Southeastern Federal Power Alliance Meeting

Alabama Coosa Tallapoosa (ACT)

May 2015 Updated Water Control Manual

USACE Reservoir Operation

29 Sept 2015

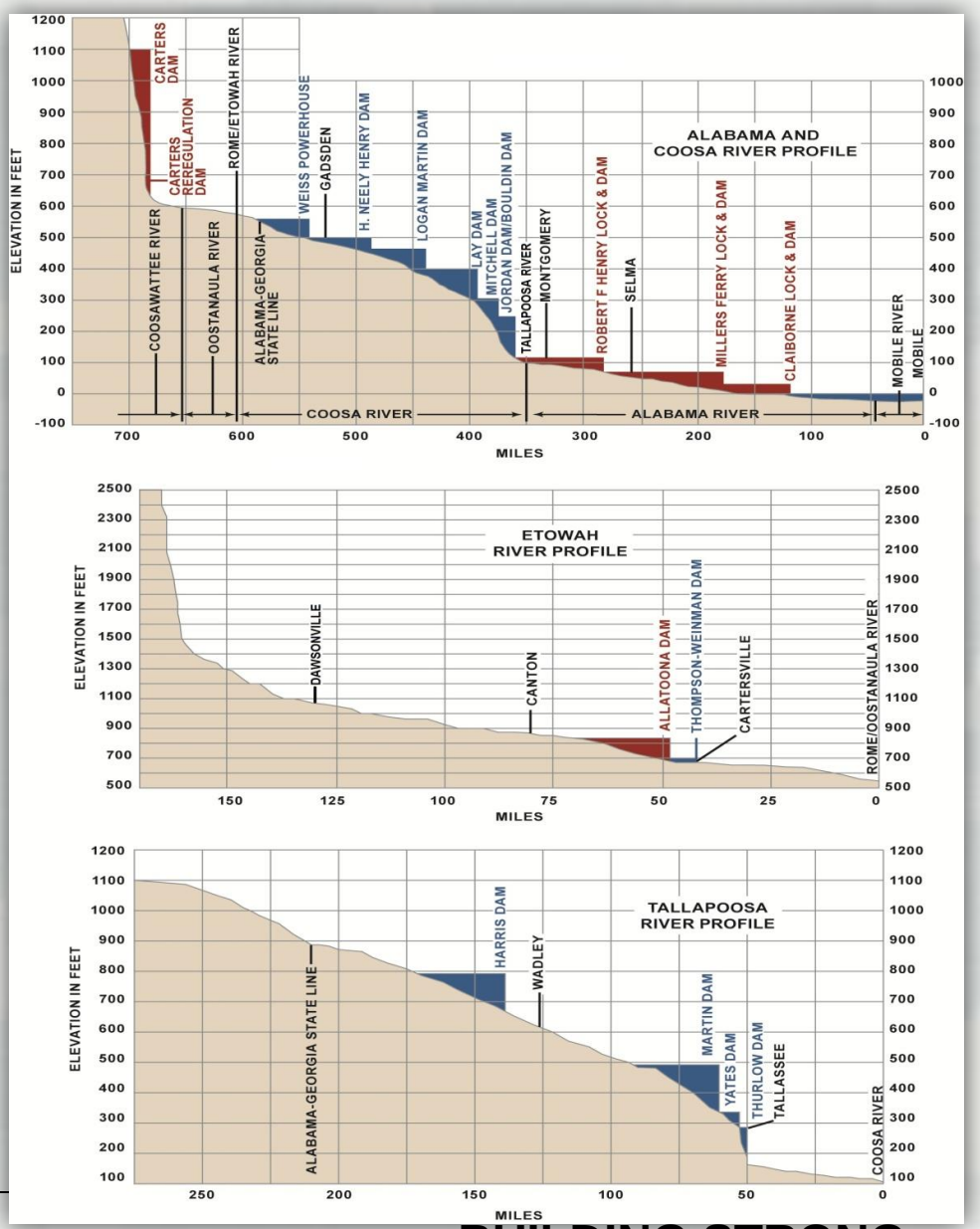
US Army Corps of Engineers

BUILDING STRONG®

Topics of Discussion

1. General Contents of ACT Update Water Control Manuals
2. Discuss Allatoona historic hydropower operation
3. Discuss modeling of Carters pumping operation
4. How we are expected to operate the ACT Federal Hydropower projects in the future

ACT Basin Reservoir Projects



Summary of Previous Operations

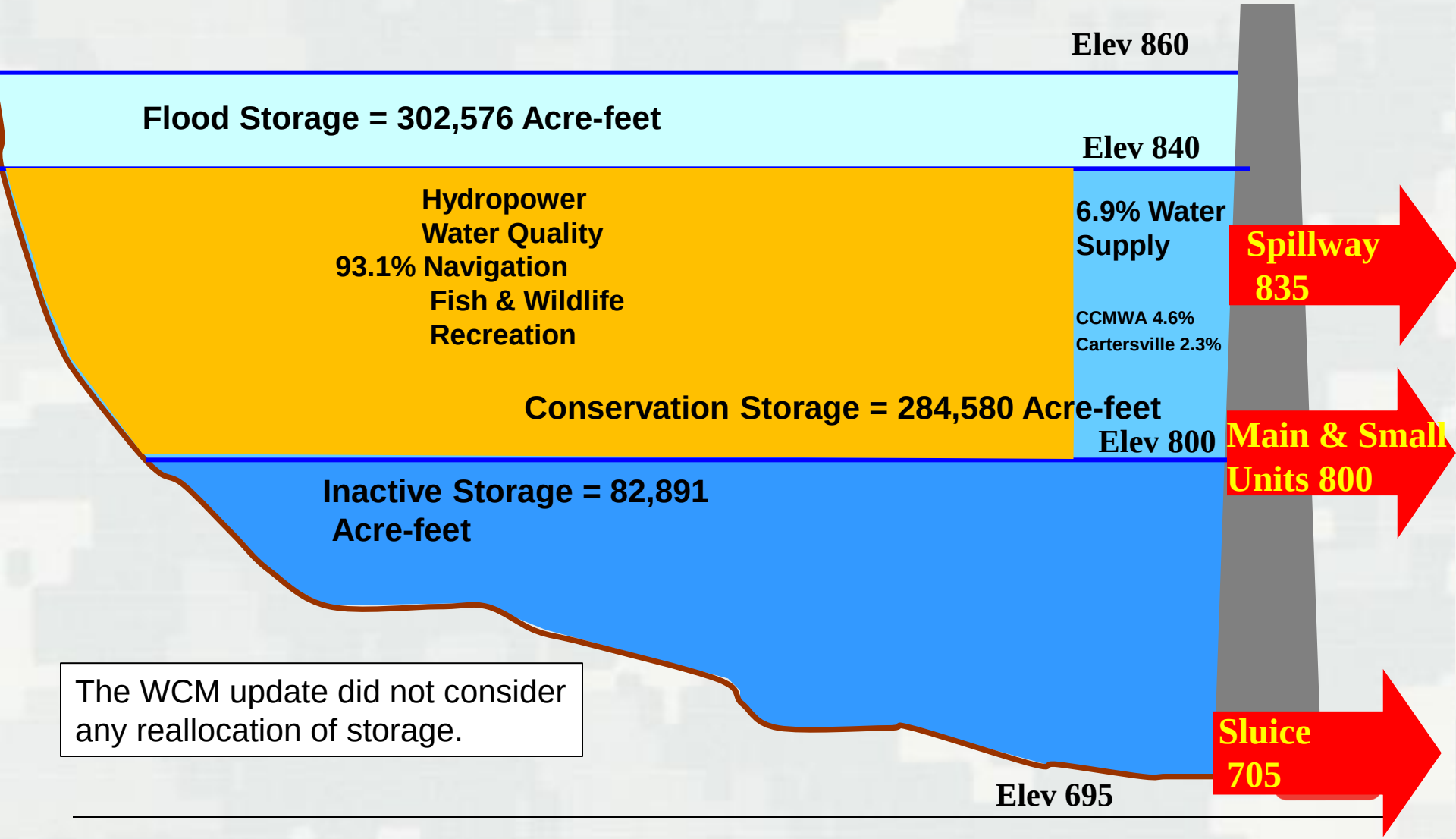
- **Flood Risk Management (FRM):** Current WCMs for USACE and Alabama Power Company (APC) Projects
- **Drought Operations:** No basin-wide drought operations
- **Guide Curves:** Current WCMs for USACE and APC Projects (excludes H. Neely Henry Dam variance)
- **Action Zones:** Current USACE action zones and APC drought curves
- **Hydropower:** As specified in current USACE manuals (no authority over APC hydropower), APC demand provided
- **Navigation:**
  - Informal 1972 Letter of Agreement, provides 4,640 cfs from APC projects
  - Flow target of 6,600 cfs from Claiborne Lock & Dam
  - Current flow targets insufficient to provide adequate commercial navigation depths
- **Minimum Flows:** 240 cfs from Allatoona & Carters ReReg, APC pre-2013 FERC licenses
- **Federal Water Supply:** Current water storage contracted amounts
- **Fish and Wildlife**
  - Continue to manage fish spawning operations at Allatoona Lake
  - Continue migratory fish passage at Claiborne and Millers Ferry Projects
- **APC Projects:** Continue operation of Coosa and Tallapoosa River Projects for FRM pursuant to existing WCMs, existing navigation flow agreements and no formal drought plan

Summary of Update Operation

- **Flood Risk Management:** No change to current operations. Flood study needed to implement operations proposed in new FERC licenses.
- **Drought Operations Plan:** New basin-wide plan includes triggers and dam releases/flow targets to conserve storage during droughts (collaboration with APC & USFWS)
- **Revised Guide Curves:** Permanently raise winter pool at H. Neely Henry (APC), Allatoona winter step down
- **Revised Action Zones:** Allatoona-revised, Carters-added, APC-No Change
- **Hydropower:** Modified variable hydropower generation at Allatoona based on action zone and time of year.
- **Navigation Plan:** Collaborative effort with APC to support commercial navigation (9.0-ft or 7.5-ft channel depth), based on assumed channel maintenance
- **Minimum Flows:** Implements seasonal minimum flows at Carters ReReg to support aquatic habitat
- **Federal Water Supply:** Limited to current water storage contracts (no excess)
- **Fish and Wildlife:** Seasonal minimum flow at Carters ReReg, drought plan targets
- **APC Projects:** Coosa and Tallapoosa Projects would be operated for FRM pursuant to existing WCMs with formal navigation plan and drought plan consistent with new FERC licenses

Substantial Focus on Allatoona Project

Allatoona Current Storage Allocation

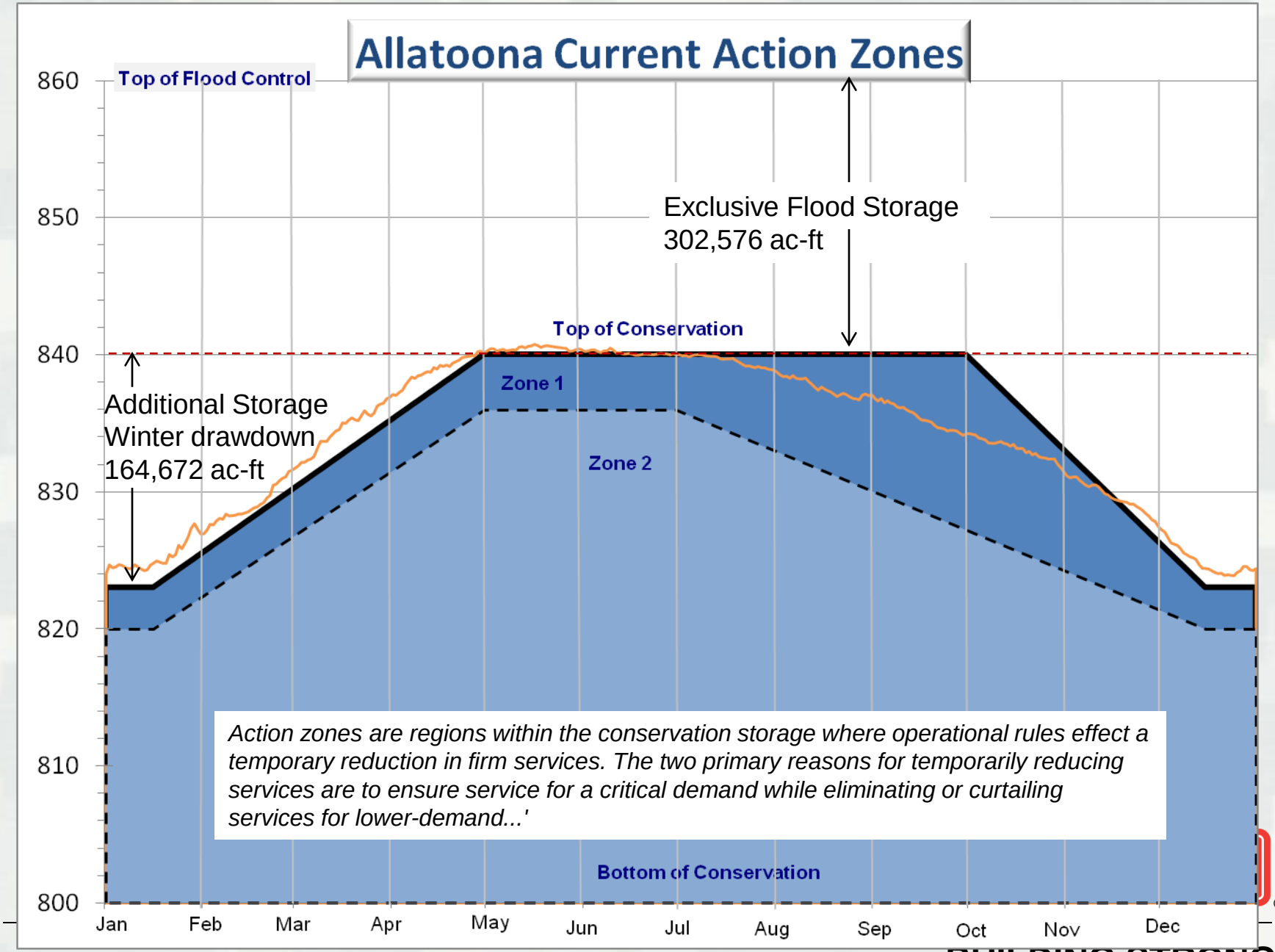


The WCM update did not consider any reallocation of storage.

Language in Previous Water Control Manual

- Page A4-3, 4-05 Reservoir Operation for Power: "While Allatoona is in *Zone 1*, the project conditions are normal to wetter than normal. Most likely, other projects within the basin or within the federal hydropower system are similarly normal to wetter than normal. Therefore *full consideration will be given to meeting the power contract amounts developed by SEPA*. This consideration will be weighed with the other purposes of the project to insure the appropriate project utilization.
- Page A4-4, 4-05 Reservoir Operation for Power: "In Zone 2 the minimum generation to support dependable hydropower capacity would generally be run. *If drought conditions become severe Zone 2 would be reserved for emergency needs*, either hydropower or downstream water supply, water quality or other extreme needs. When projected conditions indicate a significant possibility of exhausting conservation storage *routine hydropower generation may be suspended* and other conservative measures taken which would be appropriate to the drought severity.
- Page A5-1, 5-02 Critical Drought Considerations: "Maintaining an aquatic environment in the Etowah River is accomplished by continuous small turbine releases of about 220 to 250 cubic feet per second. Additional leakage and seepage from the Dam and powerhouse adds about 40 to 60 cfs…*During droughts, particularly in the late spring refill period, there may be extended periods when only the continuous release is being made*…In the occurrence of future droughts during which the continuous release may be the only release for a number of days or weeks, careful review in consultation with environmental agencies will be given to the adequacy of continuous releases."
- Page A5-4, 5-11 Drought Plan "*A **minimum** generation of 2 hours/day is allowed if the pool is in Zone 2*. Zone 1 represent more normal circumstances and *maximum generation would normally be two to six hours per day*."

- Chart 1-11:
- "Zone 1 – When the pool is in *Zone 1* normal conservation releases of water will be made. Releases from this zone will generally be equivalent to between *two to six hours of full generation*. Full consideration will be given to making hydropower releases to meet system hydropower requirements as well as other basin-wide considerations for storage utilization.
- Zone 2 – A more conservative water release will be made whenever the pool is in Zone 2. The objective will be to protect downstream water supply and water quality values and to protect the dependable generation capacity of the powerplant. Minimum releases consisting of continuous *release of about 240 cfs (small hydropower unit) plus two hours of peak power generation* each weekday will be made. However, additional short-term releases may be made for unusual or emergency situations."

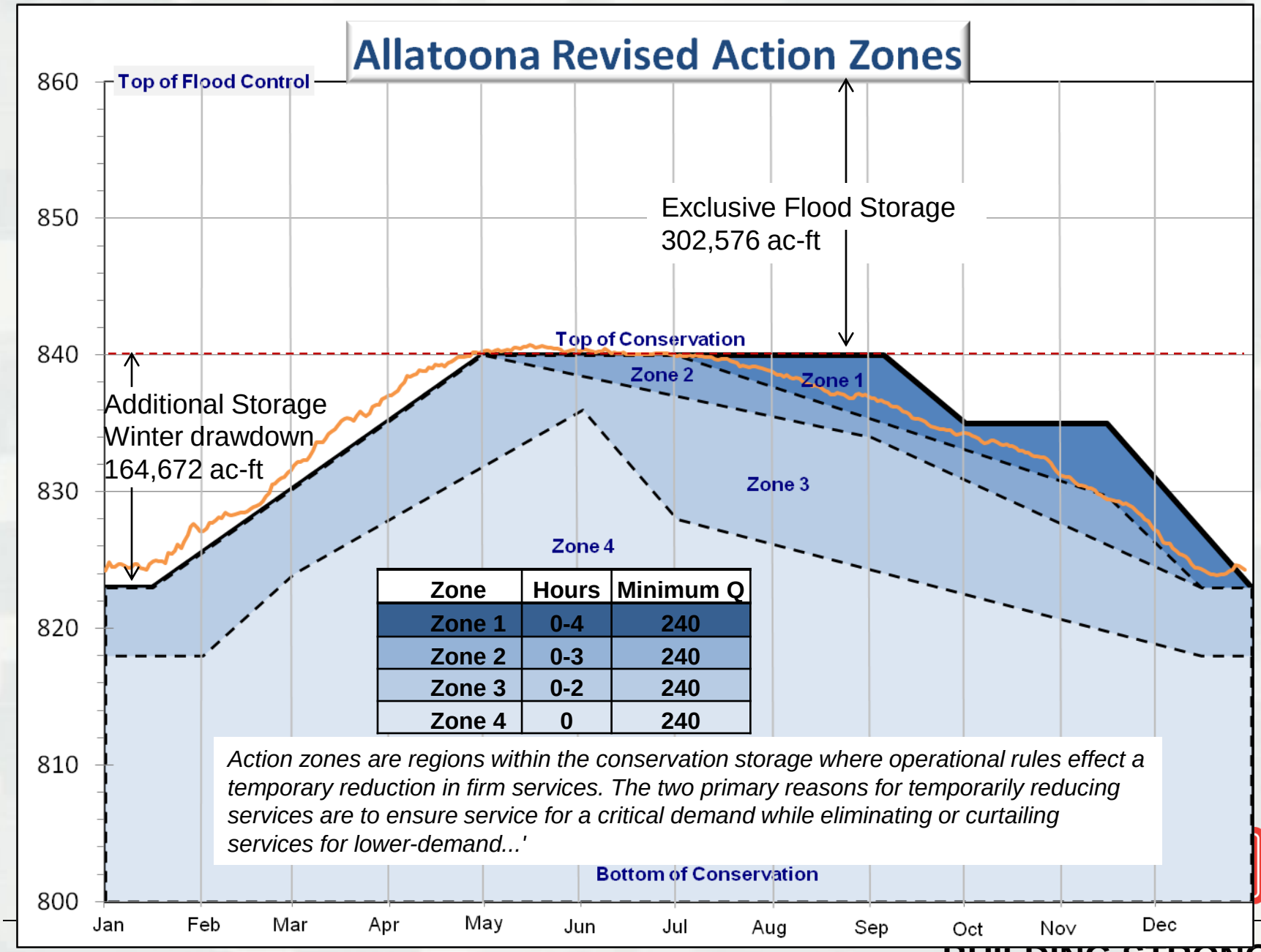


Action zones are regions within the conservation storage where operational rules effect a temporary reduction in firm services. The two primary reasons for temporarily reducing services are to ensure service for a critical demand while eliminating or curtailing services for lower-demand...'

Language in Updated Water Control Manual

- Zone 1: While Allatoona is in Zone 1, the project conditions are likely to be normal to wetter than normal during the late summer and fall months. Most likely, other projects in the basin and within the Federal hydropower system will be in similar condition. *Full consideration will be given to meeting hydropower demand by typically providing up to four hours of peak generation*. However, the duration of peak generation could be zero or exceed four hours based on various factors or activities, such as, maintenance and repair of turbines; emergency situations such as a drowning or chemical spill; draw-downs because of shoreline maintenance; drought operations; increased or decreased hydropower demand; and other circumstances.
- Zone 2: While in Zone 2, a *reduced amount of peaking generation will be provided to meet system hydropower* demand. *The typical peak generation schedule will provide up to three hours of peak generation*. However, the duration of peak generation *could be zero or exceed three hours* based on various factors or activities, such as, maintenance and repair of turbines; emergency situations such as a drowning or chemical spill; draw-downs because of shoreline maintenance; drought operations; increased or decreased hydropower demand; and other circumstances.
- Zone 3: Zone 3 will *typically indicate drier than normal conditions* or impending drought conditions. Careful, long range analyses and projections of inflows, pool levels, and upstream and downstream water needs will be made when pool levels are in Zone 3. While in Zone *3 during the months of Jan-Apr, a reduced amount of peaking generation will be provided to meet system hydropower demand while making water control regulation decisions to ensure refilling the reservoir to elevation 840 feet NGVD29 by 1 May*. Should drier than normal hydrologic conditions exist or persist, the reduced peak generation will continue until the reservoir level rises to a higher action zone. The *typical peak generation schedule will provide up to two hours of peak generation*. However, the duration of peak generation *could be zero or exceed two hours* based on various factors or activities, such as, maintenance and repair of turbines; emergency situations such as a drowning or chemical spill; draw-downs because of shoreline maintenance; drought operations; increased or decreased hydropower demand; and other circumstances.
- Zone 4: Reservoir elevations in *Zone 4 indicate severe drought conditions*. Careful, long range analyses and projections of inflows, pool levels, and upstream and downstream water needs will be made when pool levels are in Zone 4. *Peak generation will typically be suspended*. Continuous operation of the small unit will continue in order to maintain the 240 cfs minimum flow release

Allatoona Revised Action Zones



Zone	Hours	Minimum Q
Zone 1	0-4	240
Zone 2	0-3	240
Zone 3	0-2	240
Zone 4	0	240

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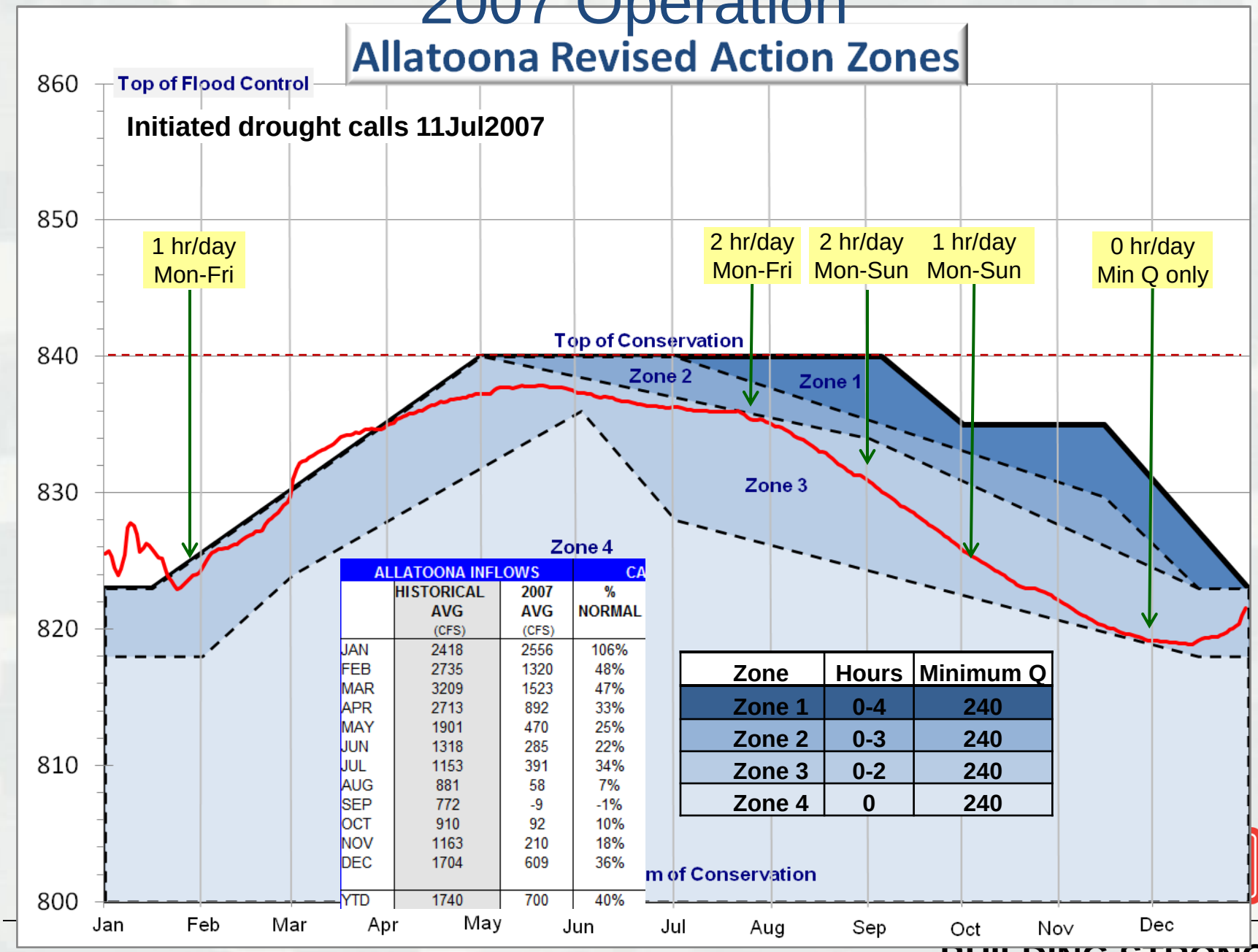
2007 Operation

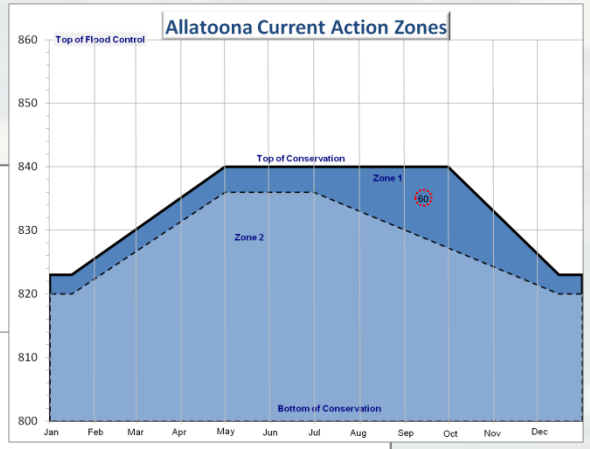
Allatoona Revised Action Zones

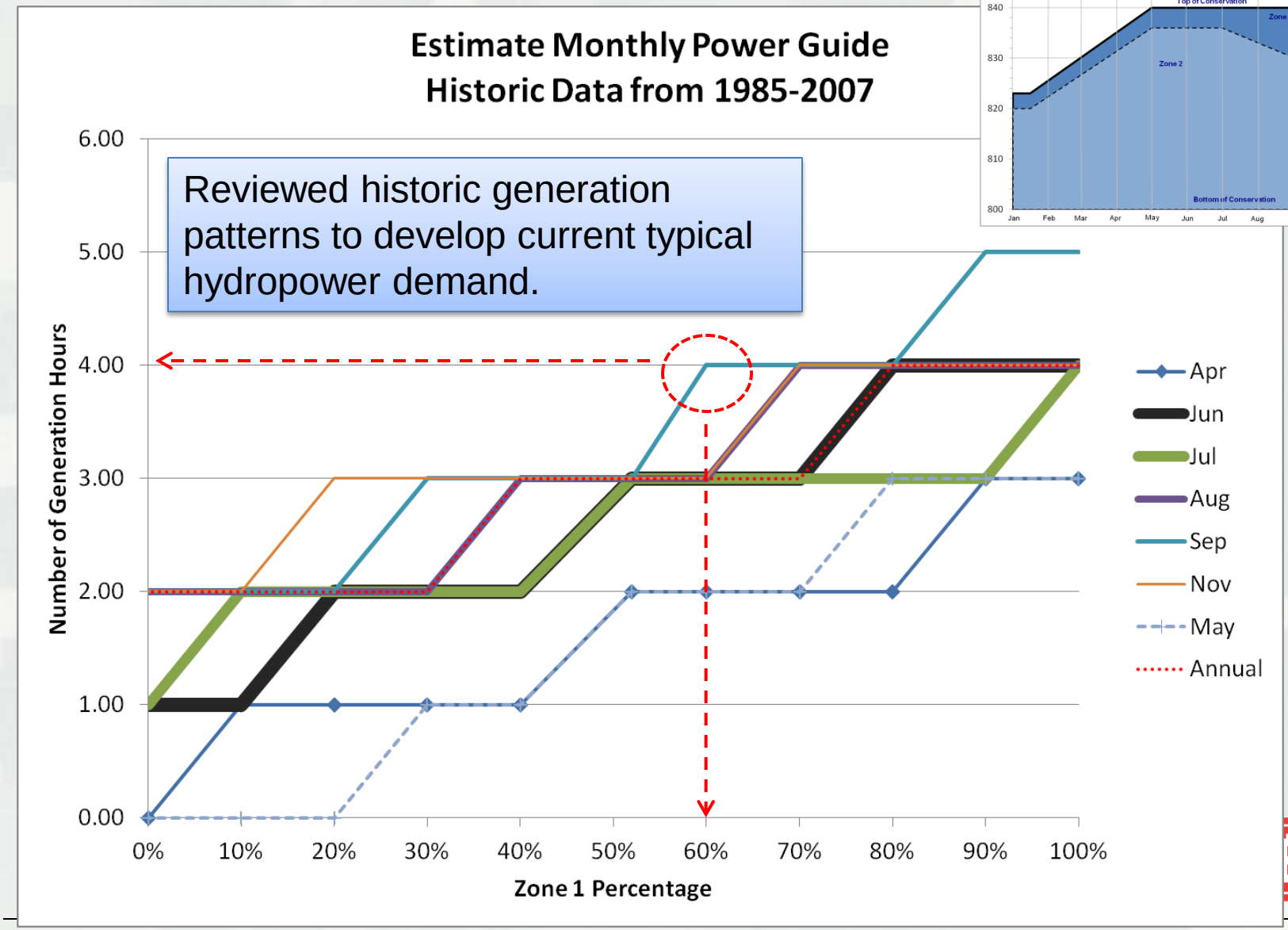


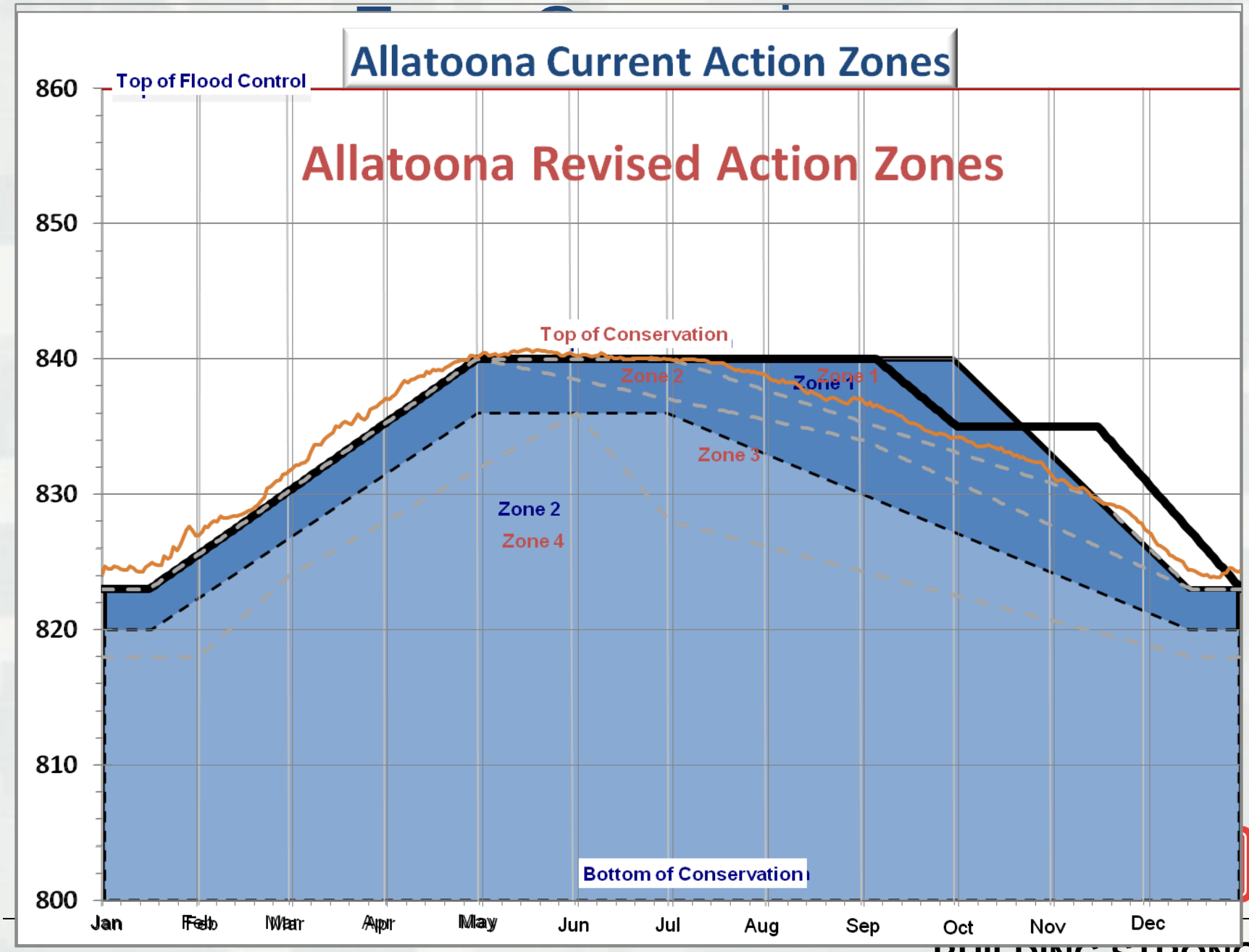
ALLATOONA INFLOWS	HISTORICAL AVG (CFS)	2007 AVG (CFS)	% NORMAL
JAN	2418	2556	106%
FEB	2735	1320	48%
MAR	3209	1523	47%
APR	2713	892	33%
MAY	1901	470	25%
JUN	1318	285	22%
JUL	1153	391	34%
AUG	881	58	7%
SEP	772	-9	-1%
OCT	910	92	10%
NOV	1163	210	18%
DEC	1704	609	36%
YTD	1740	700	40%

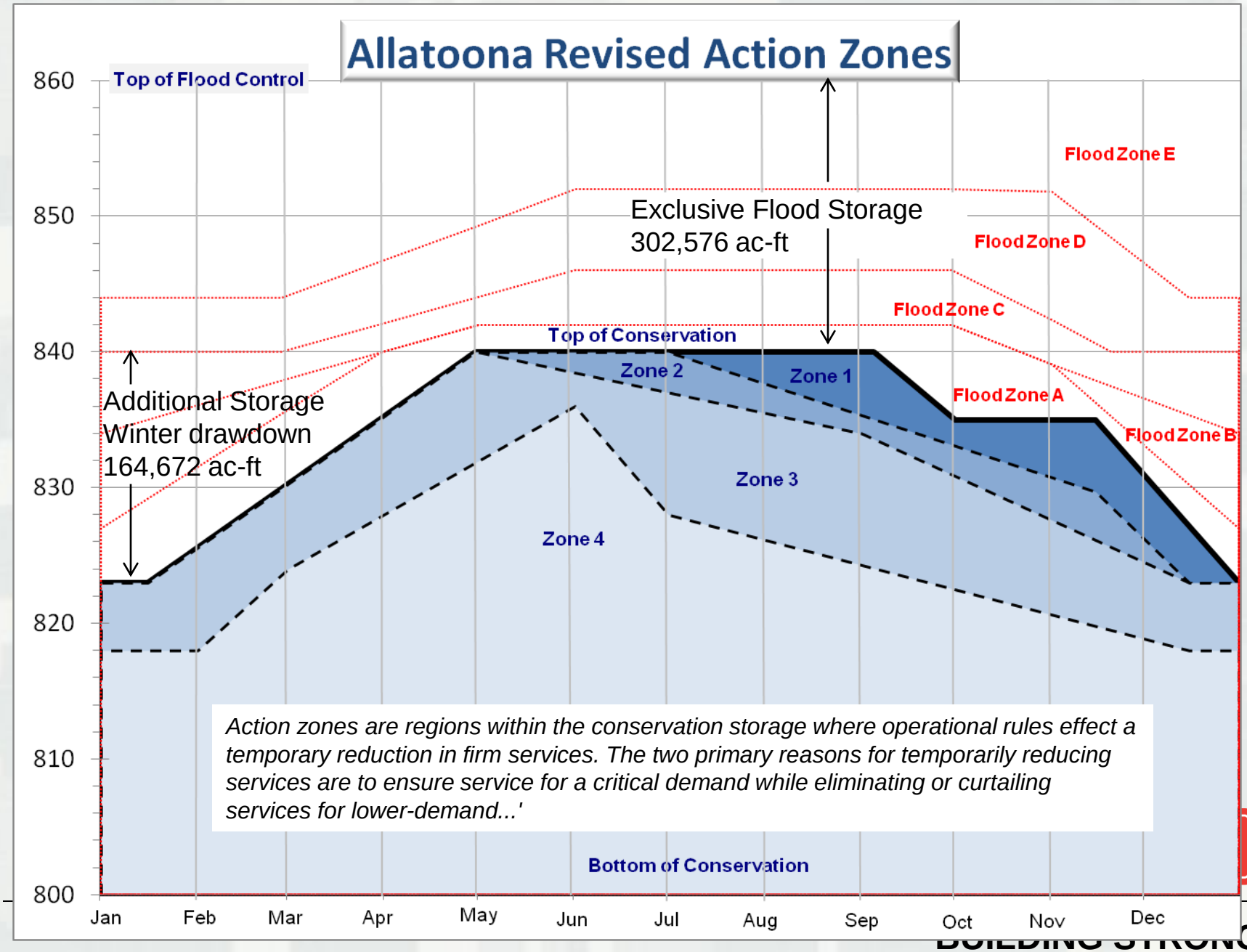
Zone	Hours	Minimum Q
Zone 1	0-4	240
Zone 2	0-3	240
Zone 3	0-2	240
Zone 4	0	240

Allatoona-Historic Generation





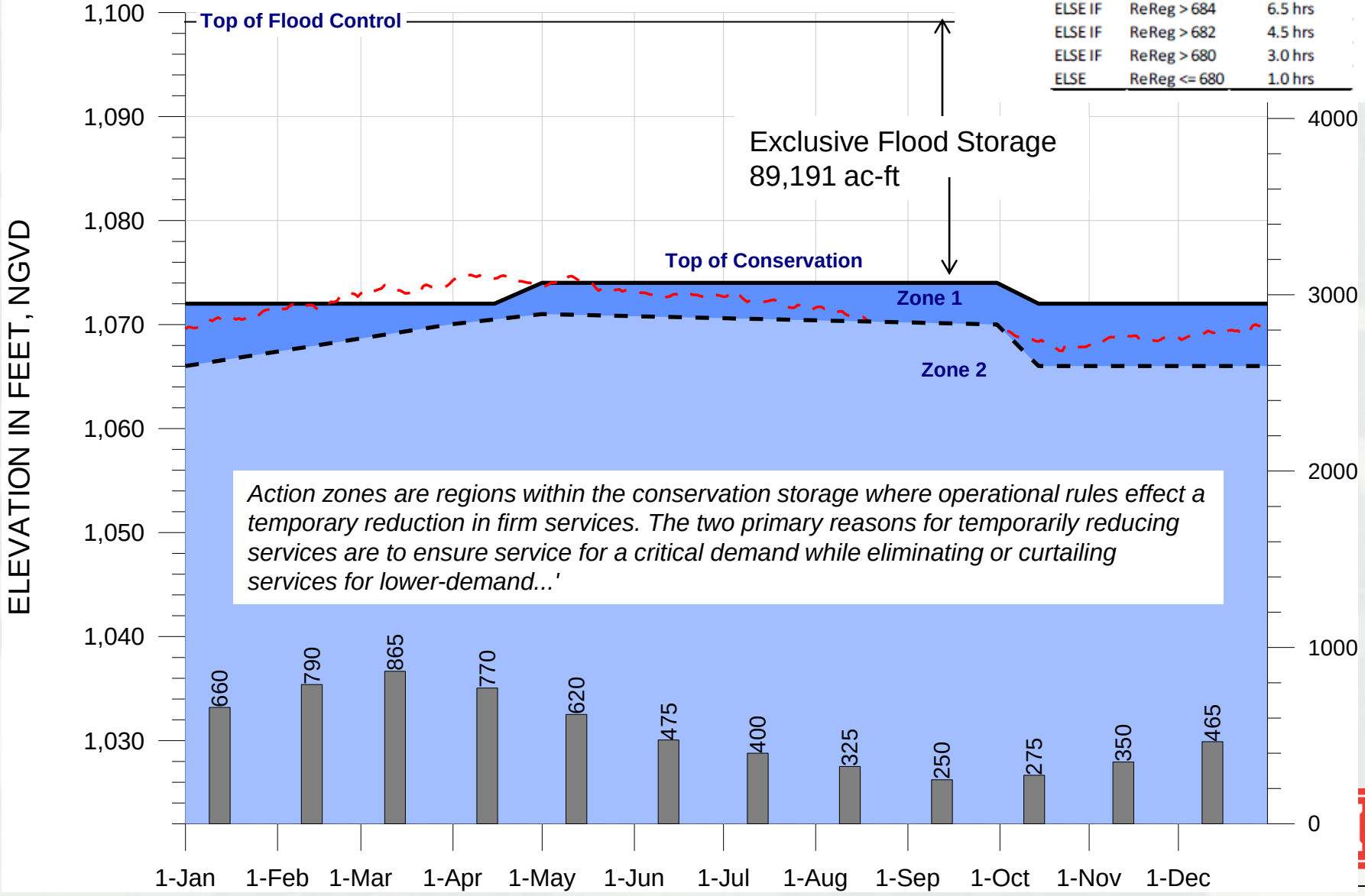




CARTERS RESERVOIR CONSERVATION ACTION ZONES

Table A.04 Relationship of Carters ReReg Pool Elevation to Conservation Pumpback Operation at Carters

	Statement	Operation Time
IF	ReReg > 686	8.75 hrs
ELSE IF	ReReg > 684	6.5 hrs
ELSE IF	ReReg > 682	4.5 hrs
ELSE IF	ReReg > 680	3.0 hrs
ELSE	ReReg <= 680	1.0 hrs



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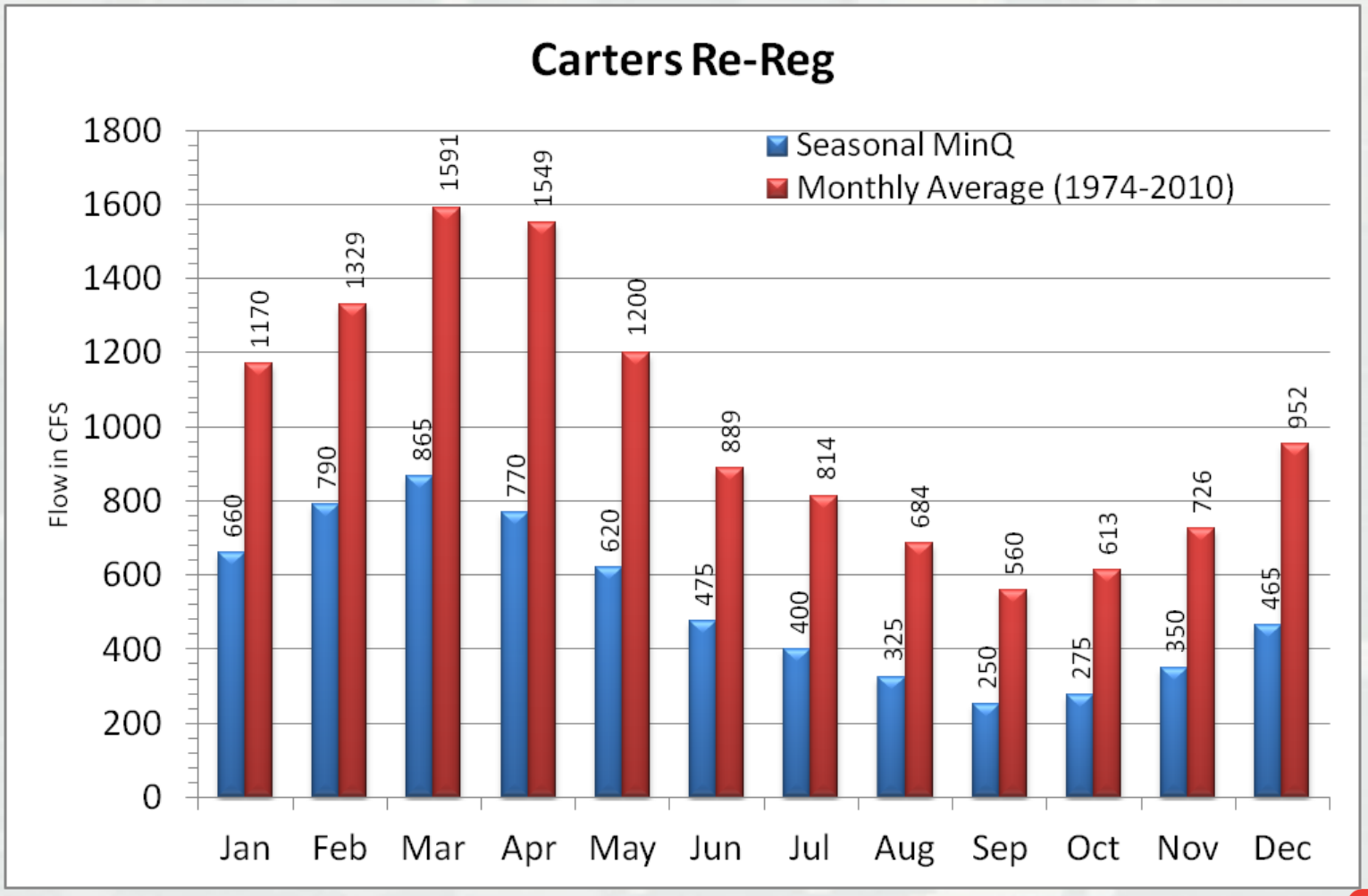
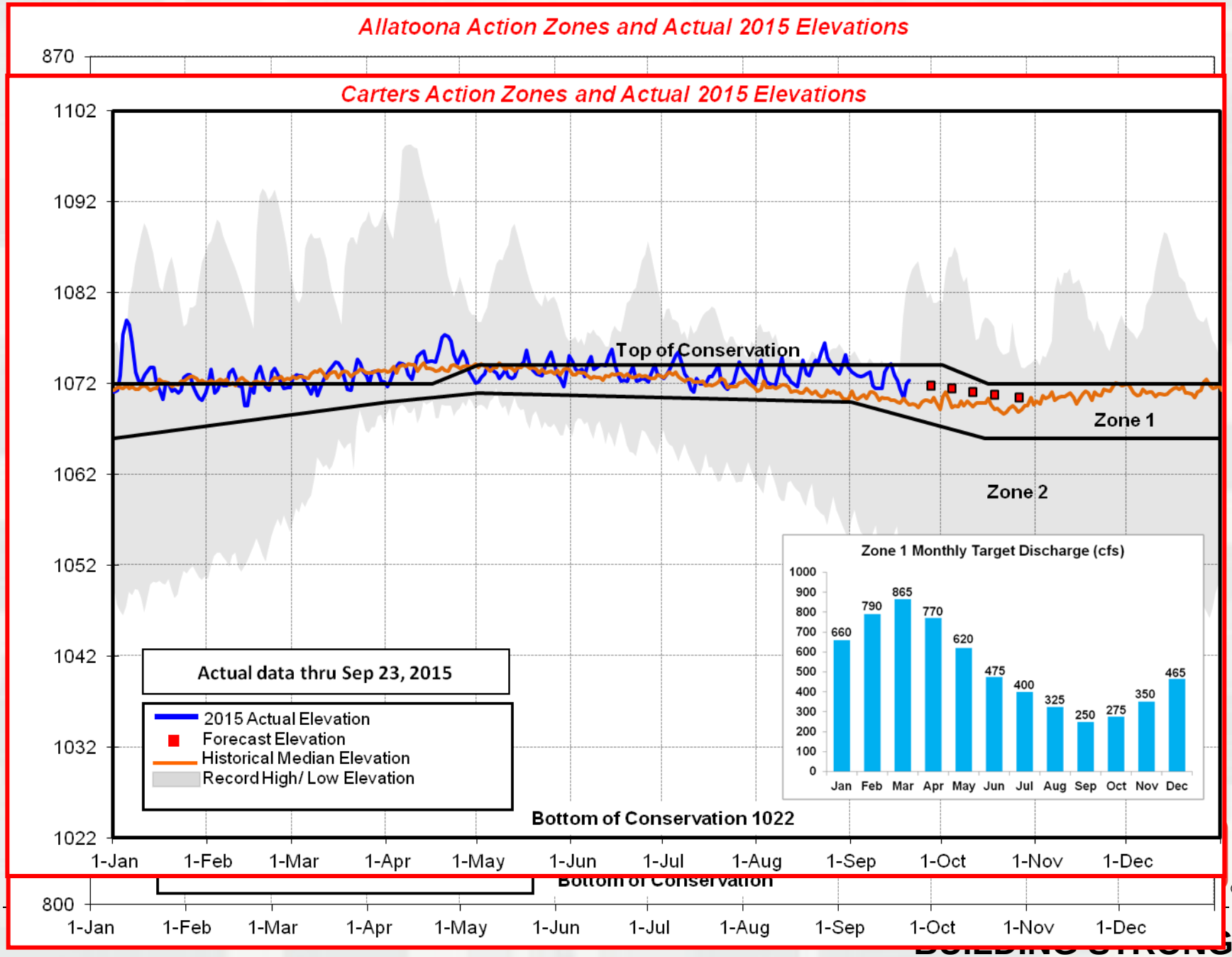
Carters ReReg
New Minimum Compared to Historic Releases




Allatoona Action Zones and Actual 2015 Elevations
870
800
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
Carters Action Zones and Actual 2015 Elevations
1102
1092
1082
1072
1062
1052
1042
1032
1022
Top of Conservation
Zone 1
Zone 2
Actual data thru Sep 23, 2015
2015 Actual Elevation
Forecast Elevation
Historical Median Elevation
Record High/ Low Elevation
Bottom of Conservation 1022
Zone 1 Monthly Target Discharge (cfs)
1000
900
800
700
600
500
400
300
200
100
0
660
790
865
770
620
475
400
325
250
275
350
465
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Questions

Our updated ACT manuals improves our preparation for similar extreme drawdowns that occurred at Folsom Lake.