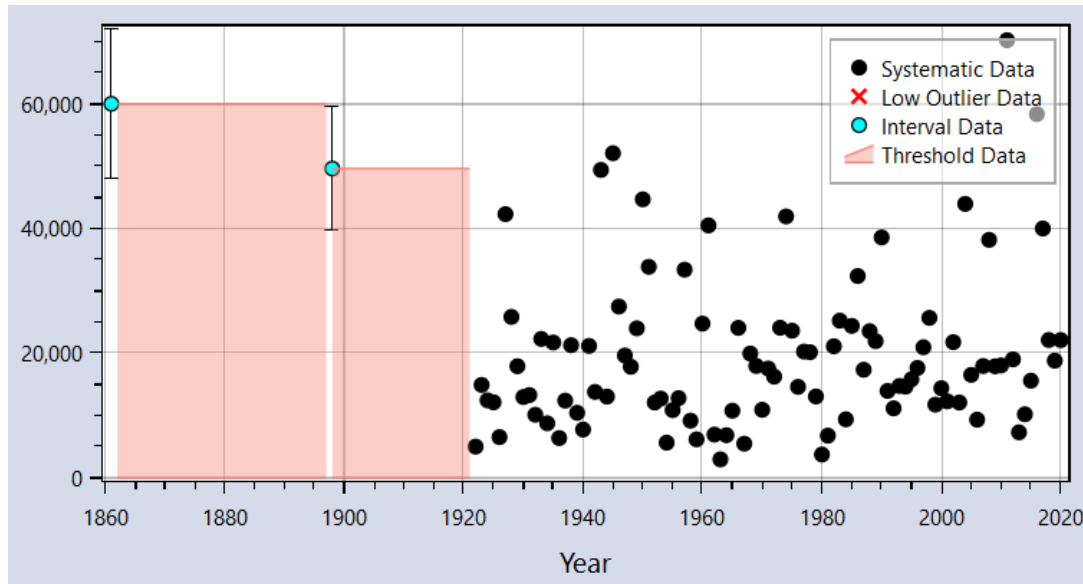
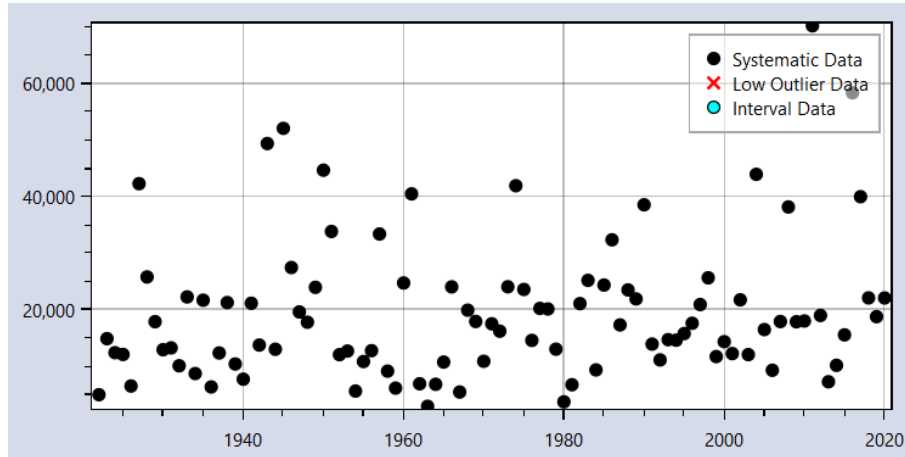
U.S. ARMY



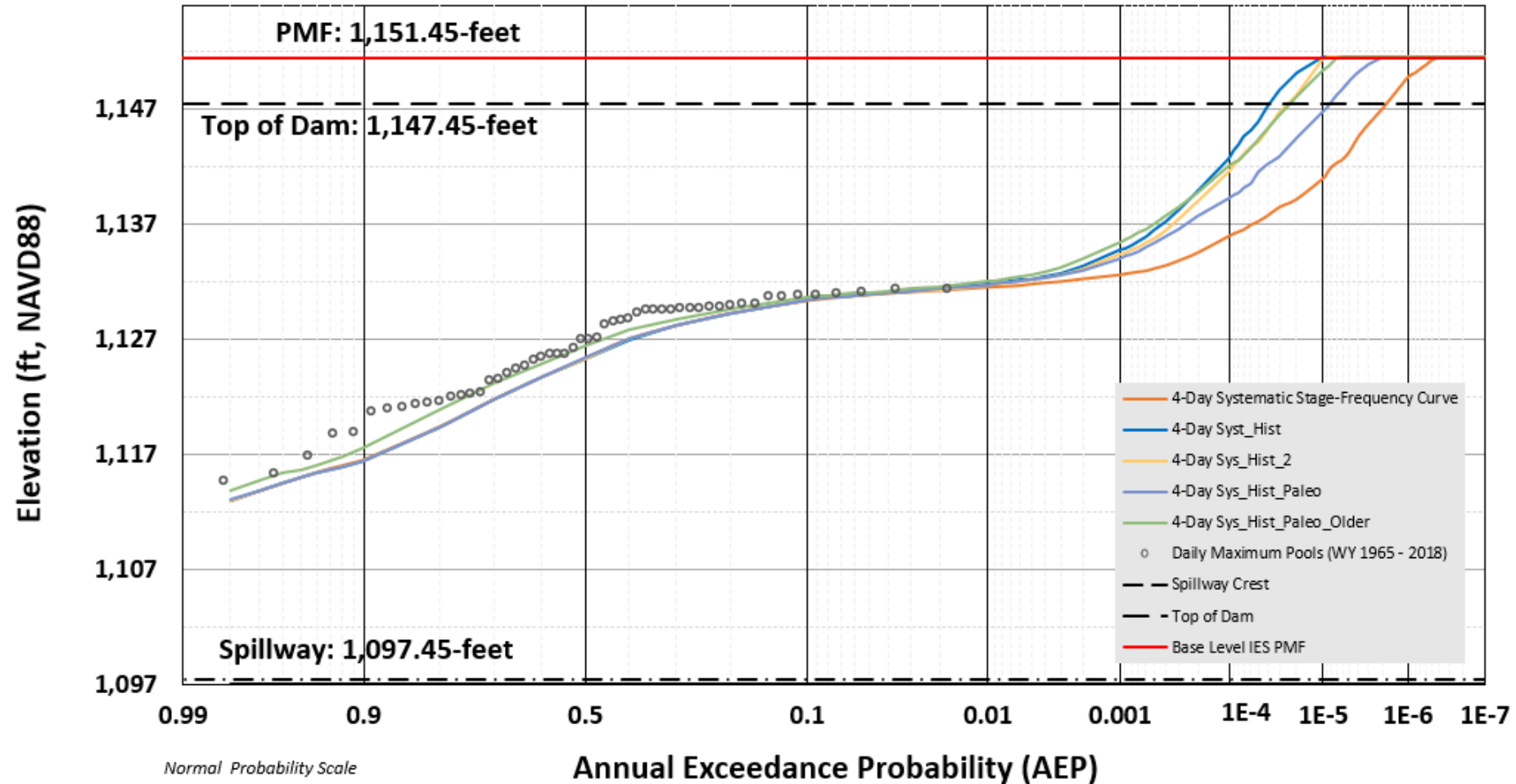
US Army Corps  
of Engineers®  
Dam and Levee  
Safety Programs

15

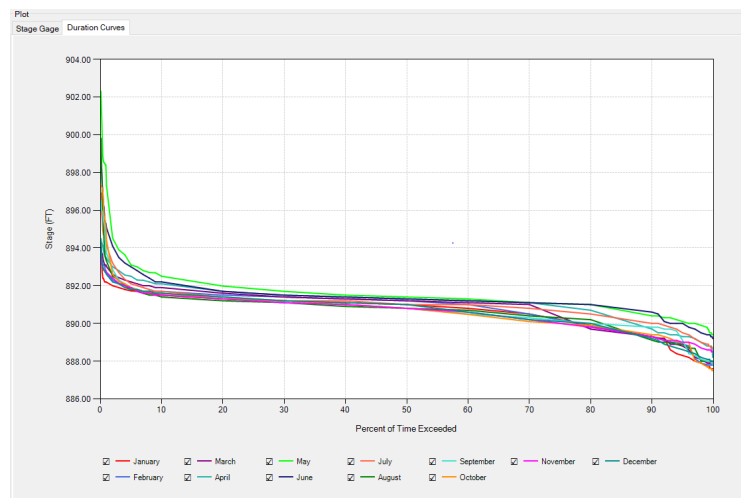
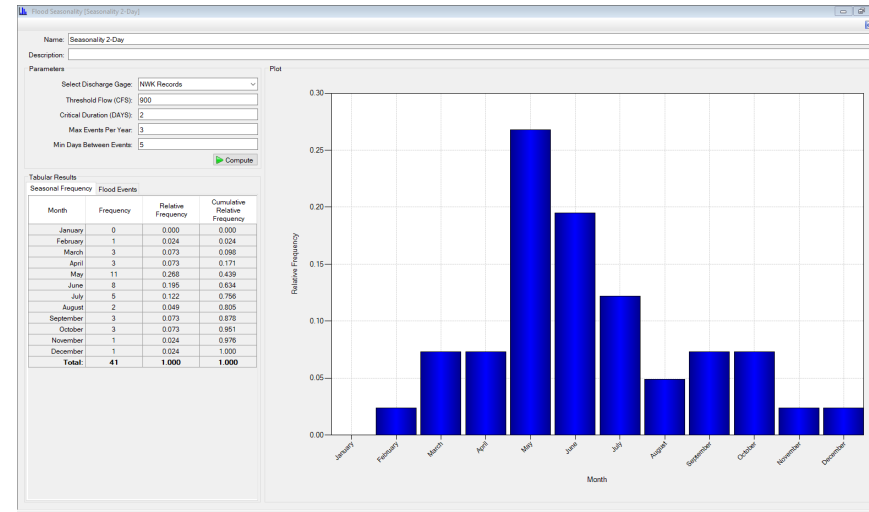
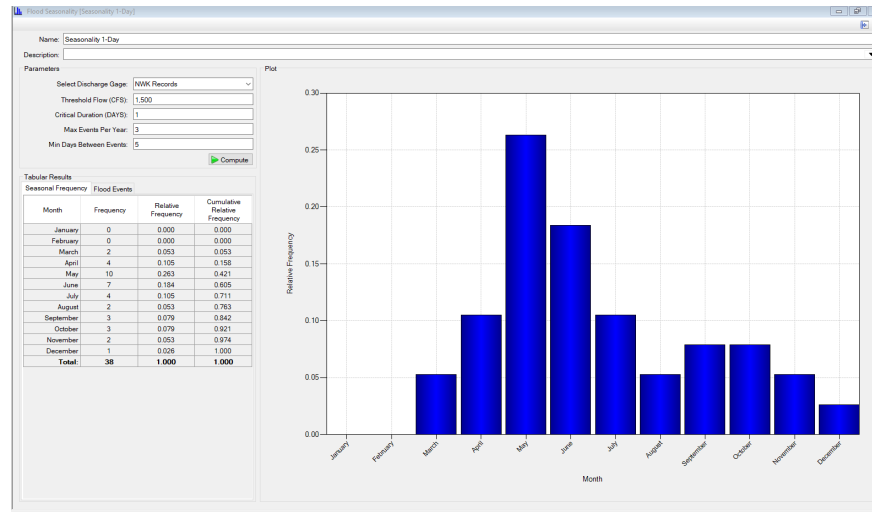
# Perception Thresholds and Historic Storms



# Perception Thresholds and Historic Storms



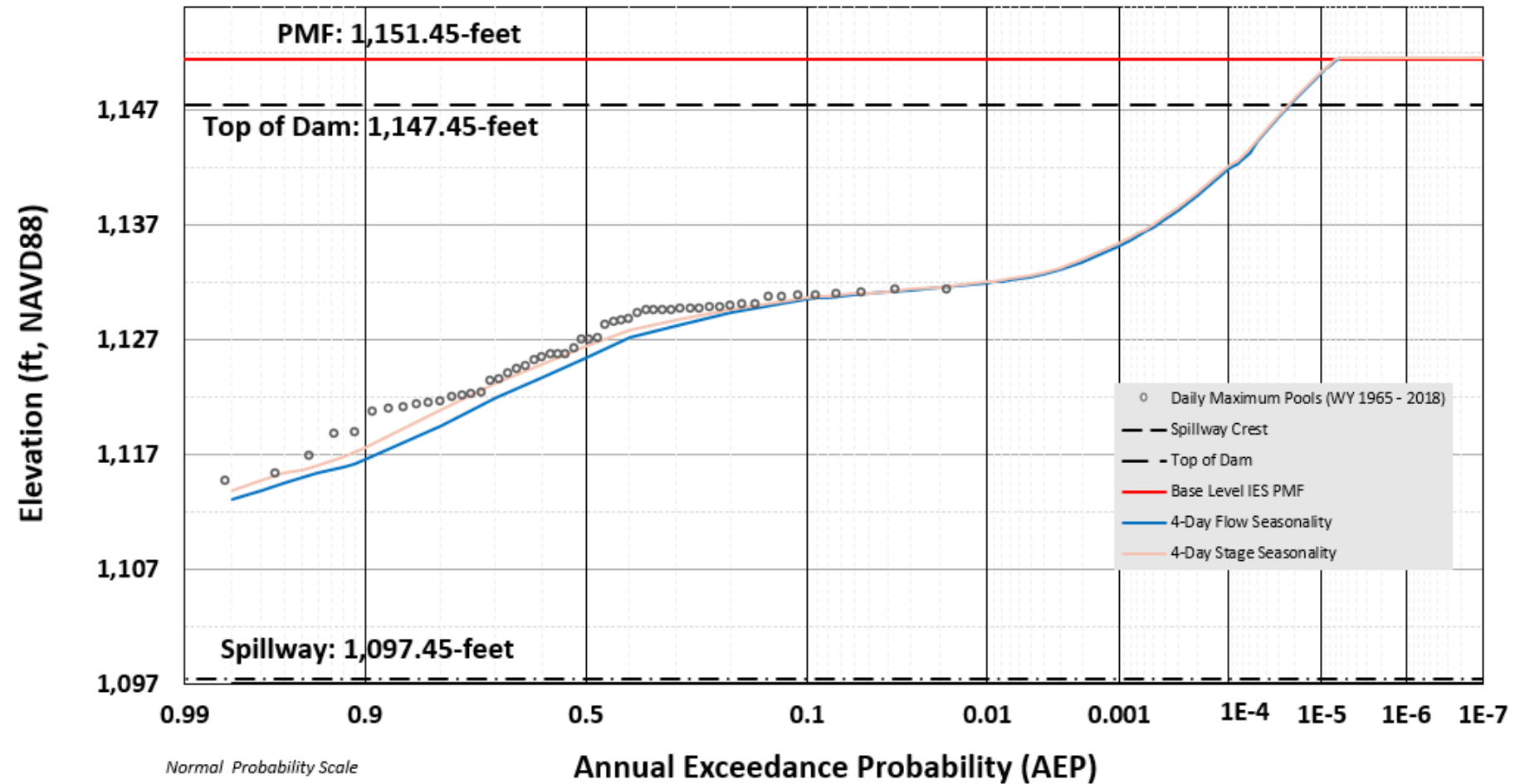
# Seasonality



**Note:** If stage-duration curves are similar, seasonality and stage-duration likely won't be impactful

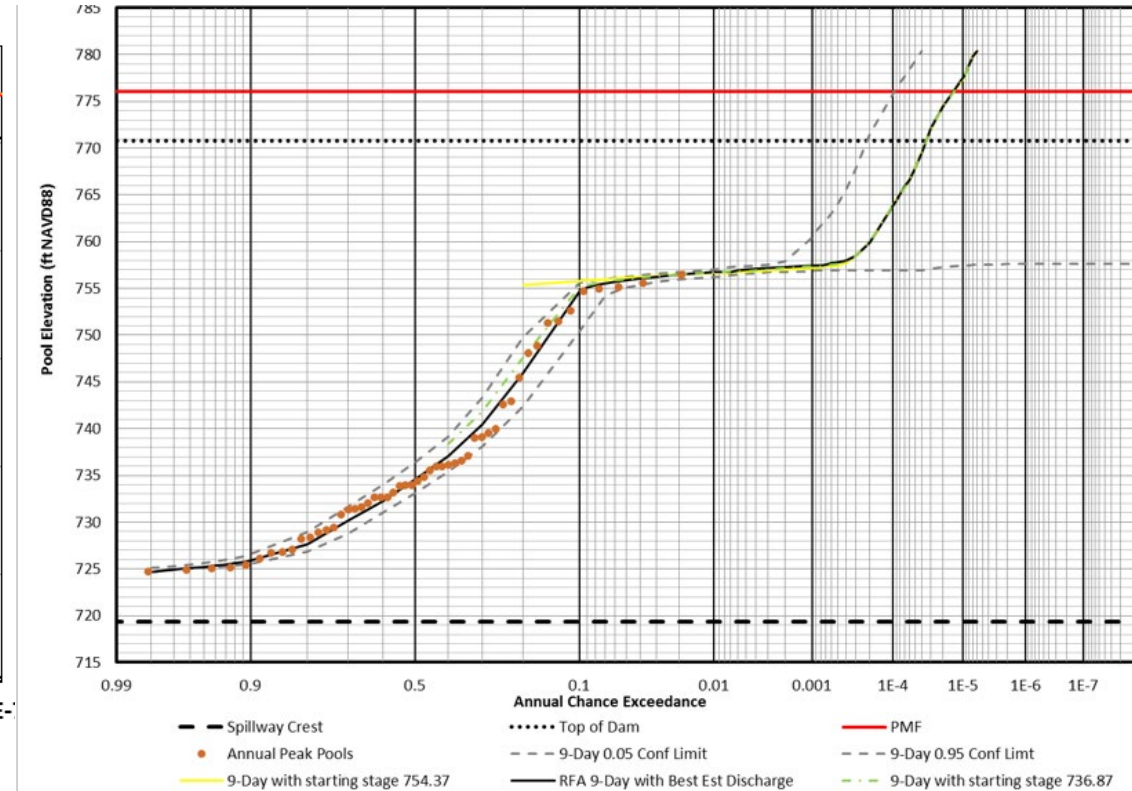
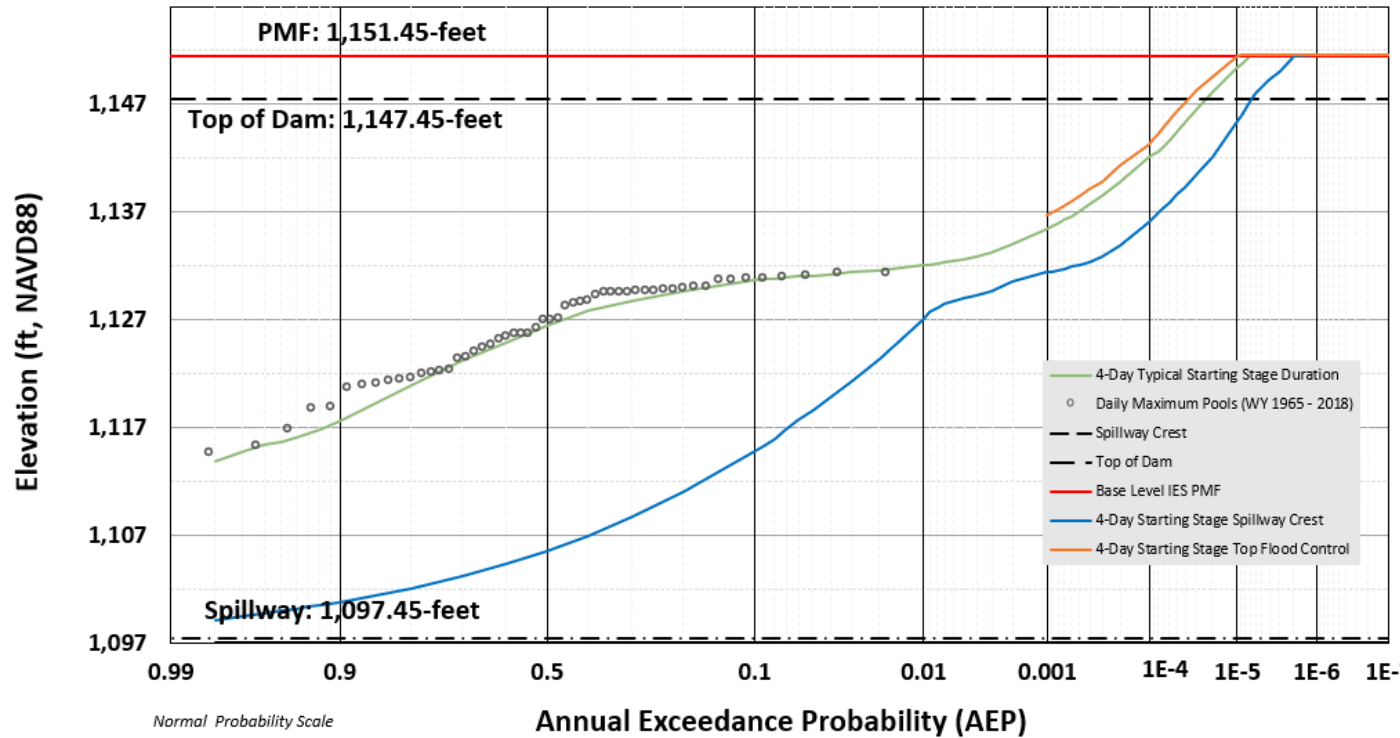


# Seasonality

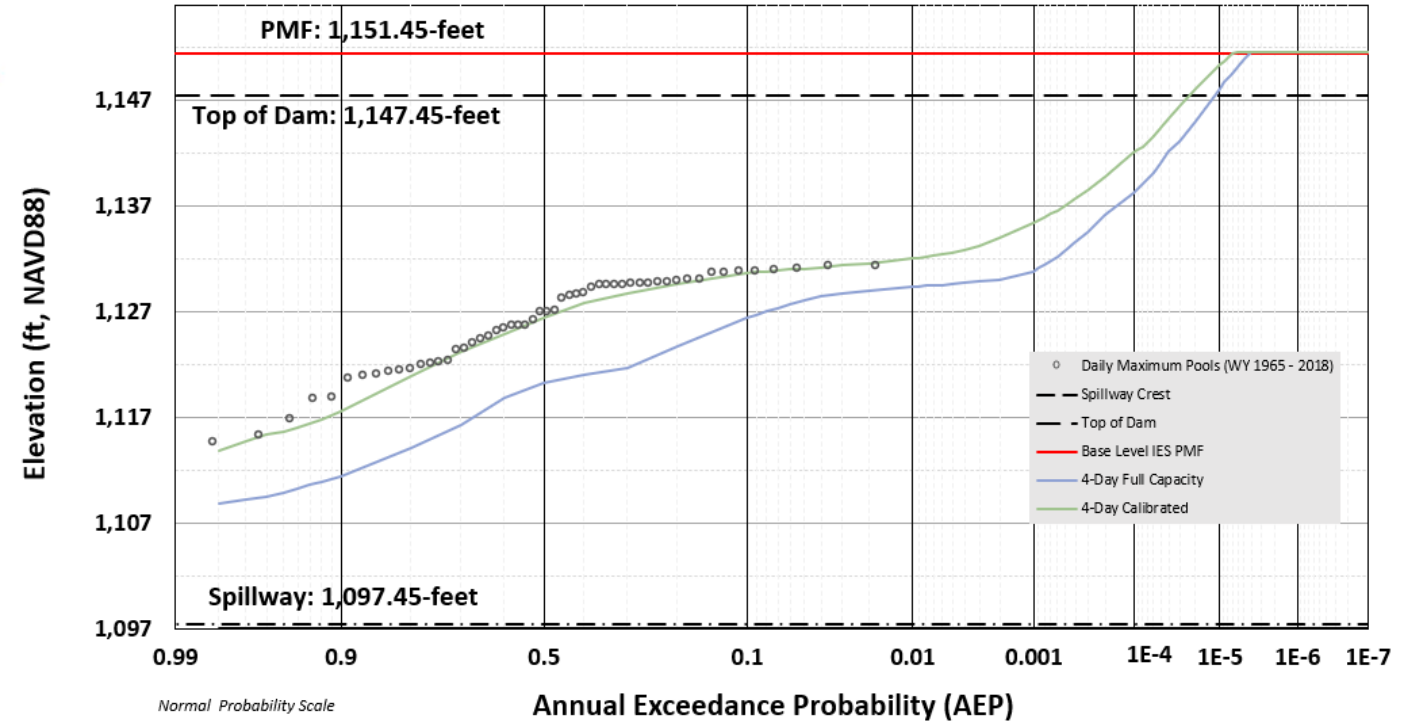
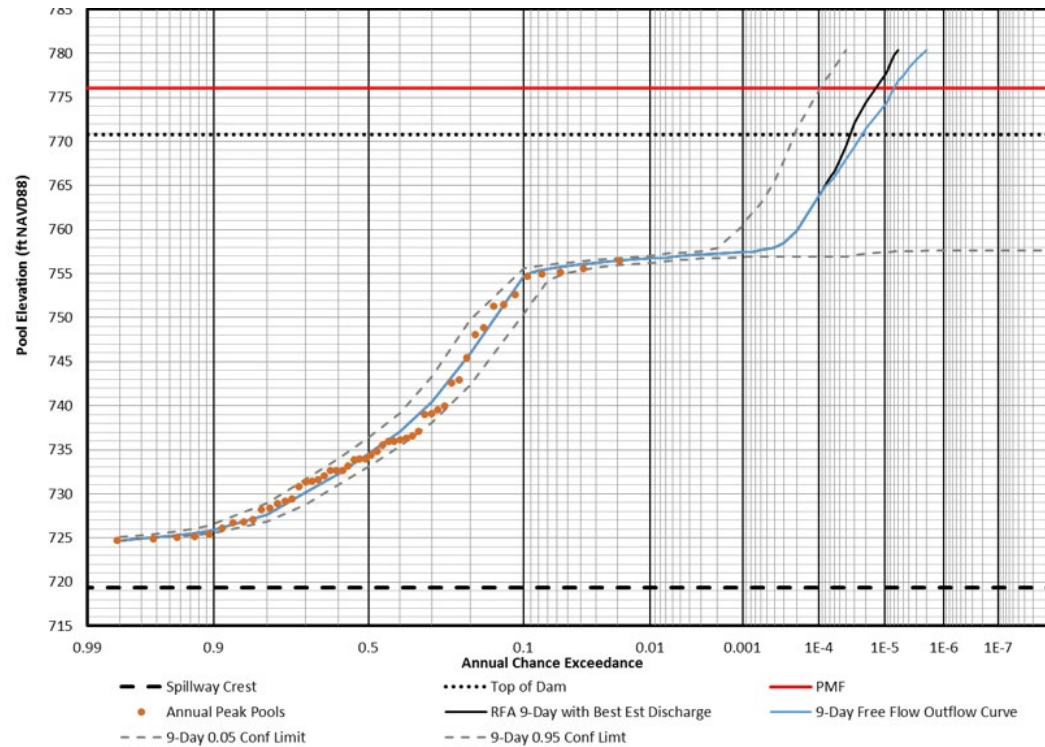


**Note:** If stage-duration curves are similar, seasonality and stage-duration likely won't be impactful

# Starting Stage



# Reservoir Model



---

# Questions