FEWS User Days

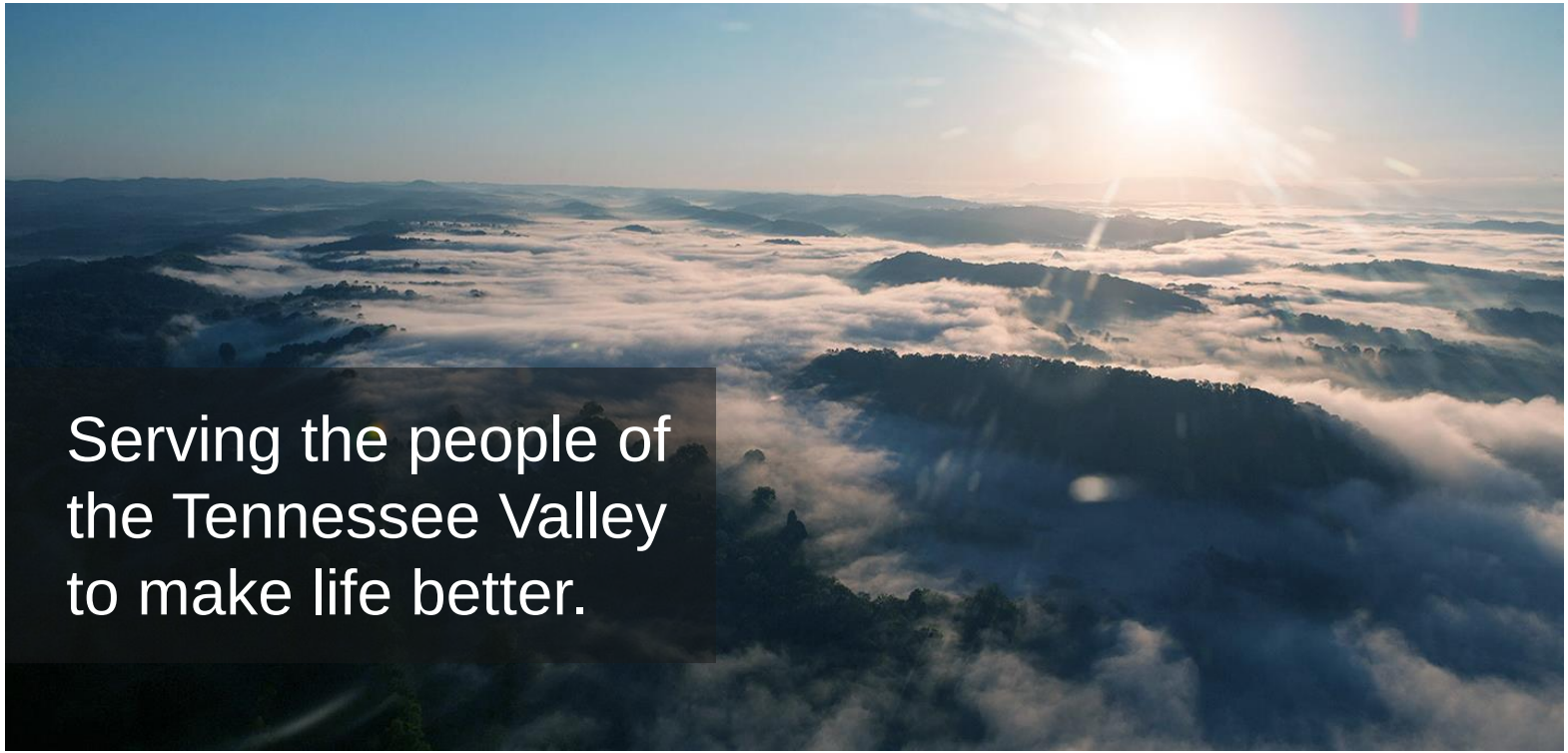
Gabriel Miller and Nathan Barber

10/27/2017

What is TVA?

A power company
and so much more…

Our Mission:


Serving the people of
the Tennessee Valley
to make life better.

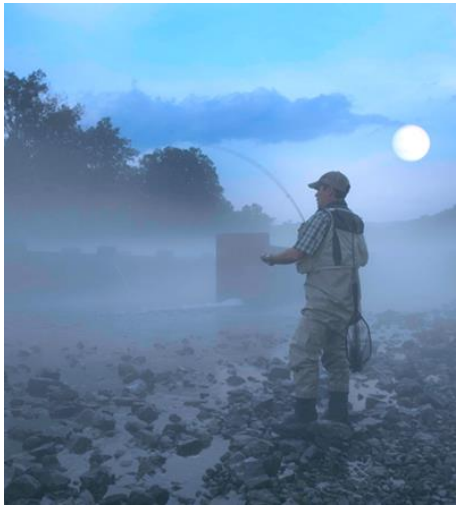
What We Do

Partner with **154** local power companies, to serve **9 million people** and **700,000 businesses** in parts of **seven states.**

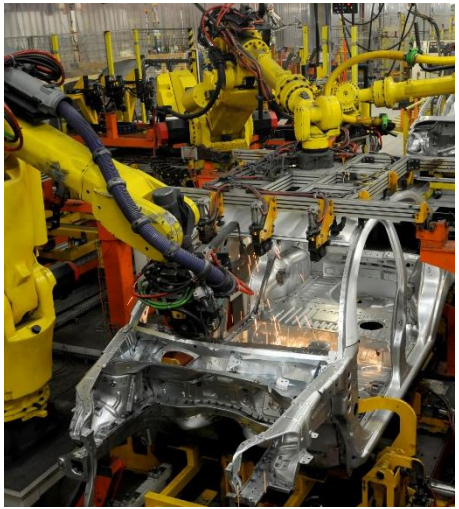
Directly serve **58** large industries and federal installations.

TVA's Mission of Service

Energy

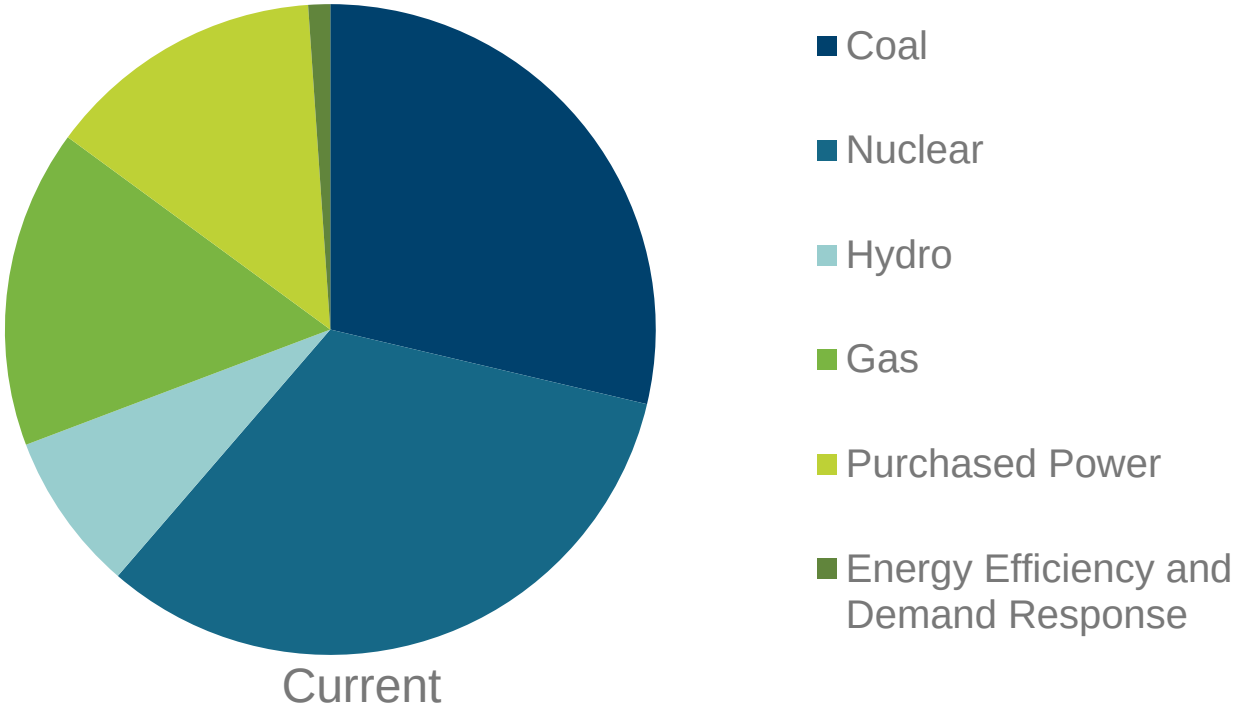


Environment



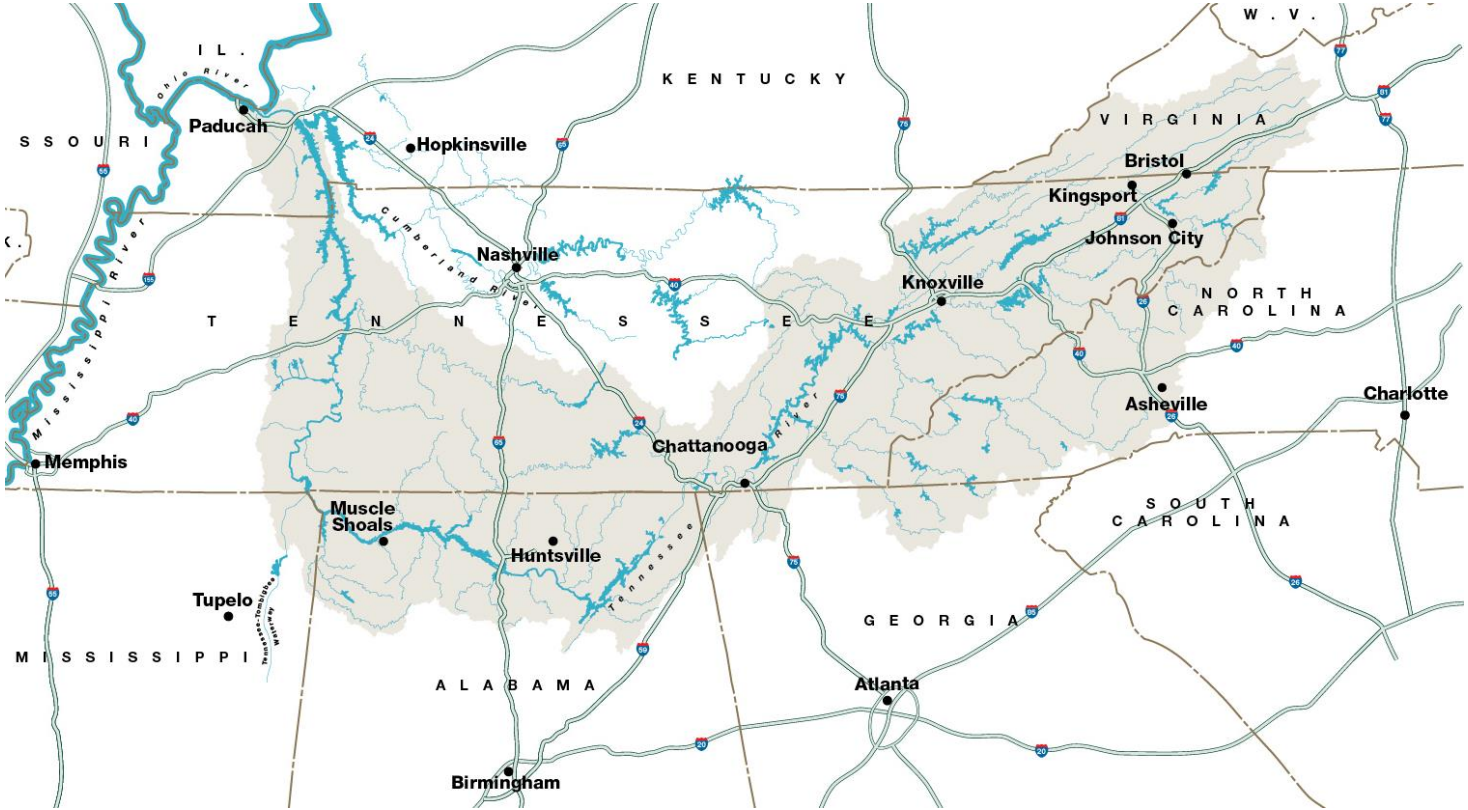
Economic Development

The TVA Power System



Rivers of the United States

Tennessee Valley Watershed



River System Management

29 hydroelectric dams

Flood damage averted:
$240 million annually

$7 billion averted
since 1936

20 non-power dams

$12 billion in recreation benefit

Integrated Tennessee River System

Navigation

Water Supply

Flood-Damage Reduction

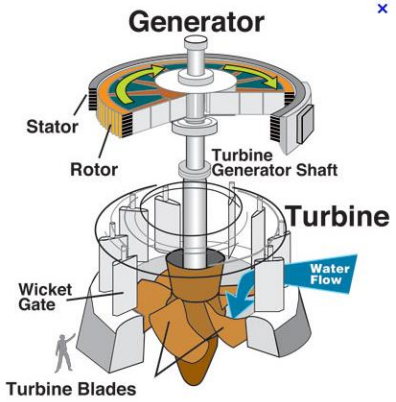
Recreation

Power Generation

Water Quality

Hydropower Generation

- Conventional generating capacity (109 units): 3,538 MW
- Pumped Storage generating capacity (4 units): 1,653 MW



Thermal Compliance/Cooling Water

- Schedule flows to minimize thermal derates at nuclear plants due to high river temperatures
- Provide cool, abundant water to nuclear and fossil plants

Water Supply

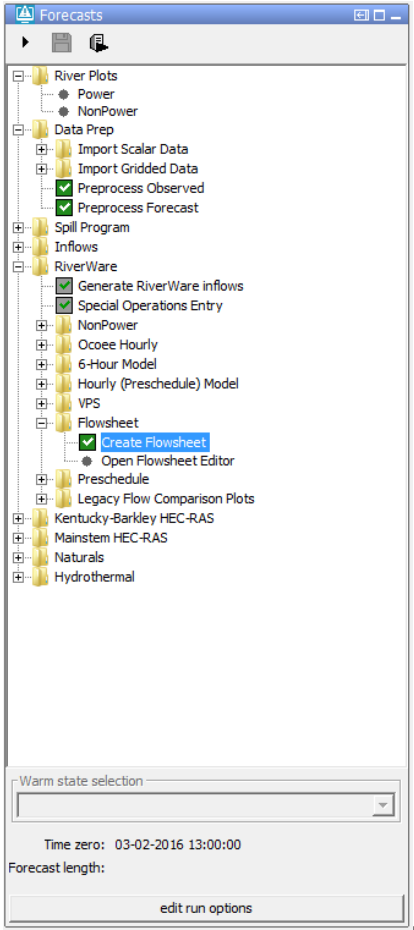
- Industrial process water and cooling water
- Municipalities water supply

Water Quality

- Minimum flows, aeration, and monitoring
- Oxygen starved water behind the impoundment is “aerated” before being released

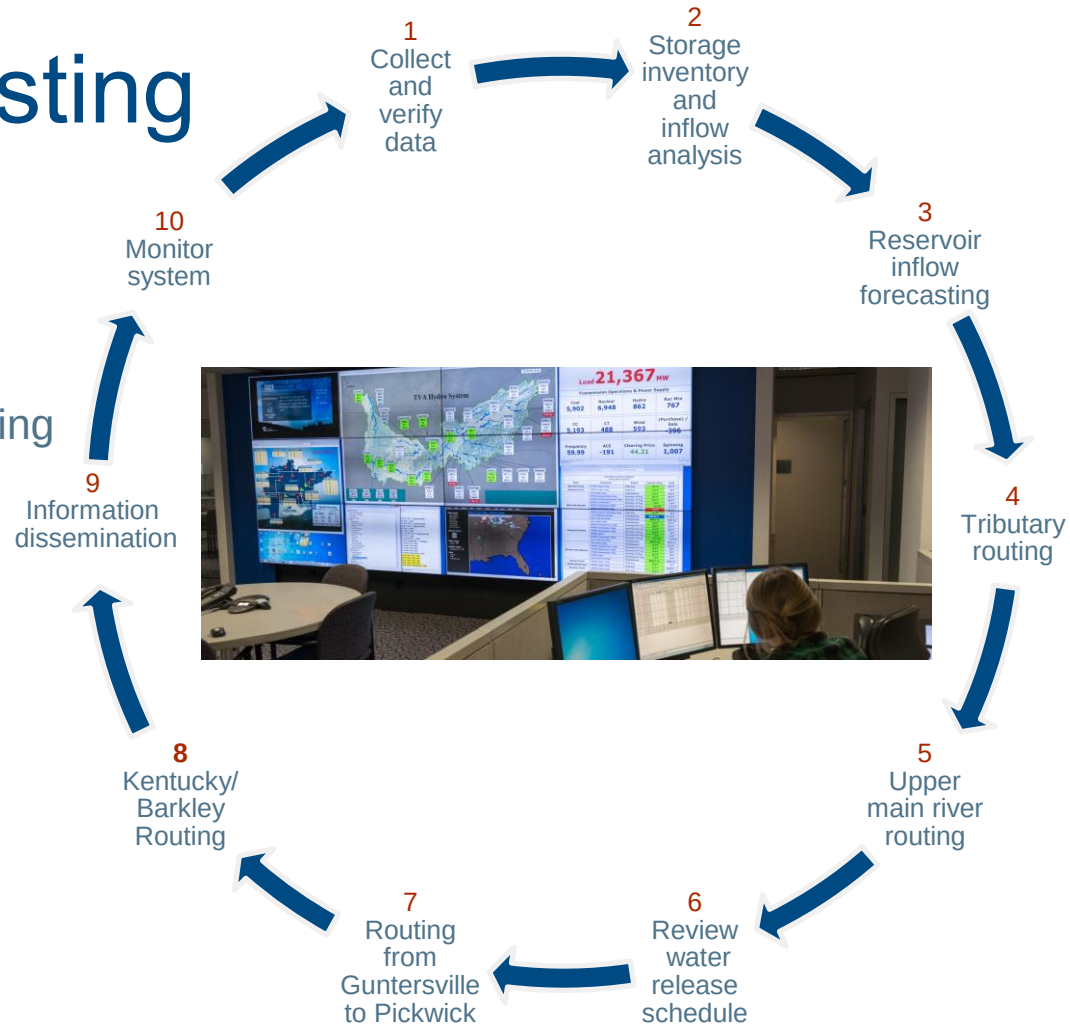
TVA FEWS System

- Three year project
  - Converted in-house forecast system to standard models and FEWS system
  - Migration from 100+ programs to one unified platform
  - Vastly improved data visualization and reports
- Went live Feb 7th 2017

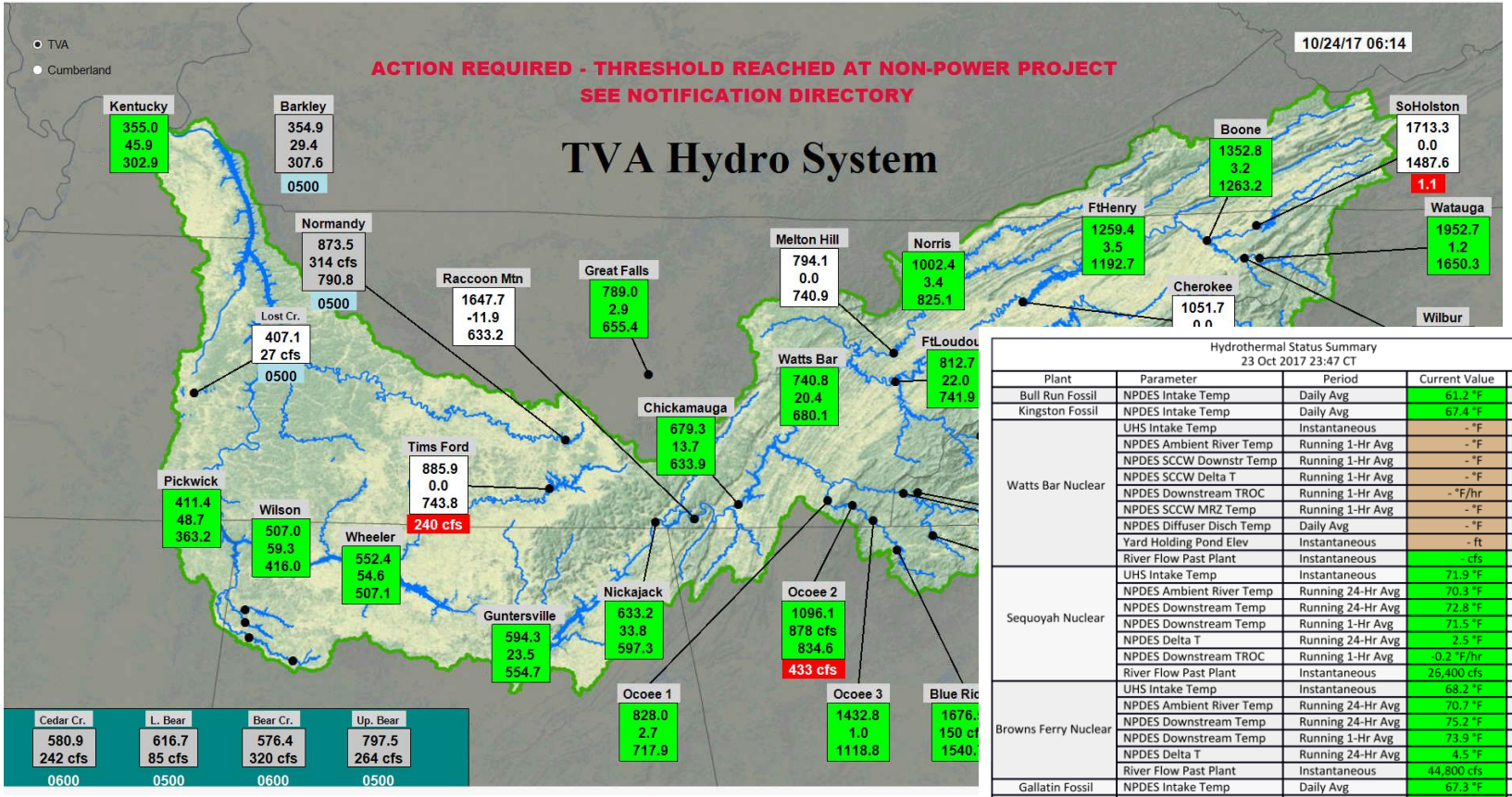


TVA's Forecasting Process

- 24/7 Operation
- Constant system monitoring
- Hydropower schedule produced twice daily



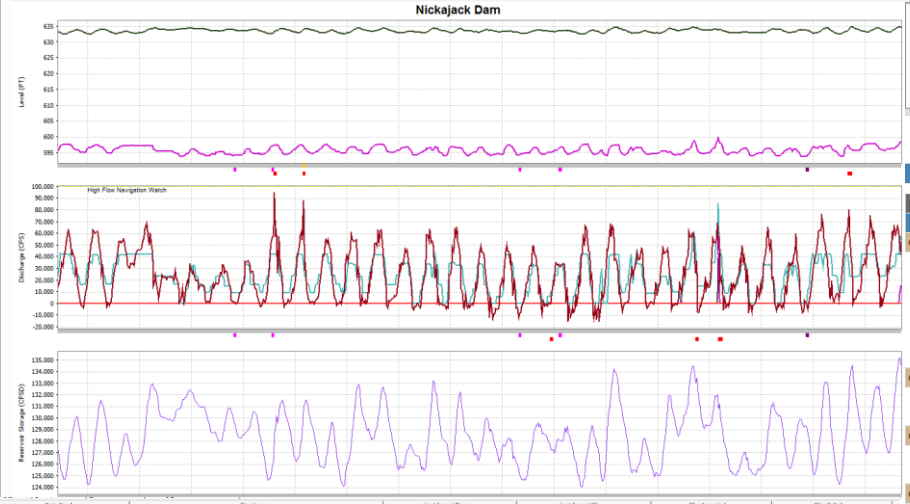
Realtime Monitoring

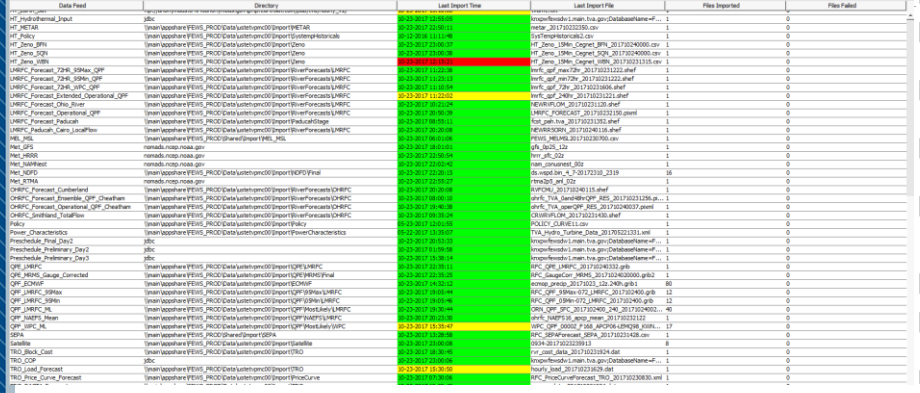


Hydrothermal Status Summary
23 Oct 2017 23:47 CT

Plant	Parameter	Period	Current Value	Limit
Bull Run Fossil	NPDES Intake Temp	Daily Avg	61.2 °F	68.3 °F
Kingston Fossil	NPDES Intake Temp	Daily Avg	67.4 °F	82 °F
Watts Bar Nuclear	UHS Intake Temp	Instantaneous	- °F	84.8 °F
	NPDES Ambient River Temp	Running 1-Hr Avg	- °F	86.9 °F
	NPDES SCCW Downstr Temp	Running 1-Hr Avg	- °F	86.9 °F
	NPDES SCCW Delta T	Running 1-Hr Avg	- °F	5.4 °F
	NPDES Downstream TROC	Running 1-Hr Avg	- °F/hr	3.6 °F/hr
	NPDES SCCW MRZ Temp	Running 1-Hr Avg	- °F	92.3 °F
	NPDES Diffuser Disch Temp	Daily Avg	- °F	95 °F
	Yard Holding Pond Elev	Instantaneous	- ft	707.02 ft
	River Flow Past Plant	Instantaneous	- cfs	4,000 cfs
Sequoyah Nuclear	UHS Intake Temp	Instantaneous	71.9 °F	86.8 °F
	NPDES Ambient River Temp	Running 24-Hr Avg	70.3 °F	86.9 °F
	NPDES Downstream Temp	Running 24-Hr Avg	72.8 °F	86.9 °F
	NPDES Downstream Temp	Running 1-Hr Avg	71.5 °F	93 °F
	NPDES Delta T	Running 24-Hr Avg	2.5 °F	5.4 °F
	NPDES Downstream TROC	Running 1-Hr Avg	-0.2 °F/hr	3.6 °F/hr
	River Flow Past Plant	Instantaneous	26,400 cfs	8,000 cfs
Browns Ferry Nuclear	UHS Intake Temp	Instantaneous	68.2 °F	92.5 °F
	NPDES Ambient River Temp	Running 24-Hr Avg	70.7 °F	90 °F
	NPDES Downstream Temp	Running 24-Hr Avg	75.2 °F	90 °F
	NPDES Downstream Temp	Running 1-Hr Avg	73.9 °F	93 °F
	NPDES Delta T	Running 24-Hr Avg	4.5 °F	10 °F
	River Flow Past Plant	Instantaneous	44,800 cfs	10,000 cfs
Gallatin Fossil	NPDES Intake Temp	Daily Avg	67.3 °F	76 °F
Cumberland Fossil	NPDES Intake Temp	Daily Avg	68.2 °F	86.9 °F
Paradise Fossil	NPDES Intake Temp	Daily Avg	62.1 °F	89 °F

Data Collection and Validation





StartDate 10/22/2017 StartHour 24

EndDate 10/23/2017 EndHour 24

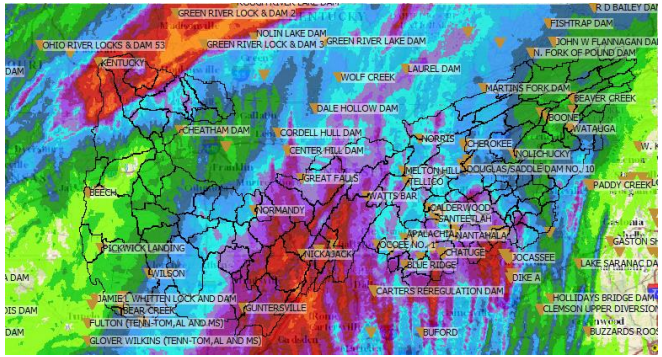
1 of 2 100% Find | Next

Questionable Hourly Water Record Data [10/23/2017 - 10/24/2017] Central Time

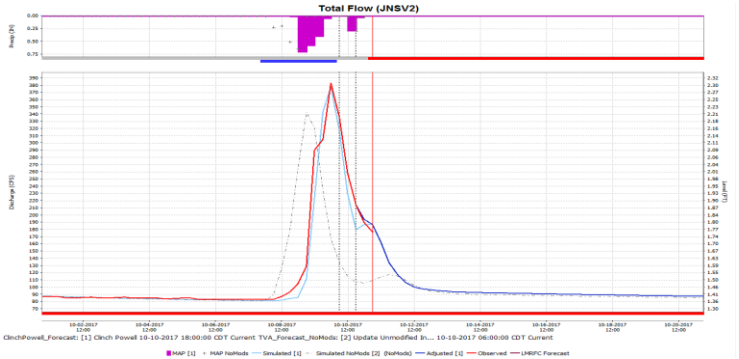
Reservoir			
Location	**Parameter**	**Quality**	**Occurrences**
Calderwood Dam			
	⊟Power, Total, MW	Doubtful:Original	2
	Date	**Hour**	**Value**
	2017-10-23	13	52.05
	2017-10-23	14	54.02
	⊞Tailwater, FT	Doubtful:Original	10
	⊞Turbine Flow, CFS	Doubtful:Original	2
Center Hill Dam			
	⊞Power, Total, MW	Missing:Missing	3
	⊞Spillway Flow, CFS	Missing:Missing	3
Cheatham Dam			
	⊞Power, Total, MW	Missing:Missing	3
	⊞Spillway Flow, CFS	Missing:Missing	3
Cheoah Dam			
	⊞Power, Total, MW	Doubtful:Original	2
Chilhowee Dam			
	⊞Power, Total, MW	Doubtful:Original	5
	⊞Turbine Flow, CFS	Doubtful:Original	5
Cordell Hull Dam			
	⊞Power, Total, MW	Missing:Missing	3
	⊞Spillway Flow, CFS	Missing:Missing	3
Dale Hollow Dam			
	⊞Power, Total, MW	Missing:Missing	3
	⊞Spillway Flow, CFS	Missing:Missing	3
J Percy Priest Dam			
	⊞Power, Total, MW	Missing:Missing	3
	⊞Spillway Flow, CFS	Missing:Missing	3
	⊞Tailwater, FT	Doubtful:Original	9
Ocoee No. 1 Dam			
	⊞Tailwater, FT	Doubtful:Original	1
Old Hickory Dam			
	⊞Power, Total, MW	Missing:Missing	3
	⊞Spillway Flow, CFS	Missing:Missing	3
Sapteetlah Dam			

Hydrologic Models (Inflows)

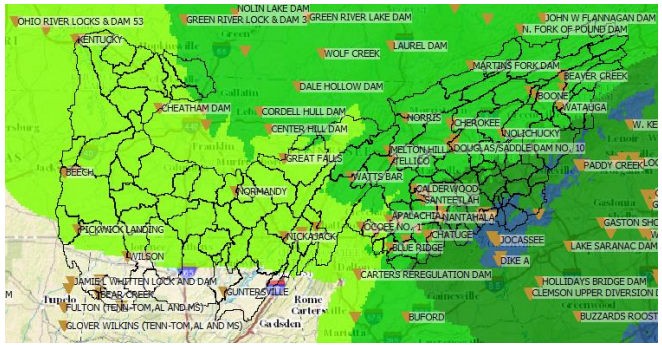
QPE Selection



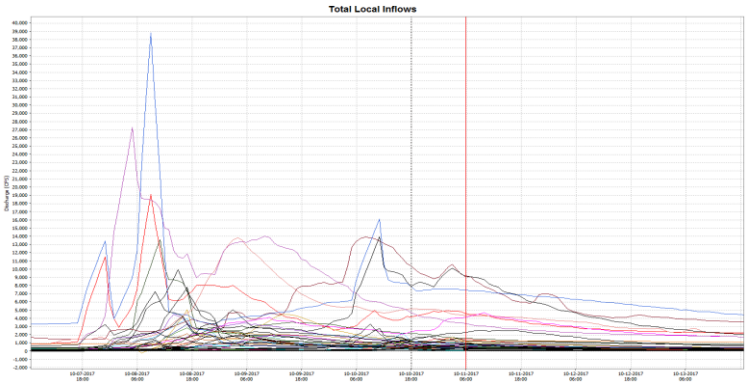
Inflow Modeling



QPF Selection

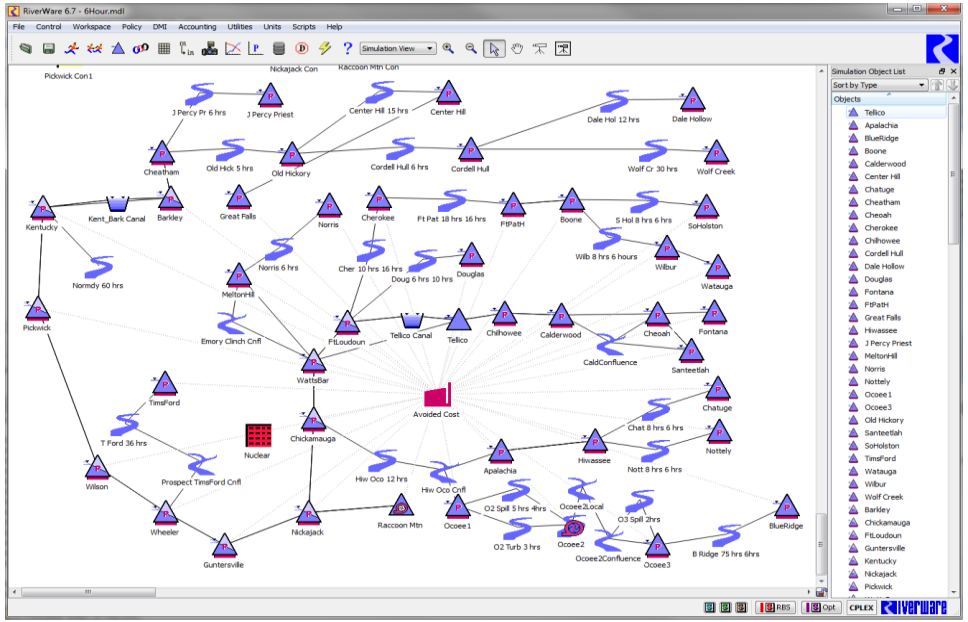


Finalize for Scheduling and Hydraulic Modeling



Scheduling the River

- Two Primary Riverware
- 6-Hour Model
  - Model reservoirs at 6-hour time steps for 14 days
  - Simulation/optimization mode
- Preschedule Model
  - Model reservoirs at hourly time steps for 3 days (using 6-hour model volumes)
  - Optimization mode



Tennessee Valley Authority (Operator Client)

File Tools Options Help

Forecasts

- Water Order South Holston
  - Adjust Water Order
  - Preview/Publish Water Order
- Water Order Tellico
- Water Order Tims Ford
- Water Order Watauga
- Water Order Watts Bar
- Water Order Wheeler
- Water Order Wilbur
- Water Order Wilson
- Log Gate Positions and Availability
- O3H Sluice Automated Messages
- Inflows
- RiverWare
  - Import COP
  - Generate RiverWare/RAS Inflows
  - Generate RiverWare Inflow Scenarios
  - Special Operations Entry
  - NonPower
  - Ocoee Hourly
  - 6-Hour Model
    - 6-hour Base
    - Open 6-hour Archived Model
    - 6-Hour Data Import (DO NOT RUN)
    - Preview/Publish Great Falls Message
    - Prepare Flowsheet
    - Preview/Publish Flowsheet
    - Publish Flowsheet Messages
    - Tributary Storage Plot
    - 6-hour Optimization
  - Hourly (Preschedule) Model
  - VPS
  - Block Cost
  - Runoff Storage to TOG
- Kentucky-Barkley HEC-RAS
- Mainstem HEC-RAS
  - Input Data Check
  - Fort Loudoun-Tellico
  - Melton Hill
  - Watts Bar
  - Chickamauga
  - Nickajack
  - Guntersville
  - Wheeler
  - Wilson
  - Pickwick
  - All RAS Profiles

Warm state selection

Time zero: 10-22-2017 24:00:00

Forecast length:

edit run options

Logs | 8 : Run Info

< Select a statistical function >

Blue Ridge Dam

Dam Safety Warning 1691.00

Level (FT) 1695.0 1692.5 1690.0 1687.5 1685.0 1682.5 1680.0 1677.5 1675.0 1672.5 1670.0 1667.5 1665.0 1662.5 1660.0 1657.5

1684.26 1679.42 1676.51 1675.71 1671.31 1669.47

NWS Warning

Discharge (CFS) 3,000 2,750 2,500 2,250 2,000 1,750 1,500 1,250 1,000 750 500 150 0

QT MIN

01-01-2017 02-01-2017 03-01-2017 04-01-2017 05-01-2017 06-01-2017 07-01-2017 08-01-2017 09-01-2017 10-01-2017 11-01-2017 12-01-2017

Map | Plots | Spatial Data | Modifiers | Data Editor | System Monitor

Plot Overview

Blue Ridge Dam

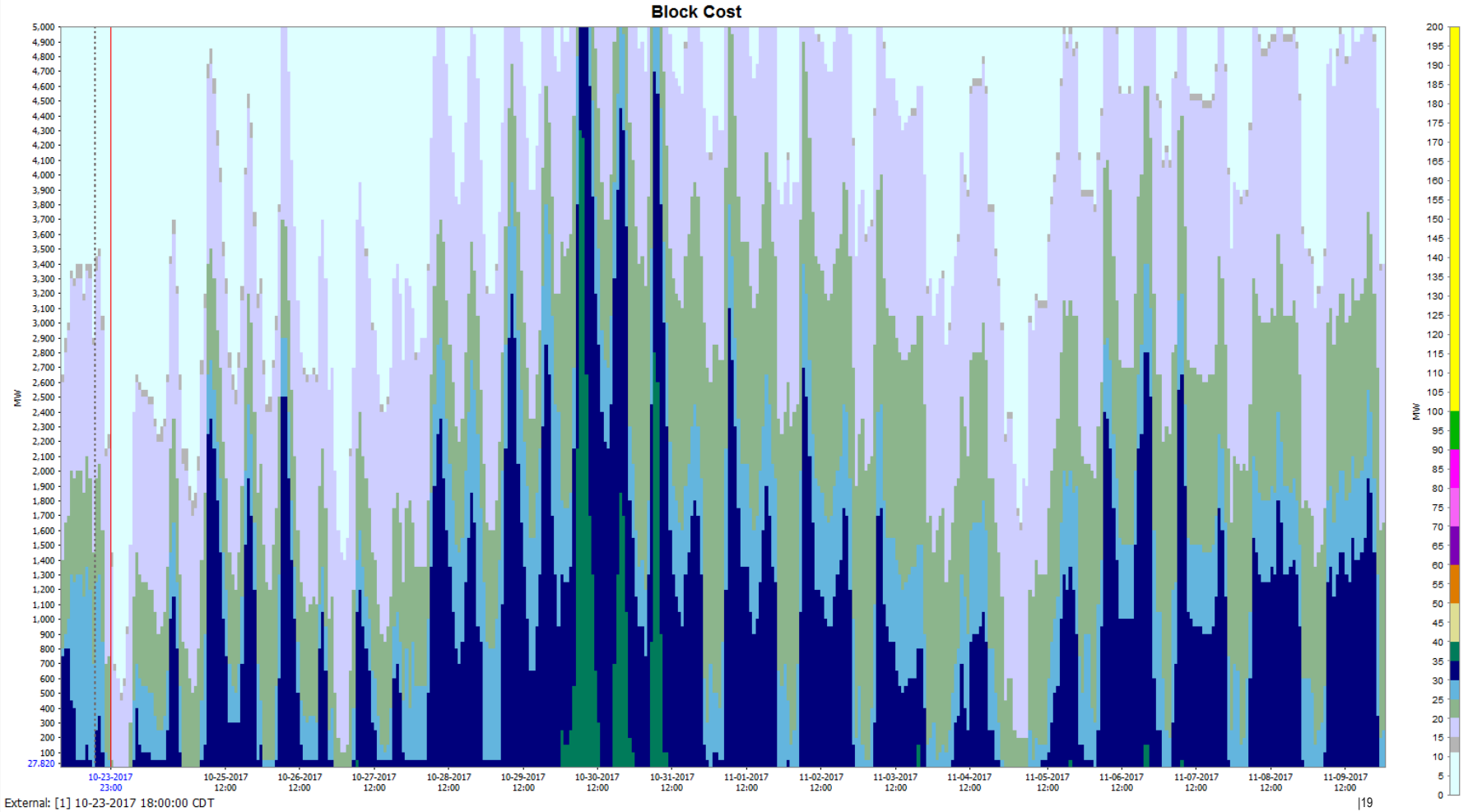
Boone Dam

Chatuge Dam

Cherokee Dam

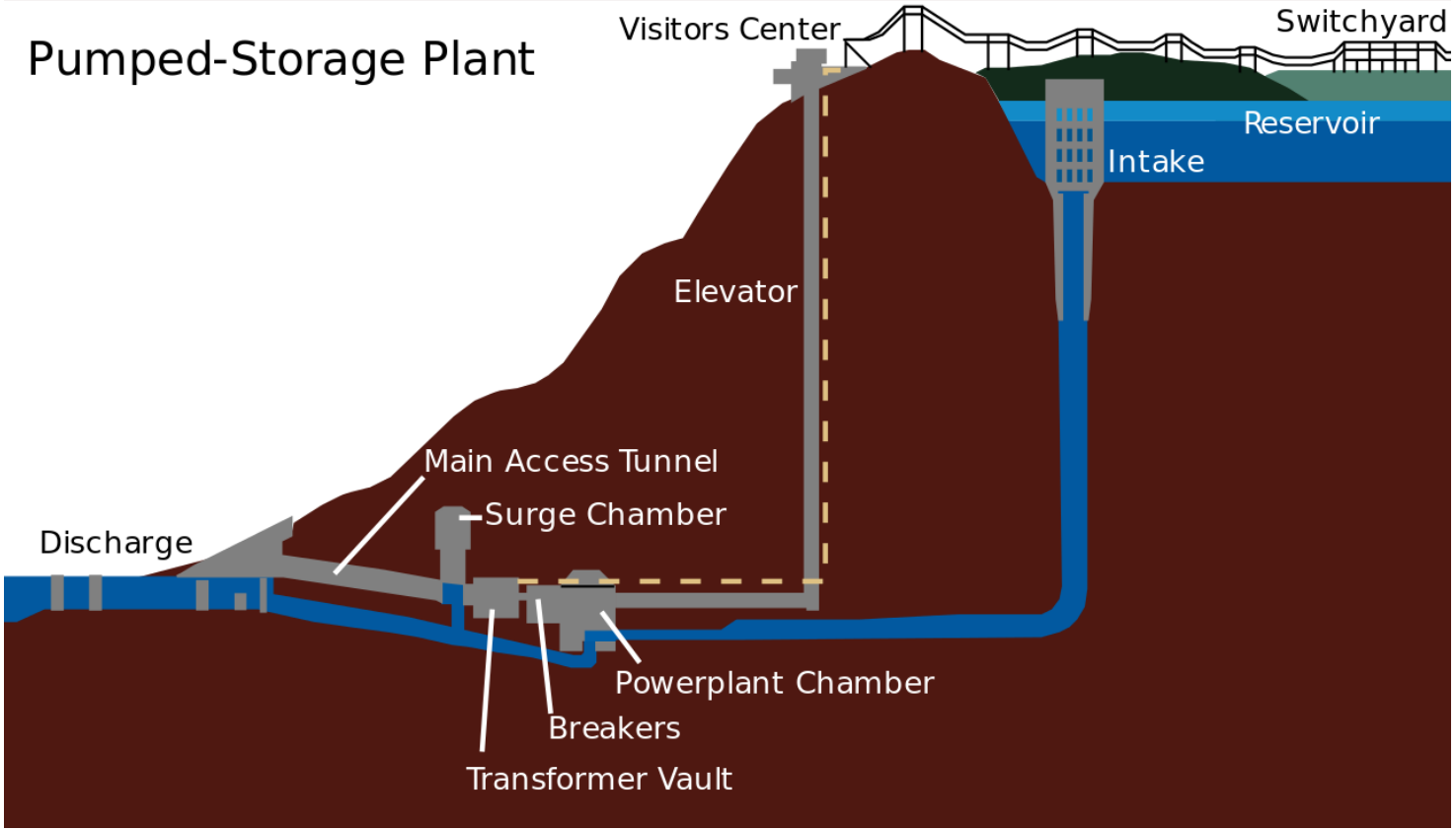
Chickamauga Dam

Miller, Gabriel Alexander | Current system time: 10-23-2017 23:00 CDT | 06:41:55 CEST | USTETVPMC00 | -88.296 , 34.064 | 0.0 MB/s | 526 MB



External: [1] 10-23-2017 18:00:00 CDT

Raccoon Mountain



To spill or not to spill

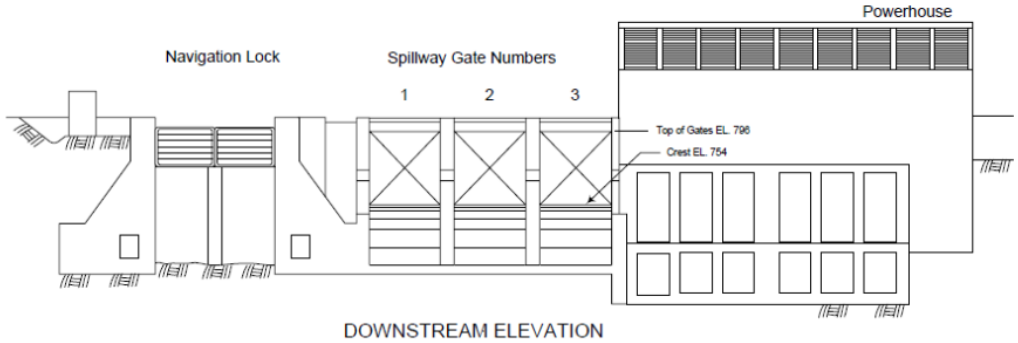
Spill Monitor - Detailed Plant Info for Melton Hill

Summary																	TFH	WBH	WEH	WIH	WLH	WTH
APH	BOH	BRH	CHH	CRH	CTH	DGH	FLH	FNH	FPH	GFH	GUH	HIH	KYH	MHH	NJH	NOH	NTH	O1H	O3H	PKH	SHH	TEC

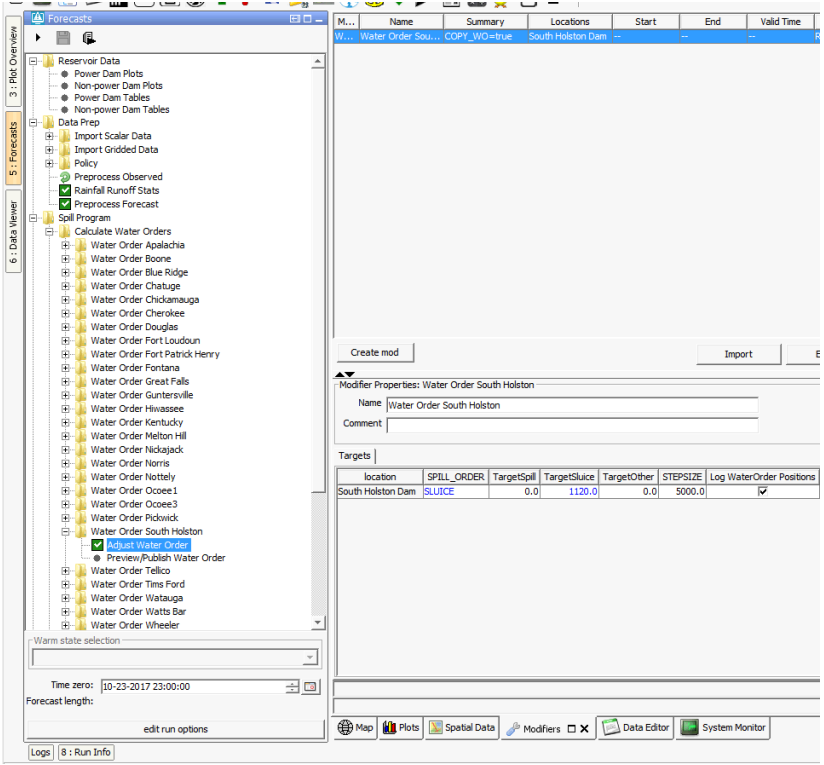
	HW Elev.	TW Elev	Spillway Flow	Sluice Flow	Other Flow	Turbine Flow	Total Flow
Melton Hill (MHH)	793.78	740.99	3550	0	0	0	3550

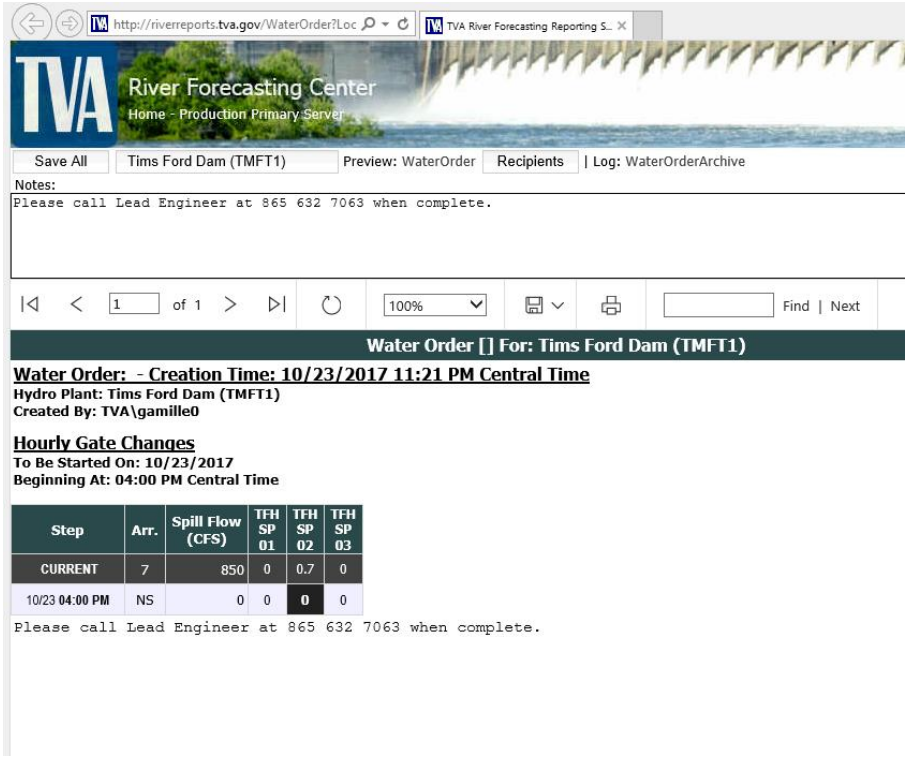
Spill Gate	Total	1	2	3
Gate Position	NS	1	SHUT	C
Current Flow	3550	2420	0	1130
Date & Time of Latest Change	10/06 14:40	10/06 14:40	10/06 14:40	10/06 14:40

Instructions

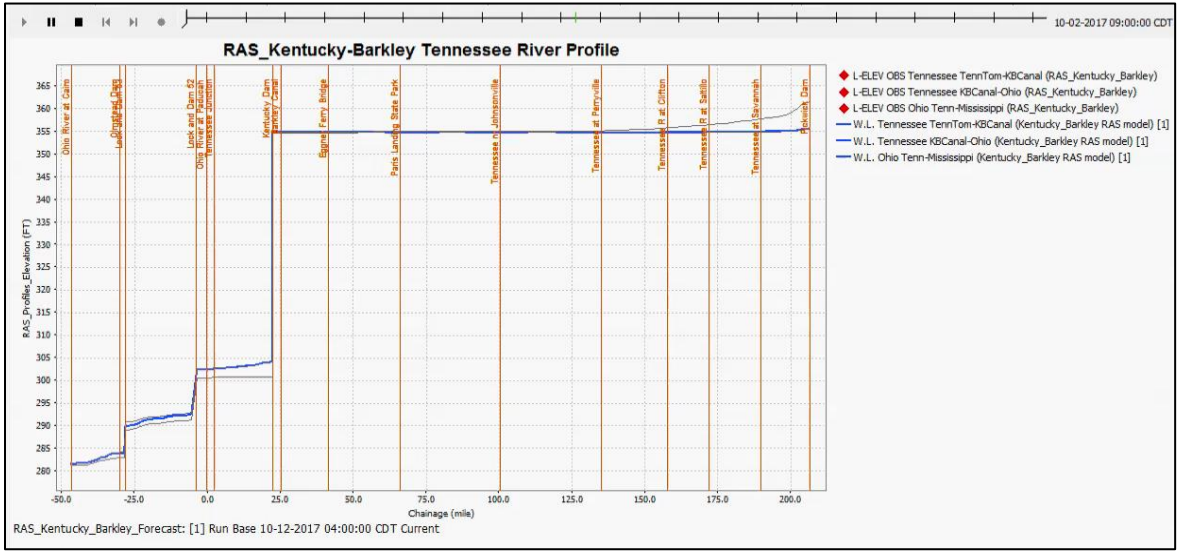


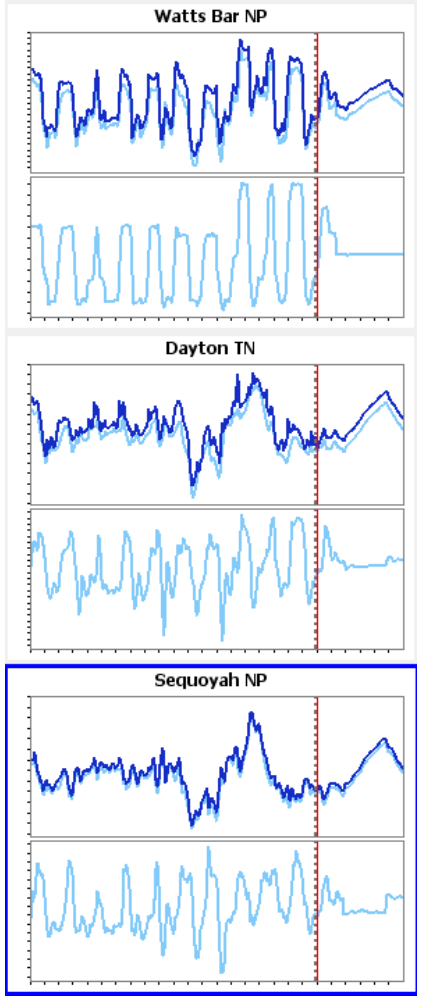
Spill Orders

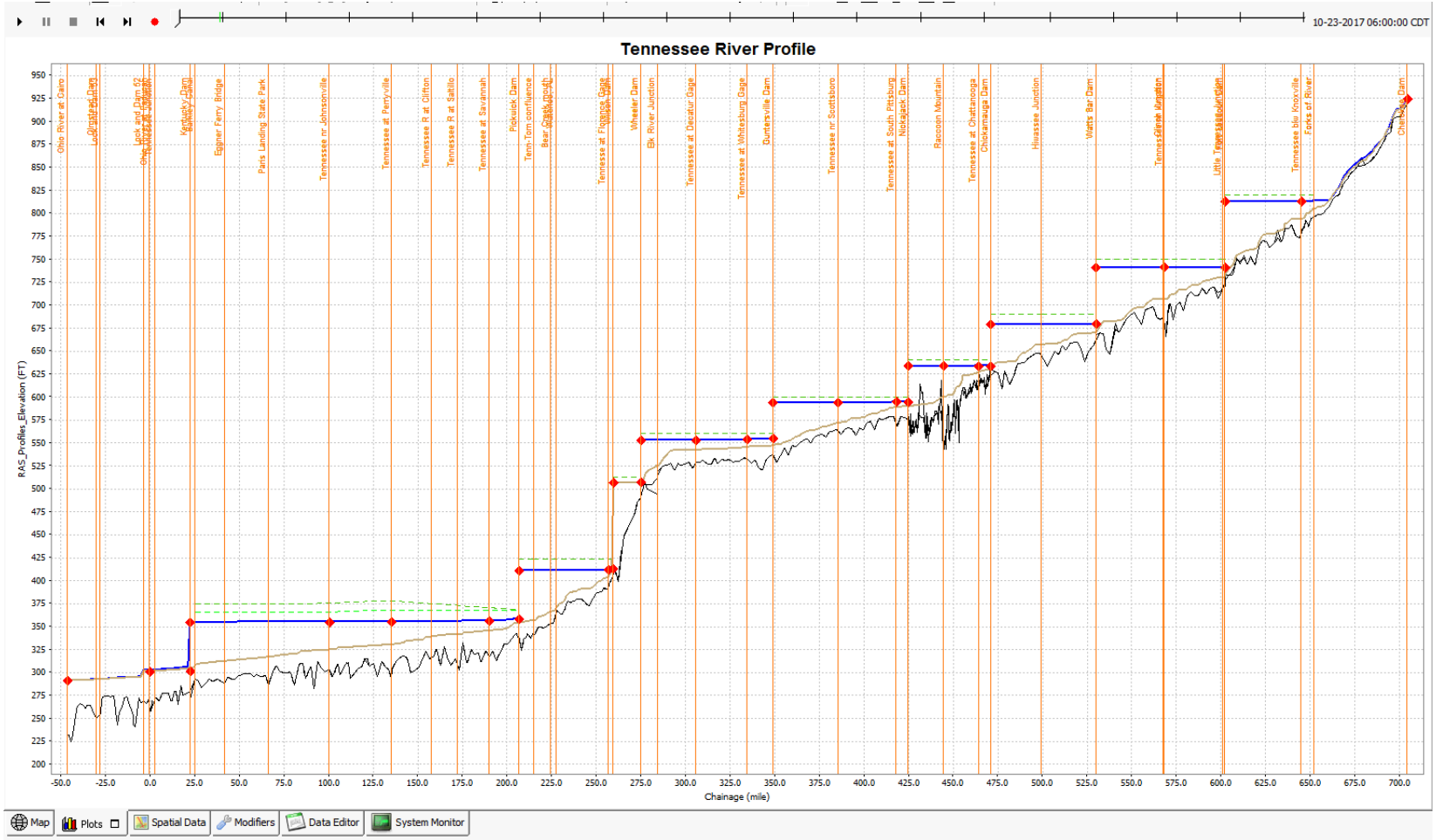




Hydraulic Models

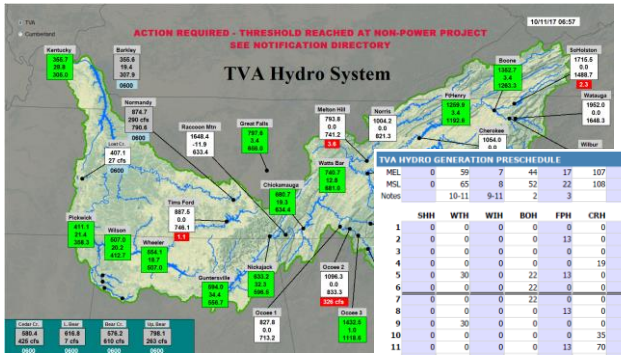





10-23-2017 06:00:00 CDT
Tennessee River Profile
RAS_Profiles_Elevation (FT)
Chainage (mile)
Ohio River at Cairo
Lock and Dam 52
Kentucky Dam
Eggner Ferry Bridge
Paris Landing State Park
Tennessee nr Johnsonville
Tennessee at Perryville
Tennessee R at Clifton
Tennessee R at Salillo
Tennessee at Savannah
Pickwick Dam
Tenn-Tom confluence
Bear Creek mouth
Tennessee at Florence Gage
Wilson Dam
Wheeler Dam
Elk River Junction
Tennessee at Decatur Gage
Tennessee at Whitesburg Gage
Guntersville Dam
Tennessee nr Scottsboro
Tennessee at South Pittsburg
Nickajack Dam
Raccoon Mountain
Tennessee at Chattanooga
Chickamauga Dam
Hiwassee Junction
Watts Bar Dam
Tennessee River Junction
Little Tennessee River
Tennessee blo Knoxville
Forks of River
Cherokee Dam
Map
Plots
Spatial Data
Modifiers
Data Editor
System Monitor

Final Products

- Schedule – Current day schedule of hydro generation
- Preschedule – Forecast of hydro generation
- Stage Forecasts on the Tennessee River

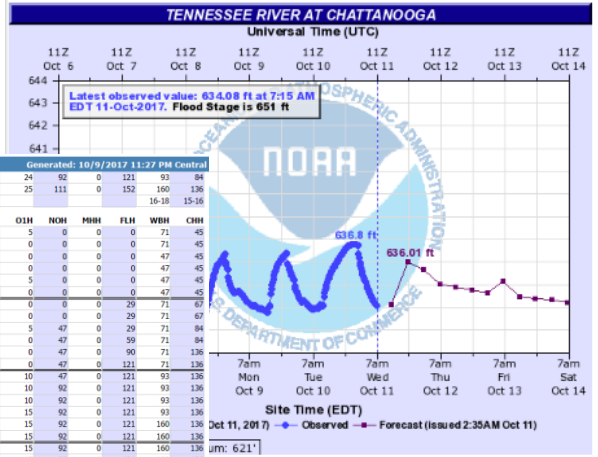


TVA HYDRO GENERATION PRESCHEDULE — Tuesday, October 10, 2017 — Generated: 10/9/2017 11:27 PM Central

MEL	0	59	7	44	17	107	146	261	12	15	137	75	0	23	18	24	92	0	121	93	84
MSL	0	65	8	52	22	108	179	294	14	19	154	78	0	28	20	25	111	0	152	160	136
Notes		10-11	9-11	2	3		5					8		1						16-18	15-16

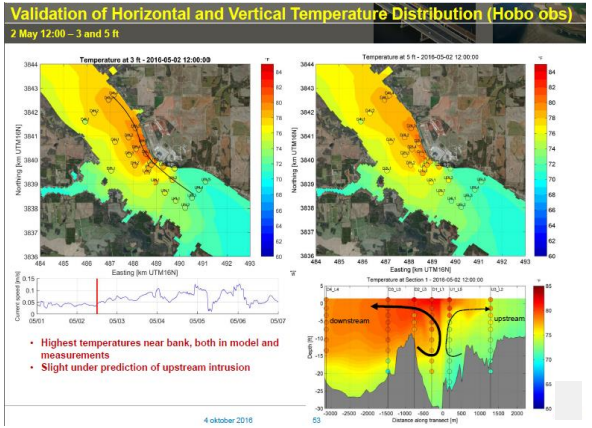
	SHH	WTH	WIH	BOH	FPH	CRH	DGH	FNH	CTH	NTH	HIH	APH	BRH	O3H	O2H	O1H	NOH	MHH	FLH	WBH	CHH
1	0	0	0	0	0	0	17	0	0	0	0	75	0	23	18	5	0	0	0	71	45
2	0	0	0	0	13	0	0	0	0	0	0	75	0	23	18	0	0	0	0	71	45
3	0	0	0	0	0	0	0	0	0	0	0	75	0	23	18	0	0	0	0	47	45
4	0	0	0	0	0	19	0	0	0	0	0	75	0	23	18	0	0	0	0	47	45
5	0	30	0	22	13	0	17	174	0	0	0	75	0	23	18	5	0	0	0	47	45
6	0	0	0	22	0	0	0	174	0	0	0	75	0	23	18	0	0	0	0	47	45
7	0	0	0	22	0	0	0	174	0	0	0	75	0	23	18	0	0	0	29	71	67
8	0	0	0	0	13	0	0	174	12	0	0	75	0	23	18	0	0	0	29	71	67
9	0	30	0	0	0	0	36	174	12	0	0	75	0	23	18	5	47	0	29	71	84
10	0	0	0	0	0	35	36	261	12	0	0	75	0	23	18	0	47	0	59	71	84
11	0	0	0	0	13	70	69	261	12	0	0	75	0	23	18	0	47	0	90	71	136
12	0	0	0	0	0	70	107	261	12	0	66	75	0	23	18	0	47	0	121	71	136
13	0	0	0	0	0	107	107	261	12	15	137	75	0	23	18	10	47	0	121	93	136
14	0	30	0	22	13	107	130	261	12	15	137	75	0	23	18	10	92	0	121	93	136
15	0	0	0	22	0	107	130	261	12	15	137	75	0	23	18	10	92	0	121	93	136
16	0	0	0	22	0	107	130	261	12	15	137	75	0	23	18	15	92	0	121	93	136
17	0	0	0	22	13	107	130	261	12	15	137	75	0	23	18	15	92	0	121	160	136
18	0	0	0	22	0	107	130	261	12	15	137	75	0	23	18	15	92	0	121	160	136
19	0	30	0	22	0	107	130	261	12	15	137	75	0	23	18	15	92	0	121	160	136
20	0	0	0	22	13	107	130	261	12	15	137	75	0	23	18	15	92	0	121	160	136
21	0	0	0	22	0	70	107	261	12	15	66	75	0	23	18	10	47	0	121	93	136
22	0	0	0	0	0	70	36	174	12	0	66	75	0	23	18	10	47	0	90	93	136
23	0	0	0	0	13	35	36	174	0	0	0	75	0	23	18	10	0	0	90	71	136
24	0	30	0	0	0	35	0	174	0	0	0	75	0	23	18	10	0	0	59	71	84
Total	0	150	0	242	104	1,260	1,478	4,524	180	135	1,294	1,800	0	552	432	160	973	0	1,685	2,096	2,424

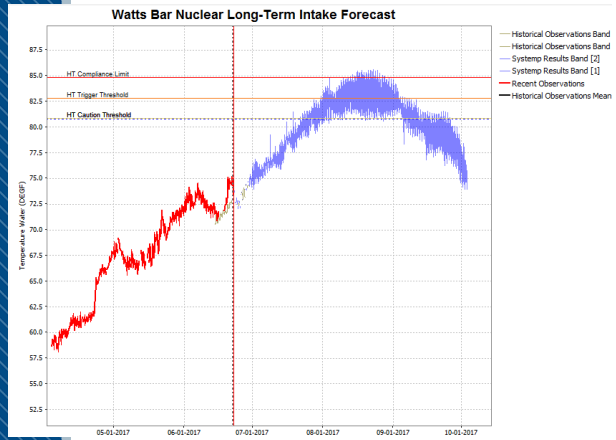
	SHH	WTH	WIH	BOH	FPH	CRH	DGH	FNH	CTH	NTH	HIH	APH	BRH	O3H	O2H	O1H	NOH	MHH	FLH	WBH	CHH
6	0	30	0	44	26	19	34	348	0	0	0	450	0	138	108	10	0	0	0	330	270
12	0	30	0	22	26	175	248	1,305	60	0	66	450	0	138	108	5	188	0	357	426	574
18	0	30	0	110	26	642	757	1,566	72	90	822	450	0	138	108	75	507	0	726	692	816
24	0	60	0	66	26	424	439	1,305	48	45	406	450	0	138	108	70	278	0	602	648	764

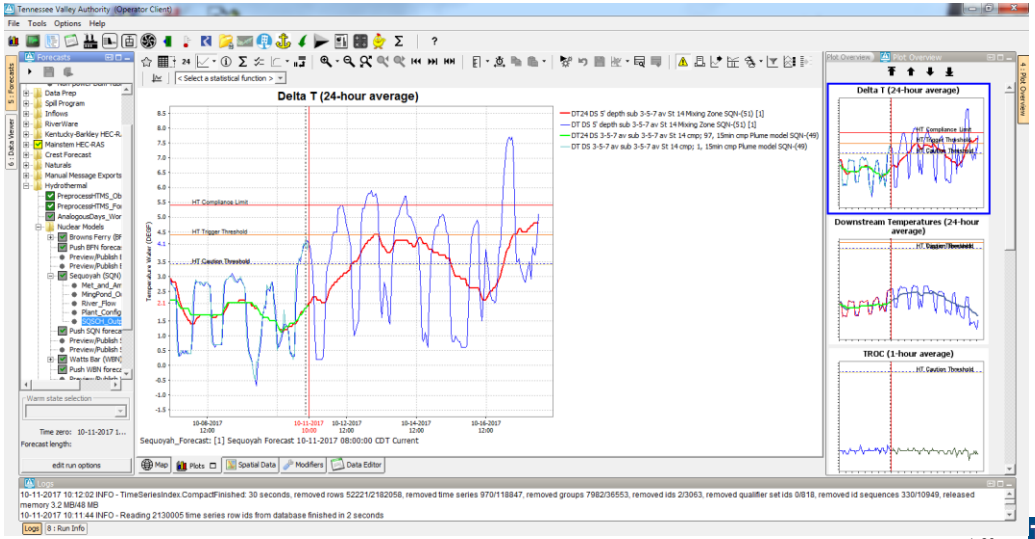


Hydrothermal Modeling

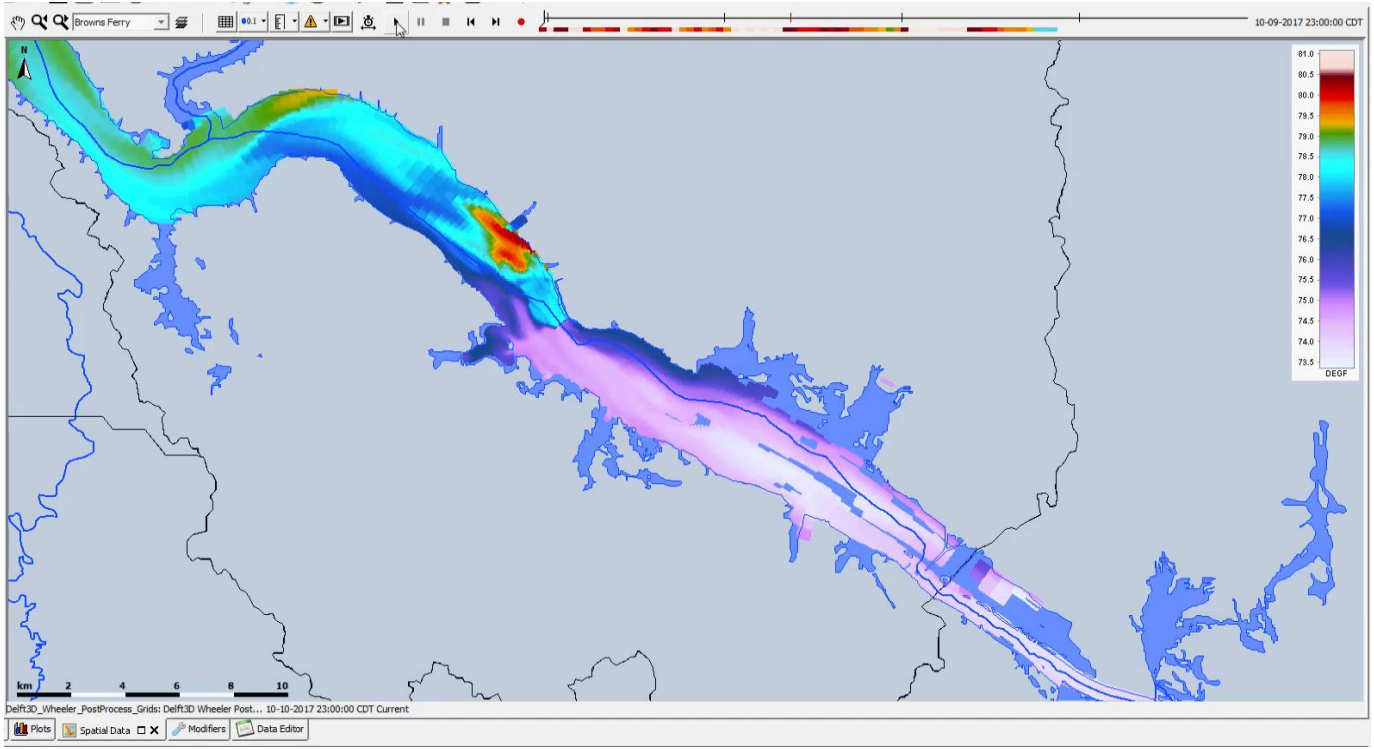
- Water Temperature forecasting for TVA coal and nuclear power plants





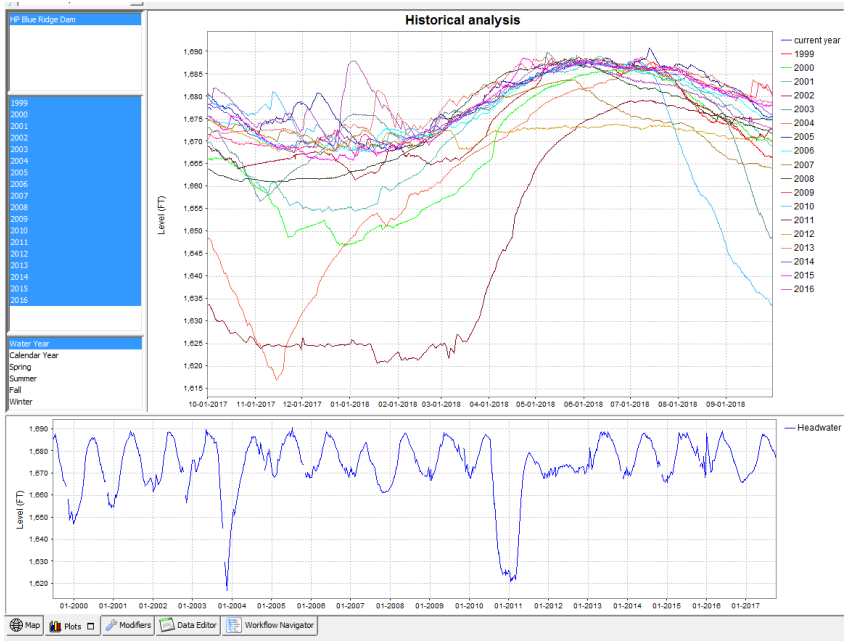


Hydrothermal – Delft3D Integration

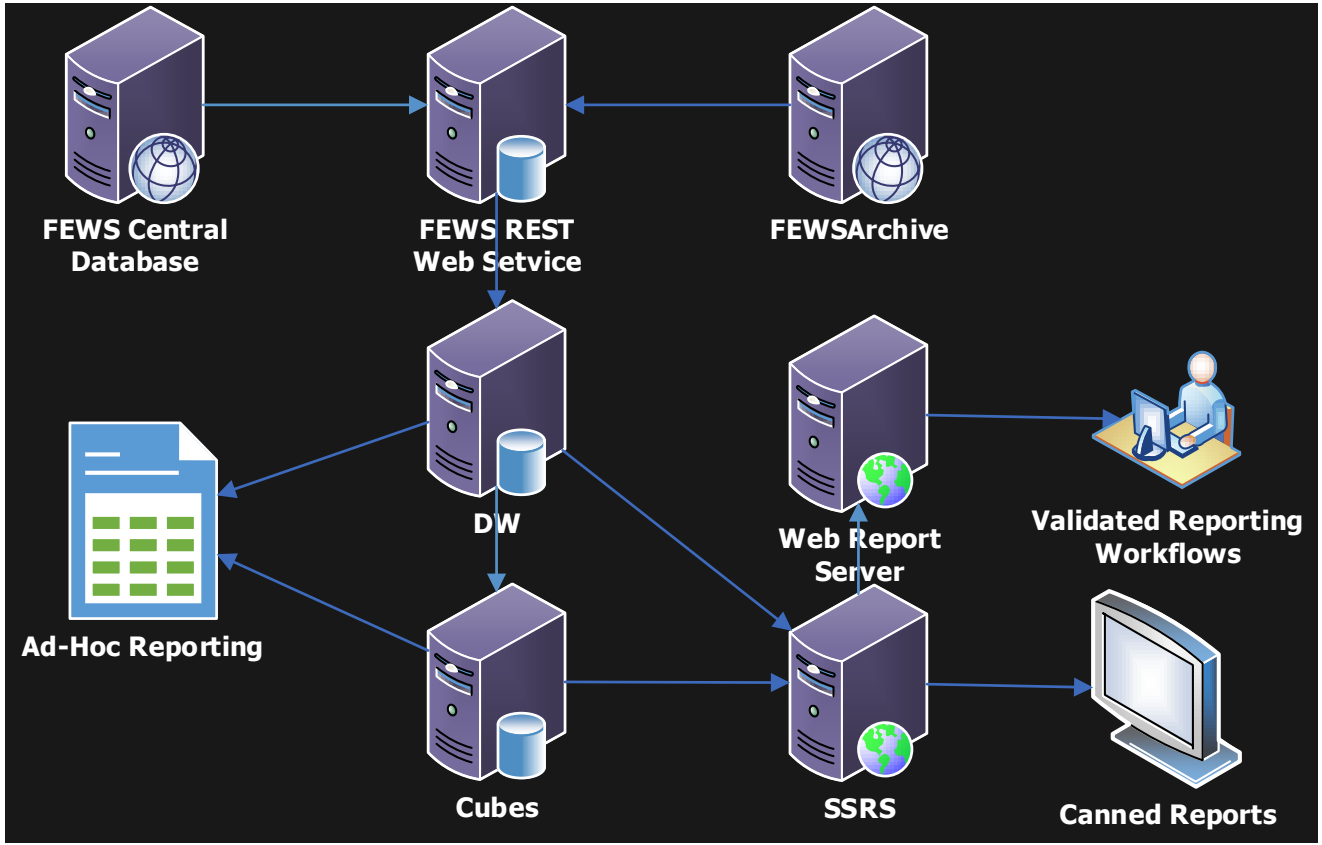


Open Archive

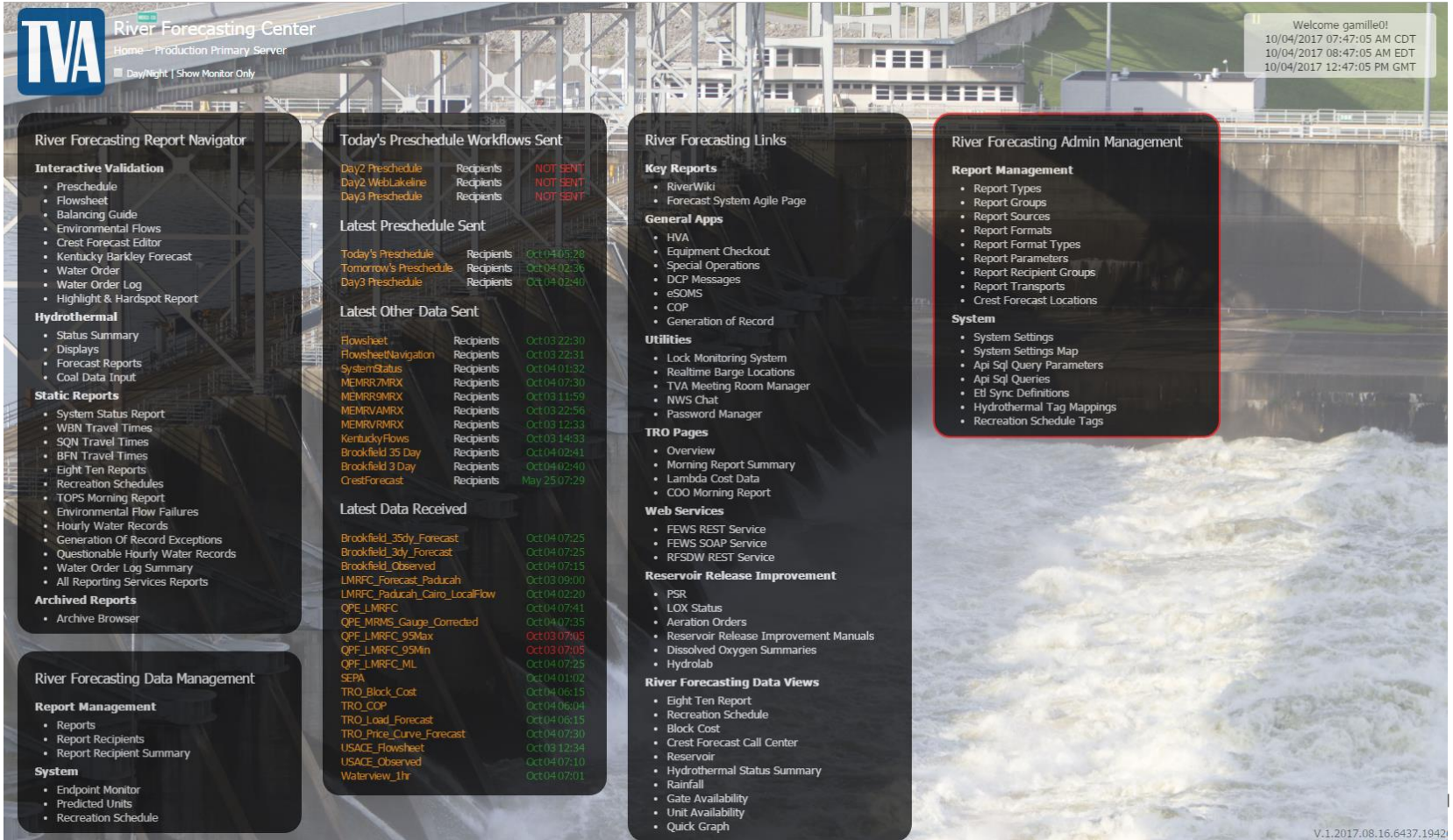
- All historical observations transferred to Archive
- All real-time forecasts and observations stored in Archive



Data Warehouse/Reporting Workflow



Reporting Dashboard



Example Reports

TVA HYDRO GENERATION PRESCHEDULE	Wednesday, October 4, 2017																		Generated:10/4/2017 5:28 AM Central		
MEL	0	59	7	44	32	107	146	261	11	15	140	75	14	23	18	24	93	0	121	71	86
MSL	0	65	8	52	42	108	179	294	14	19	158	78	16	28	20	25	111	0	150	119	138
Notes		10-11	9-11	2	3		5					8								16-18	15-16

	SHH	WTH	WIH	BOH	FPH	CRH	DGH	FNH	CTH	NTH	HIH	APH	BRH	O3H	O2H	O1H	NOH	MHH	FLH	WBH	CHH
1	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	29	47	47
2	0	0	0	0	13P	0	0	0	0	0	0	44	0	0	0	0	0	0	0	47	47
3	0	30	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	47	47
4	0	0	0	22a	0	19P	17P	0	0	0	0	44	0	0	0	5P	0	0	0	47	47
5	0	0	0	22a	13P	0	0	0	0	0	0	44	0	0	0	0	0	0	0	47	47
6	0	0	0	22a	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	47	47
7	0	0	0	22a	0	0	0	0	0	0	0	44	0	0	0	0	0	0	29	47	47
8	0	30	0	0	13P	0	17P	87a	6P	0	0	44	0	23	18	5P	0	0	29	47	47
9	0	0	0	0	0	0	0	87a	0	0	0	44	0	23	18	0	0	0	29	71	47
10	0	0	0	0	0	19P	0	87a	0	0	0	44	0	23	18	0	47	0	29	71	47
11	0	0	0	0	13P	0	0	87a	0	0	0	44	0	23	18	0	47	0	59	71	47
12	0	0	0	0	0	0	36	87a	0	0	66	44	0	23	18	5P	47	0	90	71	47
13	0	30	0	0	0	0	36	87a	0	0	66	44	0	23	18	0	47	0	121	71	47
14	0	0	0	0	13P	35	36	87a	0	15	139	75	0	23	18	0	47	0	121	71	47
15	0	0	0	0	0	70	70	174a	11	15	158m	75	0	23	18	0	47	0	121	71	47
16	0	0	0	22a	0	70	104	261a	11	15	158m	75	16m	23	18	5P	93	0	121	119m	87
17	0	30	0	22a	18	93	104	261a	11	15	158m	75	16m	23	18	0	93	0	121	119m	87
18	0	0	0	22a	18	93	104	261a	11	15	158m	75	16m	23	18	0	93	0	121	119m	87
19	0	0	0	22a	18	93	104	174a	11	15	158m	75	16m	23	18	0	93	0	121	71	87
20	0	0	0	22a	18	70	104	174a	11	15	139	75	16m	23	18	5P	93	0	121	71	87
21	0	0	0	22a	18	70	104	174a	11	0	66	75	0	23	18	0	47	0	121	71	87
22	0	30	0	0	0	35	70	87a	0	0	0	44	0	0	0	0	47	0	90	71	47
23	0	0	0	0	0	0	36	87a	0	0	0	44	0	0	0	0	47	0	90	71	47
24	0	0	0	0	13P	0	36	87a	0	0	0	44	0	0	0	5P	47	0	59	47	47
Total	**0**	**150**	**0**	**220**	**168**	**667**	**978**	**2,349**	**83**	**105**	**1,266**	**1,304**	**80**	**322**	**252**	**30**	**935**	**0**	**1,622**	**1,632**	**1,368**

	SHH	WTH	WIH	BOH	FPH	CRH	DGH	FNH	CTH	NTH	HIH	APH	BRH	O3H	O2H	O1H	NOH	MHH	FLH	WBH	CHH
6	0	30	0	66	26	19	17	0	0	0	0	264	0	0	0	5	0	0	29	282	282
12	0	30	0	22	26	19	53	435	6	0	66	264	0	115	90	10	141	0	265	378	282
18	0	60	0	66	49	361	454	1,131	44	75	837	419	48	138	108	5	420	0	726	570	402
24	0	30	0	66	67	268	454	783	33	30	363	357	32	69	54	10	374	0	602	402	402

KEY	
m	msl
P	pulse
s	schedule
R	rec
f	flow
a	agc

1. MSL
2. BOH: UFN. Spread generation and limit ramping to stabilize TW.
3. FPH: UFN. Notify TEC at 423-229-3735 for any unscheduled 2-unit use.
4.
5. DGH: UFN. Max 19,000 cfs for snail darter.
6. Follow schedule for recreation (standing note)
7.
8. APH: UFN. Ramp down 1 unit at a time.
9. WIH: UFN. Call Matt Allen if running 10MW or more between 1500 and 0600.
10. WTH/WIH: UFN. Run WTH as needed for WIH pool (standing note).
11. WTH/WIH: WTH/WIH: UFN maximum 36 MW combined generation.
12.
13.
14.
15. CHH: 10/4 at 2300 to 10/5 at 0700. 14k or less flow for steel pile installation.
16. WBH/CHH: UFN. SQN. Min 8kcfs past plant, steady if daily Q is less thank 13kcfs.
17. WBH: UFN. WBN-Run 1 hour of 1 unit generation after 4 consecutive hours of zero.
18. WBH: 10/3-10/6. Min 1 unit for WBN toxicity testing
19. GUH/WEH: UFN. BFN. Min 9.5 kcfs hourly, min 12K daily, steady past BFN if Q<15K
20. WEH/WLH: When WLH loaded, run WEH as needed to control WLH pool.
21. KYH: Run up to 25 kcfs if TW below 301
22.
23. PKH: UFN. Unit 2 must run for vibration issues.
24. Temp @ peak = 81° @ 1700

Forecast Date: **10/4/2017 2:00:00 AM** CST

Page 1 of 2

DAILY HYDRO REPORT **Thursday, March 03, 2016** **Generated:3/3/2016 7:36 AM**

SPECIAL OPERATIONS
BOH: UFN. Seepage Repair. Keep pool between 1352-1353.
FPH: 1/13-4/1. Spillway gate work. HW below 1260.5 0600-1500 Mon-Fri.
DGH: UFN. Ramp down 1 unit per hour for last two units.
NOH: 2/25. Annual Trout Survey. 1 unit 1500-2300.
HIH: thru 6/30/2016. Ring Seal Gate Work. TW < 1290.
FNH: thru 3/6. Reconnect Equipment. 7 day advance spill notice for gates 1&2.

FLH: UFN. Bridge Construction. Notify plant 2 hours prior to spill.
FLH: UFN. Chilhowee Drawdown. Maintain pool below 812.5.
FLH: 2/25. Zero generation 0800-1000 unit 4 for offline frequency test.
WBH/CHH: UFN.SQN. Min 7K daily Q past SQN. Steady if daily Q <13K. Notify HTE staff if daily Q < 8K.
WBH: UFN. WBN. Generate minimum 1 hour after 4 consecutive hours of zero flow.
GUH/WEH: UFN.BFN. Steady if Q past BFN <15K. Notify HTE staff if daily Q past BFN <10K.

EXPECTED GATE CHANGES
Today: FPH,APH,GUH,WEH,WLH,PKH
Tomorrow: FLH,WEH,WLH

If you have any questions concerning the daily hydro report, please call River Operations at 865-632-7063.

Location	Thu, 03/03	Fri, 03/04	Sat, 03/05	Sun, 03/06	Mon, 03/07	Tue, 03/08	Wed, 03/09	Thu, 03/10	Detail Trend
Canal									
Avg CombFlow	4.8	0.9	1.8	0.8	-0.7	-0.3	1.3	0.7	
Avg B>K Flow	4.8	0.9	1.8	0.8	0.0	0.0	1.3	0.7	
Avg K>B Flow	0.0	0.0	0.0	0.0	0.7	0.3	0.0	0.0	
Cheatham									
Avg Out	49.0	49.0	49.0	49.0	49.0	49.0	49.0	45.0	
Barkley									
Avg In	3.0	4.4	3.5	2.8	2.4	2.2	2.0	1.8	
End El	355.7	356.1	356.3	356.6	356.8	357.0	357.2	354.1	
6	355.4	355.8	356.1	356.4	356.6	356.8	357.0	354.2	
12	355.5	355.9	356.2	356.5	356.7	356.9	357.1	354.1	
18	355.6	356.0	356.3	356.5	356.7	356.9	357.1	354.1	
24	355.7	356.1	356.3	356.6	356.8	357.0	357.2	354.1	
Avg Out	50.0	50.0	50.0	50.0	50.0	50.0	50.0	55.0	

Environmental Flow Requirements - As of Midnight Wednesday, March 02, 2016

Minimum Daily Flow Requirements (CFS)

Location	Requirement	Observed	Pass / Fail	24 Hour Trend
Apalachia	200	4,413	Pass	
Barkley	6,000	54,721	Pass	
Boone	400	7,035	Pass	
Chickamauga	3,000	82,678	Pass	
Chilhowee	0	10,547	Pass	
Fontana	0	9,070	Pass	
Knoxville WTP	2,000	103,234	Pass	
Melton Hill	400	16,390	Pass	
Norris	800	13,973	Pass	
Pickwick	8,000	150,716	Pass	
Wilbur	107	1,442	Pass	

Minimum Inst (Hourly) Flow Requirements (CFS)

Location	Requirement	Observed	Pass / Fail	24 Hour Trend
Barkley	6,000	54,300	Pass	
Bear Creek nr Red Bay	21	825	Pass	
Blue Ridge	115	125	Pass	
Calderwood	35	9,782	Pass	
Cedar Creek	10	470	Pass	
Duck at Shelbyville	120	1,699	Pass	
Elk abv Fayetteville	120	1,451	Pass	
Kentucky	5,000	160,179	Pass	
Little Bear Creek	5	13	Pass	
Normandy	40	1,135	Pass	
Nottely	55	1,322	Pass	
Ocoee at Copperhill	75	739	Pass	
Tims Ford	80	0	Fail	
Upper Bear Creek	5	315	Pass	
Watauga at Elizabethton	112	2,059	Pass	

Wiki

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  - Preschedule
  - Kentucky Barkley
  - Data Steward
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- River Forecast System
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  - Precip Processing
  - Inflow Model
  - RiverWare
  - KB Model
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  - BFN (FEWS)
  - SQN (plant)
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  - WBN (plant)
  - WBN (FEWS)
  - SysTemp (reference)
  - SysTemp (FEWS)
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  - General (reference)
  - General (FEWS)
  - Logistics
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- Tools

Welcome to the RiverWiki

The RiverWiki s a tool to help you do your job better and more easily. How many times have you thought; "now where did I put that info on the sluice elevation at Norris," or something similar? Please use this wiki as a place to store our collective knowledge of our river system, and how to run it. The tools for collecting and organizing information are so easy that you couldn't jot down a note much faster. You don't even need permissions to use this tool, because it is yours. To edit a page simply login (upper right hand corner) and then click on the edit button.

If you encounter any bugs or issues in FEWS, please make note of them on the **Requested Improvements** page.

River Forecast System

- Data Validation
- Spill Calculator
- Precipitation Processing and Selection
- Inflow Model
- Transitional Data Retrieval
- Riverware
- Kentucky-Barkley Model
- Mainstem HEC-RAS Models
- Reports and Messaging
- Archive
- Applications and Links
- Checklists
- How to Make a Schedule Change
- Crest Forecast and Phone Bank Tools
- Verification

Hydrothermal Modeling System

- Disclaimer
- Nuclear Models:
  - Browns Ferry (plant | history | FEWS)
  - Sequoyah (plant | history | FEWS)
  - Watts Bar (plant | history | FEWS)
  - SysTemp (reference | FEWS)
- Coal Models (plants | history | FEWS)
- Data Validation and EDS (reference | FEWS)
- General (reference | FEWS)
- Environmental (reference | history)
- Logistics

Key Data

- River Data Repository
- Reservoir Operations Study (ROS)
- Support Contacts
- LakeInfo Website
- NWSChat
- Reports Manager
- Live Data
- Flood Risk and Floodplains
- Water Record Data Access
- **Water Resources Dashboard**

System Documentation

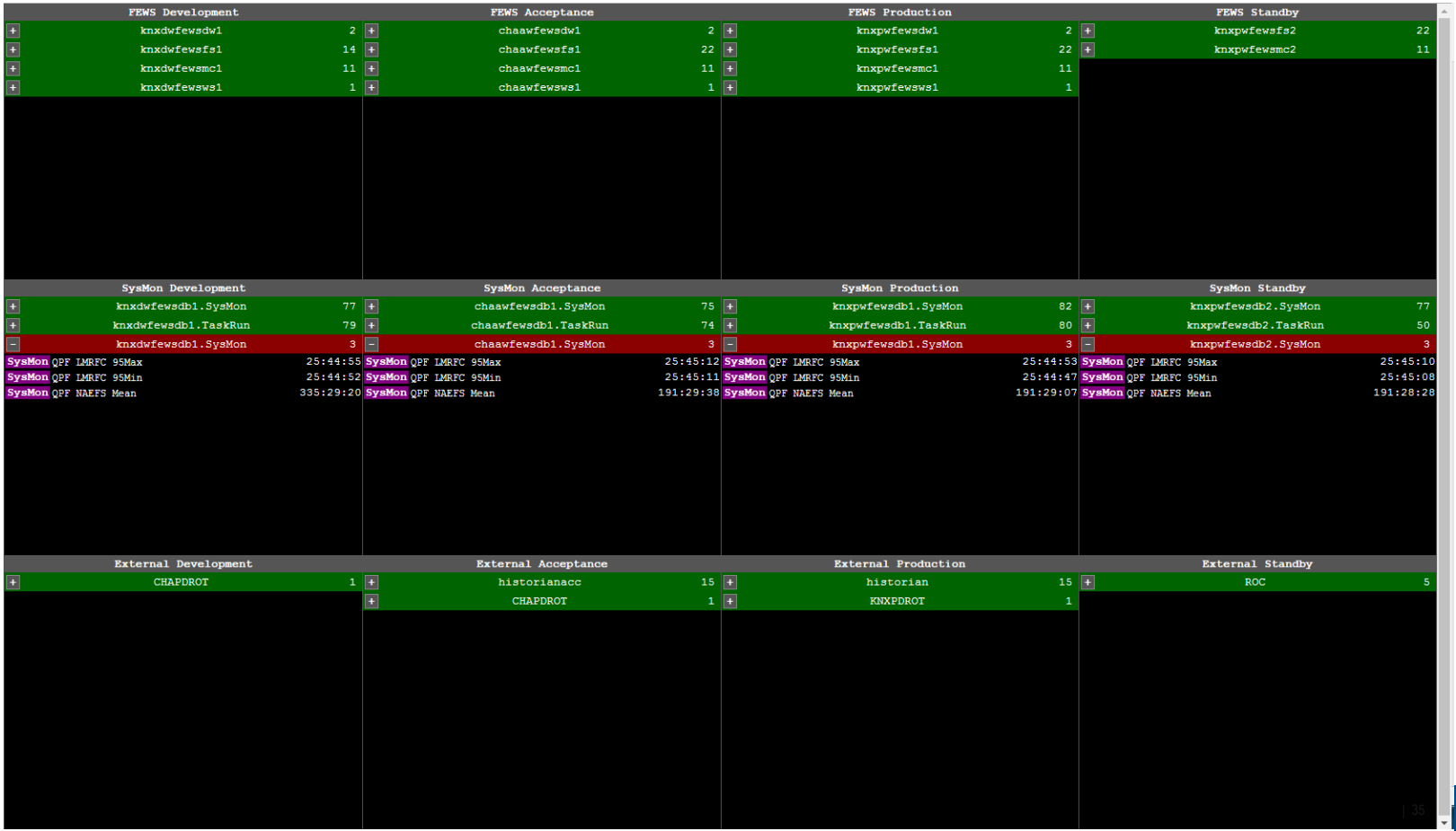
- Locations
- Parameters
- Min Flow Requirements
- System Administration
- System Diagram
- FAQ
- Daylight Savings Known Issues

FEWS Information

- How to Use FEWS
- How to Install FEWS
- Validation Colors and Codes
- Delft-FEWS Wiki
- **What's New?/What Needs Testing?**

Wiki Basics

Endpoint Monitor



Future Plans

- Verification and Performance Scoring
- Ensemble Prediction
- Real-time Inundation Mapping
- Long-term Optimization Modelling
- Operational Delft-3D hydrothermal models
- Public-facing webservice/Updated mobile application
- Watercoach training modules


TVA