Tennessee Valley Authority (TVA): 2025 User Report

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Partially taken from Helene presentation by TVA RFC.

TVA TENNESSEE VALLEY AUTHORITY

What is TVA?

The Tennessee Valley Authority is a public owned company created by the Tennessee Valley Authority Act of 1933. Its purpose is to manage the Tennessee River system and provide low-cost electricity, flood control, and land management to a vast area in the southeastern United States.

- **Provides electricity to approximately 10 million people. Selling its power to:**
  - 153 local power utilities
  - 58 direct-serve industrial in institutional customers
  - 7 federal installations
  - 12 area utilities
- **Flood control with its 29 hydroelectric dams**
- **Navigation and land management along rivers within its region of operation**

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Reservoir System Overview & Flood Control

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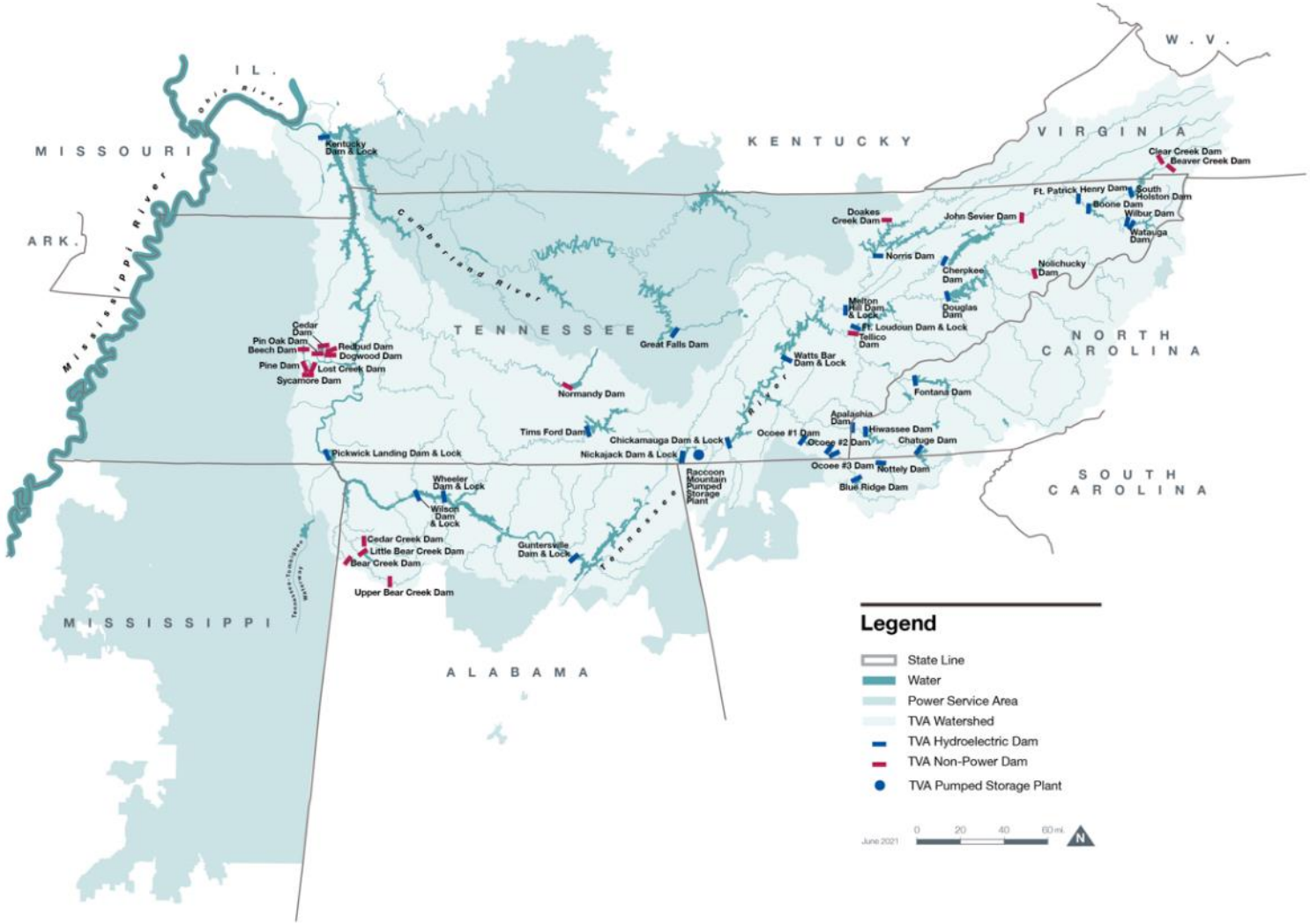
TVA Watershed & Service Area



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Integrated Tennessee River System Overview

Flood Control

Navigation

Power Generation

Water Supply

Water Quality

Recreation

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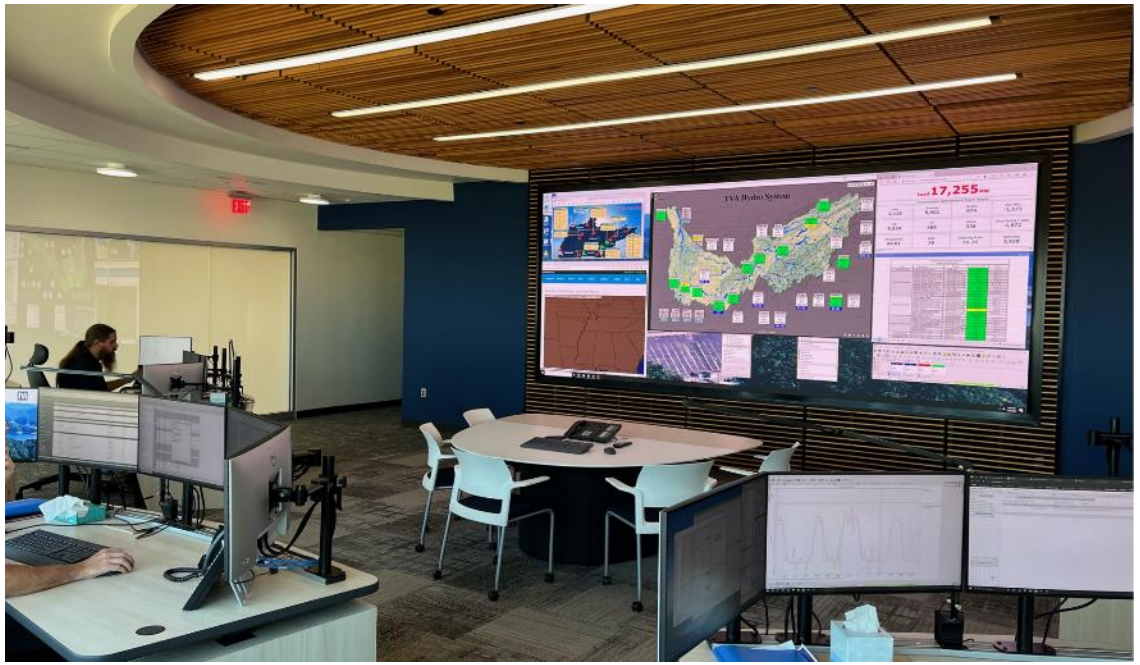
TVA River Forecast Center

Staffed 24x7 365 days a year – around the clock monitoring of the river system to respond to changing river conditions and weather as well as flooding and emergencies across the system.

TVA River Forecast Center – Knoxville, TN



- Issue 2 - 4 river forecasts per day
- Coordinate water releases with Hydro Generation
- Coordinate hourly power schedules with system schedulers
- Monitor water levels in real-time
- Provide data Management, modeling and dissemination
- Provide stakeholder notifications
- Coordinate operations with U.S. Army Corps of Engineers
- Provide public outreach

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Flood Control

- Store water in tributary dams to reduce flood levels along the mainstem Tennessee River
- Provide flood forecasting information
- Average about $300 million annually in flood damages averted in the region; nearly $2.5 billion since 2019

Chattanooga 1867 Flood of Record

Chattanooga Normal Level Today

Providing Data

250+ Data Collection Platforms (DCPs) are used to provide critical data to the Forecast Center. A itemization on the types of platforms used are as follows:

- Rain Gauges (precipitation)
    - Tipping Bucket - automated
- Stream Gauges (water level or stage)
    - Staff or Wire Weight – manual (reference)
    - Float – Manual or automated
    - Pressure – automated
    - Radar – automated (hydro plants are being upgraded to have at least its Headwater transmitted)

Helene

Event Summary
Watauga Dam
Nolichucky Dam

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High Level Event Summary

Hurricane Helene landfall in Florida (9/26)

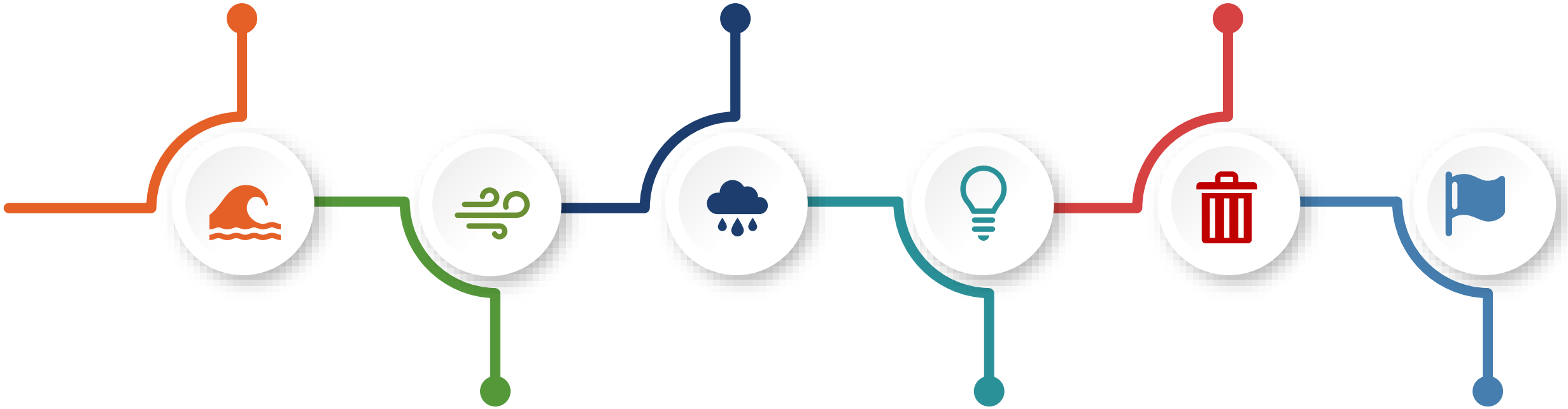
Hurricane Helene enters TVA territory as Tropical Storm (9/27)

Historic rainfall totals lead to high water and flooding causing significant damage

Impacts to TVA power system

Debris accumulates in Reservoirs

Recovery efforts begin



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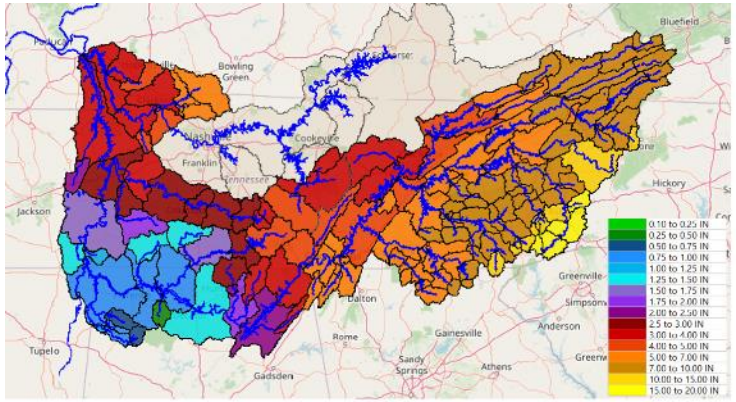
Historic Rainfall and Streamflow

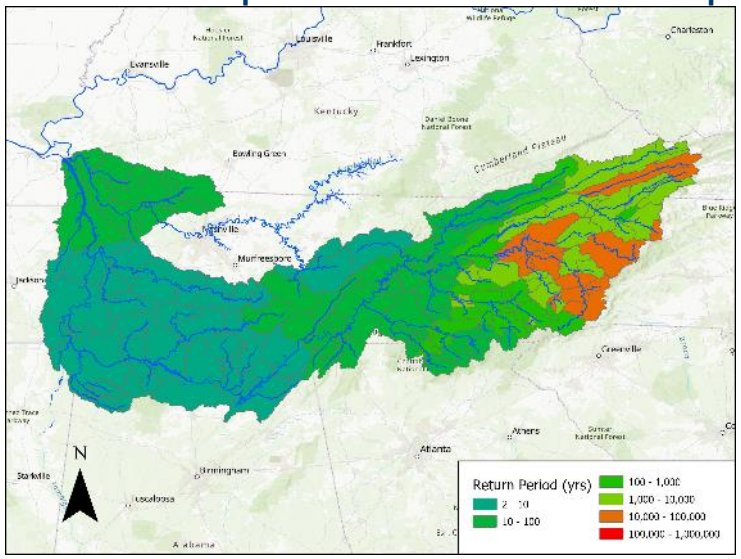
- Flood of record was approached or exceeded in many areas
- The Tennessee River watershed in East Tennessee received about 2 months of normal rainfall in just 3 days
- Some isolated areas in the Eastern portion of the service territory received 19 inches or more of rain
- Condition Red (Imminent Breach) declared for Nolichucky Dam at 11:37 Friday 9/27 as the dam exceeded a 1-in-13,000-year flood event
- Power outages to local power customers peaked at 110,000 on Friday 9/27

RAINFALL IN THE EASTERN TENNESSEE VALLEY (SEPTEMBER 23-29)	7.67 inches 10 times normal >9” over 8,000 mi^2

Observed Storm Total Rainfall through 0400 on 9/28



Areal Rainfall Frequencies – Radar Estimated Depths



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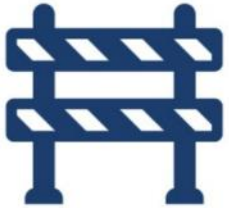
Watauga Dam

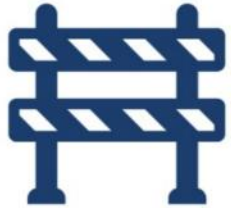
- Peak Headwater: 1970.28 (September 28 @ 0700)
- Previous Max Headwater: 1967.06 (July 8, 2013)

Nolichucky Conditions



Nolichucky Dam crested overnight September 27/28

Nolichucky Dam exceeded a 1-in-13,000-year flood event



Broken River Gauges

Experienced communication issues

Twice the flow of water seen during normal conditions at Niagara Falls

Spillway overtopped by 25 ft of water

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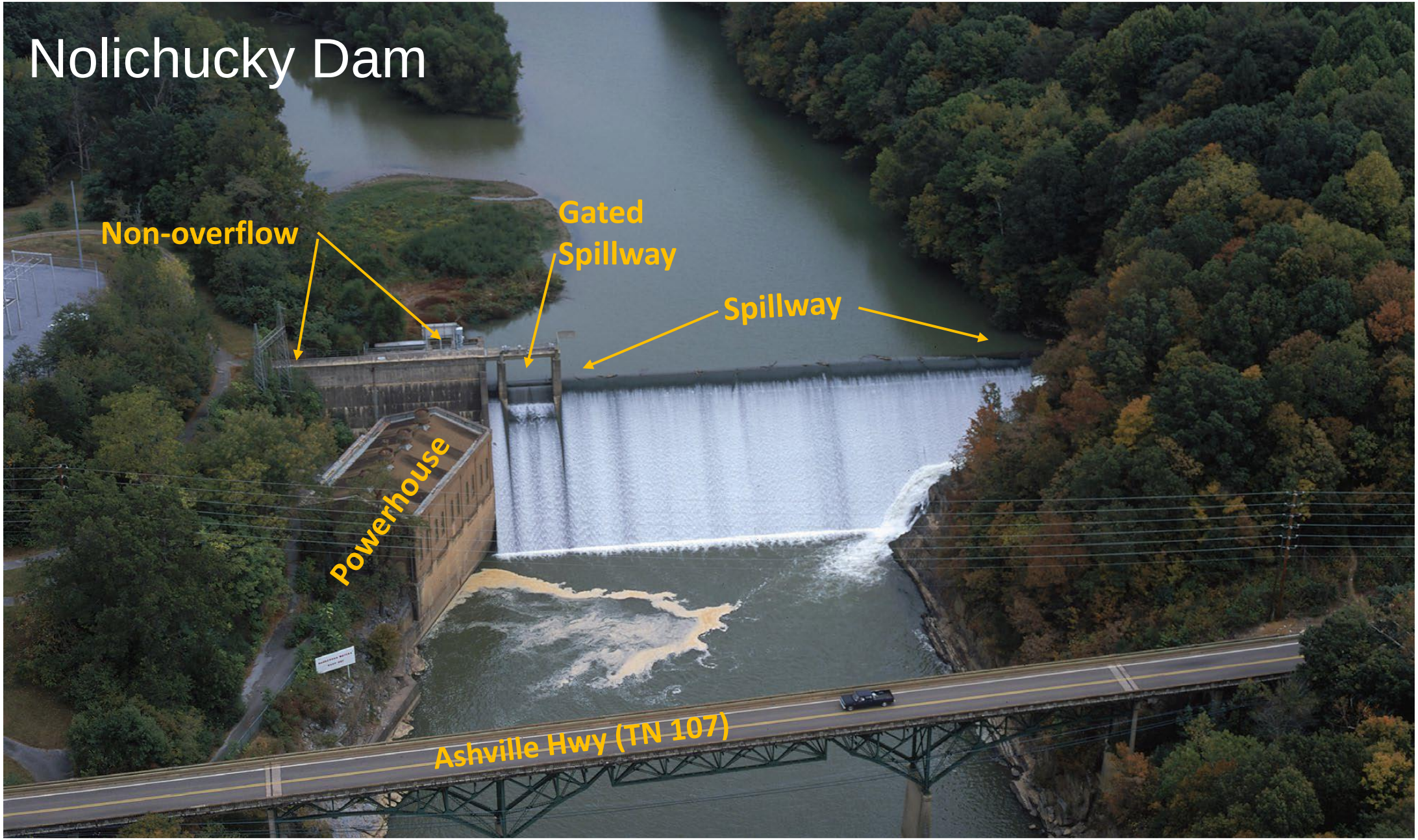
Nolichucky Dam



Nolichucky Conditions

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Nolichucky Recovery

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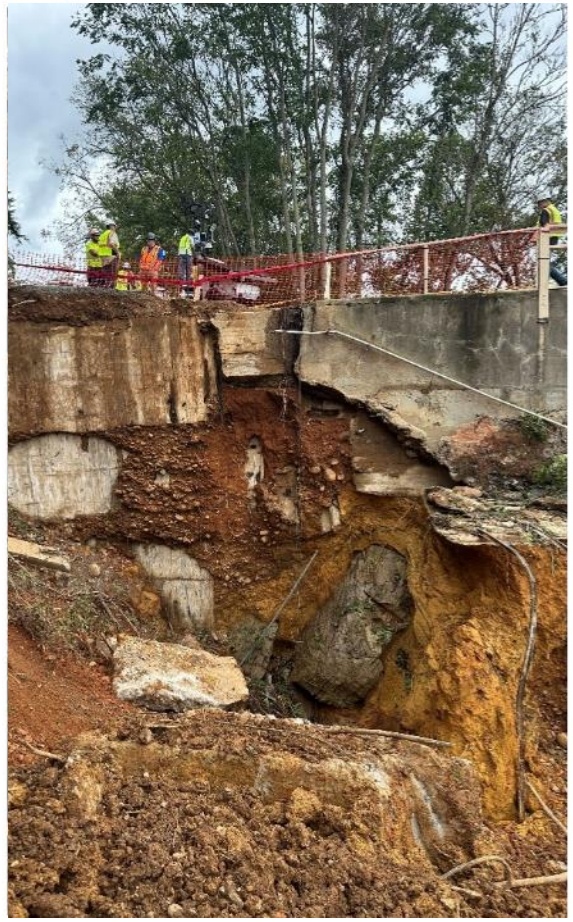
Nolichucky Damage



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BUILDING TOMORROW TOGETHER