*VIA OVERNIGHT MAIL*

December 29, 2000

Mr. Michael K. Buckley, P.E.
Director, Technical Services Division
Mitigation Directorate
Federal Emergency Management Agency
500 C St., S.W.
Washington, D.C. 20472

Re: Congaree River flood hazard study/Flood Insurance Rate Map (FIRM) Revisions - Richland and Lexington Counties, South Carolina

Dear Mr. Buckley:

Pursuant to your November 22, 2000 letter to Richland County Chair Kit Smith regarding FEMA's appeals resolution process for the Congaree River flood insurance rate mapping, we are submitting additional information for FEMA's consideration in conjunction with the revised preliminary Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FISs) and appeal resolution report issued September 26, 2000 by FEMA for Richland and Lexington Counties, South Carolina, and incorporated areas.

The maps issued in September are more defensible than the preliminary maps published in 1999, but several flaws appear to persist. First, the Lexington County base flood elevations (BFEs) are set too high due to the incorrect assumption that existing earthen levees on the Richland County side of the Congaree River will not fail until the Congaree River reaches a flow of 292,000 cfs. Second, the estimates of 100-year flows are still too low when examined in light of the known historical record and the actual operating practices of the Lake Murray Dam. Third, the flood elevation numbers provided for Congaree Creek are internally inconsistent and appear to ignore the interactive and synergistic effects of simultaneous flooding on the Congaree River, Six-Mile Creek and Congaree Creek.

## 1. Lexington County BFEs Were Set Too High Based on Incorrect Levee Failure Analysis.

The appeals resolution report states that Congaree River base flood elevations were determined assuming a two-step flooding scenario. In step one, flood waters rise on the riverward side of the Manning levees until flood elevations in Lexington County reach their maximum height. In step two, the levees then breach and floodwaters flow into Richland County, causing a significant reduction in the Lexington County flood levels. FEMA's description of the two-step rationale follows:

> As water flows through the breaches, it will fill the Richland County floodplain, and eventually the water level on both sides of the dike will equalize. Hydraulic analyses indicate that water-surface elevations are expected to decrease 2- to 4- feet in Lexington County after a breach occurs. Therefore, the worst flooding in the riverbed area and in Lexington County will occur before the dike breaches, while the worst flooding in Richland County will occur after the dike breaches.[1]

"In order to simulate this scenario," flood elevations in Lexington County were calculated assuming "*no conveyance* behind the Manning's dike in Richland County."[2] That is, BFEs were set in Lexington County assuming that the Manning levees would not fail during the 100-year flood (292,000 cfs). Since "roughly 10 percent of the total flow through the Congaree River will be conveyed through Richland County following a breach of Manning's dike,"[3] this no-failure assumption adds 10 percent more flow (ca. 29,200 cfs) on the Lexington County side than would be present if the dikes breached prior to the River reaching maximum 100-year flow.

No rationale is provided for the assumption that the Manning dikes will stay intact up to the 292,000 cfs flow levels. To the contrary, the report provides evidence that the levees will in fact breach at lower flows. On page 24, for example, the report states that sensitivity tests with the HEC-2 backwater model "indicated that Manning's levee along the left overbank of the Congaree River was overtopped for peak flow discharges of more than 200,000 cfs." The report also acknowledges at length that the 1976 flood, with a peak flow of 155,000 cfs, caused breaching of Manning's dikes near the Columbia wastewater treatment plant.[4] As stated in the materials supplied to FEMA by [redacted] in 1976, the Manning levee failed *before* the 155,000 cfs peak was reached.

In light of what is known about the Manning levees, FEMA's assumption that the dikes will fail at 292,000 cfs rather than at 155,000 cfs or 200,000 cfs appears to be factually unsupportable and scientifically incorrect. FEMA should conduct an alternative flood elevation analysis using more realistic breach scenarios. For example, FEMA should calculate BFEs in Lexington County assuming that the Manning levee will breach at 155,000 cfs. As FEMA has recognized, after that breach, flood surface elevations "on both sides of the dike will equalize." Flood water-surface elevations could be expected to "decrease 2- to 4- feet in Lexington County" from the levels that would occur if the Manning levee stayed intact until 292,000 cfs. Accordingly, FEMA should use all available information in its possession to determine the likely failure mode of the levee and recalculate BFEs in Lexington County. FEMA's existing analysis indicates that use of a 155,000 cfs failure trigger would lower Lexington County BFEs in the Congaree Creek area by two to four feet.

---

[1] "Appeal Resolution for Congaree River in Richland and Lexington Counties, South Carolina," at 27 (FEMA, September 26, 2000).
[2] Id. (emphasis added).
[3] Id.
[4] Id. at 24.

## 2. The Estimated 100-year Flow Is Too Low

We support [redacted] analysis of the historical flood record on the Congaree and urge FEMA to revise its 100-year flow estimate to better reflect what is known and documented about the Congaree's historical floods. [redacted] materials, which are attached to this letter, demonstrate that the continuous historic record is more extensive than FEMA has acknowledged. FEMA should consider all available and dependable information in making its flow estimates, including the full historic record, information about the May 1840 and August 1852 floods, and annual peak stages for the Broad River at Blairs.

FEMA continues to ascribe unjustified flood attenuation capacity to Lake Murray Dam. The adjustments appear to contravene FEMA guidelines for applying historic adjustments to watersheds without dedicated flood storage capacity. In the absence of documentary evidence to the contrary, FEMA should assume that any flood attenuation at Lake Murray Dam, a hydroelectric generation reservoir with extensive shore-side development, will be incidental and generally secondary to generation and recreation interests. Also, it appears that the method used to adjust flows prior to 1925 over-adjust the unregulated flows.

Finally, FEMA has not justified its failure to follow Bulletin 17B's requirement that floods resulting from multiple sources should be modeled separately and that the resulting estimators should then be combined for produce the 100-year flood estimate. Tropical storms qualify as such a separate source for the Congaree: the six largest floods documented for the Congaree resulted from tropical depressions. The weighted estimator method (denoted Method 2) generates a 100-year flood estimate of 247,900 cfs, smaller than five of six tropical storm-related floods in the Congaree's 147-year recorded history. The current analysis does not comply with Bulletin 17B and as a result significantly underestimates 100-year flows on the Congaree. This error is not corrected by "weighting" the incorrect analyses – a separate model should be calculated for tropical storm related flooding.

## 3. Lexington County BFEs Should Integrate Congaree River Flows With Those of Congaree Creek and Six-Mile Creek.

Figure 7 in the resolution report indicates that water surface elevations on Congaree Creek in the vicinity of the CSX rail crossing are 136 to 137 feet.[5] However, the revised preliminary Flood Insurance Study for Lexington County and Incorporated Areas, also issued on September 26, 2000 (hereafter, the "Lexington County FIS"), shows flood elevations for Congaree Creek at the CSX crossing as approximately 142 feet NGVD. Similarly, at the confluence of Congaree Creek and Six-Mile Creek, the resolution report shows a base flood elevation of 137 or 138 feet, while the Lexington County FIS shows a BFE of 142 feet – a difference of five vertical feet.

FEMA must clarify which elevations are correct and assess the interaction of Congaree River and Congaree Creek flooding to account for synergistic or combined effects on area flood elevations. FEMA has acknowledged that the flooding of the two waterbodies is related. The Lexington County FIS states that flooding on the Creek is "controlled by Congaree River" up to the confluence of Congaree and Six-Mile Creeks, and that the River's 100-year backwater extends up Congaree Creek all the way to I-26. Even so, the Lexington FIS appears to calculate floodway base flood elevations "without consideration of backwater effects" from the Congaree River,[6] while the resolution report states that the effects of

---

[5] Id at 20.

[6] Flood Insurance Study for Lexington County and Incorporated Areas (Revised Preliminary), Table 5 n.3 (FEMA, September 26, 2000).

Congaree Creek were not accounted for in its analysis.[7] FEMA must assess the combined effects of Congaree Creek and Congaree River flooding and issue consistent flood elevations on Congaree Creek and Six-Mile Creek.

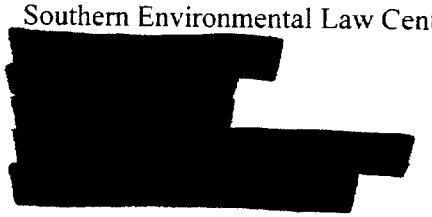
* * *

Thank you for your time and attention to this matter. Please contact me with any questions or correspondence you might have concerning this appeal. In closing, I request that you inform me of the opportunities to review materials received by FEMA as of January 2, 2000 so that I can submit additional information by February 15, 2000.

Very truly yours,

Enclosures

cc: South Carolina Wildlife Federation
Columbia Audubon Society
South Carolina Environmental Watch
Columbia Area League of Women Voters
Sierra Club
Environmentalists, Inc.
South Carolina Coastal Conservation League
Southern Environmental Law Center



[7] Id. at 18.