*VIA OVERNIGHT MAIL*

December 22, 2000

[redacted] Executive Director
SC Wildlife Federation
2711 Middleburg Drive, Suite 104
Columbia, SC 29204

The Honorable Wyman M. Rish
Mayor of the City of West Columbia
1053 Center Street
PO Box 4044
West Columbia, SC 29171-4044

Mr. Johnny Jeffcoat
Lexington County Council Chairman
212 South Lake Drive
Lexington, SC 29072

The Honorable Avery B. Wilkerson, Jr.
Mayor of the City of Cayce
1800 12th Street
PO Box 2004
Cayce, SC 29171-2004

Mr. Art Brooks
County Administrator
212 South Lake Drive
Lexington, SC 29072

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

Dear Gentlemen:

This is an appeal to the revised preliminary Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FISs) and appeal resolution report issued September 26, 2000 by the Federal Emergency Management Agency (FEMA) for Richland and Lexington Counties, South Carolina, and incorporated areas. The South Carolina Wildlife Federation (SCWF) owns real property within Lexington County bordering Congaree Creek, a tributary to the Congaree River.

Because we believe our property rights are adversely affected by the September 26, 2000 proposed determinations and findings, we qualify as appellants under 44 CFR. § 67.5(a).

The basis of our appeal is the possession of information indicating that the elevations proposed by FEMA are scientifically and/or technically incorrect. 44 CFR 67.6(a). As explained below, alternative methods will result in more correct estimates of base flood elevations. Id. In summary, the elevations announced on September 26 contain two major flaws. First, the Lexington County base flood elevations (BFEs) were set too high based on 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 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

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[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.

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 attached materials supplied to FEMA by [redacted]n 1976, the Manning levee likely failed *before* the 155,000 cfs peak was reached (see Attachment 1).

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.

## 2. 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 needs to 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 Congaree Creek were not

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[4] Id. at 24.
[5] Id. at 20.
[6] Flood Insurance Study for Lexington County and Incorporated Areas (Revised Preliminary), Table 5 n.3 (FEMA, September 26, 2000).

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.

Very truly yours,

[redacted]
Executive Director
South Carolina Wildlife Federation

cc: Hon. Robert D. Coble
Hon. Kit Smith
Mr. T. Cary McSwain
Mr. Michael K. Buckley, P.E.
[redacted]

[7] Id. at 18.

# Additional Information on FEMA's 9/26/00 Appeal Resolution for Congaree River in Richland and Lexington Counties, South Carolina

October 26, 2000

## 1 Introduction

This document is a supplement to the appeal of the new Base Flood Elevations for Richland and Lexington Counties. We would note that several of the issues brought up in the Appeal Resolution have not been broached before, specifically the use of reliable stage data prior to 1892. Use of this additional information would produce increases in the Base Flood Elevations as great as the changes observed between the 8/27/99 draft and the 9/26/00 appeal resolution.

We will first review historical data, then provide new data relevant to hydrology and hydraulics modeling, discuss FEMA's methodology, propose a new approach for computing Base Flood Elevations, and answer additional questions raised by the FEMA Appeal Resolution.

## 2 Historical Data

This subsection seeks to confirm historical flood information reported in the August 26, 1908 newspaper (Attachment 1). In reviewing historical flood information, we found stage data given for the August 1852, May 1886 (apparently misidentified as a May 1885 flood), and September 1888 floods to be

The swamp was full of water, running like a mill race. *Charleston News & Courier, September 13, 1888.*

The five State farms–Big Lake, Green Hill and Gadsden, of Seeger's and Spigner's and Aughtry's–were good for 1,600 bales of cotton and 40,000 bushels of corn, half of which would have gone to the State. Perhaps not 10 per cent will be saved. *Charleston News & Courier, September 13, 1888*

Superintendent Lipscomb had several boats hurriedly made at the Penitentiary yesterday, sent in wagons to Griffin's place. The work of the rescuers was very perilous as the fields were swept by a furious torrent. *Charleston News & Courier, September 13, 1888*

# 3 Hydraulics

The September 26, 2000 BFEs assume that floods will peak on the Lexington floodway before peaking in Richland County because the Lexington-side peak while the levees hold will be greater than the peak after the levees break. Thus the Lexington County BFE's were computed as though the levees were intact at the full height of the 100-year flood. That approach is too simple given the available historic knowledge about how a levee failure would in fact occur. FEMA must use the flow rate at which the levees would realistically fail in calculating BFEs in Richland and Lexington Counties. If that flow rate is less than 292,000 cfs, the BFEs in Lexington County would change significantly. Obviously, the proper analysis would propose a flow at which the levees would break and compare the BFE's for this flow (with the levees intact) to the BFE's for 292,000 cfs with the levees breached.

A reasonable flow at which the levees would breach would be 140,000 cfs, the flood at which the levees breached in 1976. If we look at the hourly gauge readings for the Congaree River for October 10-12, 1976 (Attachment 2), we see that when the breaks occurred (approximately 1 AM, October 11), the gauge reading was only 28.5 feet, corresponding to a flow of only 140,900 cfs. In addition, the levees broke in April 1964 at a similar flow (interestingly, they broke from interior pressure on the levees). If the levees break at only 28.5 feet, the water level may drop two or four feet on the Lexington side (as

stated by FEMA), but the river will rise another 8.3 feet before cresting. In that scenario, the peaks on the Lexington and Richland sides will coincide. If we use a larger failure trigger figure, 200,000 cfs (at which point overtopping of the levees will occur), the river will still rise 4.2 feet after the break, which again compensates for the temporary increase in storage on the Richland County side.

Clearly, Lexington County has been severely shortchanged in the current analysis. Its BFE's should be identical to Richland County's BFE's since the early peak before levee failure is most likely a false peak. In other words, Lexington County BFE's would be lower, compared to the September 26 map.

# 4 Hydrology

## 4.1 1930 Flood

In its latest analysis, FEMA correctly notes that 1930 should not be considered an unregulated event. In fact, it is an over-regulated event. If the flood event of 1930 occurred today, the flow from the Saluda River downstream of Lake Murray would have been greater. Lake Murray was at a level of only 249.4 feet on September 26, 1929 and rose to 292.2 feet over the next three days. On October 2, 1929, it rose from 299.9 feet to 305 feet. Based on the water storage capacity chart for Lake Murray published in 1930 (Attachment 2), this corresponds to storage of approximately 2.951 billion cubic feet, or an additional flow of 34,155 cubic feet per second from the Saluda River on October 2, 1929. This number is actually conservative, since estimated storage capacity from the 1930 chart is less than estimated storage from the more recent 1997 chart (Attachment 2). As an example, at 350 feet, the 1930 chart shows that each .1 foot rise stores .175 billion cubic feet while the 1997 chart shows that each .1 foot rise stores .181 billion cubic feet.

The 1930 flood is the most misrepresented event in the entire data record. If FEMA wants to adjust all pre-1930 floods downwards for a dam with no flood storage capacity, then the 1930 flood should be adjusted upwards 34,000 cubic feet per second to 337,000 cubic feet per second.