



**PARR HYDROELECTRIC PROJECT
PARR HYDRO DEVELOPMENT &
FAIRFIELD PUMPED STORAGE
FACILITY DEVELOPMENT
FERC PROJECT No. 1894 - SC**

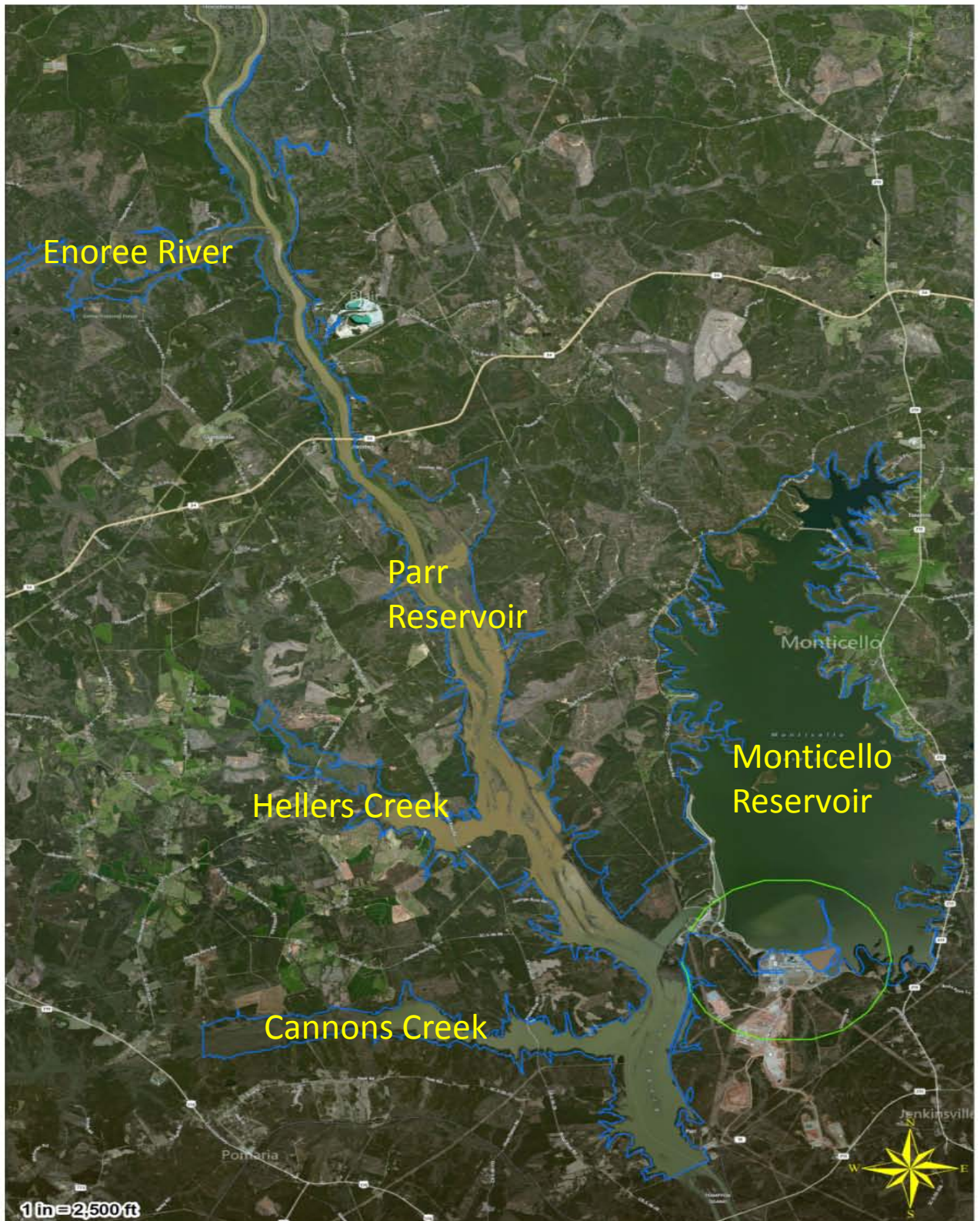
DECEMBER 4, 2012



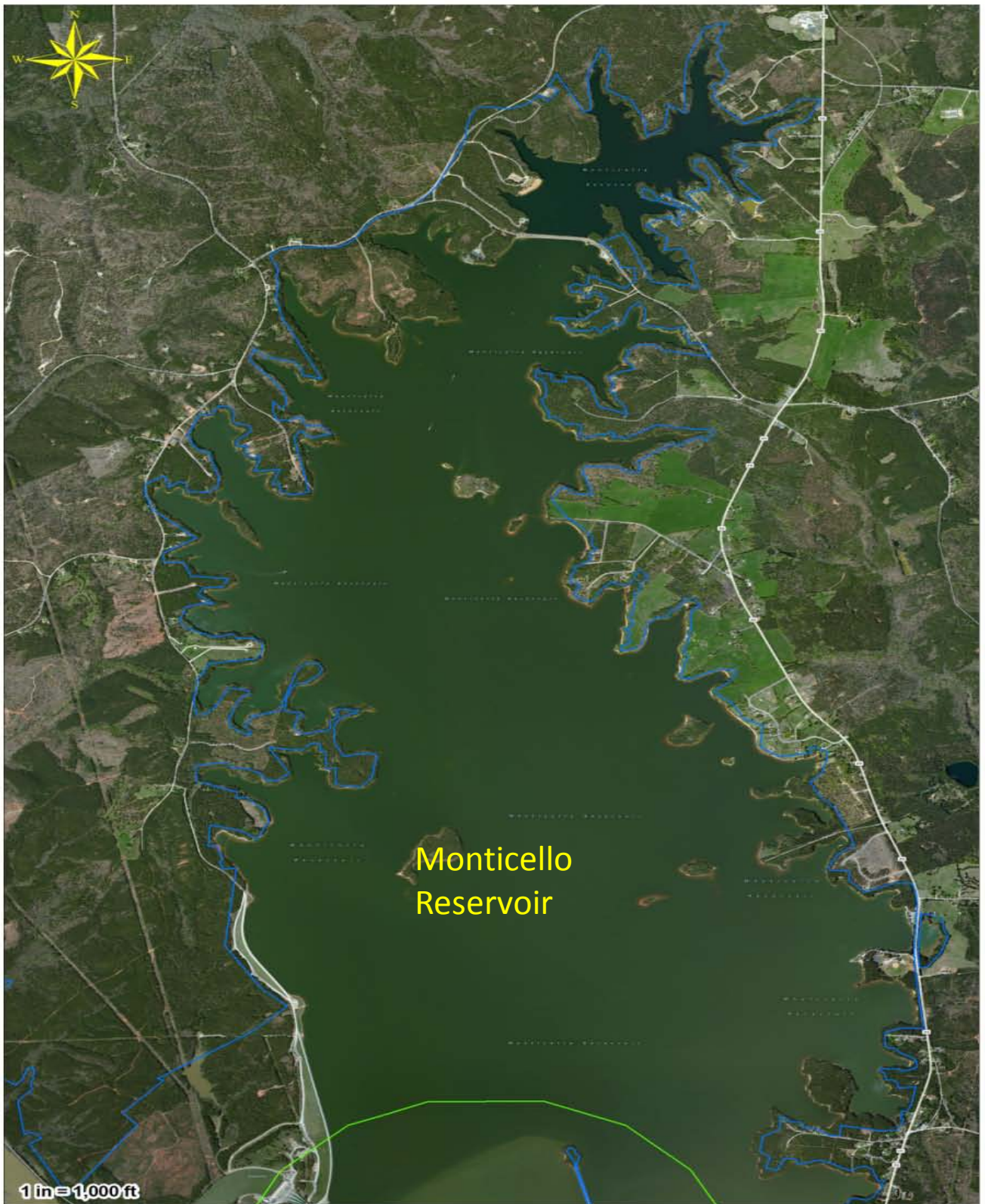
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PROJECT BOUNDARY MAPS

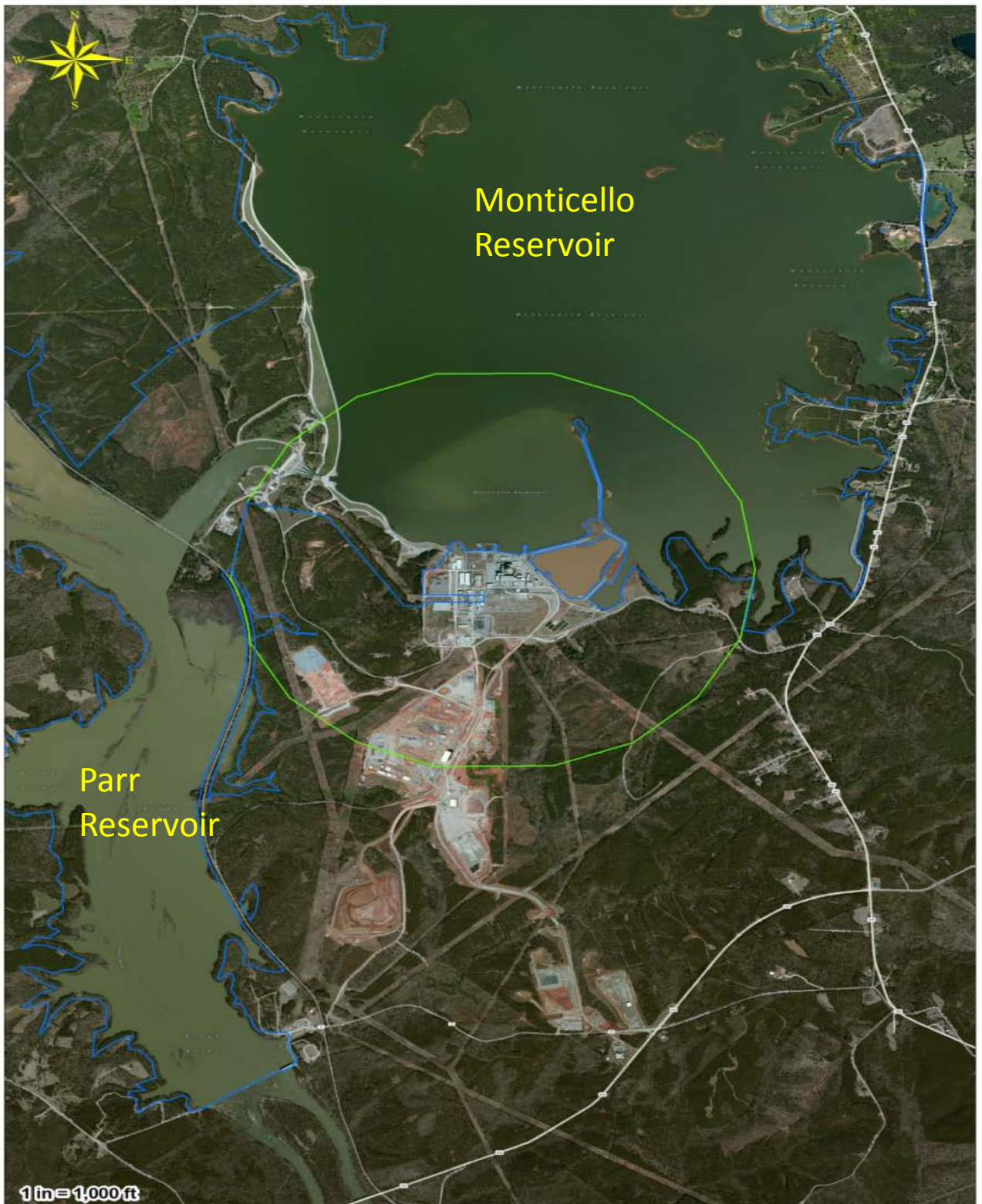
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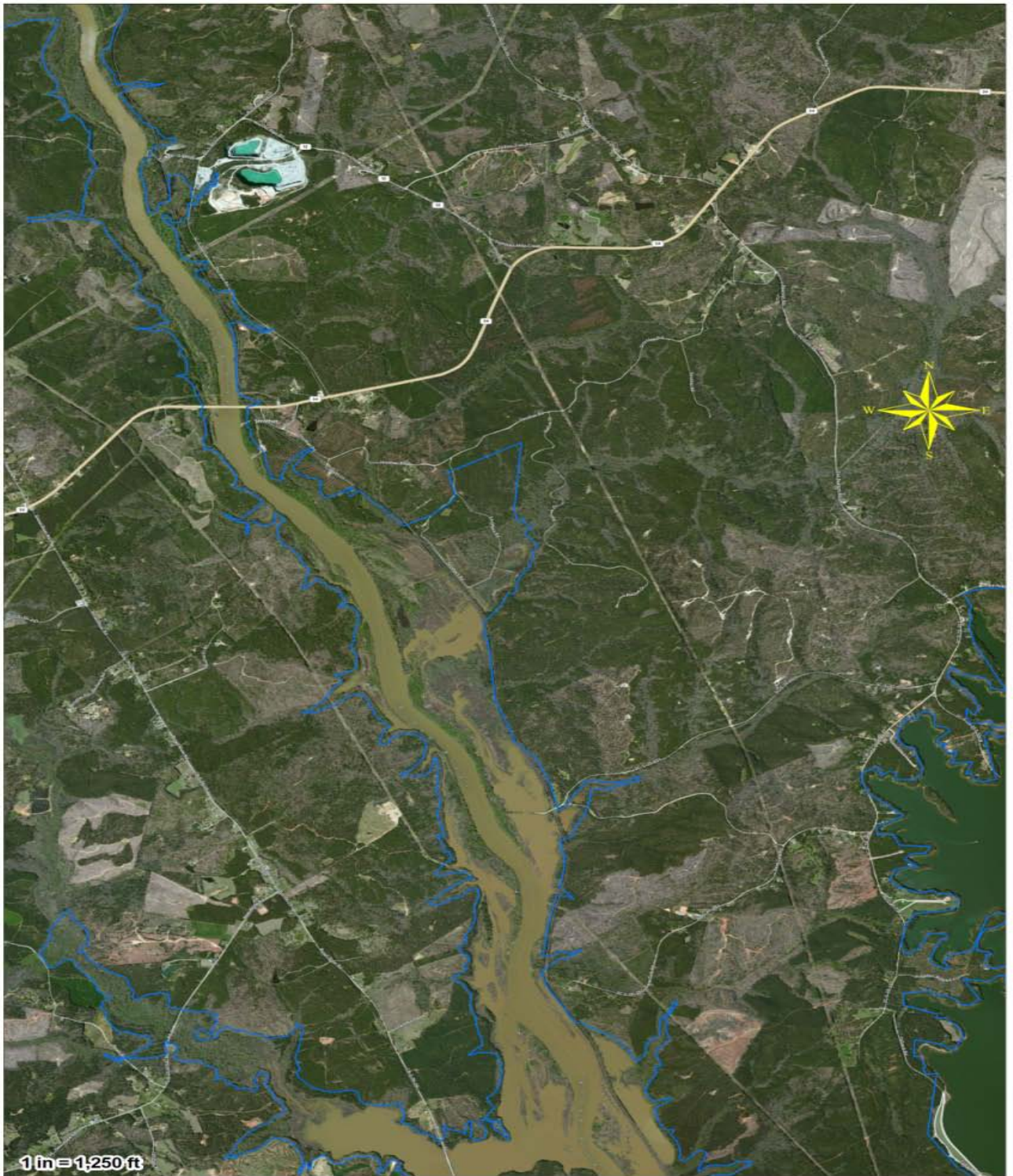
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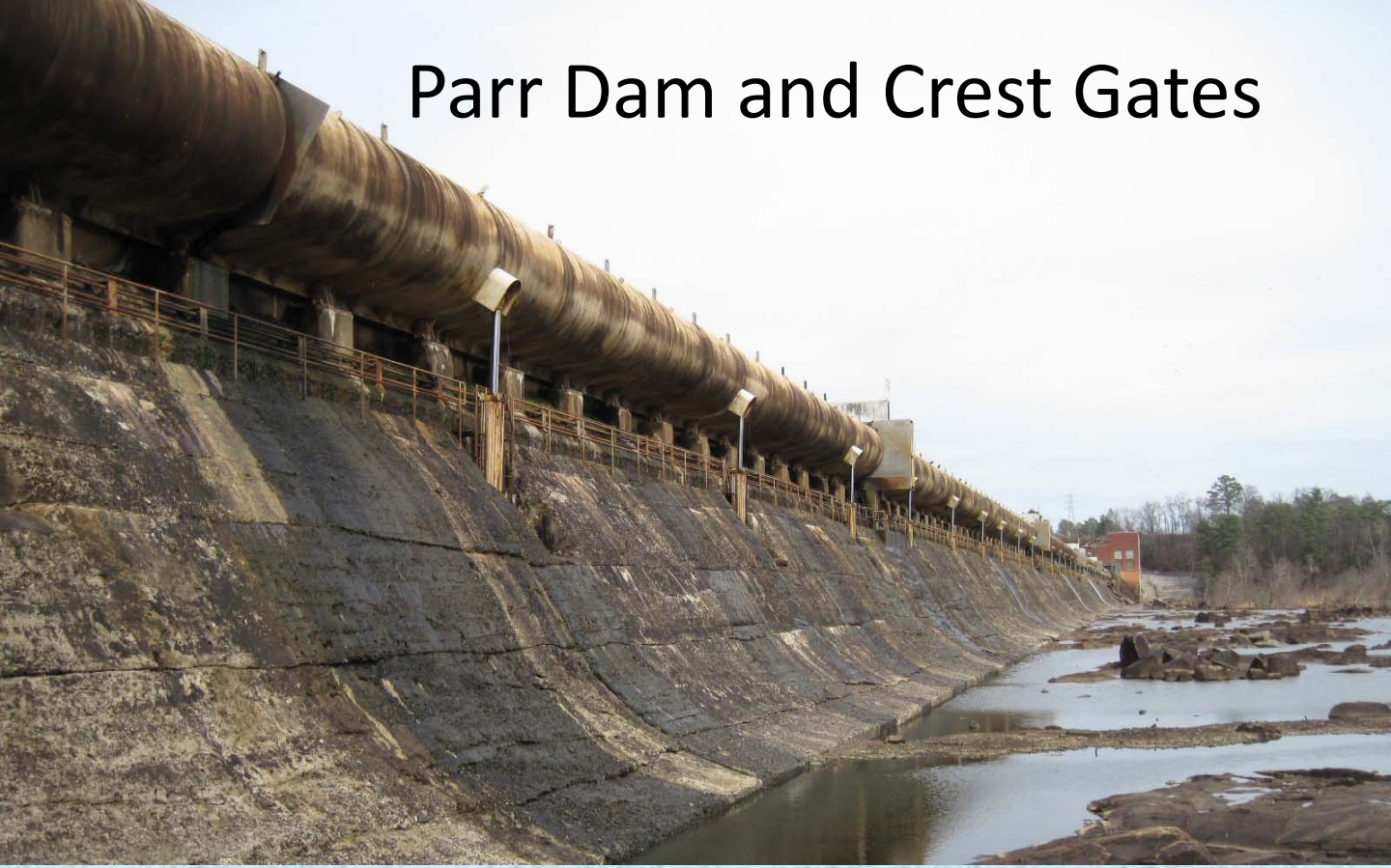
PROJECT OPERATIONS HYDRAULIC CONDITIONS

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PROJECT OPERATION

- Parr Project operation provides limited regulation of flows less than 40,000 CFS.
- Little to no regulation of higher flows, due to limited storage available in Parr Reservoir.
- USGS states that discharges at Alston gage are affected by “regulation at low to medium flows due to power plants above station.”
- Fairfield Pumped Storage (FFPS) operation usually affects only Parr Reservoir level; Parr Hydro passes instream flow in Broad River up to about 6,000 CFS.

Parr Dam and Crest Gates



- 10 bascule type gates added to Parr Dam in 1976 to increase reservoir capacity for pumped storage operation at FFPS.
- Each gate is 200 feet long and 9 feet tall.
- Normally operated in pairs.
- Gates are shown fully raised in picture.
- Provides 29,000 ac-ft of active storage in a 10 foot drawdown range. This volume is exchanged with Monticello Reservoir by FFPS.

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PROJECT OPERATION DURING “NORMAL” FLOW PERIODS

- Parr Hydro can pass up to 6,000 CFS through powerhouse if all units are operating.
- Parr usually operates continuously to pass Broad River flow.
- Fairfield Pumped Storage (FFPS) operates in peaking mode – generating during high demand periods, and pumping from Parr Reservoir into Lake Monticello during off peak periods (exchanging 29,000 ac-ft).
- FFPS generation does not usually increase flow downstream of Parr Dam, and pumping does not usually decrease flow downstream of Parr Dam - Parr Reservoir level fluctuates due to FFPS.

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PROJECT OPERATION DURING HIGH FLOWS

- License article 39 governs operation during floods:

Article 39. The Licensee shall operate the project reservoirs in such a manner that releases from the lower reservoir during flood flows shall be no greater than flows which would have occurred in the absence of the project.

- It was determined during design of FFPS in 1970s that flows exceeding 40,000 CFS downstream of Parr Dam would inundate SC Hwy. 28 in Peak, SC.
- Project is operated to not exceed 40,000 CFS downstream unless it is exceeded naturally.
- Parr Reservoir levels must also be controlled during floods so backwater does not impact upstream RR tracks.

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PROJECT OPERATION DURING HIGH FLOWS

- When Broad River flow exceeds 6,000 CFS, Parr Hydro will operate all available units continuously.
- If higher flows are on the way, operators will begin lowering the crest gates at Parr Dam to maintain Parr Reservoir at safe level for upstream RR tracks.
- FFPS can generate at full capacity up to river flows of about 20,000 CFS, with some FFPS water being spilled at Parr Dam and some being stored in Parr Reservoir. Spilled upper reservoir water is recovered during pumping from natural inflow.
- Goal is to limit downstream flow to 40,000 CFS when FFPS is operating.

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PROJECT OPERATION DURING HIGH FLOWS

- As river flow rises above 20,000 CFS, FFPS operation is limited such that the natural flow plus spill from Parr Dam equals 40,000 CFS.
- As river flow approaches 40,000 CFS, FFPS shuts down completely and Parr crest gates are lowered completely.
- Above 40,000 CFS natural flow, Parr Hydro passes what it can through powerhouse and spills the remainder.
- Frequency of floods greater than 40,000 CFS are not increased by project operations under current license.

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PROJECT OPERATION DURING LOW FLOWS

- License article 14 governs minimum flow releases from Parr Hydro:

- (a) discharge from the Parr powerhouse during initial filling of the project reservoirs and during all months of the year, except March, April, and May, a minimum flow of 150 cfs and a minimum daily average flow of 800 cfs, or the daily natural inflow to the Parr Reservoir (less evaporative losses from the Parr and Monticello Reservoirs), whichever is the lesser amount; and
- (b) discharge from the Parr powerhouse during the striped bass spawning season in the months of March, April and May a minimum flow of 1,000 cfs or the average daily natural inflow into the Parr Reservoir (less evaporative losses from the Parr and Monticello Reservoirs), whichever is the lesser amount:

- SCE&G determines inflow using three upstream USGS gages:
 - Broad River near Carlisle (02156500)
 - Tyger River near Delta (02160105)
 - Enoree River at Whitmire (02160700)

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PROJECT OPERATION DURING LOW FLOWS

- Inflow to Parr Reservoir is measured as sum of discharge at three upstream gages.
- Evaporation is estimated from data from SC State Climatologist and reservoir areas.
- Increased evaporation from Lake Monticello due to VC Summer Unit 1 operation is also estimated based on data from VCSNS.
- Excel spreadsheet is used by operators to compute inflow minus evaporation.
- When inflow minus evaporation is less than 800 CFS (1,000 CFS March – May), Parr Hydro is operated to pass the required flow.

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PROJECT OPERATION DURING LOW FLOWS

- During low flow periods, there is no excess inflow to supplement losses from the two reservoirs. This has an impact on FFPS operation.
- A little less water is available each day for pump back to Monticello. FFPS then has less MWH available the following day.
- When flow increases above 800 CFS, FFPS can recover lost water.

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RECREATION AND SHORELINE MANAGEMENT PLAN

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CURRENT OPERATIONS AND PROPOSED FUTURE OPERATIONS

IMPORTANCE OF PLANTS TO SYSTEM CONTROL

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DISCUSSION OF REMAINING QUESTIONS

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QUESTIONS THAT WILL REQUIRE FURTHER INVESTIGATION

- Instream Flow – Fish & Wildlife TWC
- Aquatic Habitat downstream of Parr dam (mile-long bypassed reach?) – Fish & Wildlife TWC
- Fish entrainment, including bar rack spacing, impingement/entrainment, velocities at intake, at Fairfield PS Facility – Fish & Wildlife TWC
- Sediment/sand dynamics – Fish & Wildlife TWC

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QUESTIONS THAT WILL REQUIRE FURTHER DISCUSSION

- Projected long term water demands on Broad River (City of Columbia /New Nuclear Plant/municipal water withdrawals) – This information will be included in the Preliminary Application Document (PAD) – If anyone is aware of other water users please let us know

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QUESTIONS THAT WILL REQUIRE FURTHER DISCUSSION

- Areas downstream of Project that could improve recreational opportunities on the Broad River –
There are no Project lands downstream of the Parr Dam
- Inventory of SCE&G/SCANA properties downstream of Project –
There are no Project lands downstream of the Parr Dam

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QUESTIONS THAT WILL REQUIRE FURTHER DISCUSSION

- Description of water temperatures and anticipated affects of expanding nuclear facilities - Please identify your specific questions as they relate to Parr Hydro?

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FUTURE ACTIVITIES AND EVENTS

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PUBLIC WORKSHOPS

- Tuesday, January 15, 2013 –
Fairfield County - Winnsboro
Women's Club, 102 S Vanderhorst
Street, Winnsboro, SC 29180
- Thursday, January 17, 2013 –
Newberry County Courthouse, 1226
College Street, Newberry, SC 29108

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CANOE TRIP DOWN BROAD RIVER FROM PARR HYDRO TO COLUMBIA HYDRO

- Three days during weeks of March 18 through April 8, 2013 (T, W, Th) – any preference now?
- Register by February 22, 2013



Questions?