



# Normandy Reservoir and Upper Duck River

## Availability Analysis

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December 6, 2023

# Agenda

TVA's Purpose and Study Area

**Goals of Drought Management Planning**

**Current Operations**

**Drought Management Plan & Optimization of Normandy Reservoir Releases**

**Balancing the Risk**

Next Steps and Key Messages

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# Normandy Dam - Purpose and Background

## **Purpose:**

- Normandy Dam provides flood protection downstream to communities along the Duck River, primarily for areas immediately below the dam and at Shelbyville.
- In addition to flood protection, Normandy Reservoir provides recreation, water supply and the support of water quality for aquatic habitat along the Duck River.

## **Background:**

- Normandy Dam serves a drainage area of 195 square miles.
- TVA's largest non-power tributary storage reservoir.

# River Forecast Center

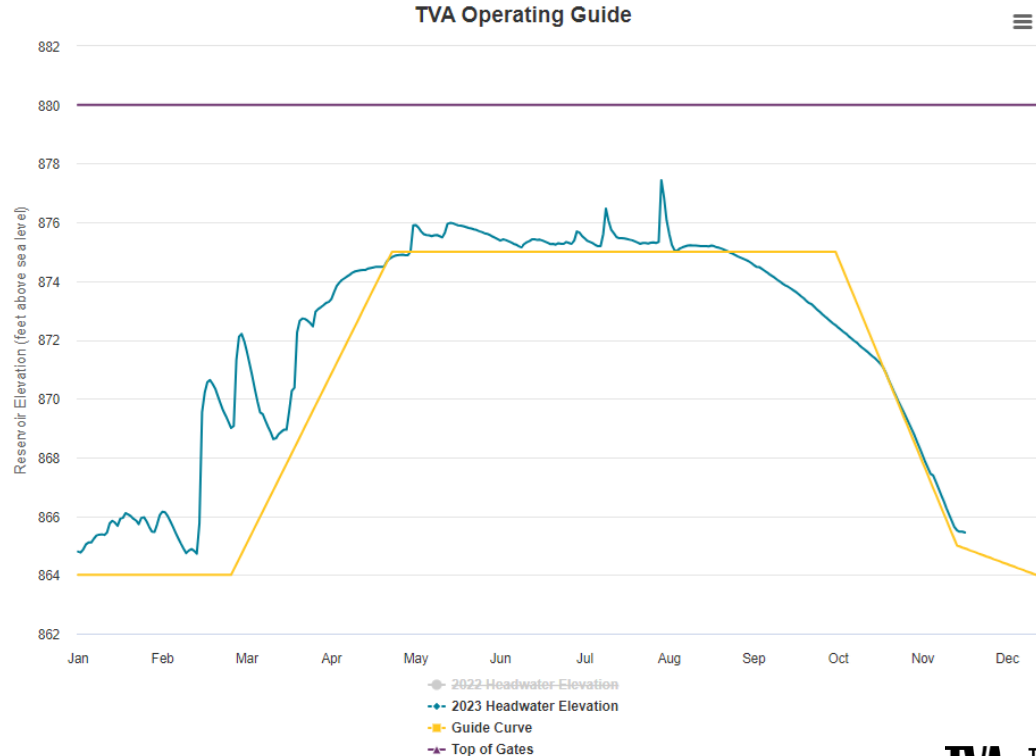
- Staffed day and night
- Issue 2 - 4 river forecasts per day
- Model and scheduling of non-power reservoirs (such as Normandy)
- Coordinate and schedule hourly generation schedules with system schedulers
- Monitor water levels in real-time
- Provide data management, modeling and dissemination
- Provide stakeholder notifications
- Coordinate operations with U.S. Army Corps of Engineers



# Normandy Operating Guide

## Operating Constraints

- Minimum Flows at Shelbyville
- Normandy Dam Minimum Flow
- Limited flood storage at summer pool
- Lag time from the dam to Shelbyville is 18 hours
- Accuracy of the weather forecast



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# Normandy Dam – Operational Challenges

## Flood Events

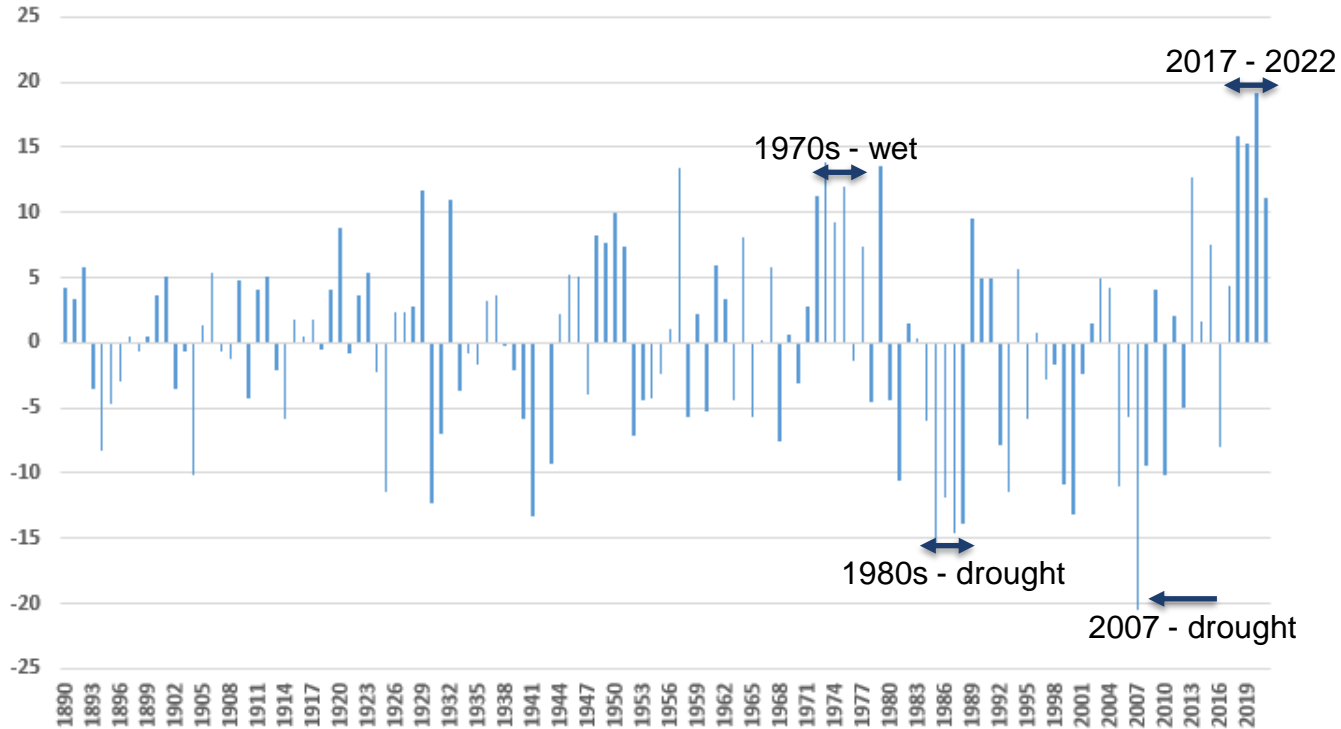
- The January 1 flood guide elevation provides just over 4.5 inches (runoff) of flood storage space to the top-of-gates elevation of 880’.
- Timing of reducing releases and beginning to hold back runoff in the reservoir is challenging due to the lag time to Shelbyville.

## Droughts

- Minimum flow requirements for water supply and water quality have evolved over time to be a good steward of the natural resource while maximizing the benefits to the area.
- It can be challenging to meet the minimum flow requirements and be as efficient as possible due to the long lag time to Shelbyville and the variability in the weather forecast.

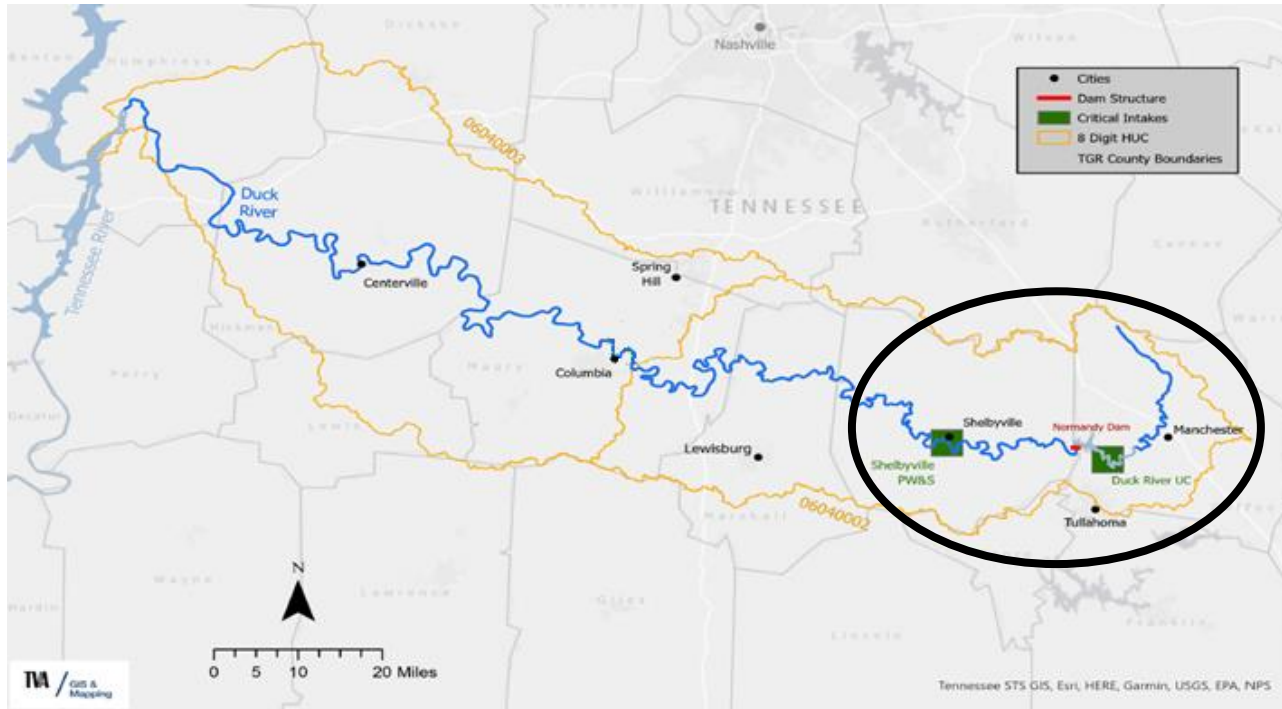
# Period of Record – Departure from Normal

Departure from Normal Rainfall  
(132 years of record)



# TVA's Availability Analysis Study and Study Area

**Purpose:** Evaluate water availability of Normandy Reservoir and the Duck River down to Shelbyville Gauge

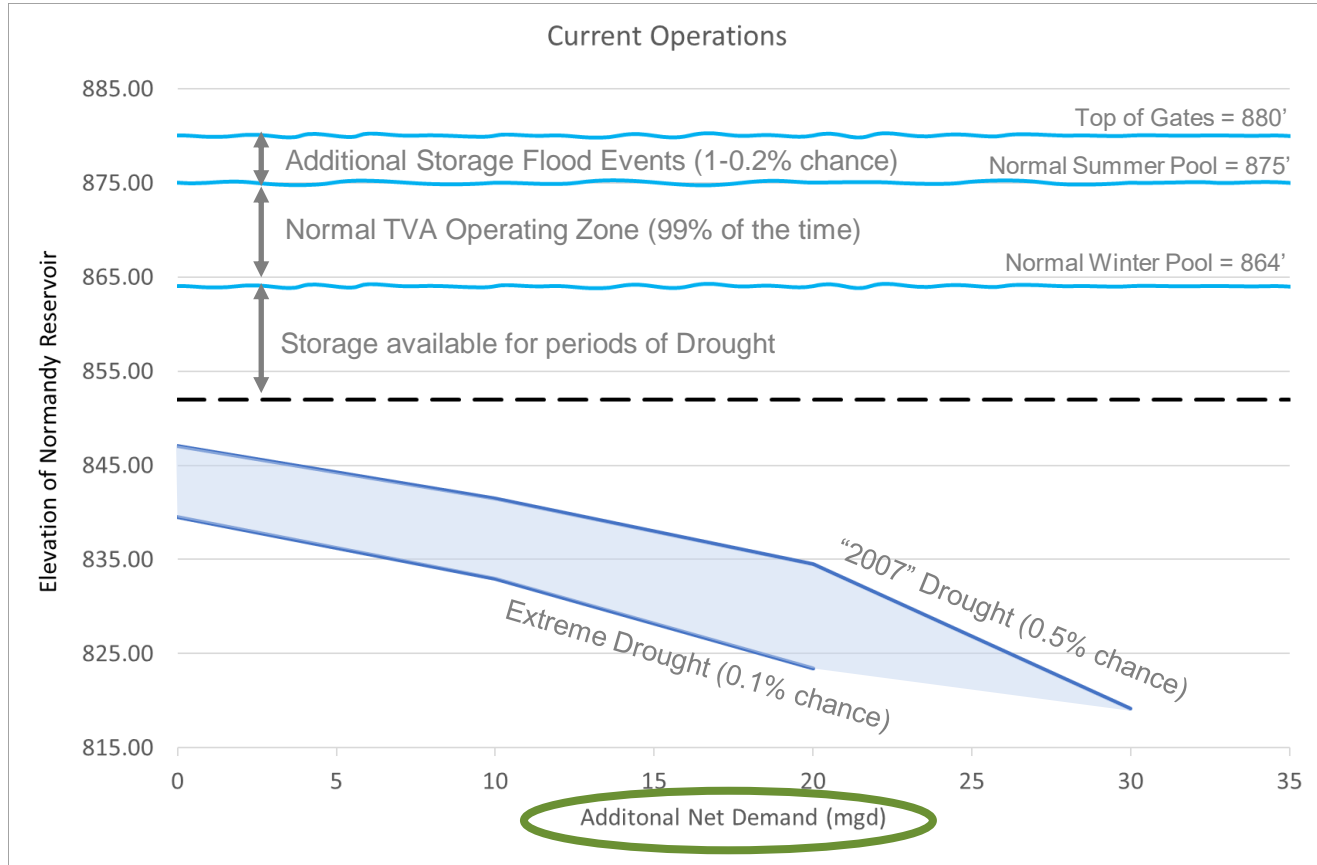




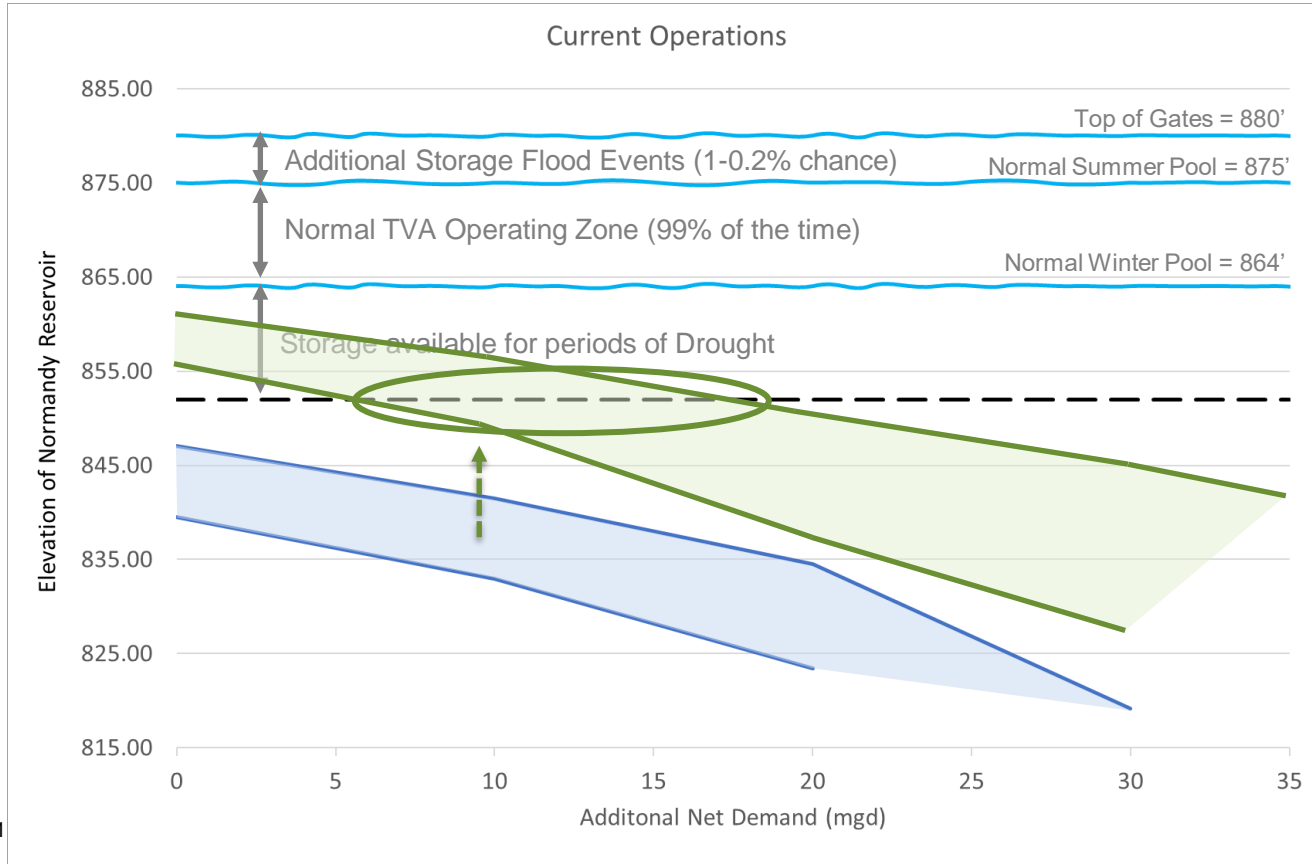
# Net Demand



# Results Current Operations



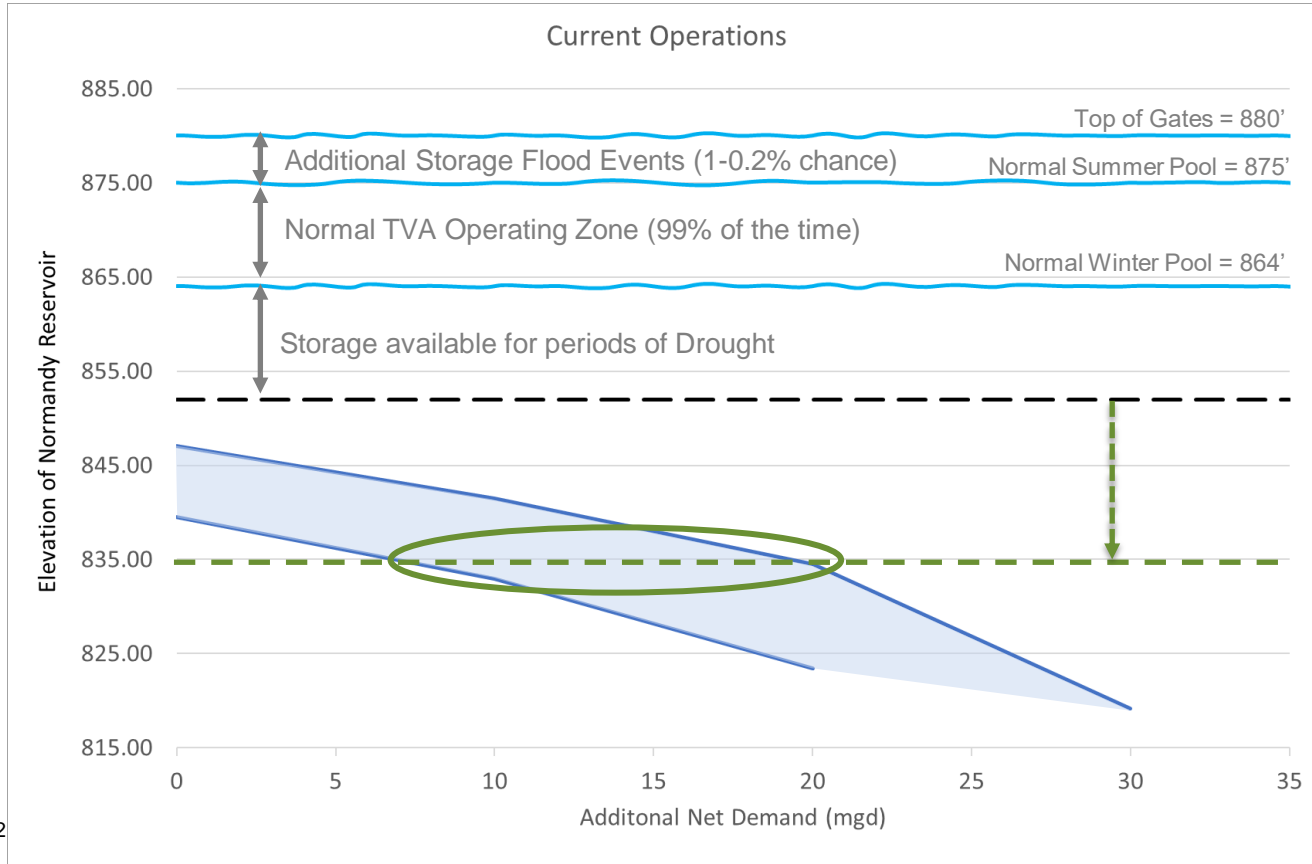
# Goals of Drought Management Planning



Planning Option A:

Adjusting flow targets downstream conserves more water in the reservoir and shift this curve up.

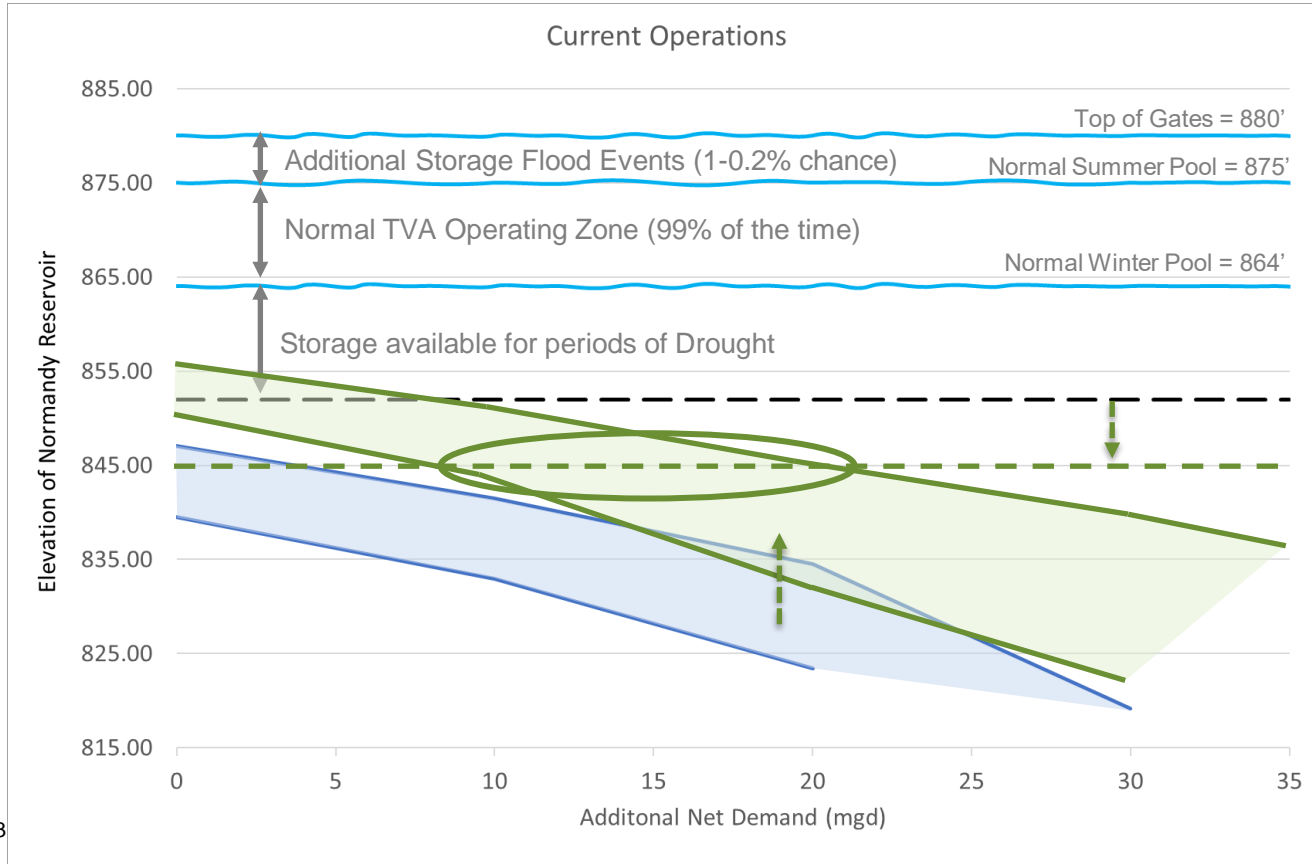
# Goals of Drought Management Planning



Planning Option B:

Adjusting elevation targets on the reservoir uses more of the storage reserves to meet downstream targets.

# Goals of Drought Management Planning



Planning Option C:

A combination of

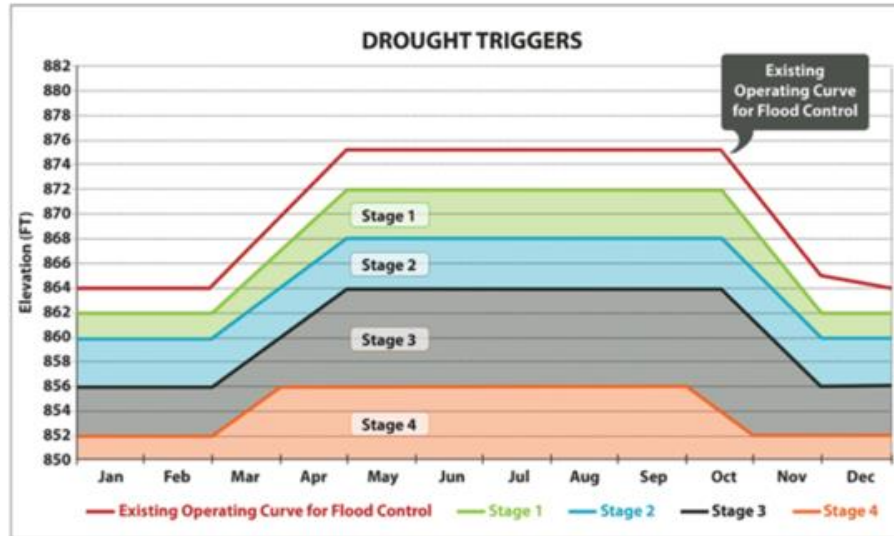
- A) Change downstream flow targets to shift the curve up.
- B) Adjusting elevation targets on the reservoir.

This takes into consideration needs and constraints of both upstream and downstream users.

# Operating Policy Update

## Drought Management Plan (DMP)

The DMP is based on the *Normandy Reservoir Drought Management Plan and Optimization of Water Releases EA*



STAGE 3	STAGE 4
<b>Drought Warning</b>	<b>Drought Emergency</b>
① 10 cfs / week reduction of Shelbyville target (down to 120 cfs)	① 10 cfs / week reduction of Shelbyville target (down to 80 cfs)
② 10% reduction of public water use	② 20% reduction of public water use

- Impose 28 day waiting period between stages
- Move out of a stage if above trigger for at least 7 days

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# Operating Policy Update

## Optimization of Normandy Reservoir Releases (ONRR)

A main recommendation for the ONRR is to change the instantaneous minimum flow requirement to a weekly average target and require an instantaneous minimum at a lower discharge.

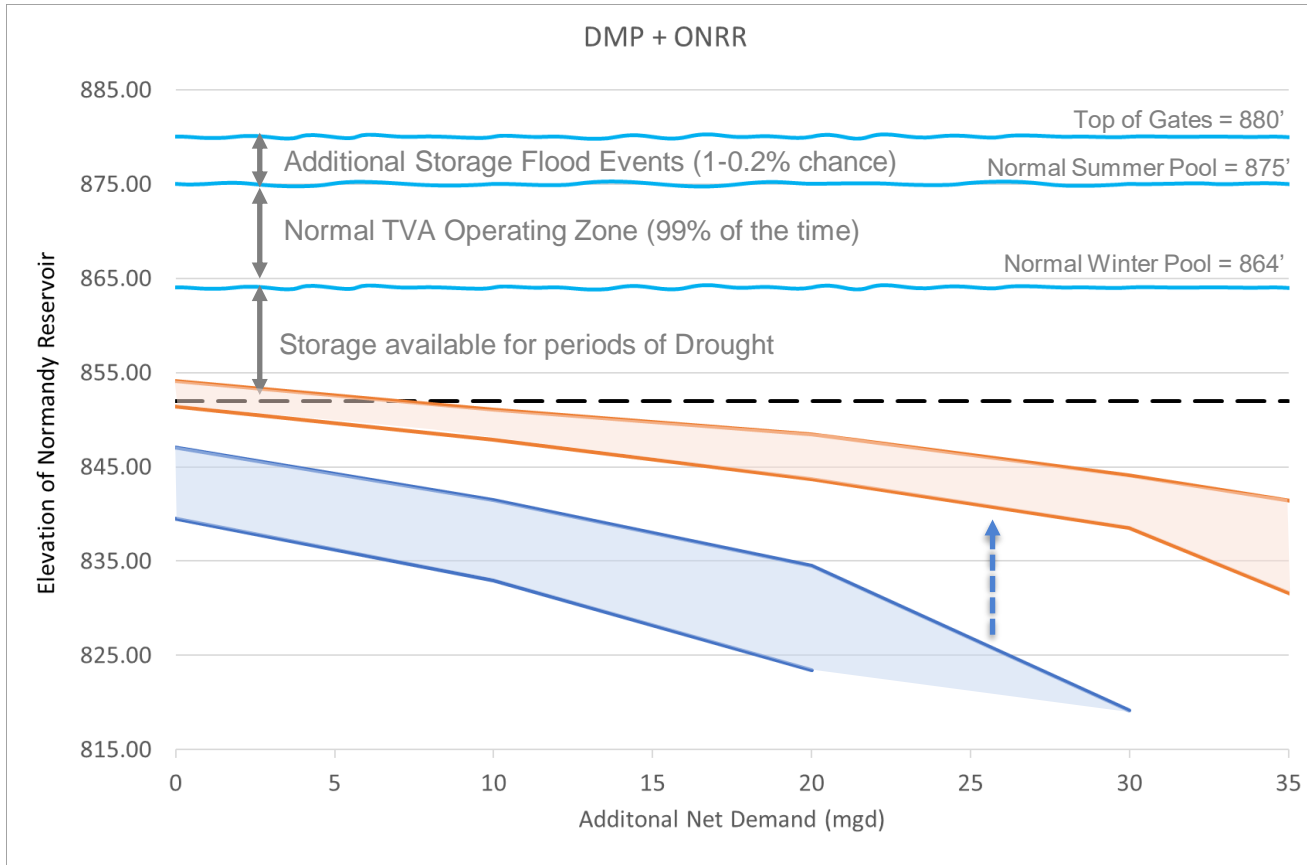
Current Policy  Optimization Policy

Instantaneous Minimum Flow Requirement  
155 cfs June – November  
120 cfs December – May

Instantaneous Minimum Flow Requirement  
135 cfs June – November  
100 cfs December – May

Weekly Average Flow Requirement  
155 cfs June – November  
120 cfs December - May

# Drought Management Plan (DMP) & Optimization



## DMP:

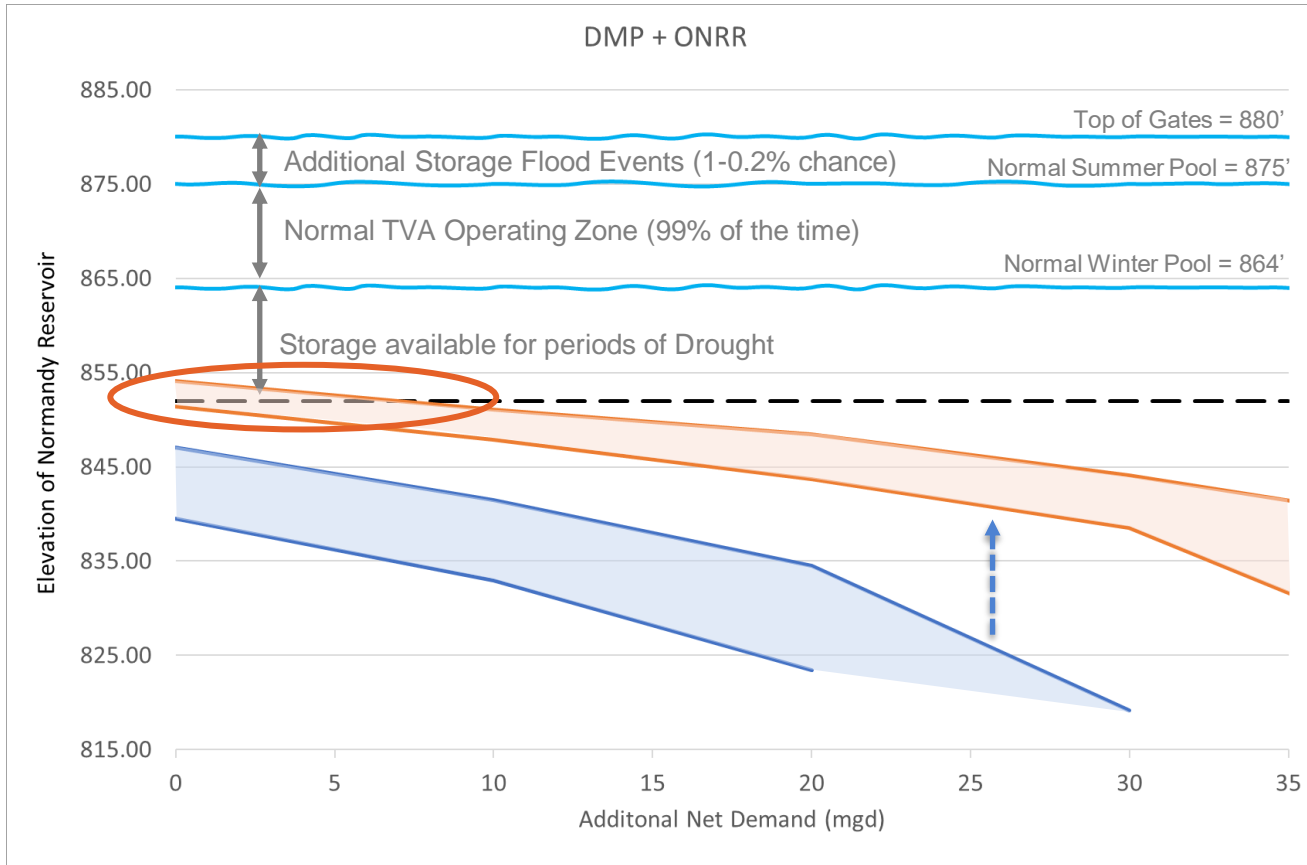
- Stage 3
  - Adjust summer 155cfs target down to 120cfs
- Stage 4
  - Adjust year-around target down to 80cfs

## Optimization

- Change instantaneous flow requirement to a weekly average



# Drought Management Plan (DMP) & Optimization



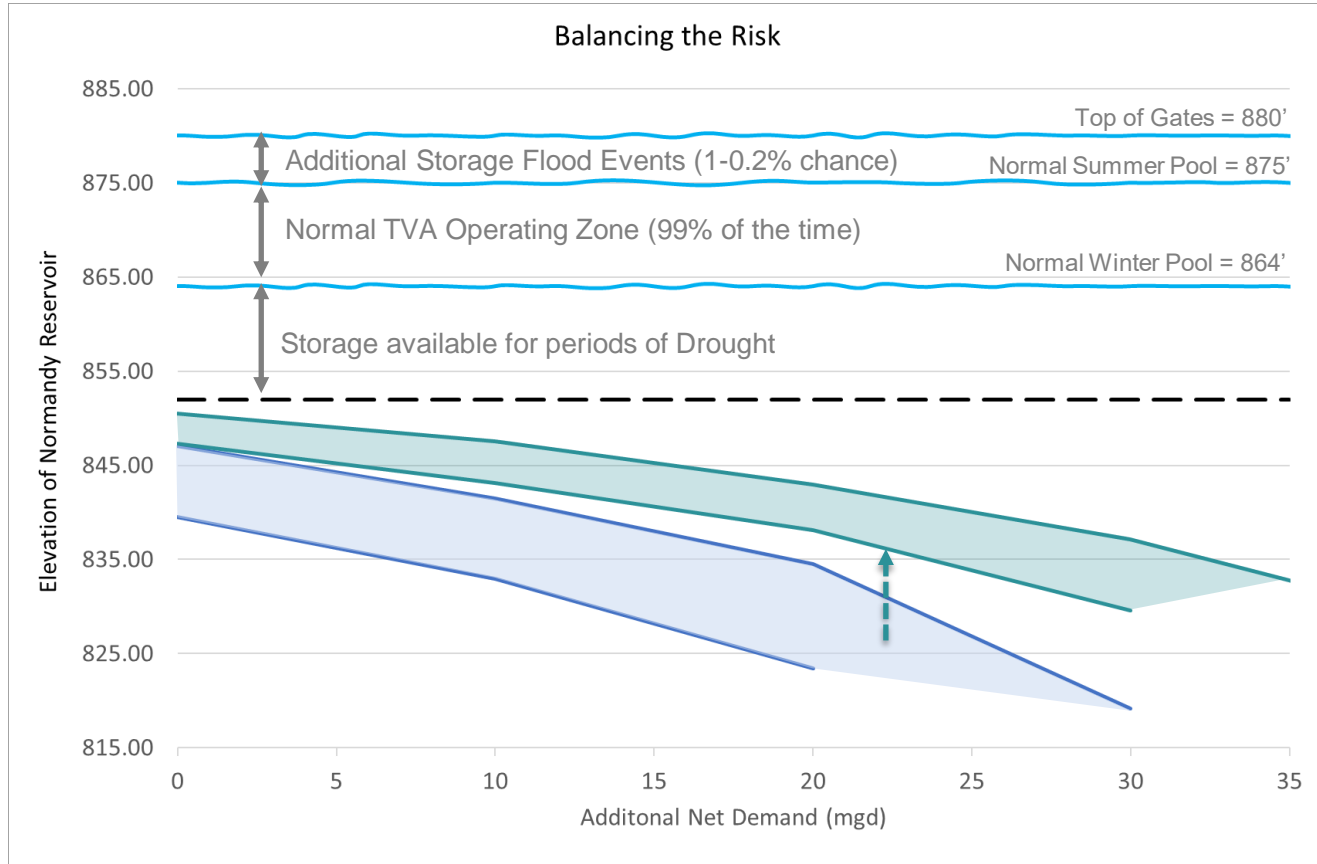
## DMP:

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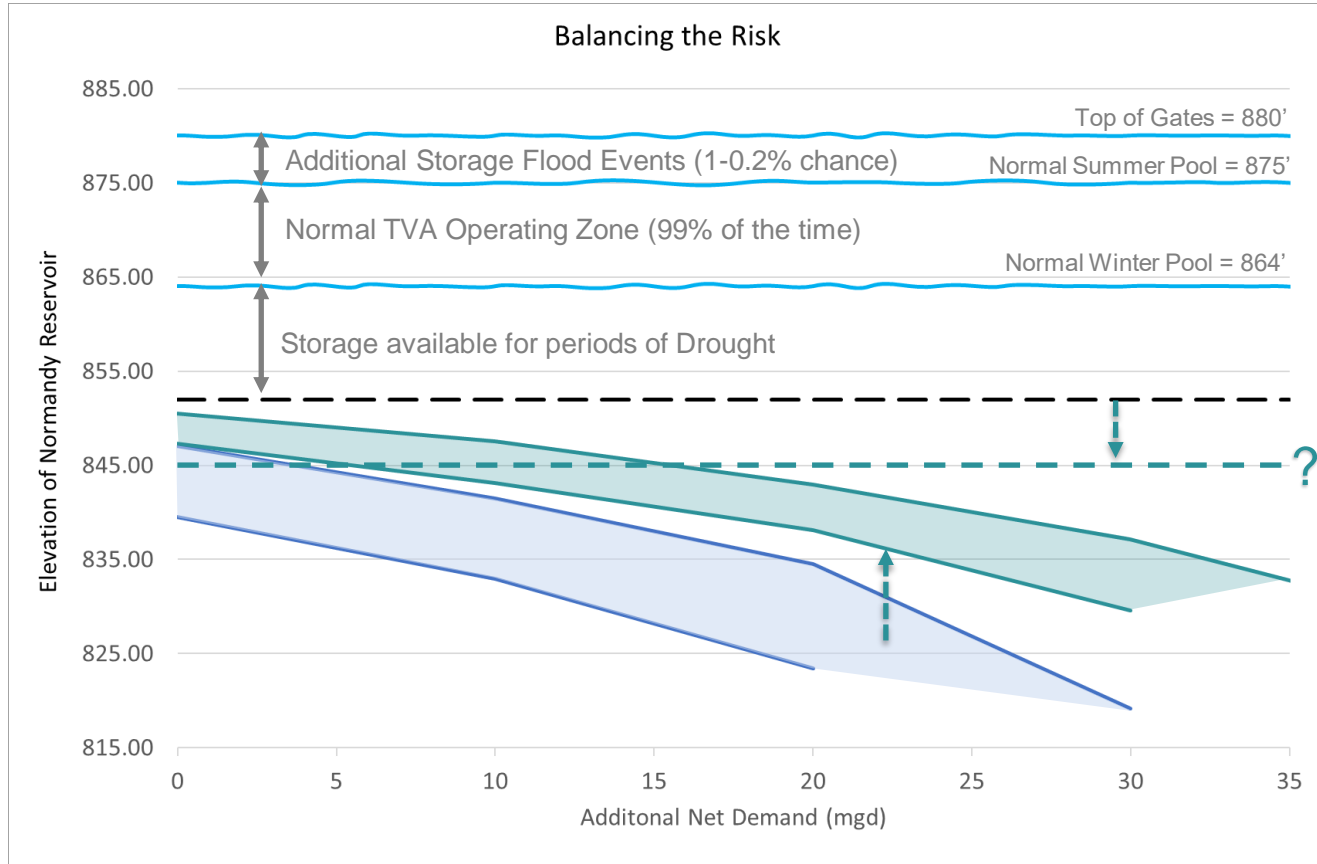
## Optimization

- Change instantaneous flow requirement to a weekly average

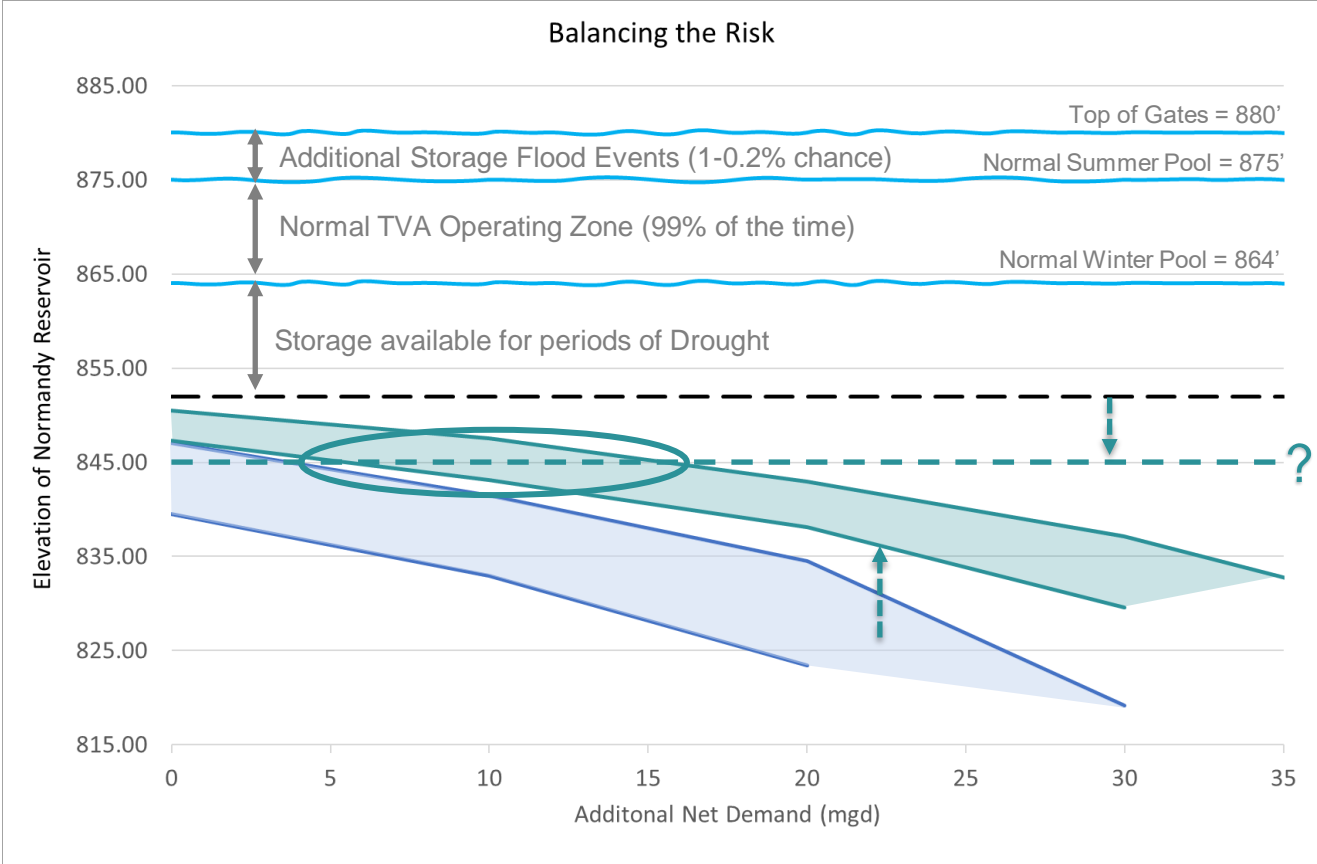
# Balancing the Risk



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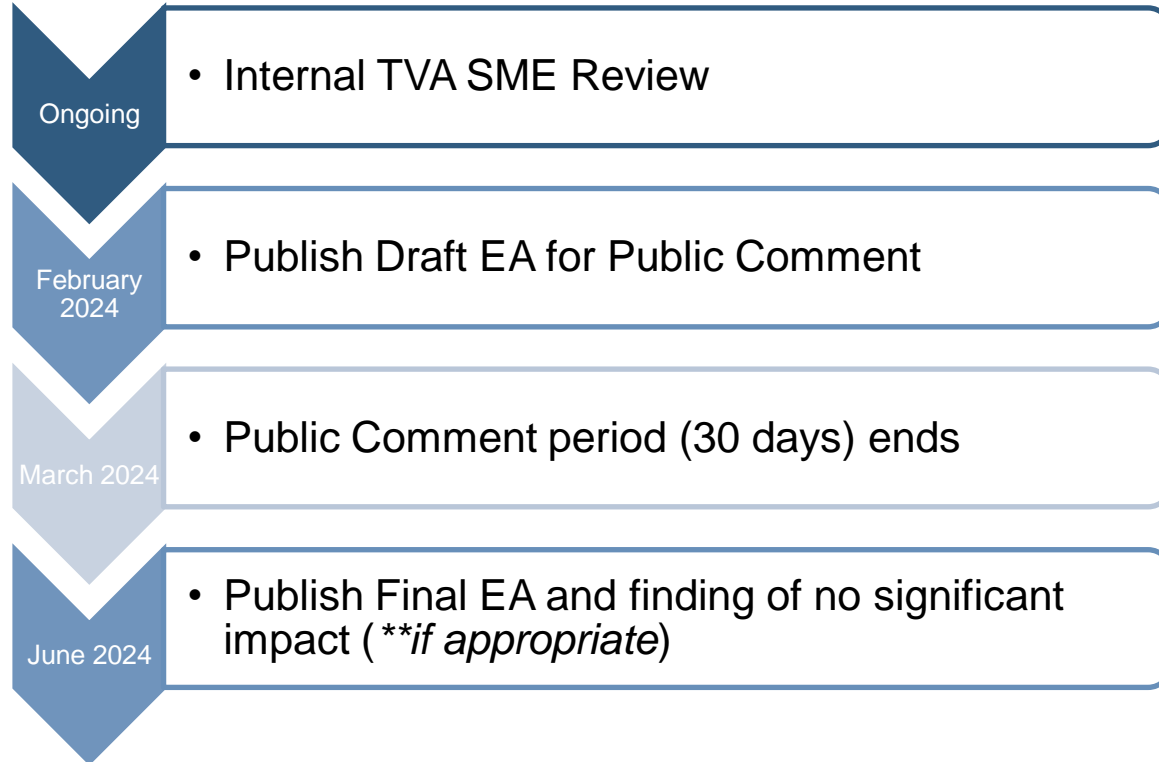
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## Next Steps & Key Messages

- Continue EA for Optimization Only – provides immediate operational benefit to balance reservoir storage and downstream flows under day-to-day weather conditions.
- Continue Stakeholder Input for balanced DMP that will address growth and provide win-win-win situation for residents, businesses and aquatic life by ensuring an adequate water supply for all users during record drought conditions.
- TVA partners with local, state, and other federal agencies to find balanced solutions to ensure adequate, sustainable supplies of water to support the region's economic growth, environmental stewardship, and other water resource needs.
- Normandy Dam provides many benefits to the region and the priority of these benefits can vary from season to season. As the region grows continuous stakeholder engagement is critical for maintaining partnerships, building public trust, and obtaining feedback.

# Optimization of Normandy Reservoir Releases

## Approximate EA Timeline



# Questions?