

**APPALACHIAN
POWER™**

An **AEP** Company

Smith Mountain Pumped Storage Project

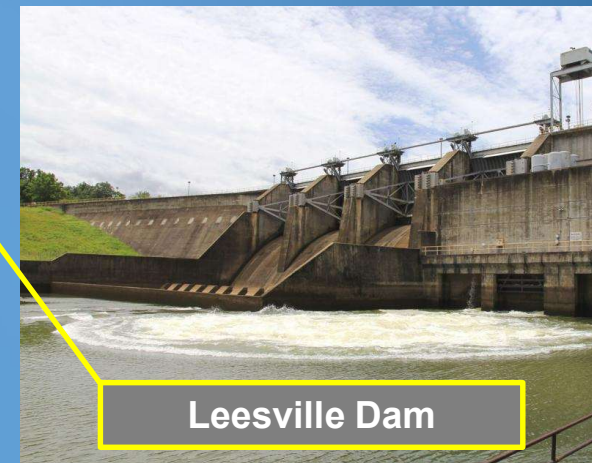
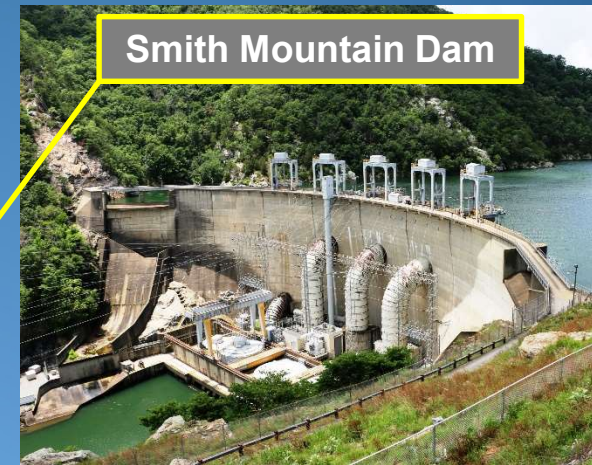
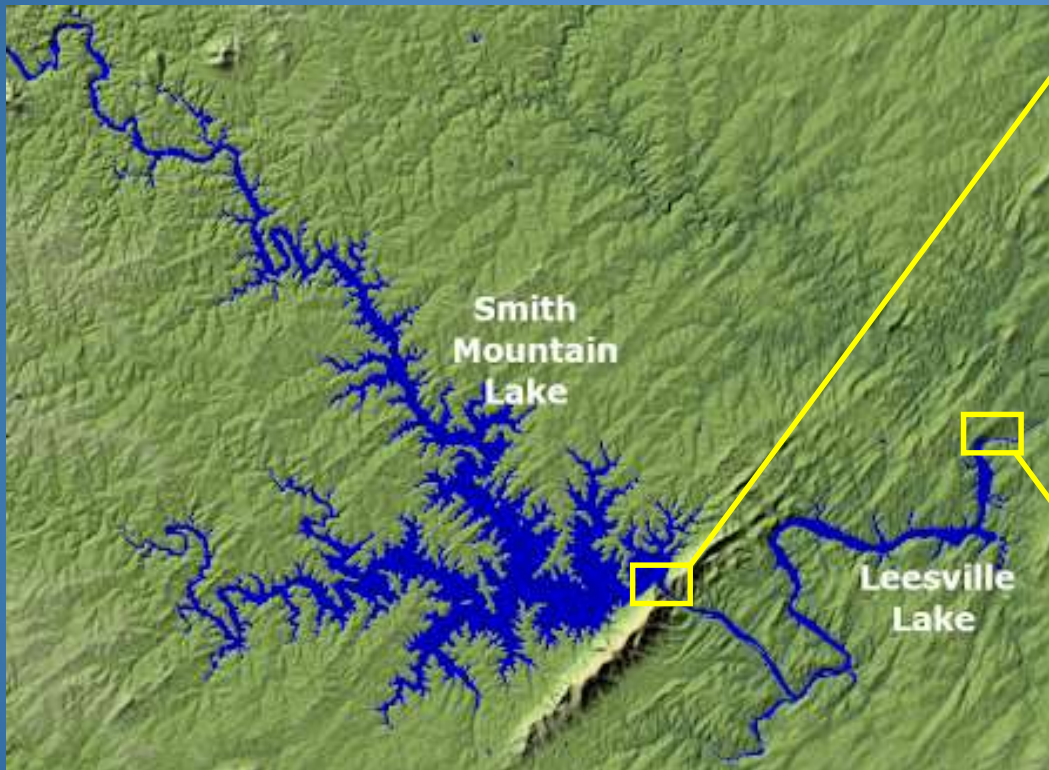




An AEP Company

What is the Smith Mountain Project?

The Smith Mountain Project is a federally-licensed hydroelectric facility consisting of two (2) dams and two (2) lakes.

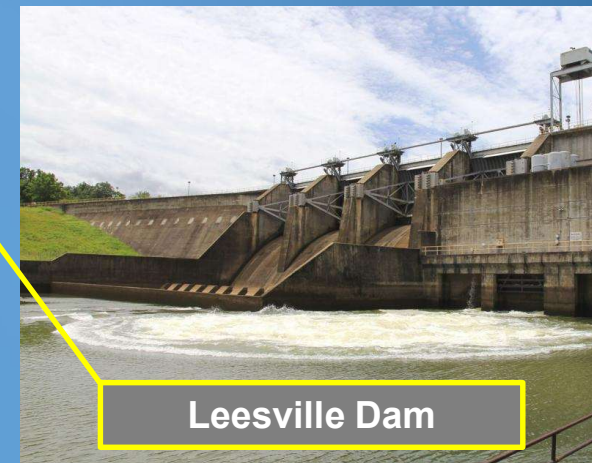
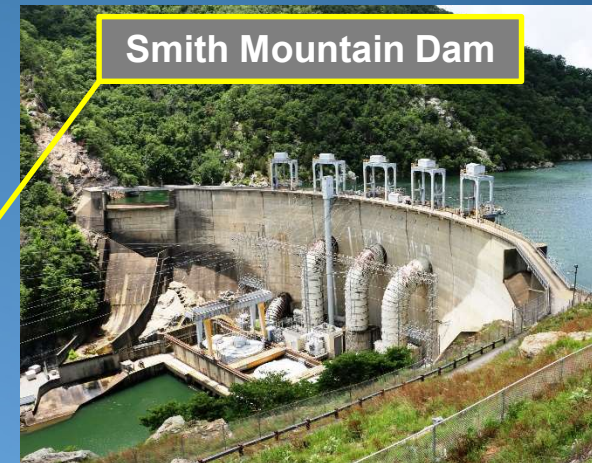
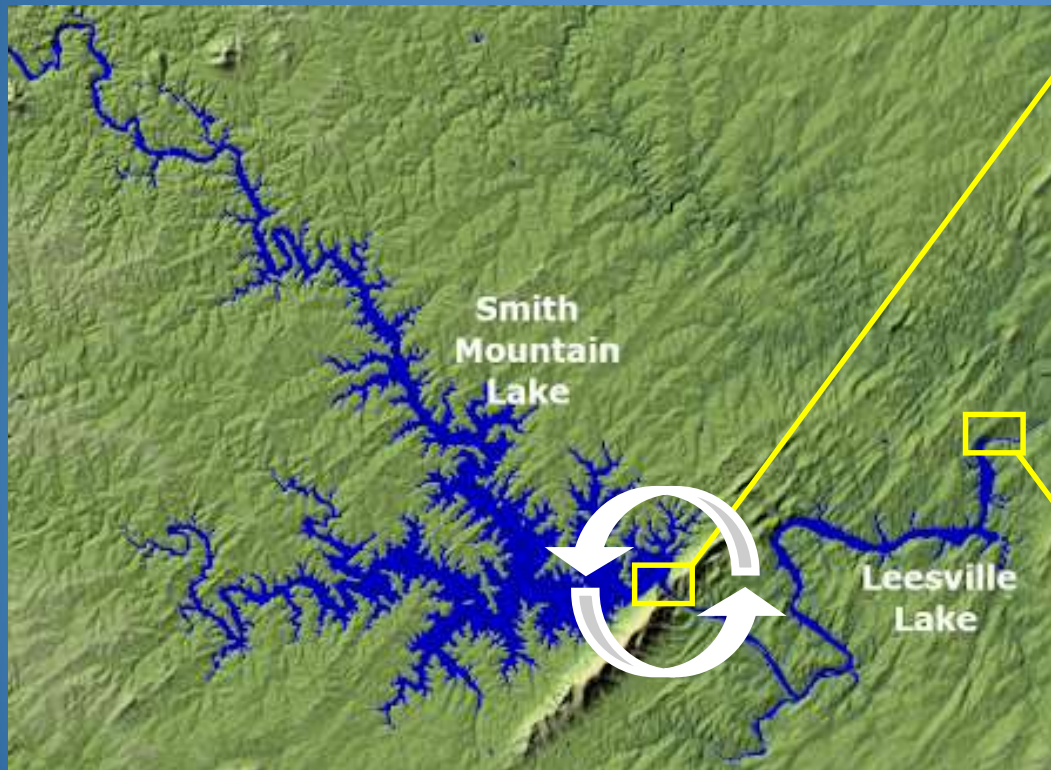




An AEP Company

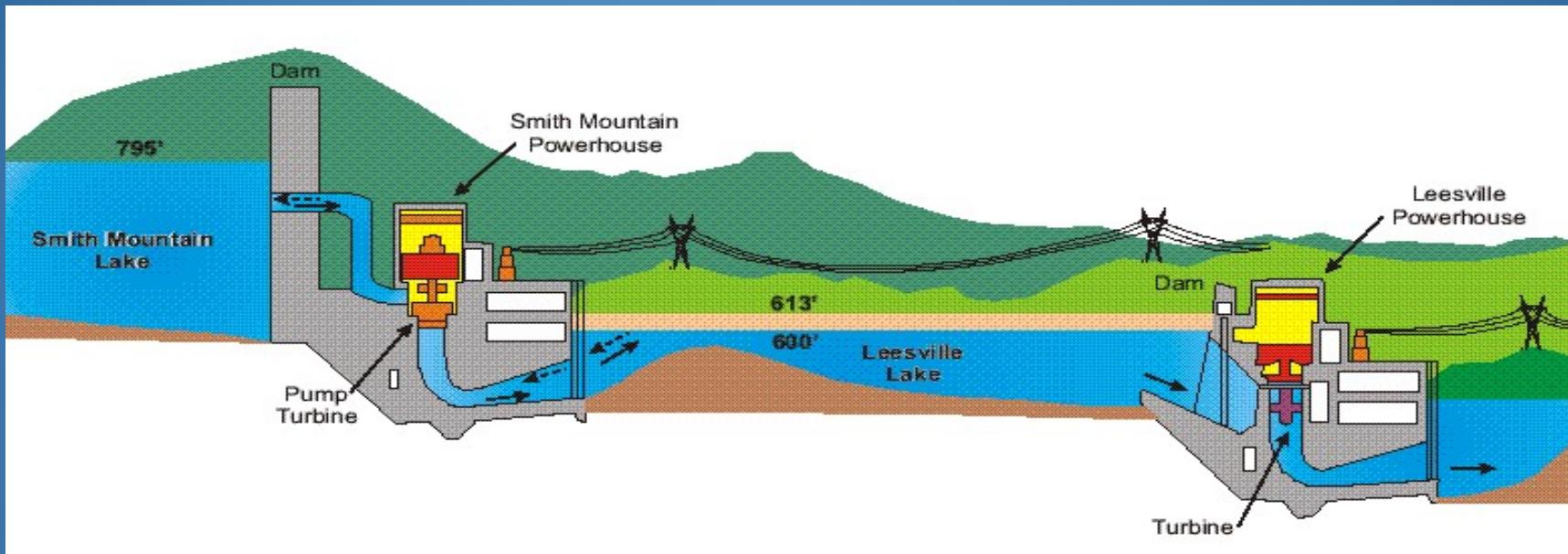
What is the Smith Mountain Project?

The Project is unique in that it recycles water between the two lakes in a process known as “pumped storage.”



What is the Smith Mountain Project?

Water from the upper reservoir (Smith Mountain Lake) passes through turbines at Smith Mountain Dam to generate electricity, then is released into the lower reservoir (Leesville Lake).



Water can be pumped back into Smith Mountain Lake for re-use, or passed through turbines at Leesville Dam to generate more electricity before being released downstream.

What is the Smith Mountain Project?

Pumped-storage allows the Smith Mountain Project to generate 636 megawatts of electricity – approximately 10-times more energy than a conventional run-of-the-river hydro facility.

The primary purpose of the Project is to generate electricity. This is known as the “Project Use.”



The Project also benefits the local community by providing opportunities for:

- public recreation
- scenic enjoyment
- fish & wildlife habitat
- economic development

What is the Smith Mountain Project?

The Smith Mountain Project includes

- more than 25,000 acres of water
- more than 600 miles of shoreline
- more than 13,000 individual parcels of land adjacent to the Project boundary



Appalachian Power is responsible for managing various operational and environmental aspects of the Project, which it does through a series of Management Plans incorporated into its federal license:

- Erosion Monitoring
- Sediment Monitoring
- Aids to Navigation
- Aquatic Vegetation
- Cultural Resources
- Habitat Management
- Recreation Management
- Shoreline Management
- Water Quality Management
- Water Management

How are water levels managed?

Water Management Plan

- requirement of federal license
- incorporated into federal license
- developed with input from federal, state & local agencies & stakeholders

Among other things, the Plan includes:

- monthly minimum flows required for aquatic wildlife, habitat & recreation downstream
- operational restrictions during drought
- operational requirements for flood control
- notification requirements
- monitoring & reporting requirements

20120419-2007 FERC PDF (modified) 04/25/2012

135 FERC ¶ 62,658
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Appalachian Power Company Project No. 2210-199

ORDER MODIFYING AND APPROVING
WATER MANAGEMENT PLAN UNDER ARTICLE 404
(Issued April 19, 2011)

1. On June 28, 2010, Appalachian Power Company, licensee for the Smith Mountain Pumped Storage Hydroelectric Project No. 2210 (Smith Mountain Project), filed a revised water management plan for the project located in and Pennsylvania Co.

Background

2. Article 404 licenses to file, for water management provisions of section 2008 with specific

3. The revised Virginia Department of Environment and Natural Resources (DENR), the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (USACE), and the Mountain Lake Area Association, and USACE documentation of completed plan file entities, and specify The licensee shall e

¹ See Order

**Smith Mountain Project No. 2210
Appalachian Power Company
Water Management Plan**

Table of Contents

Section	Page
1. Description of Project and Prior License Operations.....	1
2. Operation Under the Terms of the License Effective April 1, 2016.....	4
A. Components of RSRBROM.....	5
B. Monthly Flow Requirements.....	5
C. Trigger Points and Reduction in Flows.....	8
D. Provisions for Downstream Recreation.....	9
E. Striped Bass Spawning.....	11
a) Releases for Spawning.....	11
b) Surcharging of Lake.....	12
F. Variance Provisions.....	12
G. Summary of Flows.....	13
3. Flood Operations.....	13
A. Memorandum of Understanding with USACE.....	13
B. Notifications.....	14
a) Smith Mountain Lake.....	14
b) Downstream of Leesville Dam.....	15
4. Project Operations and Monitoring.....	15
A. Measurements of Water Levels.....	15
B. Measurements of Flows.....	15
C. Operations for Providing Minimum Flows from Leesville Dam.....	16
a) Anticyclone Operations.....	16
b) Providing Flow During Plant Outages.....	16
D. Reporting Criteria.....	16
5. Management Plan Review and Update.....	17
Appendices	
A. Summary of Historic Water Levels.....	18
B. Summary of Trigger Events Based on Historic Record.....	18
C. Graphs of Water Levels and Downstream Flow.....	18
D. Appalachian and USACE Memorandum of Understanding - Flood Operations.....	18
E. Example Smith Mountain Reservoir Flood Notification List.....	18
F. Effects of Hourly Anticyclone on Downstream Flows.....	18

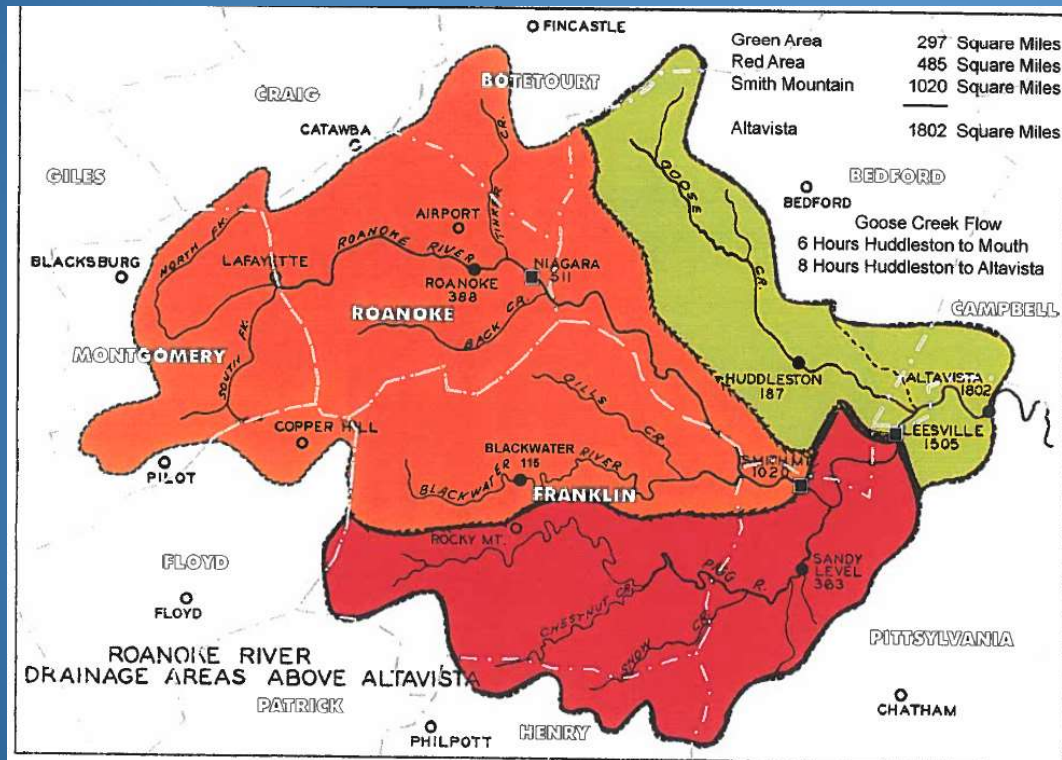
How are water levels managed?

The Smith Mountain Project is part of the Roanoke River watershed, which spans two states before draining to the Albemarle Sound. The watershed includes other lakes and dams downstream of Leesville.



How are water levels managed?

Appalachian Power continuously monitors the National Weather Service (NWS) forecast, along with a series of gauges on the Roanoke, Blackwater, & Pigg rivers, to anticipate Project inflow. Appalachian also monitors gauges at Altavista and Brookneal to understand water impacts downstream.



The Project is “balanced”
when **INFLOW = OUTFLOW**

Example:

Project Inflow

Roanoke = 500 cfs

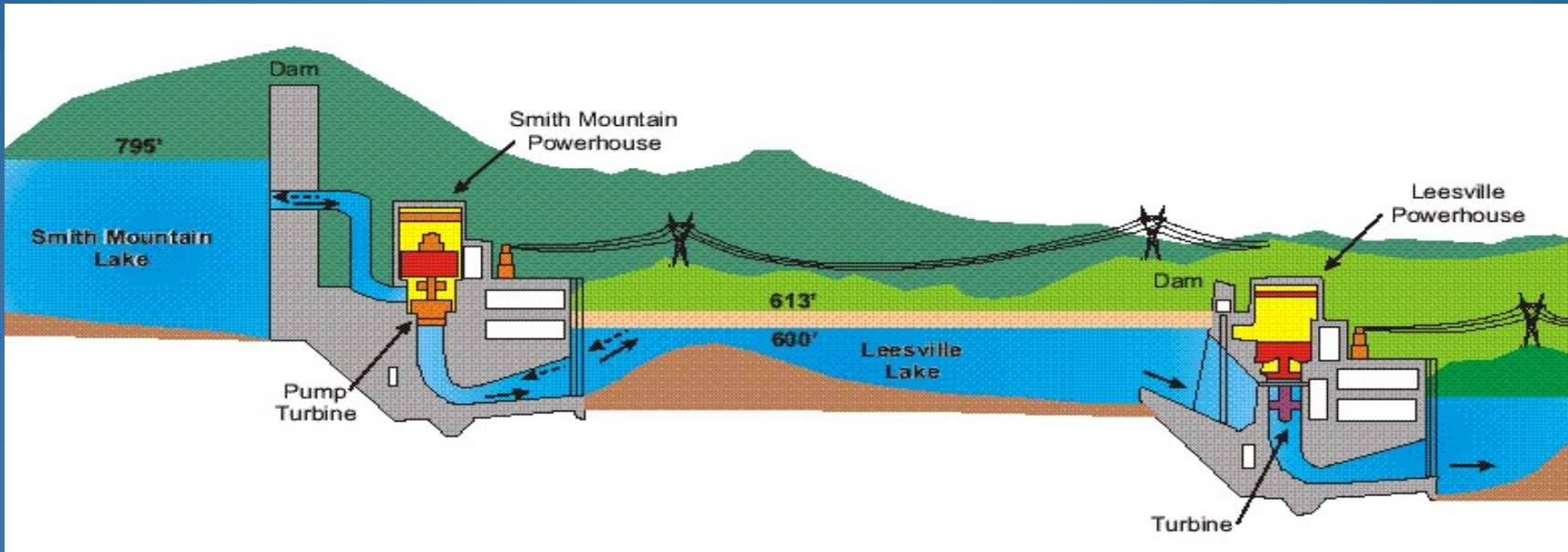
Blackwater = 50 cfs

Pigg = 100 cfs

Project Outflow = 650 cfs

How are water levels managed?

Lake levels are managed by operations at Smith Mountain and Leesville dams.



Under normal conditions, water flows through turbines at Smith Mountain Dam, lowering the elevation of Smith Mountain Lake and raising the elevation of Leesville Lake. A two (2) foot decrease at Smith Mountain Lake corresponds to a thirteen (13) foot increase at Leesville Lake. During high water events, the only generation used is to control water levels.

How are water levels managed?

Smith Mountain Lake is said to be at “full pond” when the water level is at 795-foot elevation above sea level.



When water levels rise above the spillway at the Smith Mountain Dam, Smith Mountain Lake is said to be “surcharged.”



Surcharging is part of Smith Mountain Dam’s function as a flood control project. By design, the waters of Smith Mountain Lake can rise to, and occasionally exceed 800 feet in elevation (also know as the “Project boundary” at SML).

How are water levels managed?

In managing the water levels at Smith Mountain and Leesville lakes, Appalachian Power must take the following factors into consideration:


- The demand for energy
- Existing lake levels of both lakes
- Forecast inflows into the Project
 - Smith Mountain Lake inflows
 - Leesville Lake inflows
- Forecast inflows downstream of the project
 - Goose Creek flows that combine with Project outflow
 - Altavista river gauge flow / elevation
 - Brookneal river gauge flow / elevation

The primary goal in a high-flow event is to ensure public safety. Appalachian seeks to balance water flows in order to minimize both upstream and downstream impacts. During flood periods, storm runoff will be stored, to the extent storage space is available, for the prevention or reduction of harmful river stages downstream.

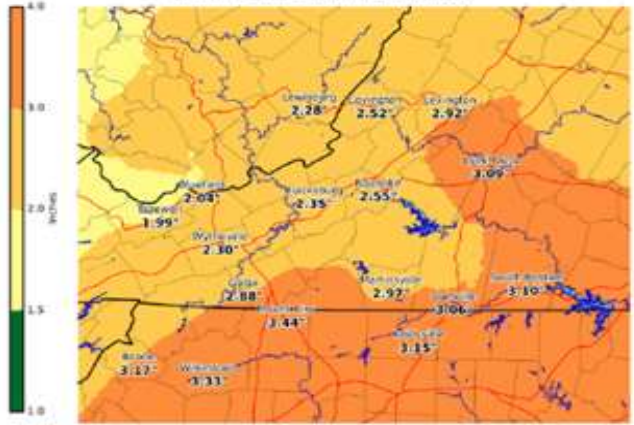
Recent High Inflow Events


Monday, November 9, 2020 – What was predicted and what steps did we take?

Heavy Rain and Possible Flooding






Blacksburg, VA
WEATHER FORECAST OFFICE

<p style="text-align: center;">OVERVIEW</p> <ul style="list-style-type: none"> ▪ Notable rainfall expected across Mid Atlantic ▪ Minor flooding of streams and rivers along with isolated flash flooding possible across southern Blue Ridge and Piedmont 	<p style="text-align: center;">TIMING</p> <ul style="list-style-type: none"> ▪ Rain starting late Tuesday night into early Wednesday morning ▪ Heaviest rain most likely during Wednesday afternoon into Wednesday night ▪ Rain ending sometime on Thursday
<p style="text-align: center;">Total Rainfall Valid: 7 PM EST Tuesday - 7 PM EST Thursday</p> 	<p style="text-align: center;">HAZARDS & IMPACTS</p> <ul style="list-style-type: none"> ▪ Rainfall amounts could reach two to three inches across entire area with localized higher amounts up to four inches along and east of Blue Ridge ▪ Runoff from heavy rain could lead to minor flooding, especially along southern Blue Ridge and in the Roanoke and Dan river basins
<p style="text-align: center;">NWS ALERTS</p> <ul style="list-style-type: none"> ▪ No watches, warnings, or advisories are in effect at this time 	<p style="text-align: center;">FORECAST CHALLENGES</p> <ul style="list-style-type: none"> ▪ Confidence is high for rain occurring but much lower for timing, placement, and amounts due to considerable variation in models ▪ Dry conditions from past week could limit any flooding, but rainfall may be heavy at times ▪ Rainfall amounts dependent on speed of cold front crossing over Mid Atlantic and track of Tropical Storm Eta in Gulf of Mexico, which both remain uncertain at this time
<p style="text-align: center;">NEXT BRIEFING</p> <ul style="list-style-type: none"> ▪ Later this afternoon or evening 	



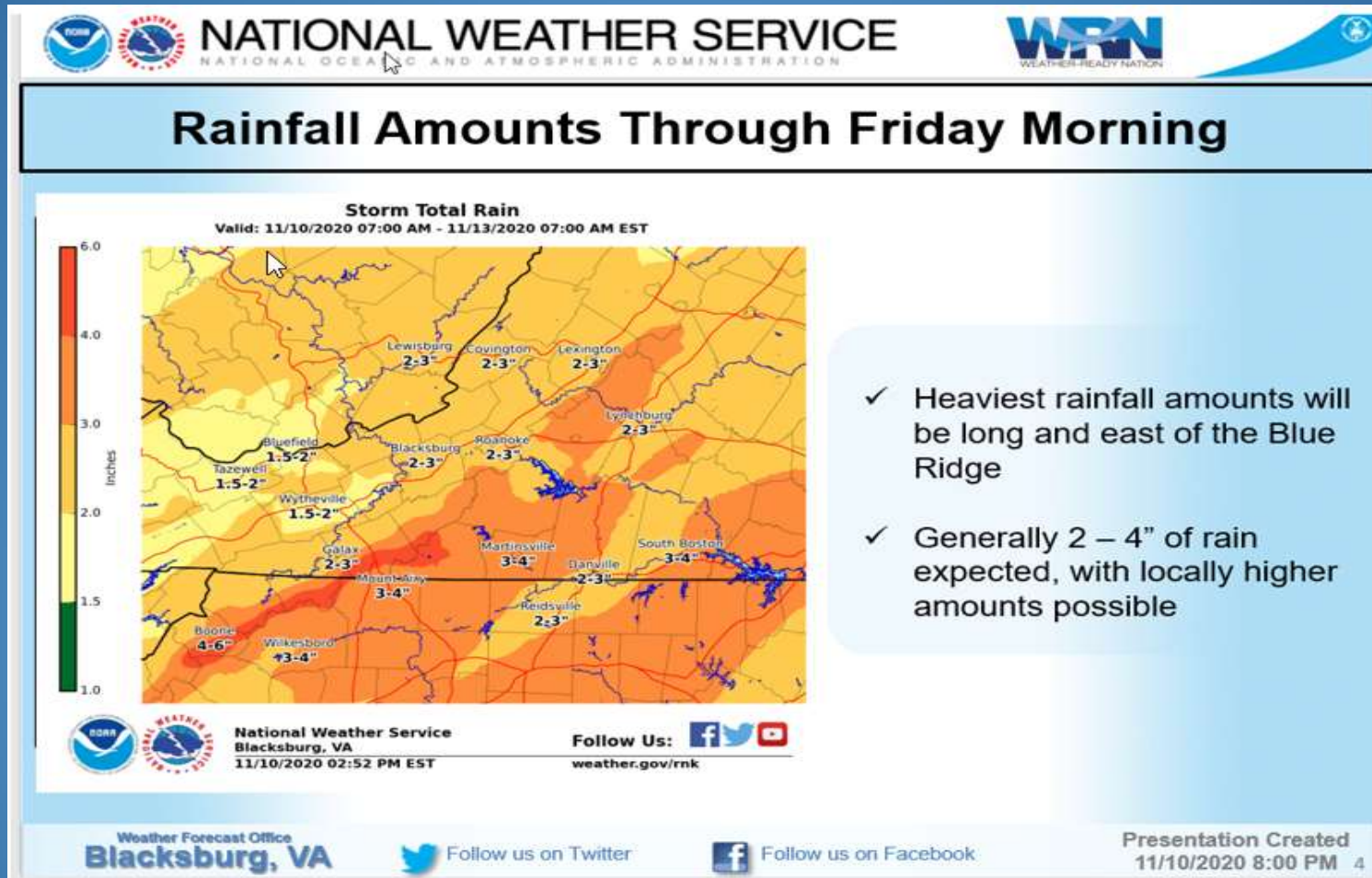
National Weather Service
Blacksburg, VA
11/09/2020 04:36 AM EST

Follow Us:   

weather.gov/rnk

ISSUED: 11/9/2020 4:44 AM www.weather.gov/rnk

Tuesday, November 10, 2020 – Ongoing preparation



- ✓ Heaviest rainfall amounts will be long and east of the Blue Ridge
- ✓ Generally 2 – 4" of rain expected, with locally higher amounts possible



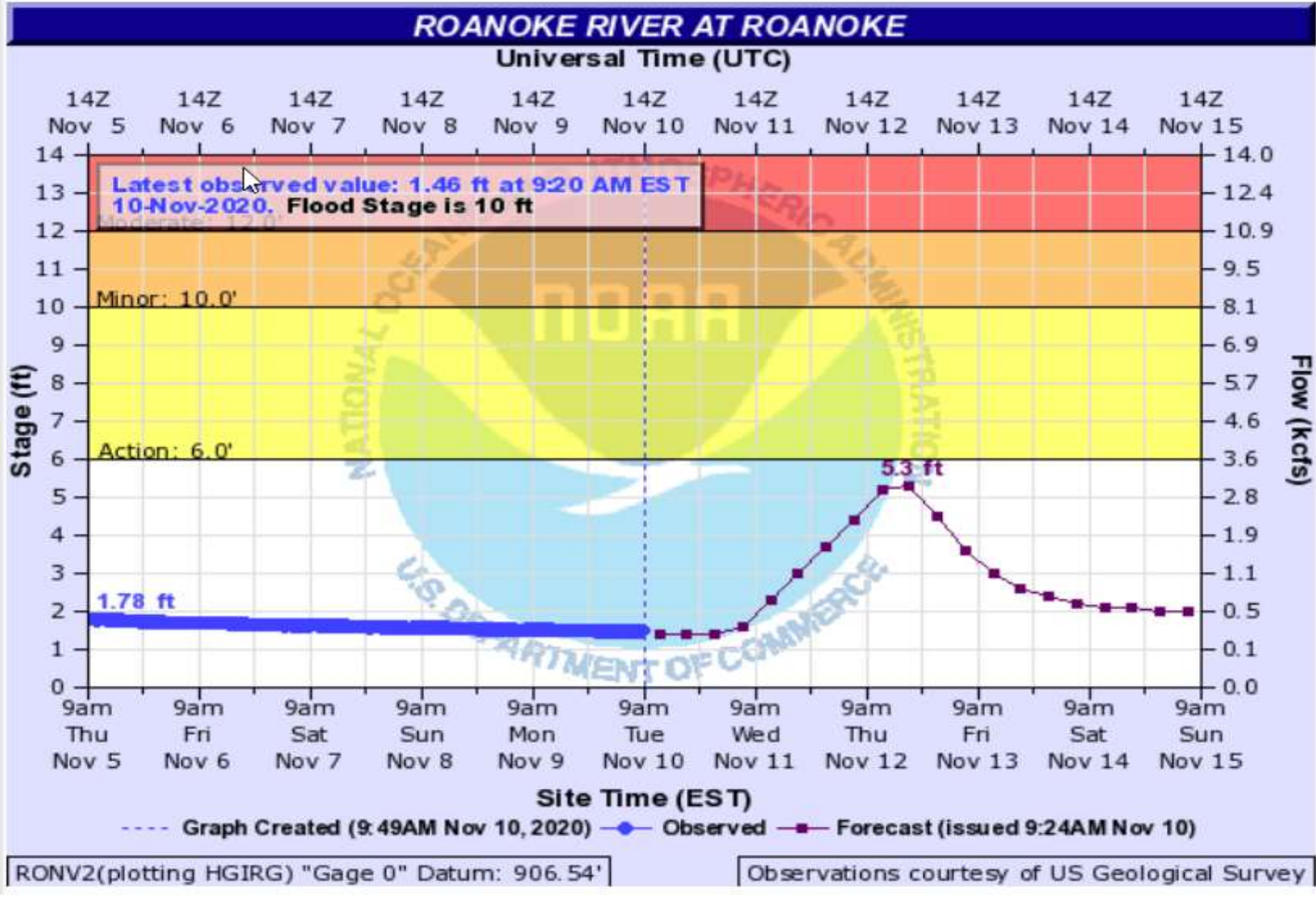
An AEP Company

Slide 15

GAP4

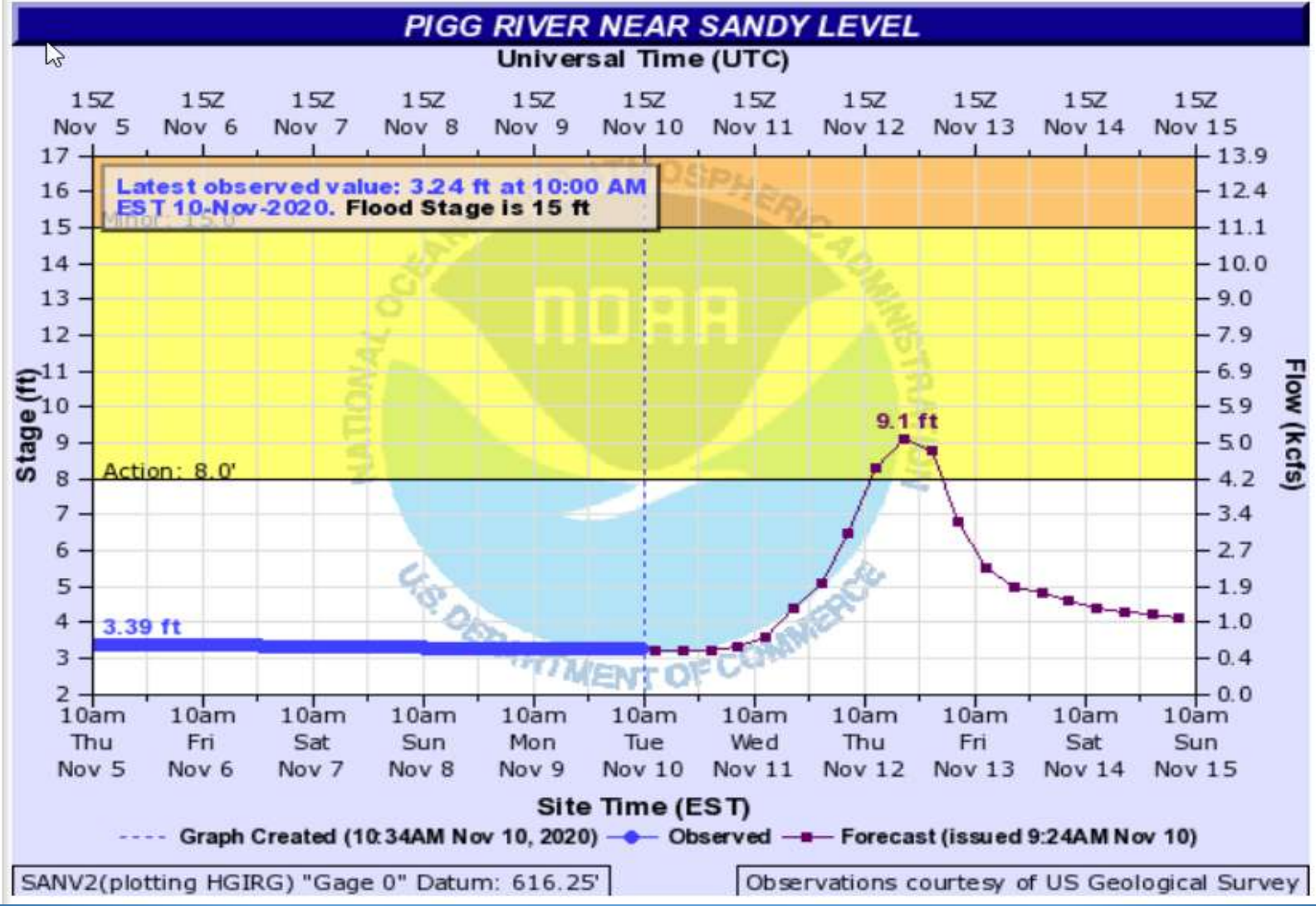
logo on bottom

George A Porter, 12/13/2020





An AEP Company

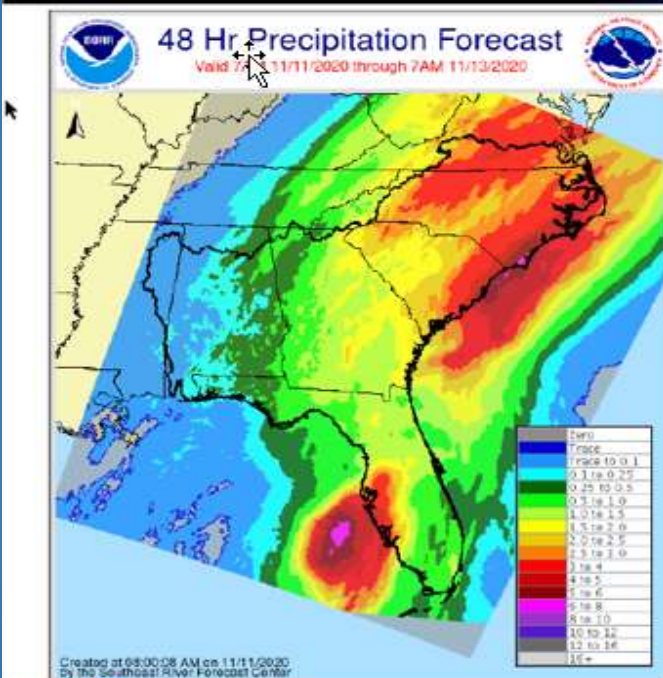


Wednesday, November 11, 2020 – What changed and how did we adjust?

48-hour rainfall forecast

Southeast River Forecast Center

Issued November 11, 2020 10:34 AM ET



Here is the 48-hour rainfall forecast from 7 am Wednesday through 7 am Friday. This 48-hour rainfall depiction is what is being used in the SERFC river models to produce river forecasts this morning.

Please continue to monitor river forecasts as this event evolves.

NWSSERFC

Decision Support Briefing

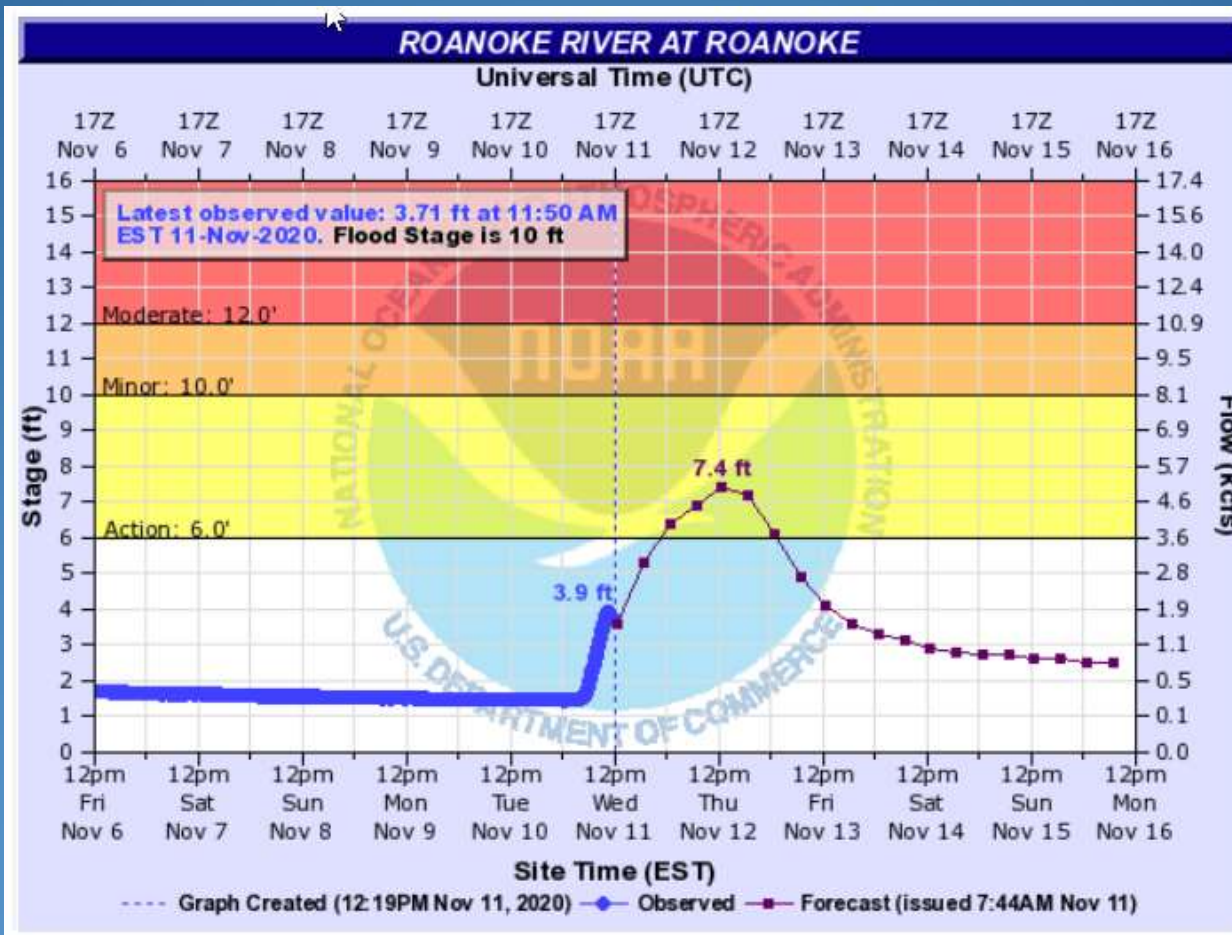
weather.gov/serfc



An AEP Company



An AEP Company





An AEP Company

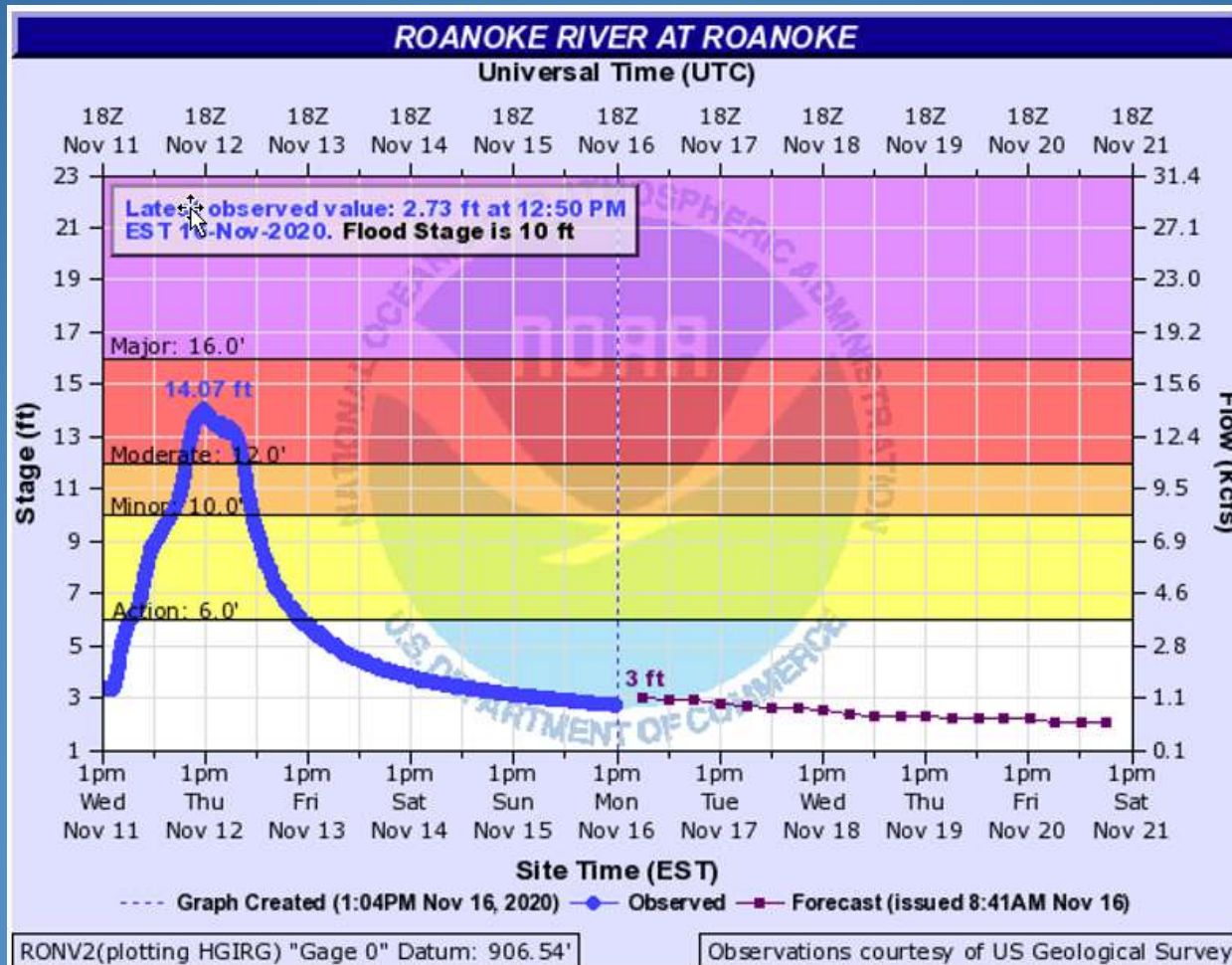


November 12, 2020 – By the numbers

- Altavista River Gage Crest = 23.40 Ft – Moderate Flood Stage
- Brookneal River Gage Crest = 34.51 Ft.- Major Flood Stage
- Smith Mountain Lake Level Crest=798.6Ft.- 3.6 Ft above Normal Full- Per Design can go to 800 Ft or 5 Ft above Full
- Leesville Lake Elevation = 612.8 Ft.

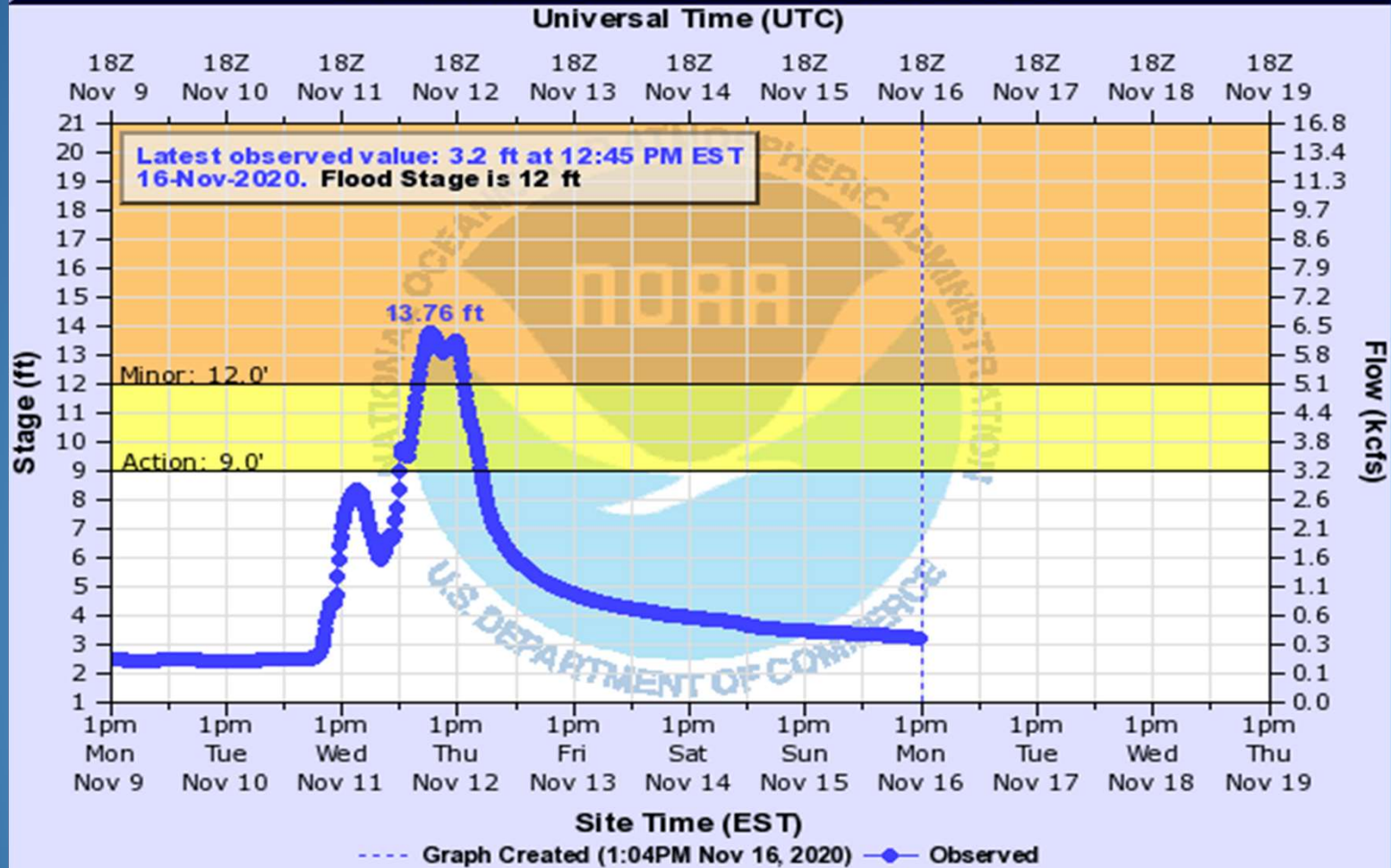


An **AEP** Company



An AEP Company

BLACKWATER RIVER NEAR ROCKY MOUNT



BLAV2(plotting HGIRG) "Gage 0" Datum: 876.45'

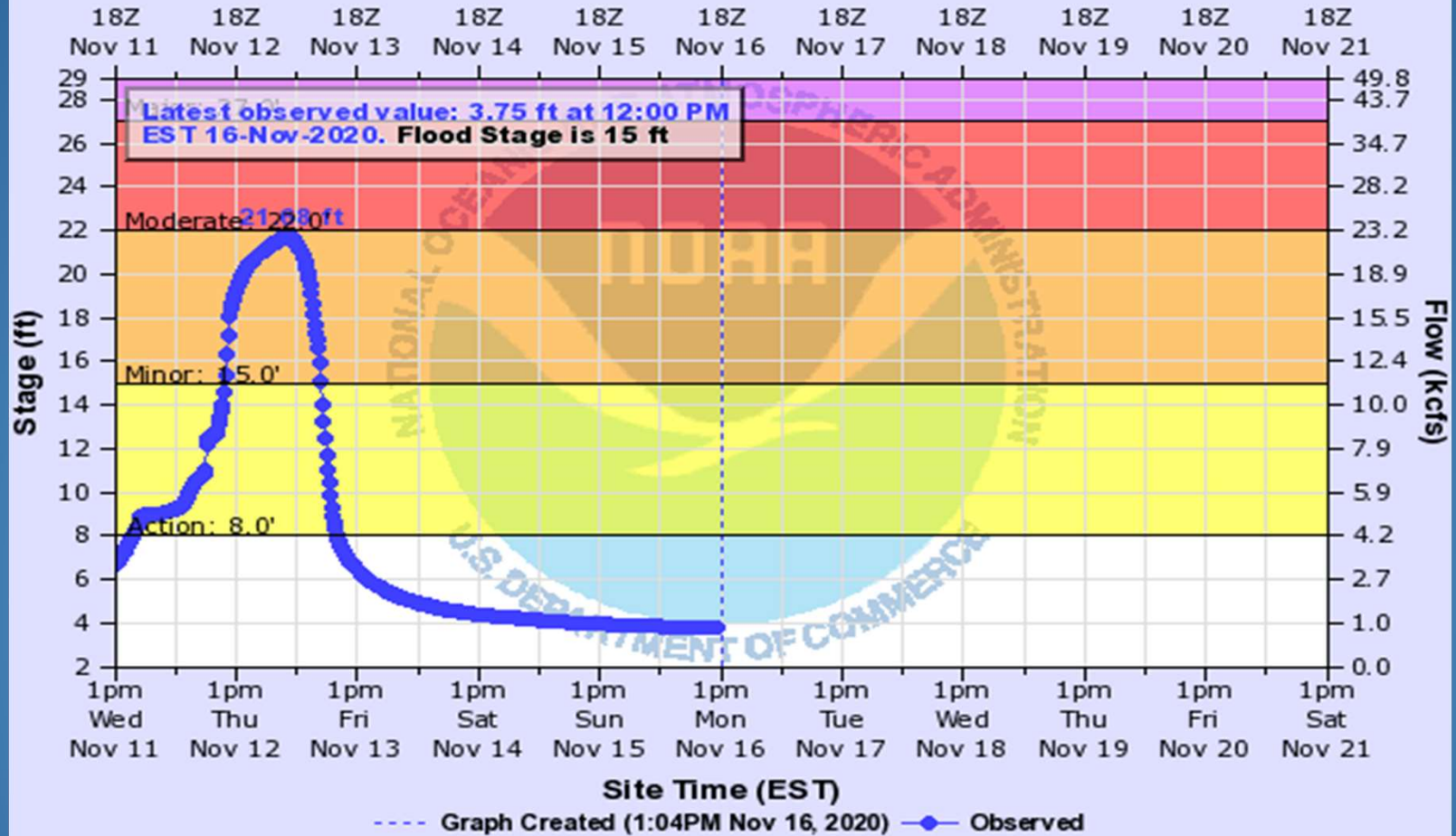
Observations courtesy of US Geological Survey



An AEP Company

PIGG RIVER NEAR SANDY LEVEL

Universal Time (UTC)



SANV2(plotting HGIRG) "Gage 0" Datum: 616.25'

Observations courtesy of US Geological Survey



An AEP Company



High Water Communications

The Smith Mountain Project Water Management Plan requires we notify certain stakeholders if Smith Mountain Lake is expected to exceed full pond. Notification list includes:

- County Government
- Local Marinas
- Media
- Non-governmental Organizations (i.e. SMLA & TLAC)
- Agencies (i.e. Virginia DEQ, DGIF)
- <https://www.aep.com/Recreation/Hydro>

Additional updates on water level changes currently provided on these platforms.

- <https://www.facebook.com/SmithMtnProject>
- [Nextdoor](#)
 - Connect with your lake community to receive lake updates via email, push notifications and text alerts.



An **AEP** Company

Thank you!