# Technical Comments of the Cities of

# Augusta, Georgia and North Augusta, South Carolina

# on

***U.S. Army Corps of Engineers Report:***
***"Savannah Harbor Expansion Project,***
***Georgia and South Carolina: Fish Passage at New Savannah Bluff Lock and Dam***
***Integrated Post Authorization Analysis Report and***
***Supplemental Environmental Assessment"***
**and Related Documents**

Submitted by

**Augusta, Georgia**

and

**North Augusta, South Carolina**

April 15, 2019

# Contents

**TECHNICAL COMMENTS OF THE CITIES OF AUGUSTA, GEORGIA AND NORTH AUGUSTA, SOUTH CAROLINA**

**On**

**Savannah Harbor Expansion Project,**
**Georgia and South Carolina: Fish Passage at New Savannah Bluff Lock and Dam**
**Integrated Post Authorization Analysis Report and Supplemental Environmental Assessment**
**February 2019**

**And Related Documents**

April 15, 2019

# I. Introduction

The Corps of Engineers (Corps) proposes to remove a dam which has been in place and established the water surface elevation upon which Augusta and North Augusta (Cities) have depended on for nearly a century. The removal will reduce water levels in the Savannah River over seventeen miles upstream through the cities of Augusta and North Augusta reducing water levels by as much as three to five feet from existing water surface elevations. *See Figures 1 – 3.* The proposed project will directly affect approximately seventeen (17) miles of river habitat and nearly a century of regional planning, economic development, water supply, and recreation in the Augusta-Richmond County and North Augusta area, one of the largest 200 metropolitan statistical areas in the United States. Immediate economic effects will be many millions of dollars and, over the 100-year period identified in the SHEP Draft Report, the economic impact to the Region will be in the billions.


*Figure 1: Water level reductions of as much as three to five feet several miles upstream of the NSBLD during February 8 – 15 (Aiken Standard, "CSRA officials react to Savannah River drawdown," Feb. 19, 2019 (attached as Appendix J))*

Augusta and North Augusta have a unique and well-developed history dependent upon water related activities, water dependent recreation, water supply including pumps for water supply all of which will be affected by the proposed action. Water resources, including the Savannah River and the affected reach and area of indirect effects, are part of our citizens' quality of life and fundamental infrastructure. The effects of the Corps proposal are significant, permanent, longstanding, and of sufficient public concern and controversy such that the action constitutes a major Federal action significantly affecting the quality of the human environment under Section 102 of NEPA, and

accordingly is required under NEPA to proceed under a detailed Environmental Impact Statement ("EIS"); 33 C.F.R. Part 230; 40 C.F.R. Part 1508.

Licensed professional engineers have identified errors in water surface elevation modeling (HEC-RAS) which were evident during the February 8-February 15 Corps drawdown of the pool. Corps modeling underestimated pool lowering by several feet in some instances, so that the observed water levels were much lower than predicted. Details regarding the modeling disparity from field evidence, calibration, and potential concerns are outlined in the Technical Comments transmitted herewith, and in the appended Report on Hydraulics Methodology, included in Appendix C. Accordingly, the SHEP Draft Report is demonstrably incorrect from a modeling and impact assessment standpoint and must be revised and reissued (in EIS form as noted above and in Legal Comments).

*Figure 2: Water level February 15, 2019 (Augusta Chronicle, "Cost Differences in Options for Lock and Dam Questioned," Augusta Chronicle (Feb. 15, 2019) attached as Appendix K)).*

*Figure 3: Water Level Decrease Augusta Riverwalk, February 15, 2019 (Augusta Chronicle, "Cost Differences in Options for Lock and Dam Questioned," Augusta Chronicle (Feb. 15, 2019) attached as Appendix K)).*

The Corps has not provided adequate time for public and local governmental consideration of the proposed action and alternatives, and has impermissibly both predetermined the action (Proposal 2-6D) and eliminated alternatives (e.g. Alternative 1-1) prior to public and governmental input. Importantly, the Draft Report was issued for public comment **less than two days after the Corps drawdown**, insufficient time for calibrating the model or assessing the drastically different field observations and conditions from the anticipated modeled effects. The Corps drawdown was commenced February 8 and continuing through February 15, 2019, and the Draft Report was issued the very next day February 16, 2019, rendering it impossible to have accounted for public comments.

During the comment period, the Corps improperly eliminated alternatives, specifically including the alternative which had the least impact on pool level and surface water elevation – Alternative 1-1. According to the Corps's blog of March 26, 2019, just three weeks prior to the close of the public comment period the Corps eliminated Alternative 1-1.[1] The Corps has not followed NEPA and Corps regulatory procedures including scoping and proposing a Finding of No Significant Impact ("FONSI") before soliciting public comment as required. These errors and deficiencies in the public notice and comment process require revision to the analysis and re-noticing to ensure Due Process and NEPA and Corps regulatory program compliance.

The Cities identify other concerns in the specific comments and supporting narratives presented below and in the attached companion Legal Comments.

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1 "Alt 2-6d is not the only in-channel alternative", Corps March 26, 2019 (last accessed March 27, 2019, at https://balancingthebasin.armylive.dodlive.mil/2019/03/26/alt-2-6d-is-not-the-only-in-channel-alternative.).

## II. Water Infrastructure Improvements for the Nation Act (WIIN Act 2016)

*The Cities of Augusta and North Augusta find that the Act has basic flaws in language that have led the Corps to erroneous interpretation and subsequent errors in methodology in the Draft Report and subsequent amendments.*

The following is a summary of principal provisions of the two options in the WIIN Act, (which was amended and passed in the U. S. Senate in a single day without hearings, debate, nor prior knowledge of the leadership of either of the States of Georgia and South Carolina):

- De-authorize the Lock and Dam
- Modify the project according to two options:

EITHER

A(i) *"Repair of the lock wall . . . and modification of the structure . . .*

*(I) to maintain the pool for navigability, water supply, and recreational activities as in existence on the date of enactment of this Act and*

*(II) to allow safe passage . . of . . . migratory fish."*

OR

A(ii) *"Construction . . . of a structure" [or weir] . . . "that is able to maintain the pool for water supply and recreational activities, as in existence on the date of enactment of this Act.*

*(III) Removal of the . . . Lock and Dam."*

Note that the two options have drastically differing purposes. Along with water supply and recreation, the first option includes navigation and fish passage, while the second option excludes navigation and fish passage. A(i) includes three purposes, including navigation. Although the Corps has interpreted navigation as being only within the pool, a plain reading of the WIIN Act reveals that the obvious intent is that the lock should remain in place and should include rehabilitation for navigation up and down the river, not just in the pool. Otherwise, navigation would become merely a subset of recreation. In fact, the "Value Engineering" alternative presented by the Corps in 2015 showed the lock remaining in place for the alternative on which this section of the WIIN Act is based.

A(ii) has only two purposes, which are different from A(i), including water supply and recreational activities only. Moreover, A(ii) contains no mention of authority for a fish passage, nor any requirement that one be constructed under this option.

The Act goes on to authorize the conveyance of the park and recreation area adjacent to the Lock and Dam to Augusta-Richmond County, Georgia, without consideration. Augusta, Georgia would normally expect to receive a functioning park and recreation area in good condition by language such as this; however, it does not appear that any facilities in such serviceable condition are planned under the implementation of this authorization.

## III. Corps of Engineers Guidance document: *Memorandum for Commander South Atlantic Division*, dated May 25, 2017.

*The Cities find that the Guidance repeats the flawed language of the Act and contains its own basic flaws in implementation instructions that have led the Corps to erroneous interpretations and subsequent errors in their report.*

Option 1 repairs the lock wall and retains the lock, which can be and should be rehabilitated for navigation as required by the Act. The Corps staff has erroneously interpreted navigation to be only within the upstream pool. If this were really the legislative intent, then why would navigation not also be an authorized purpose of Alternative 2, which obliterates the lock?

Option 1 is required to pass safely the shortnose and Atlantic sturgeon and other migratory fish, while Option 2 is not required to pass fish at all. Why then do the alternatives proffered under Option 2 include a fish passage at all?

Both the WIIN Act and the Guidance require a structure that is able "to maintain **the** pool for water supply and recreational activities, as in existence on the date of enactment of this Act". This language is clear that the existing water levels and existing range of level operation must be replicated as major design criteria for the intended project. It clearly does not imply maintaining **a** pool, or keeping just the **functionality** of the pool, or other such stretched interpretations. (emphasis added).

Members of the Georgia Congressional Delegation wrote the Corps of Engineers to "express the intent of Congress" in the WIIN Act, concluding in part, "Clearly these results [of the drawdown] do not reflect the intent of Congress." (See copy of letter in Appendix B.)[2]

The Guidance directs the identification of specific adjacent park and recreation area acreage to be conveyed to Augusta. These should be only lands not required for the project, and should not include flood passage lands that would require future maintenance by the City of Augusta for purposes other than parks and recreation.

With respect to cost sharing, it is noted that the Guidance directs, "If Alternative 1 is chosen, the federal share of post-construction costs . . . will be 100 percent; if Alternative 2 is chosen, the federal share will consist of 100 percent of the costs . . . of maintaining the fish passage; and the non-federal share will consist of 100 percent of the costs of operation and maintenance of the structure for any other purpose, including maintenance of the pool for water supply and recreation."

First, there should be no costs for maintaining the fish passage under Alternative 2, because it is not authorized to have a fish passage nor so directed in the Guidance. Second, the cost sharing directions herein have not been closely followed in the Report and the costs have sometimes erroneously been split on all alternatives whether pursuant to WIIN Act Option 1 or Option 2. The cost comparison presented in the Corps's blogpost "Comparing the two Fish Passage

2 Letter: Senators Graham, Scott, Isakson, and Perdue, and Representatives Wilson and Allen to The Honorable R. D. James and Lieutenant General Todd T. Semonite, April 9, 2019.

alternatives," is blatantly in error in that the O&M costs for Alternate 1-1 should have been assigned 100% to "Fed Share" not "non Fed Share,"[3]

## IV. Overall Comment on Erroneous Content and Changing Costs During Comment Period

*The Cities find the Draft Report riddled with errors and inaccuracies, both in fact and in analyses, so as to bring into question the quality of the information upon which critical decisions are to be made, especially because those decisions bring with them permanent threatening and negative consequences to the communities.*

The Corps of Engineers inexplicably removed Alternative 1-1 from their consideration and drastically changed their arbitrary and unsubstantiated cost projections during the middle of the comment period, leaving the Cities and other stakeholders baffled as to what alternatives and what content of the Draft Report is to be commented upon. It is assumed throughout these comments that the Cities' responses should be on the Draft Report as originally published, including Alternative 1-1. The subjects of the major substantive changes in content that were published in the Corps blog and not presented to the public in the official Public Workshop will also be addressed as those topics appear herein.

## V. Overall Comments on Corps Draft Report

### A. Hydrology and Hydraulics Methodology

*The hydraulic models used in the Analysis Report are all flawed and do not accurately represent the actual water surface profiles on the Savannah River. At least one major problem is the selection of the value for the roughness coefficient "n" in Manning's equation for open channel flow, resulting in predicted water levels much higher than reality.*

*The accurate predictions of water levels are of great importance to the design of any water level management structure and are even more paramount when those structures are fixed weirs. In those cases, the designers only get one chance to get it right. They have not gotten it right yet, as proven by the Fixed Weir Pool Simulation conducted by the Corps in February 2019.*

***Observations on-site during the February 2019 river drawdown show clearly that during modest flows, the pool behind the Lock and Dam has very little fall end-to-end, and thus acts much more like a lake than it does like a river.***

*These facts demonstrate major flaws that affect* ***all*** *of the hydraulic profile computer models and bring into question the validity of the entire Report and its conclusions, which must be withdrawn, corrected, and reissued for public comment.*

*An early drawdown to calibrate and validate the HEC RAS hydraulic model should (and could have easily been conducted) have been conducted prior to the development and use of modeling results in the selection of alternatives.*

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3 https://balancingthebasin.armylive.dodlive.mil/2019/03/18/how-two-fish-passage-alternatives-compare/, Draft Report, 4.3 Cost Sharing, p. 105, Implementation Guidance, May 25, 2017, accessed March 28, 2019; this is at variance with the Guidance document and Table 31: of the Draft Report, p. 104.

This critical comment is supported by the observations of the conditions during the drawdown of the river in February 2019. This test was a prime opportunity to test the validity of the computer simulations models using the subject of those models: the Savannah River itself.

On February 15, 2019, the water level drop from Fifth Street (111.23, NVGD 1988) to the Lock and Dam (110.28, NVGD 1988) was 0.95 feet.[4] This amount is only one-third of the difference of 3.3 feet predicted by the Corps's 8,000 cfs model.[5] Using the actual drop over the 12.0 mile reach and the corresponding flow rate occurring at the Lock and Dam at the time of 7,270 cfs just downstream from the Lock and Dam, the input values for the model can be tested.[6]

An analysis of these conditions, which is presented in detail in Appendix C, shows that Manning's "n" values probably lie between 0.019 and 0.023.[7] These values are much different from either the 0.031 or 0.033 estimates used by the Corps.[8] Their report states the following concerning this subject, "Manning's n values for natural channels are difficult to quantify outside of a laboratory setting and are subject to the professional judgement and experience of the hydraulic engineer." The drawdown furnished the best "laboratory setting" of all, the full-sized physical model of the Savannah River itself. It proved that the water level drop at Fifth Street was at least three times that which the Corps's simulations had predicted.[9]

The Draft Report also covers selection of Manning's "n" values for the weir itself, adapting the figures from the rock weir structure of the Cape Fear River Dam Removal and Fish Passage, which ranged from 0.056 to 0.078, and "ultimately landed on a conservative n-value for the rock ramp of 0.08"[10] (Emphasis added) Their adopted value lies outside the range from which it was derived. In fact, for low flows the higher n-value is not conservative at all. It will predict higher upstream stages than the results from choosing a lower value. This would produce the same type of erroneous elevation difference between predicted and actual that was observed during the February 2019 drawdown.

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4 USGS Recording Gages 02196670, 02196999, and 02197000.

5 Corps of Engineers, Analysis Report, Appendix A, Table 8, p. A-41.

6 USGS Recording Gage 02197000. A corresponding flow rate of 5,422 cfs at the Augusta Canal Diversion Dam on the morning of February 15, 2019, supports the approximate flow through the reach. This does not include flows from major creeks between the Canal Dam and the NSBLD; Unfortunately, the steady flow condition, which would have been desirable for a more accurate test, was not quite reached during the drawdown, because it was cut short when the bulkhead at the Goodale Landing neighborhood showed signs of imminent failure. (Personal communication: Vance Moody to Tom Robertson, March 6, 2019.)

7 Robertson, Thomas H., Report on Hydraulics Methodology, April 15, 2019, See Appendix C hereof.

8 Corps of Engineers, Analysis Report, Appendix A, p. A-15.

9 One of the Goals and Objectives of the drawdown was to "verify the predictions made with the riverine model for the depth attenuation through the pool. If necessary, adjustments will be made to the model to better represent the actual conditions." See "Operation Plan for Fixed Weir Pool Simulation, Savannah Harbor Expansion Project Fish Passage at New Savannah Bluff Lock and Dam", January 25, 2019, pp. 2-3, copy in the Office of the Mayor, North Augusta, SC. Because the predictions and the actual conditions of elevation were grossly different, all of the hydraulic models are likely similarly wrong, so that adjustments must be made to model and all of its simulations that underly the report. The report must be amended or republished. The Cities reserve the right to make additional comments when the corrected data is made available, because the Draft Report is erroneous.

10 Draft Report, Appendix A, 2.1.2. Geometry Modifications, p. A-5.

## B. Planning Process Comments

1. "No Action" Alternative Selection Flawed.

   *Selection of the SHEP 2012 Plan as the No Action Alternative is illogical, because it cannot be built following the WIIN Act 2016, which de-authorized the Lock and Dam. Selection of this plan also distorts the base line conditions of the complete set of water surface profiles upon which the entire Draft Report is based. The No Action Alternative, by contrast, should be the actual "existing conditions" that prevailed before and on the date of enactment of the WIIN Act, which are higher. Using the real stages as the base line would be more accurate. For example, the actual existing operating level at the Fifth Street gauge should be 114.2, not 113.2 (NAVD 1988). The alternatives analysis of the Draft Report should be withdrawn and re-analyzed with a corrected No Action Alternative.*

2. SHEP 2012 Plan (NAA) Should Be Considered An Actual Real Alternative

   *If the SHEP 2012 Plan should be retained as the No Action Alternative (notwithstanding the previous paragraph of objection), the SHEP 2012 Plan must be considered as an actual viable alternative, capable of being implemented if selected. It was approved by all agencies, was "shovel-ready" before the WIIN Act, and could likely be implemented more quickly than any other plan.*

3. Comparison of Alternatives Flawed

   *The Draft Report errs in directly comparing alternatives that are not developed pursuant to the same section of the WIIN Act, because each has different purposes and therefore the criteria should be different, depending upon whether the alternative be promulgated under Option (i) or Option (ii), as described in the WIIN Act 2016 paragraph above. Thus, the Plan Selection section must be reformulated to conform correctly to the Act. The Option (i) plans should be judged by the criteria of navigation, water supply, recreation, and fish passage. The Option (ii) plans should be judged by the criteria of water supply and recreation. Faithful application of these criteria, that will correct the similar flawed* Table 29: Final Analysis[11] *in the Draft Report, will result in a different outcome of ratings for the different alternatives, most likely giving the No Action Alternative and Alternative 1-1 the highest ratings.*

## C. Navigation

*The Cities of Augusta and North Augusta find that none of the alternatives maintain the pool as required by the WIIN Act. Further the Cities interpret the word "navigation" in the WIIN Act under its option (i) as navigation through the existing lock up and down the river past the rock ramp over the dam, as evidenced by the fact that the lock wall is directed to be retained and repaired under this option. This position is bolstered by the fact that the act does not authorize navigation as a purpose of the free-standing weir described in option (ii). The distinction clearly illustrates that the act does not contemplate "navigation" to apply merely to movements within the pool, as arbitrarily interpreted by the Corps, although it would also include those functions. All alternatives in the Draft Report fail to conform to the WIIN Act for navigability, except the No Action*

11 Draft Report, p. 100.

*Alternative, which retains the lock, but does not repair it. Navigation within the pool itself is also impaired by all of the alternatives, including Alternative 1-1 and the No Action Alternative, which lower the pool elevations.*

The WIIN Act authorized navigation as a purpose for the Option (i) alternatives but not for the Option (ii) alternatives. Keeping the lock is clearly depicted in one of the 2015 "value engineering" alternatives upon which the language of the act was apparently based, showing the rock ramp over the dam gates

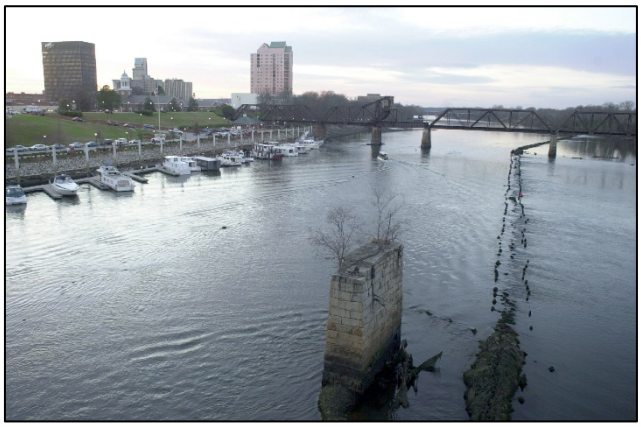

*Figure 4: Underwater jetty protruding through water surface following river level drawdown.*

As for navigability within the pool, the lowered water levels of all of the Option (ii) choices will impair or prevent safe navigation of several reaches of the pool. The recommended plan is particularly onerous, in that it purports to keep the functionality of the pool, yet dangerously exposes boat traffic to underwater obstructions that heretofore have not come into play. A particular safety issue would be newly created along the structure known as Gardner's Bar training wall or jetty, which extends for about one mile down the middle of the river near the centers of the two cities. It was constructed by the Corps of Engineers prior to 1915 to divert the main flow of the river to the Georgia side to keep the docks at Augusta scoured out to prevent shoaling. This wall is constructed of timber piles, cribs, and rock. At the existing water levels this training wall is not a major impediment to navigation and recreational use, but at lower stages of the pool the wall becomes a hazard to navigation and at the lowest level it even protrudes from the surface of the water. It will effectively narrow the useable width of the river to about half its present width, right in the middle of town where boat traffic is the greatest and where water sporting events have regularly occurred. If water levels are to be lowered, the Corps should include in the project mitigation measures for the wall not merely by "avoidance," as stated in the Draft Report[12], including selective demolition to lower the top elevation so that vessels might safely pass over in the future, as well as allowances in the project costs.

**D. Water Level Lowering.**

*The Draft Report and the Corps's blogposts are very confusing for the reviewers and for the public to comprehend and analyze in that they use several different units, types, terminology, and descriptors for level measurements in various places: feet, inches, elevations, depths, ranges, impacts, today, existing, etc.*

*Particularly confusing is the mixing of elevation figures from two different surveying datums. The original design of the NSBLD contemplated a range of normal operating water levels between Elev. 114.5 and Elev. 115.0 (NGVD 1929), and a review of recent*

12 Draft Report, Section 3.6.9.3 Future Conditions with Alternatives 2-3, 2-6a-d, and 2-8, p 90.

*USGS water stage records show that the Corps has actually operated the dam at an average normal level of 115.0. Yet, inexplicably, they have used Elev. 114.0 as the existing conditions when comparing alternatives, even though the real existing conditions show Elev. 115 to be the normal pool level on a nearly every day basis. This 1.0-foot difference in the initial base line data skews all of the comparisons in the Draft Report, which must be corrected and reissued so that truthful comparisons can be made.*

*Moreover, the Corps used an alleged, so-called "range" of operation of existing conditions of Elev. 112 to 115, which is far from what the Corps operations personnel are proven by gauge records to use actually day by day.*

The following table summarizes the water levels from the Draft Report and from other sources as shown in the footnotes below it. While it may be used to make any number of comparisons that the reader and other reviewers may wish to study, the most salient issue is that the Corps used the low side of the current normal operating level as the "Existing" conditions at the NSBLD to compare its hydraulic models for the alternatives, which is one (1) foot lower than the actual operating levels reported by USGS.

| **Description** | **Water Elevations** | | | | **Notes** |
|---|---|---|---|---|---|
| **Location** | **Lock & Dam[a]** | | **Fifth Street Bridge[b]** | | |
| **Datum** | **NGVD 1929** | **NAVD 1988** | **NGVD 1929** | **NAVD 1988** | Assumed difference = 0.8' |
| **Normal pool per original design[c]** | 115.0<br>- 114.5 | 114.2<br>- 113.7 | 115<br>N/A | 114.2<br>N/A | |
| **Corps's current operations** | | | | | |
| "Normal"[d] | 114.0<br>-114.5 | 113.2<br>- 113.7 | 115.1 | 114.3 | |
| Range[e] | 112.0<br>- 115.3 | 111.2<br>- 114.2 | N/A | N/A | |
| **Usual Levels (non-flood) per USGS gauges[f]** | 115.0[g] | 114.3 | 115.0 | 114.3[h] | Approximate Water Year 2018 year-long medians, by inspection |
| **Alternative Simulations Q= 8000 cfs from HEC-RAS Summary[i]** | | | | | Elevations Produced from Questioned Model |
| Existing | 114.0 | 113.2 | 116.1 | 115.3 | Probably wrong |
| No Action Alt | 114.0 | 113.2 | 116.1 | 115.3 | Probably wrong |
| Alt 1-1 | 113.9 | 113.1 | 116.0 | 115.2 | Probably wrong |
| Alt 2-6a | 112.6 | 111.8 | 115.4 | 114.6 | Probably wrong |
| Alt 2-6d | 111.7 | 110.9 | 115.0 | 114.2 | Inconsistent with observations 2/15/2019 |
| **Actual Elevations February 15, 2019** | 111.08 | 110.28[j] | 112.03 | 111.23[k] | Flow rate at NSBLD was 7,270 cfs, near 8,000 cfs. |
| **Desired by Cities and Counties[l]** | N/A | N/A | 115.2 | 114.5 | |

Note: The actual instantaneous flow rates in the Savannah River on the morning of February 15, 2019, were 7,270 cfs at NSBLD and 5,422 cfs at Augusta Canal Diversion Dam

References:

1. Lock and Dam United States Geological Survey (USGS) gauge is located just upstream. Datum is NGVD 1929.

2. Fifth Street USGS gauge is located on first pier from Georgia side. Datum for the recording gauge is NAVD 1988. Zero of the recording gauge is 100.00. Note that the datum for staff gauge is NGVD 1929. Zero of the staff gauge (and previous recording records) is Elevation 102.06. Verified by field surveys by Cranston Engineering Group, P.C.
3. Construction plans: *Rehabilitation of Gates and Piers, New Savannah Bluff Lock and Dam*, Plate S-500, 12 March 1995; and Corps of Engineers, U. S. Army, Savannah, Georgia, District, *Special Flood Hazard Information Report, Savannah River, Augusta, Georgia*, August 1971, p. 7.
4. Draft Report, Appendix A, p. A-19. USGS records for Water Year 2018 contradict the Corps's assertion of operating range.
5. Draft Report, 2.2.2. Hydrology and Floodplains, p. 18.
6. Inspection of records of USGS gauge records for Water Year 2018 (October 1, 2017—September 30, 2018).
7. Gauge 02196999 at New Savannah Bluff Lock and Dam.
8. Recording Gauge 02126670 at Jefferson Davis (Fifth Street) Bridge.
9. Draft Report, Appendix A, Table 8. Summary of HEC-RAS Results, p. A-41.
10. Gauge 02196999 at New Savannah Bluff Lock and Dam.
11. Recording Gauge 02126670 at Jefferson Davis (Fifth Street) Bridge. Verified by actual field survey by Cranston Engineering Group, P.C.at Elev. 111.20 (NVGD 1988) on February 15, 2019 at 11:13 am EDT.
12. Resolutions by Augusta, North Augusta, Aiken County, and Columbia County.

The recommended alternative and others that include a full-river width rock ramp as presented in the Draft Report will result in more rapid and frequent fluctuations in the level of the pool. This is due to the elimination of the large adjustable hydraulic gates in the NSBLD. No analysis or criteria for the evaluation of the increase in variability was presented in the Draft Report. A maximum drawdown rate of 0.5 feet per day was given in the Operation Plan for Fixed Weir Pool Simulation, Savannah Harbor Expansion Project Fish Passage at New Savannah Bluff Lock and Dam, January 25, 2019; however, failure of a wall occurred during the drawdown and no application or evaluation of this criteria for future conditions was provided. Evaluation, analysis, and selection of alternatives should include impacts related to more frequent and pronounced impacts from rapidly varying pool levels – such as those that will occur in the recommended alternative.

## E. Flooding

*The Draft Report gives only minimal consideration to the threat of flooding from the regulatory 100-year flood and the 500-year flood, as required by rules of the Federal Emergency Management Agency (FEMA). It fails to demonstrate that any of the alternatives will result in a "no-rise" condition, a paramount issue and potential threat to the communities, in violation of both the WIIN Act itself and of FEMA regulations. In fact, the Draft Report explicitly casts doubt over whether a "no-rise" situation is even possible. The Corps must retract and revise the Draft Report to demonstrate that the project will not cause a rise in the FEMA 100-year Floodplain, nor any change in the FEMA-designated Floodway.*

*In addition, the Draft Report inadequately addresses flooding from the more frequent (lower flow) floods, along with the physical, economic, and public safety threats resulting from those events, especially within residential and business areas along the river.*

The WIIN Act mandates that the project maintain specific minimum water levels, while the FEMA regulations require the maximum water levels from the designated "base flood" (the one-percent-exceedance-chance flood, or 100-year flood) not be raised: i.e. a "no-rise" condition. These oxymoronic boundaries create an engineering problem that is nearly impossible to solve with a fixed weir structure, regardless of its crest elevation. Because of the inability of the Corps to design either of the 2015 "Value Engineering" weir alternatives to meet these criteria, they had to discard both of them as viable choices. These were the Corps's conceptual ideas that led to the establishment of the specific options in WIIN Act in the first place. In the end Corps has had to abandon both of their "good ideas," because they are both entirely impractical solutions as to handling flows. In short, the problem is that no rock weir can be removed from the channel in times of flood to make way for large flows, as can the existing gates of the Lock and Dam, which can and regularly are lifted high above the waters below.

The only way to maintain the pool, preserve the NSBLD Park, and also handle the floods is to provide a dedicated way for flood waters to pass the New Savannah Bluff at or below the stages that currently exist. The Corps's alternatives in the Draft Report all handle flood waters around the weir in one way or another: via a "runaround spillway" (similar to a farm pond) in some, a flood channel with new gates in one, and through the existing gates, retained as in Alternative 1-1. In fact, Alternative 1-1 is the only choice which actually solves the engineering problem. And, with modifications, this basic plan can do so without adding additional risks at the Lock and Dam site or within the upstream pool.

The Draft Report describes the FEMA "existing model," (presumably the "effective" one upon which the current official flood plain maps are based) as having been originally developed with the program HEC-2 in November of 1994. The 1994 model was then set up by the Corps and is still the effective FEMA model.[13] It has its roots even earlier than that, beginning with the Corps's own work in and prior to 1971, when they published a special flood hazard report on the Savannah River. The original source of the cross-sectional data for this model is the "Savannah River below Augusta Annual Survey," and available contour maps for overbank elevations.[14] The USGS quadrangle maps with contour intervals of ten (10) feet are the most likely source, which are imprecise compared to the sophisticated LIDAR and similar sources, such as those the Corps used for the new two-dimensional (2D) modelling of the various alternatives in the Draft Report.

The Corps abandoned the FEMA profiles in favor of more precise modern methodology in its newer HEC-RAS programs for one-dimensional (1D) and two-dimensional (2D) flows for their analysis purposes, which should produce more precise results. However, the Corps kept the old FEMA work for future use in permitting, "if possible." The Draft Report states the following about the FEMA effective model:

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13 Email: Chris Budd (AtkinsGlobal) to Tom Robertson (Cranston Engineering Group, P.C.), 4/9/19: "The effective model for the Savannah River is still the 1995 [sic] study by Corps."

14 Corps of Engineers, U. S. Army, Savannah, Georgia, District, *Special Flood Hazard Information Report, Savannah River, Augusta, Georgia*, August 1971, passim.

*"The FEMA existing model was assumed to be reasonably accurate, and no attempt was made to further calibrate the model to observed data. This was also to preserve model continuity to pursue a no-rise certificate, if possible."*[15] (Emphasis added.)

The construction of a fixed weir will also cause increased frequency of flooding for lesser floods than the 100-year. For example, the Draft Report states that Alternative 2-6a "may cause a minor increase in flooding depth at dozens of parcels for the 50% AEP [annual exceedance probability, or 2-year] flood event." This is very close to the "mean annual flood," the flood which would occur on the average once every year. What the Draft Report also fails to say is that the flooding depth of this and other floods will occur more often, because the gates will not be available to re-regulate the inflows.

The Draft Report, includes inundation maps for the 50% AEP flood for Alternative 2-6a, which shows rises of three (3) inches to greater than twelve (12) inches.[16] While the rises occur over the whole flood plain, such rises will likely cause access problems for a number of residences and businesses at different locations, including along Gum Swamp Road, the un-named access road to the farms along the dead river just downstream of the Sandbar Ferry Road, the Mason sod farm buildings, and several locations within the River North neighborhood, to name a few.

## F. Water Supply Concerns

*In analyzing the workability of the City of Augusta's raw water pumping station under the various alternatives, the Corps included only the existing conditions of water withdrawal rates at the N. Max Hicks Plant Raw Water Intake, without considering ultimate build-out capacity, which is much larger. Moreover, the February drawdown showed that the Corps's hydraulic model did not predict the water surface elevations properly. Therefore, the City of Augusta has grave doubts about the future effectiveness of this critically important raw water pumping station, which supplies drinking water to a large part of the City's citizens.*

The N. Max Hicks Water Treatment Plant (NMHWTP) is a public water system for municipal water supply owned, operated and constructed by the Augusta Utilities Department ("Augusta Utilities"). The plant was constructed with public funds and is authorized pursuant to the Federal Safe Drinking Water Act, 42 U.S.C. 300f *et seq.* and Georgia Water Resources Act, O.C.G.A. § 12-5-31.

The NMHWTP is currently permitted to treat 15 Mgal/d, and the planned site capacity at this location is 60 Mgal/d. The plant will be expanded in 15 Mgal/d increments as system demands increase.

The hydraulic analysis of the raw water pumping system included modeling at three flow rates, the highest being 19.5 Mgal/d. This flow was chosen as it corresponds to the pumping capacity of the existing pumps. The Draft Report acknowledges, however, that the existing station is capable of pumping 30 Mgal/d with the changeout of existing pumps and addition of a fifth pump. The piping is already in place for the addition of a fifth pump.

15 Draft Report, Appendix A,2.1.2. Geometry Modifications, p. A-5.

16 Draft Report, Appendix A, Attachment 2.

When the Corp's consultant modeled the raw water system to evaluate the impact of water surface elevations corresponding to Option 2-6d, they deemed it prudent to include vacuum assisted priming for the raw water pumps, even though they determined the system would be marginally acceptable without them. The system does not currently have vacuum assisted priming, and its construction is estimated at $228,000 by the Corps.

Augusta Utilities is concerned about the following deficiencies in the Corps's analysis:

- The highest flow rate modeled was 19.5 Mgal/d and the modeling indicated the existing system required modification.
- Actual constructed pump station capacity (with pump changeout) is 30 Mgal/d. No analysis was provided for this condition.
- The river intake system, typically the most expensive part of the raw water system, is capable of delivering 60 Mgal/d at current water surface elevations. A significantly lower water surface would likely require extensive modification to the river intake system. As the intake and pumping system was designed with current water surface elevation parameters, at this time it is not known whether the intake and pumping system will be able to meet original design criteria with the changes proposed by the Corps in the Draft Report.
- All the hydraulic analyses of Augusta's raw water system were predicated on the Corps's modeling of water surface elevations for various alternatives. The drawdown that occurred the week of February 11, 2019 proved that the Corps's modeling overstated water surface elevations. Actual water surface elevations will be significantly lower than what is predicted by the Corps's modeling.

## G. Recreation and Economics

*The Cities of Augusta and North Augusta find that impacts on recreational uses of the river are not adequately identified, evaluated, or mitigated within the Draft Report. The majority of in-river recreational uses upstream of the NSBLD were not identified or evaluated in the analysis of the presented alternatives. While an effort to evaluate some of the impact on some of the upstream docks was undertaken, this narrow focus does not include most of the current recreational uses and was based upon inaccurate modeling that grossly underestimated the degree of lowering predicted by the Corps's hydraulic modeling.*

*Recreational considerations in the Corps's evaluation of the alternatives appear to have only included physical impacts to a select group of docks resulting from reductions in water surface elevations, with no consideration of the cost consequences. However, other recreational uses and considerations including but not limited to those outlined below are significant and do not appear to have been adequately considered in the evaluation of the alternatives and (presumably) their formulation.*

*The Cities request that a much more complete inclusion of recreational uses and related economic impacts analysis be undertaken and used in the development and evaluation of alternatives.*

*The City of Augusta requests that river corridor planning efforts as outlined in the River Vision Plan be addressed in the development and evaluation of alternatives. This includes the development, refinement, and evaluation of alternatives to the US Army Corps of Engineers' (Corps) design for the New Savannah Bluff Lock and Dam (NSBLD), fish*

*passage, and adjacent NSBLD Park. The City requests that the NSBLD Park be maintained in area and elevation to keep it as a valued community amenity and maintain its rich history. Maintaining this park as such, strictly prohibits the proposed "floodplain bench" included in many of the presented alternatives including the Recommended Plan.*

1. Recreation, Uses, and Economics not Adequately Considered.

   *Planning, design, and alternative evaluation should include issues such as: level of activity around the water's edge both for current conditions and anticipated future users; frequency and range of flows within the recreational river; and potential consequences of accidently falling into the water (low water and high-water conditions) and consequences of inadvertent navigation or entrainment in the rock ramp fish passage.*

   The use of the river in the greater Augusta area includes the pool from the shoals near the Augusta Canal intake to the NSBLD and continuing downstream through the lock. While not currently operational, the lock has been used recreationally by residents for many years.

   Recreational uses in the upstream pool are highly reliant on the maintenance and stability of the water surface elevation currently provided by the NSBLD and its on-going operations. Recreational activities that Augustans currently enjoy on and along the banks of the river include: viewing, fishing, skiing, wake boarding and wake surfing, motor boating, rowing, kayaking, whitewater rafting at the shoals, long-term docking of house boats, and hosting of various water dependent events. Additionally, access to the water and water's edge other than that related to use of docks is critical to these recreational uses. Access to the water's edge will be made much more difficult as the increased variation will make the immediate area slippery and muddy and the banks will be steeper and/or higher above the waterline. This particularly impacts fishing - a critical component of everyday life for many Augustans and a significant recreational and economically important use of this reach of the river.

   Identification and adequate consideration of the impacts to most all these activities and user groups was not evaluated in the Corps's Draft Report and supporting alternative analysis. It is evident that lowering of the pool over a wide range of flows will negatively impact these activities. Depths will be reduced, useable surface area will be reduced, more obstacles will be exposed, and access to the water's edge will be significantly inhibited. In addition to overall decrease in pool depths, variation of the water surface will occur much more frequently and additional negative impacts to most if not all these activities as well as bank stability, aesthetics, and maintenance will result. Increased variability in the water surface elevation was not considered in the development and evaluation of the alternatives as it relates to these activities, issues, and future river corridor planning.

   Decreased depths and increased variability in the water surface elevations will negatively impact fishing, skiing, wake boarding and wake surfing, motor boating, and rowing, and operations of safety craft – particularly during the hosting of various water events. The only recreational metric applied to depth was 2 feet – and this was as it relates to accessing docks. This criterion is not appropriate for many if not all the activities listed above. Furthermore, the analysis, determination, and application of this forecast is not accurate, thorough, or appropriate. This is described below in the

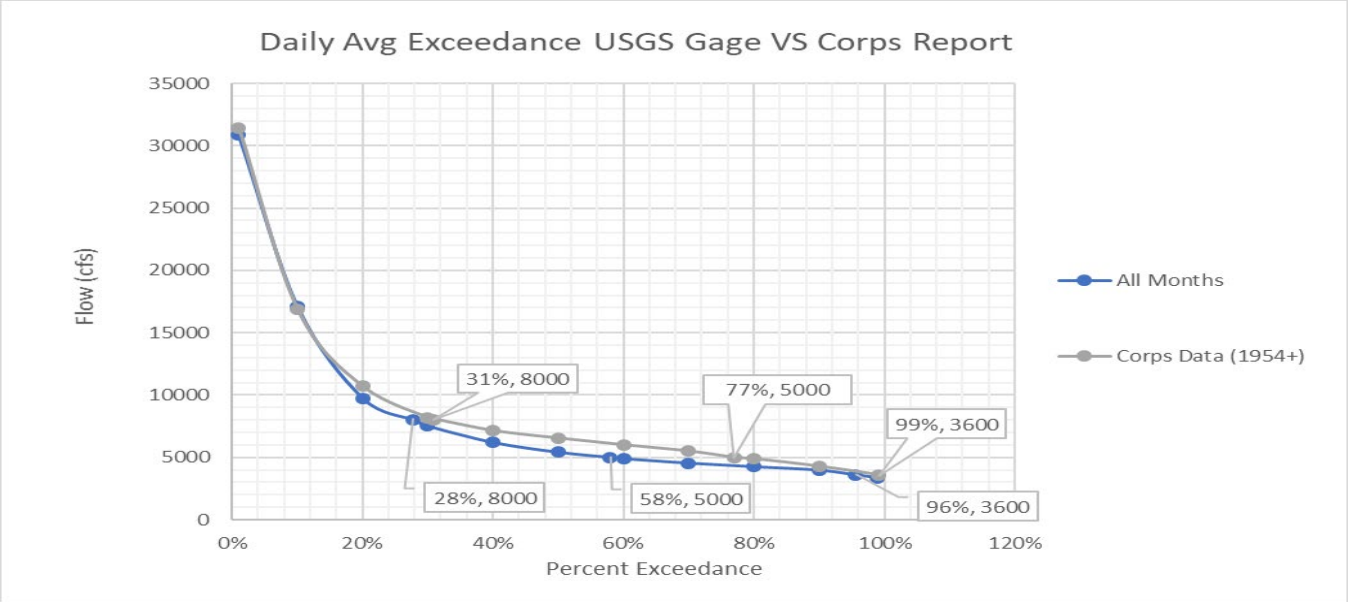
section entitled *Prediction on Water Surface Elevations and Decreased Depths,* in some of the Appendices, and elsewhere.

It is intuitive that decreased depth also results in increased velocities in the pool. This is also theoretically evident by the application of the equation Q=VA or V=Q/A or V=Q/(d*w), where V is the velocity in the pool, Q is the flow in the river, and A is the cross-sectional area of the river, d is the average depth in the river, and w is the average or effective width at that depth. Increased velocities result in several safety issues including increases in the risk related to abrasion or impingement from being swept over or impinging upon various obstacles, lodged debris, rock or structure on the invert, and over the rock ramp fish passage as included in most of the alternatives presented by the Corps. This concern is heightened by a demonstrated safety issue – i.e. one that has already been exhibited. It has been reported that there have been injuries or drownings when people in pool have inadvertently gone over the existing dam. One such case in 2008 occurred when a woman died by going over the lock and dam on her jet ski. Designing features in a river with the objective to create low hazard conditions can help prevent accidents like these from occurring.

People that inadvertently fall in the river (exacerbated by worsened conditions along the water's edge resulting from more variation is pool elevations as described elsewhere) will have a higher tendency to be swept downstream and encounter more difficulties exiting the water. Consideration of these types of safety issues would impact many aspects of the design of the rock ramp including type, gradation, and size of rock; pool (recovery zone) spacing, widths between constrictions, etc. Sufficient detail, discussion, or analysis to evaluate these and other potential hazards is not discussed, included in alternative evaluation, or even presented.

2. Evaluated Flows and Frequency

As stated on page 49 of the Draft Report, flows used to evaluate project impacts (except to public water supplies) was 5,000 cfs. The "normal conditions" flow rate used in the descriptions of the presented Alternatives was 5,000 cfs. It is not exactly clear why this was chosen as no clear reasoning is given. As stated in the Draft Report and indicated on the figure below, flows that occur between 5,000 cfs and 3,600 cfs occur a noteworthy part of the time. Figure 7 of Appendix A of the Draft Report shows that flow in this range occurs about 25% of the time. Flows in this range occur more frequently during the several months in the summer, when recreational use is highest. Recreational uses, impacts on docks, etc. outlined herein occur a significant time during this flow range, and it is not justified to ignore them in the development, analysis, and selection of alternatives. Flows occurring in the range of 3,600 and 5,000 cfs should be included and evaluated in the development, presentation, evaluation, and selection of all alternatives.




3. Prediction on Water Surface Elevations and Decreased Depths

*As further detailed elsewhere, the estimation on the decreases in depths presented by the Corps are inaccurate and insufficient. As decreased depths are more frequent and perhaps rapid fluctuations in depth negatively impact identified issues and recreational activities, the impacts have not been adequately determined.*

Shortcomings in the prediction of depths include:

- The modeling used to estimate impacts to these docks is flawed and greatly underestimates the amount of the decrease in the pool elevations that would result for the provided alternatives. This was made apparent during the drawdowns and survey on February 15, 2019.
- Depths were evaluated at a river flow of 5,000 cfs. As presented above, this flow rate is not appropriate.
- Depths predicted and provided are based upon a bathymetric survey that the Corps conducted in January 2018. It is not clear in the Draft Report that the level of detail of this study is sufficient to evaluate the impact of lowering the water surface and increasing the variability (particularly during lower flows) is adequate to evaluate these recreational activities. Since most of these activities were not considered, concern as to adequacy of the bathymetry used in the development, analysis, and evaluation of the alternatives is justified.
- Evaluation of the increase in frequency and degree of variations in the water surface was not provided. Pool elevations and resulting depths that vary more often and more drastically over time further decrease the recreational value of the pool.
- The decrease in depths is more severe than predicted in the Draft Report because the historical record of the stream gauge data indicates higher water surface elevations than used in the Draft Report for existing conditions.

- No evaluation of the increased deposition due to removal of the gates was provided. (Qualitative opinion was presented supporting a conclusion of no significant impact, however based upon extensive multi-dimensional sediment modeling efforts on a recent project on another river with a sediment-trapping upstream reservoir, the Cities do not accept this foregone conclusion with no supporting analysis.

4. Impacts to Docks

   Most of the analysis and results as provided on all but the first page of Appendix G are not accurate nor representative of the impacts that would result with implementation of any of the proposed alternatives. Moreover, the analyses consider the No Action Alternative as the base line condition; when, in fact, the existing water levels are higher. Consideration of the impact for adjacent land owners to install new docks was not made, nor were the costs for these significant changes accounted for.

5. Impacts to Hosting Special Events

   The Draft Report does identify the following Special Events that are or have recently been hosted in or along the Savannah River:

   - The Ironman 70.3
   - Head of the South Regatta
   - The Augusta Southern Nationals
   - Southeast Masters Rowing regionals

   The Augusta Convention and Visitors Bureau reports that these events have a combined economic impact of $11.5 million.

   The Corps's Draft Report states that:

   "*The Savannah River Basin Water Control Manual would be updated to increase flows from J. Strom Thurmond to meet water surface elevations required for the special events except when in drought contingency operations and flood conditions. As a result, the Ironman 70.3 and Head of the South Regatta would not be adversely impacted by any of the alternatives outside of periods of drought and flood."*

   However, the different alternatives would require greatly differing releases in flow and these releases are much more (due to the hydraulic modeling underestimation of water surface elevation) than would have been anticipated. Consideration of these issues would impact related costs and increase the probability that the events could not be held due to insufficient water supply. Furthermore, determination of the release rates, costs for these releases, and prediction of the frequency when these events could not be held were not provided in the Draft Report.

   Also, this operation could increase the flow rate which would increase the overall downstream velocities, and change the velocities across the event cross-section, changing the watercourse from lake-like to riverine. This would negatively impact all races or timed events. For example, it would give an advantage here and a disadvantage there, depending upon which "lane" a competitor might be assigned to. The predicted increase in downstream velocities were not provided and could increase a variety of safety issues.

6. Impacts to Larger Boats & Commercial Operations

Patriot Boat Tours operates a larger pontoon boat. There may not end up being enough depth at the main tour boat dock at Tenth Street to accommodate tour vessels. There may be additional commercial or private operations of larger boats that would draw more water or otherwise be reliant upon a deeper pool. These were not identified in the Draft Report.

*Figure 5: Princess Augusta*

7. Impacts to the NSBLD Park

*Alternatives that include excavation of the Park for the "floodplain bench" or over-flow channel including the recommended 2-6d alternative have a significant negative impact on the NSBLD Park. These alternatives would effectively render the park useless or nearly useless and it would become a maintenance liability. This park has a historically significant history and is utilized by many residents. These impacts were not considered as part of the Draft Report, including Appendix G - Recreation. Inclusion of these negative impacts must be considered in the development, evaluation, and selection of the alternatives.*

In 1915 the Augusta Levee was constructed to control flooding in downtown Augusta, Georgia, and expanded in 1936. Initially, the Levee greatly restricted the public's access to Augusta's riverfront from downtown to the mouth of Butler Creek, but with the 1937 completion of the NSBLD, the Corps's public Park provided direct access to the Savannah River.

The Corps's creation of this public space allowed the locals a place to interact with the river for these many decades. It has been a point of access for fishing, boat launching, and a gathering place for the entire community. Indeed, its importance to the City, especially those who reside in South Augusta cannot be understated.

A key historical component to the inclusivity of the Park showed itself during the 1950s-1960s when the majority of the City of Augusta was segregated, but the Park was not. It has served as a gathering place for all of the community's citizens for over 65 years. Its pavilions have provided the location for hundreds, if not thousands, of family reunions, birthday parties, and civic meetings.

The NSBLD Park has been one of the main access points for bank fishing since at least the early 1950s, and maintaining that access is imperative to the surrounding community to foster inclusivity and prevent gentrification. Many of the local citizens regularly fish along the river bank in the park, which is an essential element to their daily lives. In short, the park is a significant cultural feature of Augusta.

The NSBLD Park sits on the confluence of two emerging bike/nature/walking trails whose development is ongoing. The levee, which starts above the remaining shoals 17 miles upstream from the Park, creates an elevated path and contiguous trail through downtown Augusta ending at the Park. Over three-quarters of this levee has been

converted into a trail with remaining miles slated for conversion in the next few years. The Butler Creek trail starts at Lombard Mill Pond near Fort Gordon Gate 5 and running the length of the creek ending at the NSBLD park. That trail is 20% completed and is slated to be finished in coming years.

The Corp has recognized a portion of the historic importance and sense of place the Park has provided. As stated in the Draft Report:

> *'The NSBLD Park provides visitors a place to enjoy the outdoors by providing a place to fish, boat, and have picnics. The project area is in an undeveloped area on the Georgia side of the project surrounded by trees and a couple of open field areas for recreational opportunities and looks out to privately-owned undeveloped farmland on the South Carolina side with the Savannah River in between. The historic Lock and Dam structure is also a unique feature people can visit while visiting the area."*

The Draft Report however did not place economic value or considerations of quality of life on the use of the park or the significant history of the park to Augusta in their development, analysis, economic analysis, and selection of the presented alternatives. The NSBLD Park is an amenity that should remain with the community! Future plans must embrace the Parks importance and the benefit it has provided must be recognized and maintained for future generations.

The Park is decimated under the Recommended Alternative and other alternatives that include a "floodplain bench" or over-flow channel. These alternatives effectively render the park useless or nearly useless and it would become a maintenance liability.

As an example, Alternative 2-6d - Fixed Weir w/ Dry Floodplain would have a significant impact on the Park as it includes an excavated floodplain bench cut into almost the entire park to pass higher flows, thereby increasing the frequency of flooding, and impacting the uses, functioning, and safety of users.

The Park is rendered useless in the alternatives having the excavated floodplain bench for a number of reasons. Shade trees, landscaping, structures would likely not be located in the floodplain bench because of unsustainable maintenance efforts and negative impacts on flood conveyance. One of the most significant reasons is due to the frequency of flooding and resulting safety, wet and muddy conditions. Flooding can come from at least three separate sources:

a. Flooding from the adjacent wetlands, Butler Creek, and flooded areas tributary to the floodplain bench – that is overland and ground water flow from these upland areas to the river would be intercepted by the floodplain bench. This lowered area (due to increased head) would increase these flows and the frequency at which they occur.

b. Flooding from the downstream river commonly referred to as "tailwater" or "backwater." The Figure entitle Tailwater, below, is based upon the hydraulic modeling by the Corps. The Draft Report states that the floodplain bench would be lowered to elevation 110, however inspection of the HEC-RAS model indicates a much lower elevation of the bench of about 107.7. The existing elevation of the Park is about 117, which corresponds to a flow of over 35,000 cfs or about 0.5% of the time. The 110 elevation corresponds to a flow of about 24,500 cfs and a frequency of about 4% of the time. The 107.7 park elevation (from the model) occurs at a flow of about 18,500 or 8.5% of the time.

   <u>In other words, the Park will flood due to the tailwater about 8 times more frequently using the elevation stated in the Draft Report, or over 16 times more frequently based upon the floodplain bench elevation in the hydraulic model.</u>

   Either of these estimates in the increase in flooding frequency is very significant. For comparison, various cities and drainage districts with extensive experience of maintaining and operating trails, recreational facilities, and river front park amenities have criteria that sets the elevation of the facilities at the 10-year event – in this case about 60,000 cfs. The lower extreme in maintaining recreational facilities such as parks, trails, etc. is often the 2-year event or 33,000 cfs. The existing elevation of the Park is on the lower end of this range, and it is therefore critical not to increase frequency the Park area gets flooded. The modeled elevation of the floodplain bench floods at 18,500 cfs which is well below the 2-year event and floods about 8.5% of time which results in a frequency that is not practical to maintain for recreational park related activities due to the frequent wet and muddy conditions, accumulation of debris and sediments, and safety concerns.

   The difference in the elevation of the floodplain bench stated in the Draft Report of 110 and the modeled bench elevation of 107.7 is a significant discrepancy which would impact the development and evaluation of alternatives that account for impacts to this Park.

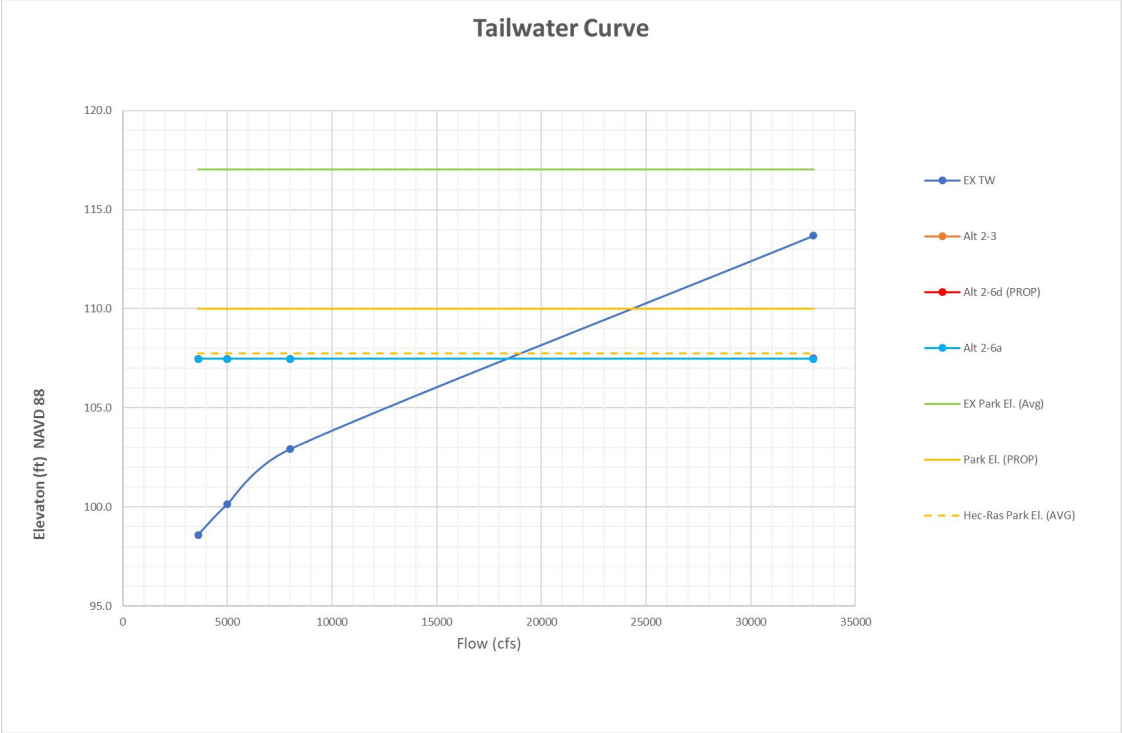



*Figure 6*

c. The third source of flooding that the Park or floodplain bench is from river water upstream of the rock ramp flow essentially around the (crest) of the rock ramp. This type of flooding is more damaging and dangerous than the other two types because of the velocity of the flow and scour potential. Based upon hydraulic data in the Draft Report, the floodplain bench in Alternative 2-3 would flood almost all the time and would flood about 70% of the time in the recommended Alternative 2-6d. Obviously, this would be the predominant source of water in the "Park" or floodplain bench.

   The term "floodplain bench" does not reflect the morphologic or any other reasonable interpretation or definition of how this impacted area of the Park would function. A floodplain bench typically is elevated at flood elevation at bankfull conditions. Bankfull conditions usually occurs between the 1-year and 2-year event or about 16,000 cfs to 33,000 cfs. This range is much higher than what results in the Alternatives with a floodplain bench. The Draft Report states that the "the bench would be grassed or rock lined to prevent erosion. Either of these surfaces in these wet conditions would not be conducive to recreational use. Given these conditions including the aesthetics and (lack) of recreational usage, more appropriate terms for the "floodplain bench" are a spillway or overflow channel.

   The floodplain bench renders most of the park unusable. The flood plain bench hinders access to the fishing areas for residents, removes the open field that is used by residents for special gatherings and severely limits access to the river. These alternatives do not evaluate the future recreational use of the park. These alternatives eliminate the historic uses of the Park outlined above.

All the alternatives presented "cut" or encroach upon the Park and reduce its size. Alternative development, evaluation, and selection should preserve or effectively mitigate area removed from the Park.

*It is readily apparent that the floodplain bench would be totally unusable for most any recreational activity, would likely look and act like a spillway or channel, be rock-lined, and/or become a maintenance nightmare. Alternatives that increase the flooding of the Park should not be considered further. Only Alternative 1-1 effectively maintains the Park elevation and flooding frequency thereby allowing the potential to preserve its recreational and historical significance to Augustans.*

8. Summary - Recreation, Uses, and Economics not Adequately Considered.

   Appropriate consideration and inclusion of all recreational uses and their economic impact would influence the development, evaluation, and selection of the alternatives. These efforts should be based upon accurate predictions in water surface elevations and evaluation of the frequency of the variations in the water surface elevations.

   Based upon information and analysis provided in the Draft Report, only Alternative 1-1 should be considered as it comes close to adequately addressing the issues and impacts outlined above. As presented, Alternative 1-1 lowers the pool elevation and decreases depths, however it may be possible to adapt Alternative 1-1 to meet the historic pool elevations. This can only be ascertained once the hydraulic model is calibrated and validated so it can be reliably used to assess the very important prediction and conclusions regarding the prediction of the pool elevations.

9. River Vision Plan for the Savannah River

   *Development, analysis, evaluation and selection of alternatives should include and support this planning effort and the economic and quality of life impacts it will provide. Alternatives at the NSBLD need to address pool elevations, safety, and the intended uses and development of the NSBLD Park, trails, and recreational uses. Only Alternative 1-1 currently comes close to integrating with the objectives and requirements reflected in this planning document.*

   The City of Augusta has undertaken a *River Vision Plan* for the Savannah River which extends from downstream of the New Savannah Bluff Lock and Dam (NSBLD) through Augusta and the natural shoals to Thurmond Lake. (A copy of the plan is presented in Appendix F.) In addition to creating highly recreational destination-oriented whitewater venues at the NSBLD and two other dam sites, the plan would open over 36 miles of a water trail starting from Thurmond Lake. The culmination of this water trail would be at the proposed whitewater venue integrated into NSBLD Park. The plan shown in the following figure, includes other sites with programming and activation elements focused on publicly owned property along the river within the city limits of Augusta. Identified activities and venues include a whitewater course, ropes course, zipline, water taxi, river cruise, fireworks display, fishing access, boat access, event pavilion, gathering spaces, destination playground, trails, outdoor markets, disc golf course, and historic markers. These rely on the pool created by NSBLD, recreational passage and low-hazard conditions at and around the NSBLD, and preservation/integration of the park north of the NSBLD – referred to here as

NSBLD Park. These are further described in the *River Vision Plan* for the Savannah River for the City of Augusta.

This plan includes an outdoor adventure sports park including a whitewater recreation bypass in conjunction with the removal of NSBLD. Inclusion of a whitewater recreational venue would create a major boating attraction drawing visitors throughout the region and shape the City's image. While somewhat different than the venue in Columbus, Georgia (rated as One of the Top Twelve Man-Made Adventures in the World by USA Today), it alone could create a similar economic impact and improvement in quality of life. Combined with other key features in the overall River Vision Plan for the Savannah River, the economic impact would further increase the economic and recreational impact of the proposed NSBLD Adventure Park. This design would incorporate fish passage, whitewater features, and other amenities and ideas suggested by the community. The Park is to be a place for picnics, family and group events, fishing, and outdoor and river recreation, as it has been since its inception.

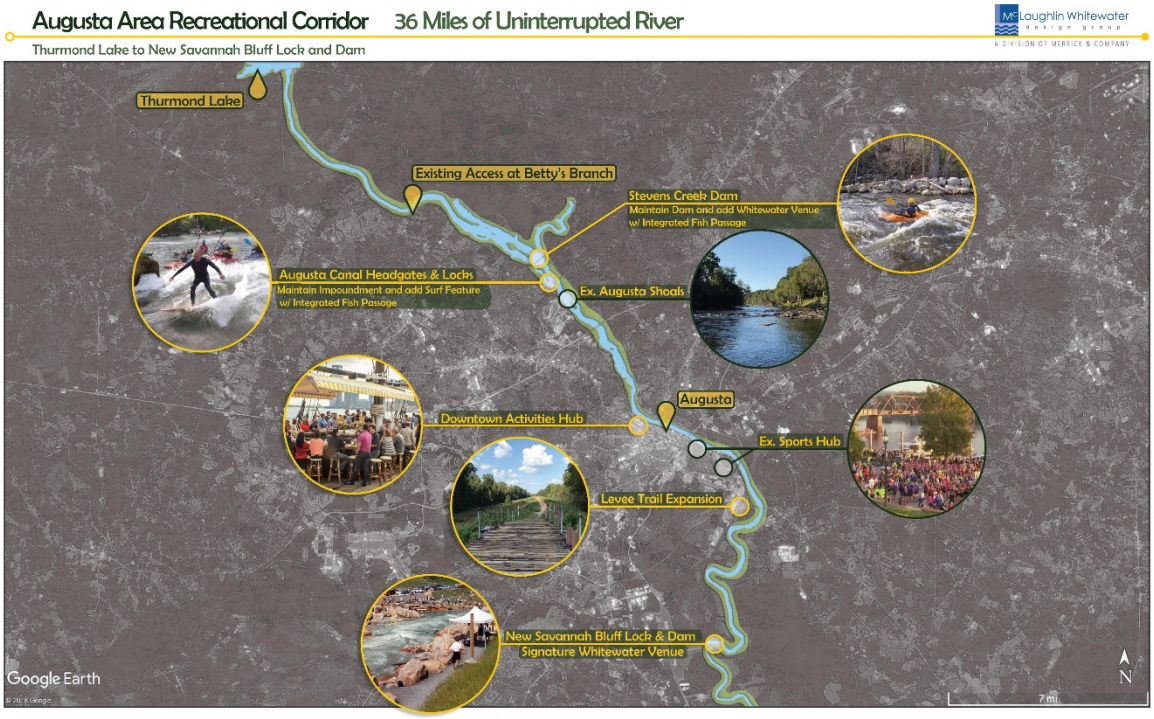



*Figure 7 River recreation plan from Thurmond Dam to New Savannah Bluff Lock and Dam.:*

Economic impacts related to this plan are significant. The recreational potential of the proposed amenities and improvements outlined in this planning document are judged to greater than the extremely successful recreation and river restoration project constructed in Columbus Georgia on the Chattahoochee River. The Savannah River has more flow, the recreational reach is much longer, and this reach is more accessible to densely populated areas. Economic impacts are further discussed in the memorandum, "Economic and Quality of Life Impacts Related the Proposed Savannah

River Recreational Improvements," which is included as a part of the *River Vision Plan* in Appendix F.

10. Integration of the NSBLD Alternatives with Upstream Planning

*Issues related to the elevation of the pool outlined in the existing recreational uses section above are heightened by the far-reaching River Vision Plan.*

Planning, design, and alternative evaluation considerations should consider issues such as: level of activity around the water's edge both for current conditions and anticipated future users; frequency and range of flows within the recreational river; and potential consequences of accidently falling into the water (low water and high-water conditions). More specific issues to address include but are not limited to the fish passage, piers or mid-stream obstacles, all types of bank armoring, woody vegetation, debris and debris accumulation, etc.

It has been reported that there have been drowning accidents resulting by craft being swept over the dam. Additionally, it is highly likely that people will be drawn to the proposed in-channel rock ramp fish passage. Given the history and future interaction with recreators, public safety must be a primary design objective and considered in the development and subsequent evaluation of the alternatives. Inclusion of a whitewater bypass course into the New Savannah Bluff Lock and Dam Park is an important element in addressing safety concerns related to upstream and local river recreational use. Inclusion of a whitewater bypass is mostly independent of the various Alternatives for the NSBLD presented by the Corps.

11. Integration of the NSBLD Alternatives with the Proposed NSBLD Park

The presented alternatives do not consider future recreational use of the NSBLD Park. The citizens of Augusta would like the opportunity to utilize and enhance the Park and turn it into a community space for all ages to experience the river and the surrounding greenspace. The City of Augusta has funded the *River Vision Plan*, which includes the park as a future outdoor recreational hub, complete with trails, climbing opportunities, zip lines and even a whitewater course. The vision for the park includes additional programming for new music venues, community events and food truck opportunities. In short, the future recreational hub envisioned by the study paid for by Augusta was not considered by the Corps.

The overarching goals of planning and development of alternatives create connectivity among a growing metropolitan area, and to provide opportunities for enhanced recreation and appreciation of our natural resources in ways that will contribute to improving the economy, pride, and quality of life for locals and visitors. There are additional potential projects that could tie into the future recreational hub at NSBLD, creating a regional recreational corridor that begins at the Augusta Shoals upstream and ends at the NSBLD adventure park. This would be the first of its kind in the nation and have compounding positive economic impacts for the region.

12. Fishing

Fishing is a critical component of everyday life for Augustans that live near the New Savannah Bluff Lock and Dam Park. People fish at the landside of the lock, using the ready access to and amenities in the Park. Keeping the Park available to the public,

along with safe access for fishing should be considered and weigh heavily in the evaluation of recreational uses. Fishing however does not appear to be included in the development or evaluation of the presented alternatives. An alternative that keeps the Park available to the public, along with safe access for fishing is essential. Alternatives that remove or diminish the Park are unacceptable.

13. Criteria for Recreational Value for the Park

- Maintaining the current pool elevation
- Keeping the park intact with opportunity for enhancements
- Access points to the river for fishing, boating and other in-river recreational activities
- Improved safety and navigability of the river
- Connectivity between the Park and nearby trails (Levee Trail and Greenway systems)
- Recognition as a local historical landmark

14. Integration with the Whitewater Passage and NSBLD Alternatives

*Low-hazard passage of recreational whitewater craft through or around the rock ramp or existing lock and dam should be considered in the development, refinement, and evaluation of the alternatives*.

Passage of boats around the NSBLD has historically been provided by the lock. This is evidenced in a 2014 article written by the CORPS, where it was noted that the city operated the lock a few dozen times a year for recreational boating. Although the whitewater passage is of a different type, it would mitigate the economic and recreational loss associated in all the presented alternatives with the elimination of the lock.

The recreational and regional economic importance of providing whitewater passage at the NSBLD is further increased as outlined in *River Vision Plan*. With the completion of key elements of this plan, a navigable water trail of 36 miles in length would be created with the whitewater bypass at the NSBLD being a vital part of that plan.

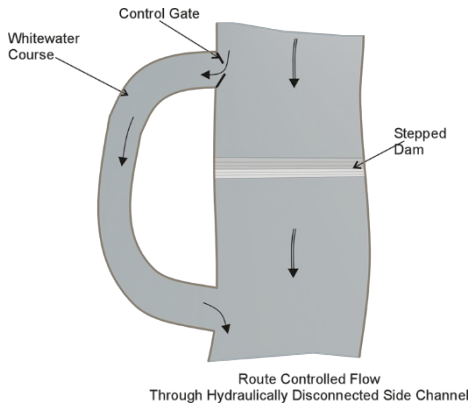
There are several different approaches to providing passage. One approach would be to design the rock ramp to be low-hazard, thereby providing passage within the rock ramp. This was not selected in the *River Vision Plan for the Savannah River for the City of Augusta*; however, if complexities arise with a bypass configuration, a rock ramp designed to be low-hazard to recreational users or inadvertent swimmers should be considered.

While some type of recreational or safety oriented navigational whitewater bypass could likely be integrated into the presented alternatives, the practicality to integrate a recreational whitewater venue of national caliber with broad economic and quality of

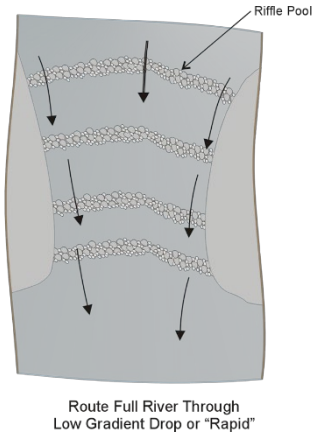
life improvements with this project will depend (in part) upon the alternative selected and consideration of the recreational uses outlined above.

Alternative 1-1 would readily support a wide range of options for inclusion of a major boating attraction drawing visitor throughout the region and shape the City's image as described in our report and previous presentations. Note that Alternative 1-1 is included in the figure showing the whitewater venue in the *River Vision Plan*.

A whitewater bypass may be able to be integrated into Alternatives with an excavated floodplain bench or in Alternative 2-8. However, the primary participants at this type of venue are spectators and the floodplain bench would greatly inhibit viewing and access due to frequent flooding and lower ground elevations. As noted elsewhere, the Recommended Plan and other alternatives with a floodplain bench would virtually eliminate the recreational value of the remainder of the park within the footprint of the floodplain bench.




Side Channel Passage Type as Currently Proposed in the *River Vision Plan.*




In-River Passage, or combined fish and recreational passage as included in the fish passage project in Pueblo, CO.

*Figure 8: Schematic Types of Recreational Passage*

## H. Impacts and Costs for Temporary Works During Construction.

*The Draft Report does not identify temporary structures needed to implement any of the alternatives, nor does it outline a plan for the construction sequencing, dewatering and water level maintenance or control. These efforts have significant cost and physical effects, and additional analyses are needed to develop, analyze, cost, evaluate and select a recommended plan.*

Significant structures, such as coffer dams and divider berms will be needed during construction, possibly as tall or taller than the existing dam. Large bypass channels and/or widening of the river adjacent to the rock ramp will also likely need to be constructed around the proposed rock ramp dam through the NSBLD Park and along the south bank to convey the large and continuous flows during construction. The costs and environmental impacts and impacts created by mitigation measures will be large. There will be disturbances to the banks, the park, large volumes of upstream sediments to handle. Extensive pumping may be needed, settling ponds to mitigate water quality impacts are typically required, and disturbances related to the large coffer dams

constructed in flowing water will occur. Given the large river with continually flowing conditions, construction efforts and costs related to these water control and dewatering efforts will likely cost as much or more than the construction of the rock ramp. In other words, the cost for these efforts will likely be much greater than the cost of the rock ramp (as identified) if it and its support substructure were constructed in a field or temporarily dried riverbed. This has been the case in many rock structures built in rivers, such as in Columbus, Georgia, which did not have nearly the amount of continuous flow to deal with.

## I. Real Estate

*The Cities and County are concerned about the effects of the project on the real estate that fronts on and lies near the seventeen-mile-long Lock and Dam pool. There are upward of 446 individual privately-owned parcels of land fronting on the pool, to say nothing of the nearby parcels benefitting from proximity to and views of the water. The diminished value of the waterfront properties and the hindrance effect on ongoing and planned redevelopment projects caused by the lowering of the pool must be considered a cost of the project and compensation, paid. The Draft Report ignores these effects and is thus deficient. It must be withdrawn, corrected, and reissued for public comment.*

*The Corps arbitrarily omitted considering all alternatives by omitting any fish passage or construction on the South Carolina side, choosing instead to obliterate a functioning park to avoid purchasing a few acres of land.*

The lands along the river and near it have been the focus of revitalization and economic development efforts on both sides of the river for many years as established by riverfront master plans beginning in 1981 on the Augusta side and 1996 on the North Augusta and Aiken County shore. The Cities have been pursuing exciting new projects that create homes, businesses, and quality of life improvement opportunities for its citizens, as well as value for the owners of the properties, totaling many hundreds of millions of dollars. These values are jeopardized by the lowering of the pool elevations, where docks and boats are grounded, viewsheds blighted, and access to the water curtailed. This translates into immediately reduced real estate values where the water use and access formed large percentages of the dollar value of the landward property. That portion of their real estate value is instantly gone and may constitute a taking.

Typically, Corps's reports on water resource projects would consider damages from flooding (or water level lowering) in terms of stage-damage curves, which are used to estimate dollar values of projected damages. The Draft Report is deficient in this respect and does not consider any monetary damages to real estate from the proposed project.

The Corps asserts that the project is limited, "to the extent possible, to land that is currently owned by the federal government. Several of the project alternatives considered were developed based on the maximum project footprint." [17]

## J. Sedimentation

*The Corps fails to address the long-term sedimentation of the pool over the life of the project, which will ultimately, cause multiple problems upstream, silting-in and impairing*

17 Draft Report Appendix E, Real Estate, Section 1.18, p. 9; and Appendix A, Engineering, revised version 2/22/2019 Section 6.2 Real Estate accessed 4/9/2019.

*the operation of water intakes, reducing flow cross-sections, raising flood levels, and other negative effects. The Corps must consider the beneficial effects of choosing an alternative that does not create upstream silt deltas, such as Alternative 1-1.*

*The Draft Report also fails to consider adequately the movement of existing silt masses downstream and the accompanying exposure of various types of deleterious materials. The Draft Report lacks consideration of the issue of dealing with legacy toxic sediments that will likely be disturbed by exposure along and within the pool and during the construction on the site. The Corps must address the presence or absence of legacy toxic chemical composition and potential fate and transport of those sediments and must provide a plan to facilitate sediment stabilization of newly exposed sediment sources.*

1. Siltation of the Pool Over Time

   The Draft Report aptly points out that there are three large multi-purpose reservoirs owned by the Corps of Engineers upstream that act as sediment traps for the Savannah River downstream, and also that the Stevens Creek Dam and the Augusta Canal Diversion Dam have the same effect. It should be noted, nevertheless, that there are many streams that enter the river downstream of Thurmond Dam and that the pools of Stevens Creek and Augusta Canal dams are nearly full of sediment.

   The erection of a fixed weir will forever halt the transport of bed-load sediments and trash, which are now released continuously by design at the under-flow gates of the Lock and Dam. Ultimately, the pool will fill in with silt, albeit over what might normally be considered a long time, but not so long a period when taken in the context of the 100-year time planning horizon of the Draft Report. A full-scale example of this phenomenon is at the Stevens Creek Dam just a few miles upriver from the pool. Built in about 1915, its impounded pool is virtually filled with silt, so that emergent wetlands cover many acres of what used to be the middle of the Savannah River. Such a fate will ultimately occur, given enough time, at any fixed weir at New Savannah Bluff, and will eventually extend upstream to impair water intakes, docks, etc.

   The Corps Draft Report also points out high shoaling areas at two locations: on the North Augusta side of the river behind the training wall (incidentally, built by the Corps of Engineers itself to prevent shoaling) and near the Sand Bar Ferry Road area.[18] This latter area includes the head of Blue House Bar, which was the low-flow head of navigation in drought times before the New Savannah Bluff Lock and Dam cured the navigation problem and made the shoaling at this location no longer a problem. These areas will continue to accumulate silt over time, as described above, and will become a problem once again, especially if the pool levels are lowered.

2. Toxicity and stabilization of newly exposed sediments

   Pool drawdown showed the extent of new sediment that would be exposed as a result of pool elevation changes. Those sediments will be exposed to new wave lapping and rainfall/runoff erosion processes. It is unclear whether those newly exposed sediments contain legacy pollutants and what the fate and transport of those pollutants may be. Appendix E contains a table of Sediment Chemistry Data taken from samples in 2006-2008 from multiple locations along the Savannah River; RM 202, RM 198, and RM

18 "Sedimentation Evaluation for SHEP Fish Passage," August 9, 2018, Draft Report, Appendix A, Attachment 3.

190 are all within the Lock and Dam pool section. Newly exposed sediment will impact water quality in the form of turbidity and suspended sediments until the newly exposed sediment is stabilized by vegetation. In addition, any legacy toxic components could be mobilized as a result of erosional forces, this could have a significant impact on drinking water supply for the Max Hicks drinking water plant (intake below Augusta Marina), on aquatic biota, recreational activities, and on sporting activities such as the Ironman triathlon. Is there a plan to determine legacy toxic chemical composition and potential fate and transport of those sediments? Is there a plan to facilitate sediment stabilization of newly exposed sediments with vegetation by seeding/or planting these newly exposed areas?

## K. Aquatic Resources

1. Impact of Dam Alterations on Savannah River Fisheries

Currently, NSBLD provides appropriate hydrologic forces to maintain an approximately 50' scour pool on the downstream side of the dam. This scenario provides unique physical and geological forcing necessary to maintain a mid-stream gravel bar located approximately 600 ft downstream of the dam and scour pool. This geological and physical forcing has been in place for over 90 years, since the dam was constructed, and is considered the contemporary "new normal" for biological species in the Savannah River with life spans of 90 years or less. It is expected that all alternatives for fish bypass/NSBLD modification will alter the necessary erosive flows and sustaining dynamics currently maintaining this gravel bar, resulting in alteration of this important spawning habitat (CORPS, 2018): the extent of impact is not known.

Experts that have studied Savannah River fisheries have concluded that several endangered species rely on the gravel bars below NSBLD for suitable spawning habitat. Grabowski and Isely (2006) showed that the endangered (Georgia listed) robust redhorse relied on the only two known gravel bars below NSBLD for spawning and showed a high degree of site fidelity for spawning at those two sites. Freeman and Freeman (2001) concluded that the endangered robust redhorse uses gravel bars exclusively with the bar below NSBLD as a critical habitat. For Atlantic sturgeon, NOAA-NMFS designated the gravel bar below NSBLD as an endangered habitat critical to support spawning of Atlantic sturgeon in 2017 (NMFS, 2017; USACE, 2019).

Shortnose and Atlantic sturgeons as well as Robust redhorse have keen site fidelity to spawning grounds. Kynard et al (2016) indicated that shortnose sturgeon return "home" to the same reach with 100% site fidelity and spawn annually at the same small sites. Less is known about the Atlantic sturgeon but they are also believed to have high site fidelity in southeastern rivers (Collins, et al., 2000). Robust redhorse are known to have high site fidelity in the Savannah River Basin (Grabowski and Isely, 2006).

In all rivers where shortnose sturgeon studies have been conducted, it was shown that these fish spawn at one reach, the most upstream reach used during their life history (Kynard, et al., 2016). Kynard et al (2016) also suggested that female shortnose sturgeon that have historically spawned below dams are more genetically hard-wired to home to their historical spawning grounds. Finally, Kynard et al. (2016) suggested that even if river rapids exist, which are believed to be the favored spawning

conditions for shortnose sturgeon, this does not mean that they will seek those areas if that individual imprinted at a different reach during the early life stages.

No matter the option chosen for NSBLD, either rock ramp or bypass, it is without doubt that the physical and geological forces currently maintaining the mid-channel gravel bar will be removed and the imprinted/endangered habitat will no longer be available as spawning habitat for these endangered species. Hypothetically, if these fish do not use the rock ramp, either as a bypass or in-river structure, to move further upstream during spawning migrations to the Savannah River shoals area (the presumed preferred habitat), it could cause a devastating collapse of the Savannah River populations of Atlantic sturgeon, Shortnose sturgeon, and Robust Redhorse by significantly reducing spawning success at either the gravel bars or shoals reaches.

In 2013, the Cape Fear rock arch ramp was officially unveiled. This structure replaced a similar low head dam structure, like NSBLD, while leaving in-place a lock system. This would be an excellent opportunity to learn how successful it has been regarding fish passage. Unfortunately, NCDNR is not permitted to tag the endangered Shortnose or Atlantic sturgeons and have only been tracking migrations of shad, herring, and striped bass. Therefore, there is no data available on passage for the endangered sturgeons. There has been one observation of an Atlantic sturgeon above the rock ramp structure but there is no evidence that it passed the rock structure as opposed to passing as a result of lockage.[19] Furthermore, the rock ramp has been successful in passing shad and herring but not striped bass so engineers, scientists, natural resource managers, and NOAA Fisheries are discussing future adaptive management strategies in an effort to facilitate passage of all species.[20]

If the primary goal of the NSBLD alteration is to allow passage of shortnose and Atlantic sturgeons beyond NSBLD, then **no matter the design alternative chosen, Corps, NOAA-NMFAS, and GPA should take an adaptive management approach and ensure successful passage and spawning behavior of these fish. Sufficient funds should be allocated for monitoring fish migration patterns to either reach remaining shoals above NSBLD or spawn at any remaining gravel bars that may exist after construction below the dam and sufficient contingency funds should be set aside to make appropriate alterations to the chosen alternative until successful spawning behavior has been proven with reliable, peer reviewed data at either remaining gravel bars or within the shoals.**

2. Impact of dam alterations on dissolved oxygen concentrations

The Savannah River is not meeting state standards for water quality due to low dissolved oxygen concentrations in the Savannah Harbor. As a result, a Category 5R alternative restoration plan was developed in order to bring the Savannah Harbor reach into compliance with the standard. In order to meet the restoration plan, all sources of biochemical oxygen demanding substances to the river below Thurmond Dam were identified, and a model was developed by GAEPD and SCDHEC with the intent to reduce sources of those substances so the dissolved oxygen standard could be met in

19 (https://sero.nmfs.noaa.gov/habitat_conservation/hcd_headlines/cape_fear_ld1_fishway.html).

20 (https://sero.nmfs.noaa.gov/habitat_conservation/hcd_headlines/cape_fear_ld1_fishway.html https://www.coastalreview.org/2017/01/river-advocates-work-to-add-fish-passages/)

the harbor. The foundation of the model was based upon "natural background conditions", meaning that natural biological, physical, and chemical processes that contributed to oxygen generation and oxygen consumption were accounted for in the model before all discharger contributions were considered. A significant source of dissolved oxygen generation within the Augusta reach of the Savannah River included aeration of the river water as it cascaded over the dam. The figure below shows 2 years of 15-minute interval dissolved oxygen data (over 60,000 15-minute observations). These data show that aeration over the dam resulted in an average dissolved oxygen saturation of 107% (at RM 185 site) with both 25% and 75% of the data above 100% saturation and a few excursions to a low of 90% saturation. This can be compared to the shoals reach of the Savannah River (RM202) which had a lower average saturation, a wider 25% and 75% range, and lower DO% excursions below 90%. The proposed rock arch ramp will be more similar to the RM202 dataset because this shallow water habitat will undergo photosynthesis and respiration due to the attached algae on the rocky substrate in addition to aeration. The second figure below shows continuous data from below the shoals in July 2012. The data show that aeration and photosynthesis increased dissolved oxygen saturation to 122% in the afternoon but aeration and respiration at night lowered saturation to nearly 70%. Any loss or gain of dissolved oxygen within the Savannah River system below Thurmond Dam will impact the 5R process and could jeopardize restoration of dissolved oxygen in the Savannah Harbor.

Since dissolved oxygen is so critical, there should be peer reviewed documentation from other rock ramp projects around the country that show dissolved oxygen dynamics will not be impacted by the chosen alternative. Furthermore, that documentation should be in the form of measured data from those projects and not modeled results since this impact is so critical to restoring the river and could impact the viability of each municipal and industrial discharger below Thurmond Dam.

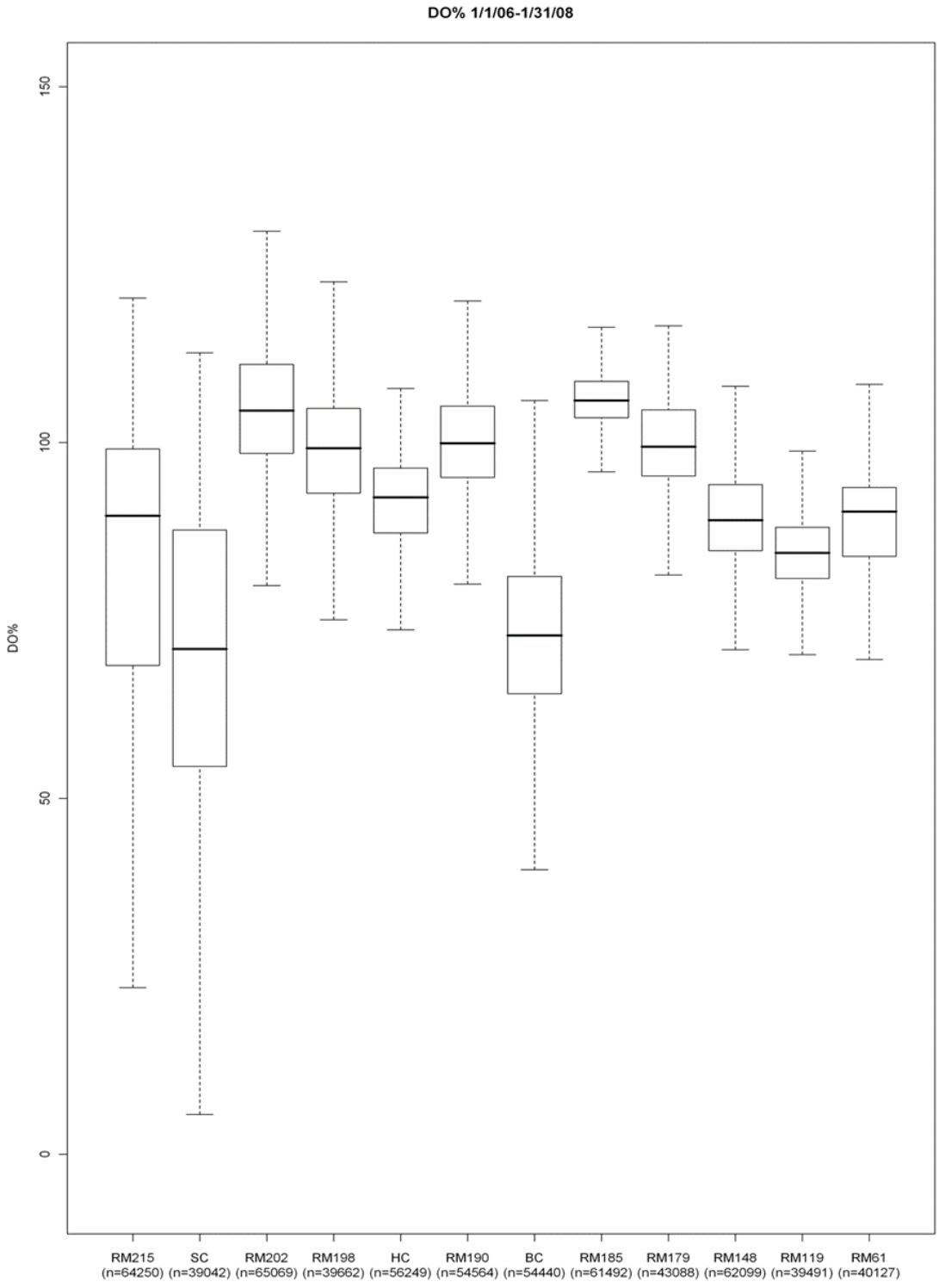



*Figure 9: Dissolved oxygen percent saturation statistics from multiple continuous Savannah River water quality stations from January 2006 through January 2008 (from Comprehensive Savannah River Study, Final Report: February 2006-January 2008. Phinizy Center for Water Sciences.)*

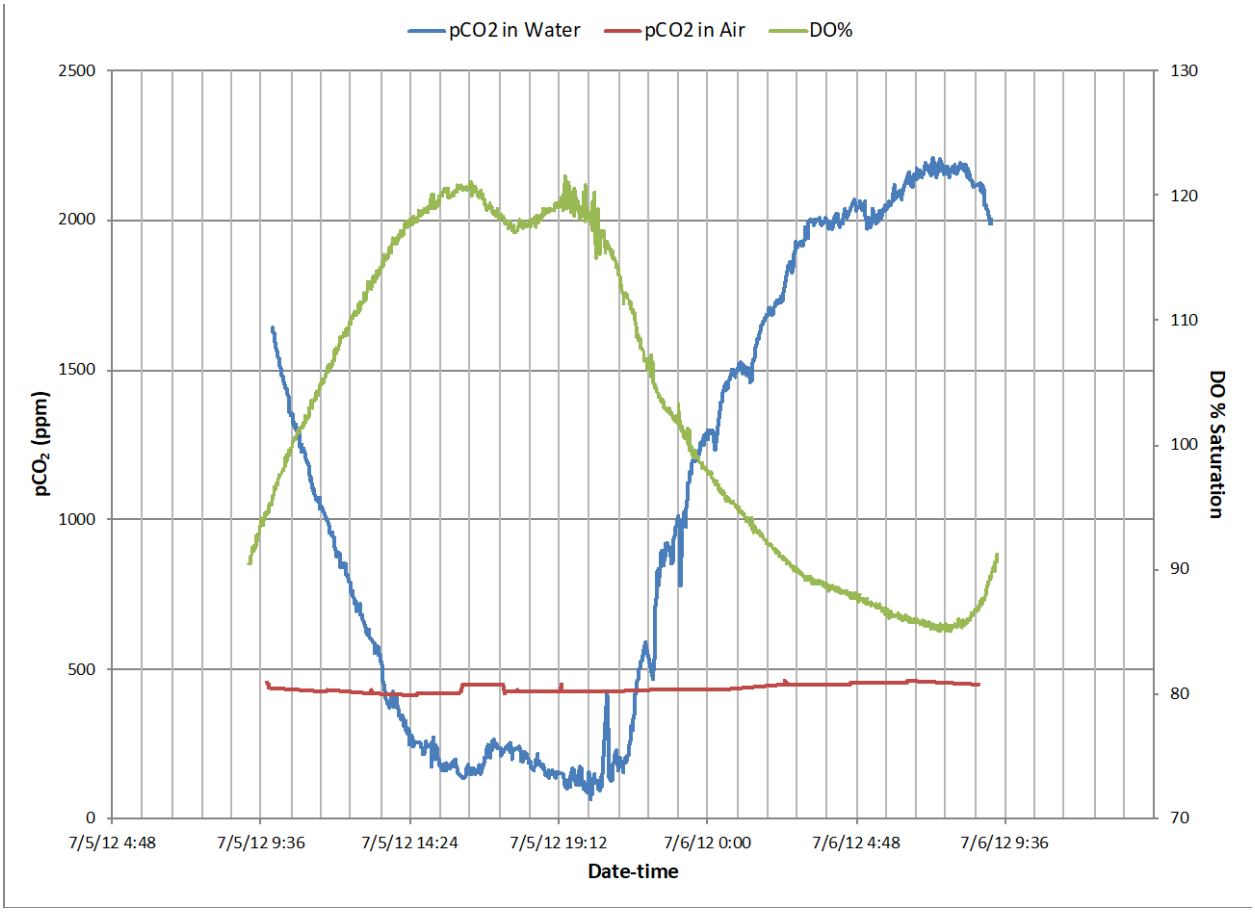



*Figure 10: Measurements of dissolved oxygen percent saturation (green), partial pressure of $CO_2$ in water (blue) and partial pressure of $CO_2$ in air (red) at River Mile 202 (immediately below the shoals section of the Savannah River) over a 24-hr period, from July 5, 2012 through July 6, 2012.*

3. Scour Hole Below NSBLD

   What is the fate of the scour hole below the dam for the preferred alternatives?

4. Effect of Drawdown on Groundwater Elevations

   After the drawdown, a crack developed in the soil behind a seawall on a property adjacent to the Savannah River. The failure was likely due to subsidence as a result of the lower pool elevation during the drawdown. Whether the seawall was installed properly or not is a matter of discussion, but the incident elucidated an important facet of the river system that could have a major effect as a result of a lower pool elevation. All surface waters in the Augusta and North Augusta areas flow to the Savannah River, groundwater contributes to that surface water flow. The pool elevation sets the piezometric head for all surface and regional surficial groundwater systems that drain to the river. Since groundwater and surface water flows to the river, changing pool elevation will have an impact on the regional surficial groundwater table by decreasing piezometric head and lower water levels in the watershed that drains to that pool elevation. This impact could have a positive effect in some areas of Augusta and North Augusta that have had historic flooding issues because the Lock and Dam artificially held the piezometric head higher than when the dam was not in place, but could have significant impacts in areas where groundwater drawdown weakens under

portions of each city that are supporting significant infrastructure. This again, shows that the series of dams in the Savannah River are the "new normal" for the river and changes that effect widescale systems, such as the regional groundwater system, could have significant economic impacts if not appropriately studied and accounted for. How will this potential impact be addressed if the pool elevation is proposed to be lowered from current normal levels?

5. Justification of mitigation

The Corps must clarify how NOAA-NMFS justified mitigation of access to spawning habitat above NSBLD in lieu of destruction of nursery/summer habitat in the estuary. The Cities would like to understand the NOAA-NMFS justification and should include providing the peer-reviewed statistical cost/benefit analyses to justify this conclusion as well as any peer-reviewed publications that support this justification. This justification should be weighed relative to some of the world's renowned experts on shortnose sturgeon (including a NMFS expert; Kynard et al., 2016) suggesting that even if river rapids exist (believed by many fisheries experts to be the favored spawning conditions for shortnose sturgeon), this does not mean that they will seek those areas if individual fish imprint at a different reach during the early life stages.

## L. Impacts to Wetlands not Adequately Identified, Evaluated, or Mitigated

*Identification, mitigation, and evaluation of potentially impacted wetlands and the differing impacts to these by the various alternatives were not presented in the Draft Report including the Draft Finding of No Significant Impact. Therefore, the development and evaluation of the proposed alternatives in the Draft Report are inadequate.*

*Draft Report & Appendix C – Environmental Resources: Wetlands not investigated in the footprint of any of the alternatives.*

Specific issues are as follows:

1. Wetlands near the NSBLD Site

- Impacts to wetlands adjacent to project site – PF01A and PFQ1C on Figure 9, and (potentially) others not identified - could not only be impacted by the lowering of the water upstream of the pool, but would also likely be further impacted by alternatives that include lowering of NSBLD Park. Excavation of the so-called wetlands bench will increase the hydraulic head differential and thereby tend to drain the wetlands identified in the NWI Map and other potential wetland areas located north easterly of the site.

- The Draft Report did not include an Environmental Impact Statement (EIS), wetlands delineation investigation, nor report for the proposed alternatives for the currently proposed project boundary. While these were conducted for the original SHEP Plan, the footprint of the proposed alternatives is clearly very different – located primarily on the north side of the river rather than the south side. While a National Wetland Inventory Map is referenced, based upon site inspection there are areas with standing water (observed during a site visit) to the north and east of the site. If these are subsequently identified as wetlands, they could also be impacted by most if not all the proposed alternatives.

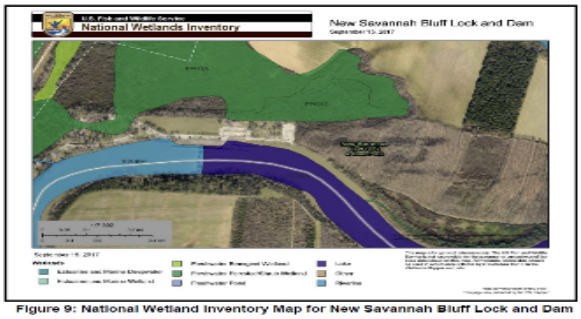


Figure 9: National Wetland Inventory Map for New Savannah Bluff Lock and Dam

2.2.5 Terrestrial Resources and Wildlife

*Figure 11*

- The footprint impacted by the alternatives is not clearly presented and does not adequately include or identify the areas needed for construction related activities including but not limited to access and dewatering.

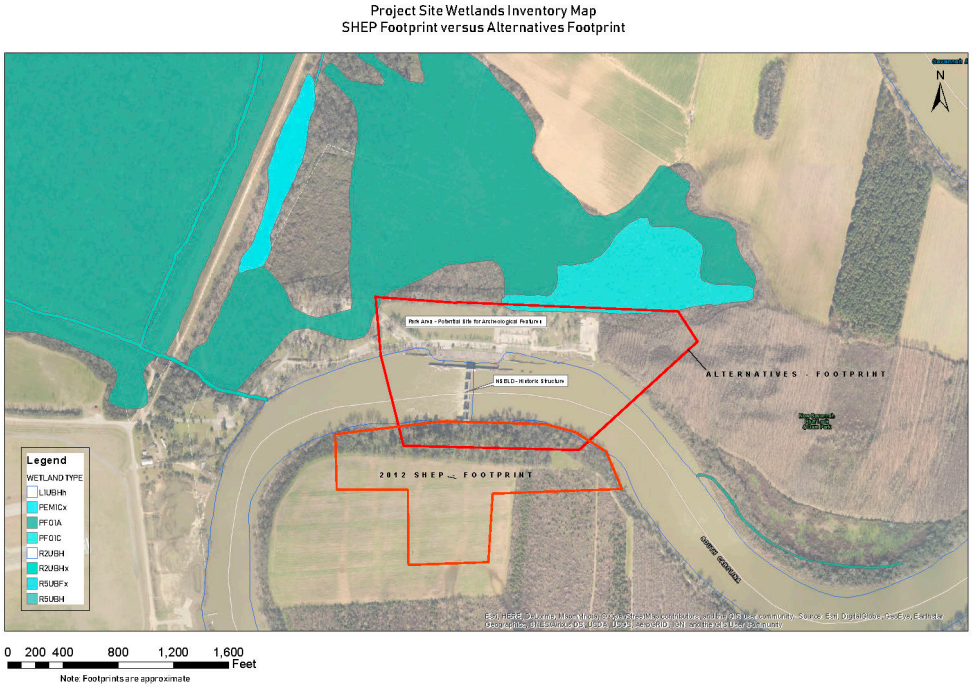



*Figure 12*

- All presented alternatives (other than 1-1) also include removal of the NSBLD which will entail vastly different dewatering efforts, construction techniques, and construction related impacts to the river as related to the original SHEP Plan. Identification, quantification, development, and evaluation of mitigation measures

and impacts on aquatic resources, and costs should be included in the development and refinement of alternatives.

2. Wetlands Upstream of the NSBLD

*Draft Report & Appendix C – The lowering of pool surface elevation will potentially affect fringe wetlands on the 17-mile reach of the Savannah River above the NSBLD, and wetlands with hydrologic surface connection to the river affected by reduction in pool elevations below existing surface water elevations. Based upon published data including USGS National Wetland Inventory, the affects would include thousands of acres of wetland, fringe wetland, and sensitive riparian habitat. The Corps failed to assess both direct and indirect effects of the proposal and alternatives on these sensitive areas which are protected pursuant to Section 404 of the Clean Water Act.*

*Section 2.2 of the PAAR addresses only areas in the immediate vicinity of the NSBLD and includes no assessment of pool surface elevation lower on the 17-mile mainstem stretch and the direct and indirect effect on wetland, fringe wetland, and sensitive riparian habitat and ecosystem features.*

River Reach Wetlands Inventory Map – 17 Miles of Impact

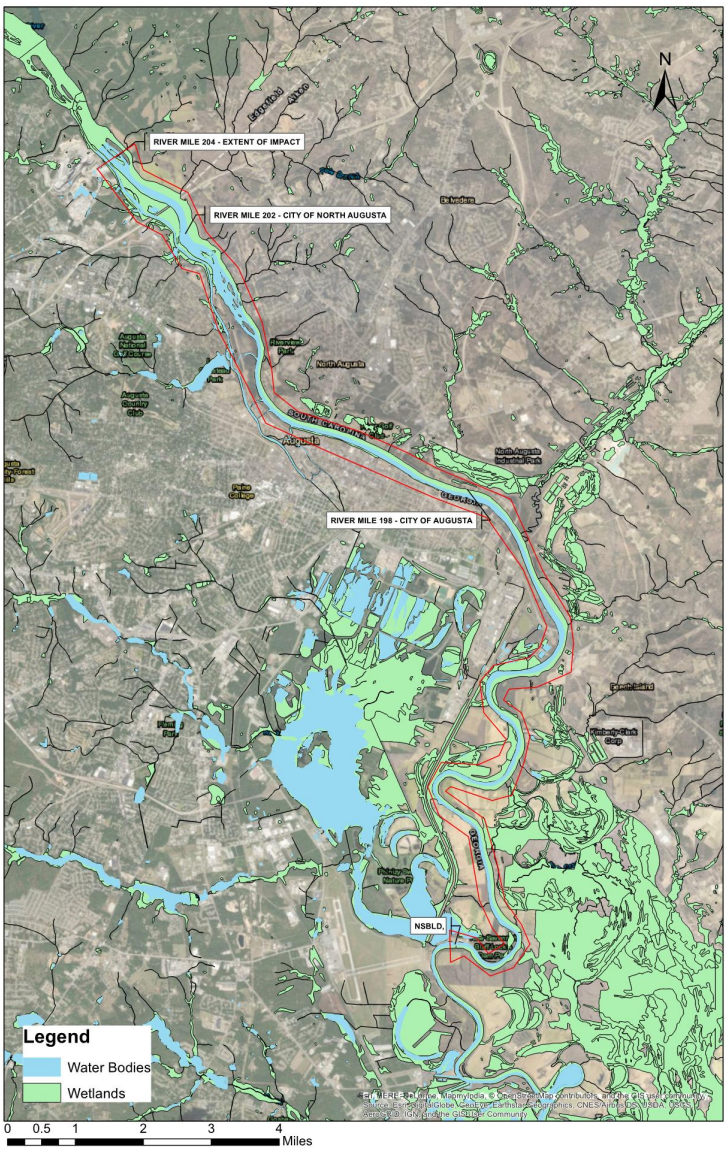



*Figure 13*

- As outlined within the Draft Report and elsewhere in these comments, the presented Alternatives were estimated to lower the existing water surface in the pool by about 5 feet for Alternative2-3 or 3 feet for the Recommended Alternative 2-6d (5,000 cfs at the NSBL). Projected lowering of the water surface is even greater at flows below 5,000 cfs which occur during significant periods. Also, as stated elsewhere, the

water surface elevations observed during the drawdown where significantly lower than projected by the Corps's model, which demonstrates further potential impacts to upstream wetlands. This reduction in water surface over existing conditions occurs (albeit at dimensioning amounts) throughout the impacted reach appears to be about 17 miles, however even this is not clearly established in the Draft Report. This lowering of the pool would likely have some impact on wetlands adjacent to the river over this entire reach. None of these potential impacts were identified or evaluated within the Draft Report.

For comparison, the original SHEP Plan was predicted by the Corps to have no reduction of the upstream water surface elevation at 5,000 cfs at the NSBLD. Therefore, impacts to upstream wetlands were not as critical of an issue as with the alternatives presented in the Draft Report.

**M. Power Generation – A Lost Opportunity for O & M Revenue?**

*When the New Savannah Bluff Lock and Dam was built it was equipped with three identical water turbine bays for potential future installation of hydro-electric turbines. Under options where the lock wall is repaired, these bays could be fitted with three water-driven turbines powering three synchronous or induction generators totaling about 335 kW of electrical power, or about 1.0 MW. These units could produce almost 8 million KWH per year at a value exceeding $400,000 annually.*[21] *The City of Augusta could use the power itself at their nearby Messerly wastewater treatment plant, Hicks water treatment plant, or Augusta Regional Airport, thereby maximizing the value of the revenue. Moreover, the pool would not be lowered by the modest flows through the water wheels. The Corps should consider the added benefit of power generation as a potential offset against future maintenance costs of the applicable alternatives, including Alternative 1-1.*

**N. Cultural Resources and Historical Considerations**

*The Draft Report contains meager, erroneous, and incomplete information on the Corps's plans to comply with the applicable requirements of the National Historic Preservation Act. While the Corps states that they will conduct archaeological investigations according to the 2012 SHEP Programmatic Agreement, that agreement and its attachments make no mention of the New Savannah Bluff site nor the NSBLD. The Area of Potential Effect in the Draft Report is erroneous and needs to be corrected to include all of the areas impacted by the proposed alternatives, including at least all of the federally owned lands currently leased to Augusta, Georgia. It is known that the NSBLD is eligible itself for inclusion on the National Register of Historic Places, as acknowledged in the Draft Report. However, the Draft Report proposes no specific mitigation for its loss, which will occur in whole or in part in all alternatives except the No Action Alternative. The Draft Report merely states that an MOA with Georgia and South Carolina SHPOs will be required, and that perhaps documentation according to Historic American Engineering Record standards would be accomplished. The original SHEP EIS Programmatic*

21"New Savannah Bluff Lock & Dam Hydro Electric Program," and "What does the US Dept. of Energy (DOE) think about the potential of hydroelectricity at the New Savannah Bluff Lock and Dam?", www.savannahriver.org, accessed April 4, 2019.

*Agreement*[22] *states, only in blanket terms, that the investigations pertaining to historic buildings and structures will be conducted according to the specified federal guidelines.*

The Area of Potential Effect (APE) boundary should be adjusted to cover all of the areas impacted by the proposed alternatives, including access roads, lay down areas, and other areas on the Georgia and South Carolina side to be affected by the project, as well as the reach of the Savannah River upstream of the Thirteenth Street Bridge to the base of the Augusta Shoals above River Mile 204. The boundary should be enlarged to include at a minimum all of the federally owned lands leased to Augusta, Georgia (containing the lock-tenders' residences site), plus an adjacent colonial era cemetery, and the downstream lands to the end of the bluff. Also, there is a high probability of encountering remains of previous occupations of Native Americans at New Savannah Bluff. The Chickasaw Indians are known to have occupied the site during the historic period. Collections at the Augusta Museum of History include a fine shell gorget recovered from the borrow pits adjacent to this property, indicating that other remains might be discovered or disturbed. The extended upper reach of the river includes the historic Campbelltown Ferry site leading from historic Ezekiel Harris House (NRHP) across the river to Campbelltown and to the site of the colonial village of Fallmouth. The base of the shoals may contain remains of historic and prehistoric fish weirs and traps used to capture fish, particularly migratory fish such as those which are the subject of the Fish Passage project.

The Draft Report contains errors in identifying historic resources in the upstream pool, particularly bridges. There are two early to mid-19th Century railroad bridges across the Savannah River, but one is upstream of the Fifth Street Bridge and the other downstream. These are historic, patented "rolling lift bridges." In addition, there are stone piers from the former South Carolina Railroad covered timber bridge upstream of the Fifth Street Bridge. In addition, the Fifth Street Bridge, with a superstructure completed about 1935, is a historic property itself, containing a unique swing span. It is also the sole known example of a brick pier supported bridge in the United States.[23]

The Draft Report mentions wing dams, pile dikes, and other features constructed by the Corps over many years in the reach under the pool as aids to navigation. The Fish Passage with its lowered water levels will effectively undo more than 166 years of projects and expenditures by the Corps to improve navigation in the Augusta-North Augusta area. Do those projects not still serve the important purpose of helping to maintain navigability, even though they may have been forgotten by the very agency that built them?[24] The "low training walls" should include the main training wall in the slack water pool opposite the Cities' waterfronts, sometimes called Gardner's Bar Jetty, which angles out from the South Carolina bank to the center of the river at the Norfolk Southern Railroad bridge at Sixth Street and extends thence roughly down the center of the river for approximately one mile. While it is a historic resource, it may become a safety hazard to navigation (both for recreational and economic development purposes) if the pool is lowered,

22 The Programmatic Agreement is hidden in the Draft Report appendices. The "Savannah Harbor Expansion Project Cultural Resources Programmatic Agreement" is found in Appendix C5 to the Draft Report, but is erroneously titled in the "Appendix C Environmental Resources Documentation" table of contents as "8-Step Process for EO 11988: Floodplain Management."

23 Personal communication, Eric DeLony, former director of HAER, with Tom Robertson, circa 2012.

24 Drawings of these features date back to at least 1853, when extensive surveys were made of the Savannah River navigation between Augusta and Savannah; and include plans dated 1883, 1888, 1916, and others. See The National Archives, Record Group 77, Civil Works Map Files, and Fortifications Files, and others.

requiring some sort of practical mitigation, not mere avoidance as a "check the box" mitigation measure for cultural resource preservation.

The NSBLD has been identified as eligible for listing on the National Register of Historic Properties, and Georgia DNR Historic Preservation Division has identified that the project will have adverse effect on the NSBLD under the National Historic Preservation Act (NHPA). Alternatives removing the NSBLD will have permanent destructive effect on the historic resource. Alternatives 1-1 and 2-1, which leave the NSBLD in place, minimize and avoid effects to historic resources and provide additional opportunities for historic and cultural benefits which have not been considered by the Corps. Interpretive centers, educational and historic tourism benefits of leaving the NSBLD in place, as has been done with similar projects with Corps involvement or ownership, have not been considered or assessed. For additional historic and cultural resources issues see Legal Comments, Section IX.B.

# VI. Specific Comments on Alternative 1-1

*The Cities of Augusta and North Augusta request that the Corps reinstate and select a corrected and modified Alternative 1-1, because it is the only plan that comes close to maintaining the pool, as required by the WIIN Act 2016.* ***But even Alternative 1-1 illegally lowers the pool, as it does not comply with the WIIN Act and because it was formulated using the erroneous HEC-RAS computer model that was disproven by the February 15, 2019 drawdown.***

## A. Reasons to include and select Alternative 1-1

1. Advantages, under the WIIN Act 2016 specified purposes:
    - Maintains the pool, under nearly existing conditions (As presented, Alternative 1-1 lowers the pool elevation and decreases depths, however it may be possible to adapt Alternative 1-1 to meet the historic existing pool elevations.)
    - Preserves navigation in the pool.
    - Preserves the Lock and Dam Park.
    - Passes migratory fish.
2. Disadvantages, under the WIIN Act 2016 specified purposes:
    - Eliminates navigation up and down the river.
    - Removes the Lock, but preserves the water control gates of the Dam.
3. Other Advantages, not directly related to WIIN Act specified purposes:
    - Maintains adjustable control of the pool levels.
    - Requires no land purchases.
    - Requires no upstream flooding easement rights to be purchased.
    - Reduces impacts to aquatic resources and construction dewatering efforts and costs during construction.
    - Would best enable a future whitewater feature along the frontage of the park, if one should be added in the future.

4. Other Disadvantages, not directly related to WIIN Act specified purposes:

   - Requires ongoing maintenance of mechanical and structural elements of the remaining gates.

**B. Reasons to Question Costs Related to Alternative 1-1**

1. Widely Changing Costs

   The cost figures presented by the Corps for this and other alternatives have varied greatly at each stage of this project and were even changed by an order of magnitude during the middle of the current public comment period. The underlying bases of these costs have not been shared with the public, and are so unreliable and unsubstantiated that no rational conclusions can be drawn by the Cities nor the public at large.

   The Corps has used their latest highly escalated cost projections and a question about the fish passage efficiency to throw out the most reasonable of the plans proffered in the Draft Report. This decision is arbitrary and should be reversed.

   The costs assume a complete rebuild of the Lock and Dam at Year 50 at a cost of $93.7 million, and a huge amount of Operation and Maintenance costs besides. Engineering economic analyses do and should consider proper maintenance costs to operate the facility over the time of the planning horizon. The very large and highly suspect O&M costs should obviate the need for a complete rehabilitation at that time. It is totally unclear what the basis of those exorbitant O&M costs are. Moreover, the Corps will certainly not be actually placing funds into a sinking fund to pay for the rebuild. The Corps should present supporting documentation of the newly escalated cost figures, so that the Cities and stakeholders may reach conclusions on their validity.

2. Erroneous Cost Estimates and Assignment of Responsibility Cost Sharing

   The Corps's Implementation Guidance states that if any alternative is chosen under (i) of the WIIN Act, the federal share of operation and maintenance costs is 100%, and if any alternative is chosen under (ii), the O&M costs are to be split according to the purposes of those costs. Therefore, the O&M costs for Alternative 1-1 should be 100% federal. But, the escalated cost chart in their blog post of 2019/03/18 shows a split federal/non-federal cost for Alternative 1-1, the same basis as presented for 2-6d.[25] In reality all of the O&M costs for 1-1 should be corrected to be a federal expense. Is this a hidden reason for the Corps to eliminate Alternative 1-1 late in the public comment period?

   Moreover, the Corps's cost estimates overall are arbitrary and unsupported, contradicting previously published figures by such wide margins as to bring into question their veracity for use in rational decision making.

25 https://balancingthebasin.armylive.dodlive.mil/2019/03/18/how-two-fish-passage-alternatives-compare/, Draft Report, 4.3 Cost Sharing, p. 105, Implementation Guidance, May 25, 2017.

Thus, the Corps's blog table is an unsubstantiated presentation of erroneously-assigned, inflated costs. Their cost and assignments do not follow the Corps's own instructions from their Headquarters, and must be discarded and revised.

## VII. Specific Comments on Alternative 2-6d.

*The Cities of Augusta and North Augusta object to the selection of Alternative 2-6d, because that plan violates the authorizing legislation in that it does not maintain the pool for water supply and recreation as required by the WIIN Act 2016, and does irreparable and permanent damage to the communities, their industries, businesses, citizens, and visitors.*

### A. Reasons to Reject Alternative 2-6d.

Alternative 2-6d consists of a fixed weir with a floodplain runaround through the Lock and Dam Park.

1. Advantages, under the WIIN Act 2016 specified purposes:
   - No technical advantages for authorized purposes.
   - Most cost effective (according to the Draft Report)
2. Disadvantages, under the WIIN Act 2016 specified purposes:
   - Greatly lowers the pool (much lower than predicted in the Draft Report).
   - Impairs water supply in the pool.
   - Impairs recreation in the pool.
   - Eliminates the Lock and Dam Park for recreation.
3. Other Advantages, not directly related to WIIN Act specified purposes:
   - Passes fish. If the design of the rock ramp works for passing sturgeon, then the full river width of the ramp is beneficial to the fish for their finding the ramp.[26]
   - Highest weir without land inundation (according to the Draft Report).
4. Other Disadvantages, not directly related to WIIN Act specified purposes:
   - Eliminates navigation up and down the river.
   - Impairs safe navigation within the pool.
   - Results in a pool water surface that will fluctuate much more frequently and dramatically than historic conditions. This will result in bank instability, poor access to the water's edge, increased difficulty in egress from the water, and failure of structures such as occurred during the drawdown.
   - Effectively eliminates the vast majority and significantly decreases the value of the NSBLD Park.

26 This benefit is included and stated here, notwithstanding the fact that the WIIN Act does not require nor authorize fish passage for this alternative, because it is authorized under option (ii) of the act.

**B. Reasons to Question Costs Related to Alternative 2-6d.**

1. Erroneous Cost Estimates and Assignment of Responsibility for Cost Sharing.

The Corps's cost estimates are arbitrary and unsupported, contradicting previously published figures by such wide margins as to bring into question their veracity for use in rational decision making.

The Corps's Implementation Guidance states that if any alternative is chosen under (ii) of the WIIN Act, the federal share of operation and maintenance costs is 100% for the fish passage alone, "including monitoring, adaptive management, and operation and maintenance"; while the share of costs for any other purpose is 100% non-federal, including ". . . operation and maintenance of the structure for any other purpose, including maintenance of the pool for water and recreation."[27] The escalated cost chart in the Corps's blog post of 2019/03/18 shows zero ($0) ongoing O&M costs for Alternative 2-6d. under the "Non Fed Share."

It is absurd to assume that there will be no maintenance required for the specified tasks over the life of the project. Certainly there will be costs for maintaining the unlined flood water runaround, repairing scour holes, removing accumulated silt behind the weir, removing accumulated flotsam interfering with navigation in the pool at the boat ramp, keeping up the boat ramp, and a myriad of other similar items.

The federal share of the first cost is also erroneously calculated in the blog post, which states that the federal share of the SHEP Fish Passage is limited to 75 percent of the original SHEP Fish Passage authorized in 2014, "which is currently estimated at $62,673,000." This unsupported cost estimate is greatly understated, as it is inconceivable that all of the other costs quoted by the Corps have recently escalated dramatically and inexplicably, while the original plan cost has remained the same or nearly the same. The cost estimate of the original SHEP plan must be corrected and updated commensurate with the treatment that all of the other cost estimates have received. The Corps must furnish background substantiation of the costs to allow clear understanding and independent review by the stakeholders of the economic analyses to be accomplished.

Thus, the blog table is once again an erroneous presentation of costs, according to the Corps's own instructions from their Headquarters, and must be discarded and revised.

## VIII. Detailed Comments on Corps Draft Report, Line by Line

The comments in this document are supplemented by more detailed comments on the individual sections, presented line by line, which are included herein in Appendix G.

27 Note that the Draft Report does not follow the Corp's Implementation Guidance on costs to be included. The Implementation Guidance does not mention "navigation" costs as a non-federal cost (consistent with the WIIN Act), while the Draft Report includes navigation as a non-federal sponsor cost (inconsistent with the WIIN Act). (See Implementation Guidance, May 25, 2017, pp. 2-3; and Draft Report, 4.3 Cost Sharing, p. 105.)

**Appendices**

| | |
|---|---|
| APPENDIX A | Resolutions of Governing Bodies: Augusta, North Augusta, Aiken County |
| APPENDIX B | Letter from Senators and Congressmen to Department of the Army, Corps of Engineers, April 9, 2019. |
| APPENDIX C | Report on Hydraulics Methodology, April 15, 2019 |
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| APPENDIX E | Savannah River Sediment Chemistry Data |
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| APPENDIX H | Other Alternatives That Have Been Proposed |
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# APPENDIX A

## Resolutions of Governing Bodies: Augusta, North Augusta, Aiken County

## RESOLUTION IN SUPPORT OF OPTION 1-1 FOR THE SAVANNAH RIVER LOCK AND DAM

WHEREAS, the Savannah River is a valuable asset to the entire Central Savannah River Area and especially to the consolidated government of Augusta, Georgia and its citizens;

WHEREAS, the Augusta Commission supports the idea of constructing a fish passageway to improve and sustain favorable outcomes for the fish and other wildlife in the Savannah River; and

WHEREAS, maintaining a high pool level in the Savannah River is critical to sustaining the commercial and recreational uses of the Savannah River; and

WHEREAS, the governing body of the consolidated government of Augusta, Georgia wishes to express its strong support for Corp of Engineer option 1-1 (retain Dam with Georgia Fish passage); and

WHEREAS, the governing body of the consolidated government of Augusta, Georgia wishes to express its strong opposition to any fish passageway option that would lower the pool level of the Savannah River more than is minimally necessary for a fish passageway.

NOW THEREFORE, THE AUGUSTA COMMISSION HEREBY RESOLVES AS FOLLOWS:

Section 1. **Support for** Option 1-1 and maintaining the 114.5ft (NAVD 1988) pool level for the Savannah River at Downtown Augusta location (as recorded at USGS Monitoring Gage #02196670).

Section 2. **Opposition** to any option that lowers the pool level of the Savannah River less than 114.5ft at Downtown Augusta location to construct a fish passageway. The Mayor and Commission of Augusta, Georgia strongly oppose all options that would reduce the pool level of the Savannah River.

Section 3. **Severability** - To the extent any portion of this Resolution is declared to be invalid, unenforceable, or non-binding, that shall not affect the remaining portions of this Resolution.

Section 4. **Repeal of Conflicting Provisions** - All resolutions inconsistent with this Resolution are hereby repealed.

Section 5. **Effective Date** - This Resolution shall be effective on the date of its approval by the Augusta, Georgia Commission.

SO RESOLVED, this the 18th day of December, 2018.

**AUGUSTA, GEORGIA**

By: _____
Hardie Davis, Jr.
As its Mayor

AGM
12/18/18

ATTEST:

_____
Lena J. Bonner, Clerk of Commission

RESOLUTION NO. 2019-1
A RESOLUTION IN SUPPORT OF OPTION 1-1 FOR THE NEW SAVANNAH BLUFF LOCK AND DAM AS PRESENTED BY THE ARMY CORPS OF ENGINEERS AS A MITIGATION PROJECT FOR THE SAVANNAH PORT DEEPENING

WHEREAS, the City relies on the Savannah River for drinking water, recreation, and as a beloved amenity that contributes to the quality of life for our citizens; and

WHEREAS, the City of North Augusta has branded itself as "South Carolina's Riverfront" and recently, along with private developers, has invested hundreds of millions of dollars into developing said riverfront; and

WHEREAS, the City and its citizens have grown reliant and accustomed to the river pool created by the Lock and Dam since it went into service in 1937; and

WHEREAS, the 2016 WIIN Act states that any mitigation project selected by the Corps must "maintain the pool … as in existence on the date of enactment of this Act"; and

WHEREAS, the City believes that pool elevation to be 114.5 (NAVD 1988) as measured at Downtown Augusta location (as recorded at USGS Monitoring Gage #02196670); and

WHEREAS, the preferred option 2-6d as selected and presented by the Corps would lower said pool by approximately 2.5 – 3 ft.; and

WHEREAS, the Mayor and City Council, after examining all options presented by the Corps, believes that option 1-1 is the only option that comes close to maintaining the existing pool.

NOW, THEREFORE, BE IT RESOLVED by the Mayor and City Council of the City of North Augusta, in meeting duly assembled and by the authority thereof, that ,

1. Option 1-1 as presented by Corps is the preferred option of the City.
2. Any and all measures should be undertaken by the Mayor and City Administrator to ensure that the present pool be maintained.

DONE, RATIFIED AND ADOPTED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF NORTH AUGUSTA, SOUTH CAROLINA, ON THIS THE 7TH DAY OF JANUARY, 2019.

Robert A. Pettit, Mayor

ATTEST:

Sharon Lamar, City Clerk

| | |
|---|---|
| Sponsor(s) | : County Council |
| Committee Referral | : County Council |
| Committee Consideration Date | : January 15, 2019 |
| Committee Recommendation | : Approval |
| Effective Date | : January 16, 2019 |

RESOLUTION NO. 19-01-15

COUNCIL ADMINISTRATOR FORM OF GOVERNMENT FOR AIKEN COUNTY

Expressing Support of Option 1-1 for the New Savannah Bluff Lock and Dam as Presented by the United States Army Corps of Engineers as a Mitigation Project for the Savannah Harbor Expansion Project.

WHEREAS:

1. Aiken County and its citizens have come to rely and depend upon the pool of water in the Savannah River created by the New Savannah Bluff Lock and Dam since it went into service in 1937; and

2. The City of North Augusta, the City of Augusta, as well as industries located along this pool, draw drinking, process and cooling water from the pool; and

3. In addition, the Savannah River is a major amenity that contributes significantly to the quality of life in our community and has recently drawn hundreds of millions of dollars in new public and private investment along the area of the pool; and

4. The WIIN Act, adopted in 2016, requires that any mitigation project chosen by the United States Army Corps of Engineers maintain this pool at the elevation that existed on the date of the adoption of the Act; and

5. It is believed that the elevation of the pool is 114.5 (NAVD 1988) as measured at Downtown Augusta location (as recorded at USGS Monitoring Gage #02196670); and

6. The preferred option of the Corps of Engineers, known as Option 2-6d, would lower the pool by an estimated 2.5 – 3 feet, creating operational issues for governments and industries, as well aesthetic and recreational problems for our community and the investments being made along the riverfront ; and

7. Aiken County, in consultation with the City of North Augusta, the City of Augusta, and the major industries utilizing the pool, have concluded that this option does not serve the best interests of our residents; and

8. Aiken County, having reviewed the various options presented by the Corps of Engineers, has concluded that Option 1-1 is the best and most reasonable option to maintain the pool for use by our residents and industries.

NOW THEREFORE BE IT RESOLVED BY THE AIKEN COUNTY COUNCIL THAT:

1. Aiken County Council does hereby endorse Option 1-1 for the New Savannah Bluff Lock and Dam mitigation project as the preferred option and requests that the United States Army Corps of Engineers reconsider their preferred Option 2-6d.

2. Aiken County Council also directs the County Council Chairman and County Administrator to continue efforts to ensure that the current pool created by the New Savannah Bluff Lock and Dam is maintained.

(signatures on following page)

Adopted at the regular meeting of Aiken County Council on January 15, 2019.

ATTEST:

Tamara Sullivan, Council Clerk

SIGNED:

Gary Bunker, Chairman

IMPACT STATEMENT:

COUNCIL VOTE: Unanimous

| | |
|---|---|
| Sponsor(s) | : Development Committee |
| Committee Referral | : Development Committee |
| Committee Consideration Date | : June 20, 2017 |
| Committee Recommendation | : |
| Effective Date | : June 21, 2017 |

RESOLUTION NO. 17-06-105

COUNCIL ADMINISTRATOR FORM OF GOVERNMENT FOR AIKEN COUNTY

(Expressing Support to the United States Army Corps of Engineers for the Preservation of the Pool Created by the New Savannah Bluff Lock and Dam at Current Levels and for the Repair and Rehabilitation of the Structure.)

WHEREAS:

1. Aiken County, particularly the area along the Savannah River, has long depended on the pool created by the New Savannah Bluff Lock and Dam (NSBL&D) for drinking water, recreational use, industrial development; property development and wastewater discharge; and,

2. The NSBL&D has reached the stage that it needs substantial repair and rehabilitation and under the Water Infrastructure Improvements for the Nation (WIIN) Act, the primary objectives for the United States Corps of Engineers are to design and construct a structure that will maintain the pool for water supply, recreation activities and, possibly, navigation and to not increase flood risks in downtown Augusta and North Augusta; and,

3. It is recognized that NSBL&D was not built as a flood control structure, but certain changes could adversely impact properties along the pool or other users of the impoundment by either increasing the risk of flooding in downtown North Augusta and Augusta, lowering the pool to an unacceptable level or both; and,

4. Alternative designs have been discussed, including a fixed elevation weir without the ability to effectively control water levels, which provides a major area of concern for Aiken County; and ,

5. The Savannah Harbor Expansion Project (SHEP) includes funding for passage at the NSBL&D for endangered fish in the river, and some funding for repair or replacement of the NSLB&D; and,

6. Many years of inaction on this project has resulted in further deterioration of the structure, increasing the risk of the loss of the pool, an event that would be devastating to the economies of communities on both sides of the Savannah River; and,

7. Aiken County Council wishes to encourage prudent and expeditious action by the United States Army Corps of Engineers to repair and rehabilitate the NSBL&D in a fashion that best meets the needs of our community.

NOW THEREFORE BE IT RESOLVED BY THE AIKEN COUNTY COUNCIL THAT:

1. Aiken County Council requests the United States Army Corps of Engineers develop a fully funded plan for the repair and rehabilitation of the New Savannah Bluff Lock and Dam, including the passage for endangered species, which preserves the pool created by the structure at current levels and does not increase flood risks in downtown North Augusta and Augusta.

2. Aiken County Council encourages that the resulting project plan be developed and executed in a fashion consistent with the goals of the SHEP project and timeframe.

(SIGNATURE PAGE TO FOLLOW)

Adopted at the regular meeting of Aiken County Council on June 20, 2017.

ATTEST:

Tamara Sullivan, Council Clerk

SIGNED:

L. Andrew Siders, Chairman*

IMPACT STATEMENT:

COUNCIL VOTE: Unanimous

*Serving as Chairman pursuant to Aiken County Code Section 2-30(b).

**RESOLUTION 19-06 IN SUPPORT OF OPTION 1-1**
**FOR THE SAVANNAH RIVER LOCK AND DAM**

WHEREAS, the Savannah River is a valuable asset to the entire Central Savannah River Area and especially to the consolidated government of Augusta, Georgia and its citizens;

WHEREAS, the Columbia County Board of Commissioners supports the idea of constructing a fish passageway to improve and sustain favorable outcomes for the fish and other wildlife in the Savannah River; and

WHEREAS, maintaining a high pool level in the Savannah River is critical to sustaining the commercial and recreational uses of the Savannah River; and

WHEREAS, the governing body of Columbia County, Georgia wishes to express its strong support for Corp of Engineer option 1-1 (retain Dam with Georgia Fish passage); and

WHEREAS, the Columbia County Board of Commissioners wishes to express its strong opposition to any fish passageway option that would lower the pool level of the Savannah River more than is minimally necessary for a fish passageway.

THEREFORE, The Columbia County Board of Commissioners now hereby resolves:

**Section 1. Support for** Option 1-1 and maintaining the 114.5ft (NAVD 1988) pool level for the Savannah River at Downtown Augusta location (as recorded at USGS Monitoring Gage #02196670).

**Section 2. Opposition** to any option to construct a fish passageway that lowers the pool level of the Savannah River less than 114.5ft near Downtown Augusta.

**Section 3. Repeal of conflicting resolutions** – Any resolutions in conflict with this Resolution are hereby repealed to the extent necessary to eliminate such conflict.

**Section 4. Effective Date** - This Resolution shall be effective immediately upon its adoption.

SO RESOLVED, this the 19th day of February, 2019.

**Columbia County Board of Commissioners**

By: Douglas R. Duncan, Jr.
Chairman

**Attest:**

Patrice R. Crawley, Clerk of the Board of Commissioners

# APPENDIX B.

## Letter from Senators and Congressmen to Department of the Army, Corps of Engineers, April 9, 2019.

# Congress of the United States
Washington, DC 20515

April 9, 2019

The Honorable R.D. James
Assistant Secretary of the Army (Civil Works)
108 Army Pentagon
Washington, DC 20310-0108

Lieutenant General Todd T. Semonite
Commanding General and Chief of Engineers
U.S. Army Corps of Engineers
441 G. Street, NW
Washington, DC 20314-1000

Dear Secretary James and General Semonite:

We write to you to express our concerns regarding the future of the New Savannah Bluff Lock and Dam (NSBL&D) and express the intent of Congress for Public Law 114-322, the 2016 Water Infrastructure Improvements for the Nation Act (WIIN). It is our hope that by clarifying the Congressional intent and highlighting our concerns regarding the impact of Alternative 2-6d on the water pool level, which is vital for municipal and industrial water supply for the surrounding area and recreational activities for the citizens of North Augusta, Augusta and surrounding communities, the U.S. Army Corps of Engineers can arrive at a solution that benefits both the communities along the Savannah River and the Corps.

On November 15, 2018, the Corps announced Alterative 2-6d, which would remove the lock and dam and construct a fixed weir with a dry floodplain bench, as their preferred option for the future of the NSBL&D. On February 9, 2019, the Corps began a simulated drawdown test in order to demonstrate the effects of Alterative 2-6d on the pool levels, which are vital for water supply and recreational activities for the surrounding communities. On February 15, 2019, the Corps halted the drawdown simulation after effects of the river drawdown resulted in instability of the Georgia riverbank in the residential neighborhood of Goodale Landing. In addition, the simulation resulted in numerous docks becoming useless for recreational activities while they sat in the mud given the reduced pool level. Clearly these results do not reflect the intent of Congress.

The WIIN Act of 2016 allows for the modification or removal of the NSBL&D to allow for the passage of shortnose sturgeon, Atlantic sturgeon, and other migratory fish in order to mitigate the environmental impacts of the Savannah Harbor Expansion Project (SHEP) while also taking into consideration that the Corps must maintain the river conditions that were in place on the date of enactment. Congress clearly intended for the Corps to seek out a solution that would benefit both SHEP and the local communities. Unfortunately, as the recent drawdown test has proven, Alternative 2-6d does not appear to meet the requirements of the plain text of the legislation or the intent of Congress when it passed the WIIN Act. Communities like North Augusta and Augusta have invested millions in improvements along their waterfront and to say that Congress

intended to thwart the economic growth by eliminating or severely hampering access to the river would be wrong. We encourage the Corps to consider the intent of Congress and to only pursue an alternative that fulfills the environmental requirements of SHEP while also protecting the investments of our riverfront communities.

We would also like to address the Corps' stance regarding the impact of the new structure on the depth of the pool. The 2016 WIIN Act mandates that the Corps build a structure that is "able to maintain the pool for water supply and recreational activities, as in existence on the date of enactment of this Act." The Corps' stated that their implementation guidance "interprets the language to mean the current functionality of the pool must continue to allow for water supply, recreation and navigation as it did on the date of the enactment" and further argues that the alternatives currently being considered "maintain[s] this functionality." However, we find this statement to be inaccurate given the reduced river level prohibited individuals from utilizing their docks for recreational activities, such as fishing, boating, kayaking. In addition, local industry has expressed concern that the preferred alternative will not maintain the pool necessary to supply their water intakes. We would like to understand how the Corps can justify that the preferred alternative maintains the functionality of the pool given the results of the recent drawdown and the fact that the test was aborted.

In closing, we ask that the Corps take into close consideration the intent of Congress as you select the final alternative. We must protect our riverfront communities and ensure the Corps follows the law to ensure that the water supply and recreational activities are functional as they were on date of enactment.

We look forward to continued engagement with you regarding the future of the NSBL&D and we appreciate your cooperation as we work together to ensure that our riverfront communities continue to prosper.

Sincerely,

Lindsey O. Graham
United States Senator

Johnny Isakson
United States Senator

Tim Scott
United States Senator

David Perdue
United States Senator

Joe Wilson
Member of Congress

Rick W. Allen
Member of Congress

Cc: Brigadier General Diana M. Holland, Commander, South Atlantic Division, U.S. Army Corps of Engineers

# APPENDIX C
# Report on Hydraulics Methodology, April 15, 2019

**REPORT ON HYDRAULICS METHODOLOGY**

**Savannah River at Augusta Georgia and North Augusta, South Carolina**

**Thomas Heard Robertson, PE, AICP, RLS**

**April 15, 2019**

## Introduction

The Corps of Engineers conducted a live test during the week of February 11, 2019 of the hydraulics of the reach of the Savannah River that extends from the New Savannah Bluff Lock and Dam upstream to the base of the Augusta shoals. This section is approximately seventeen (17) miles long and includes the waterfronts of both the City of Augusta, Georgia, and the City of North Augusta, South Carolina. The "drawdown" was conducted as a simulation of the fixed-weir pool that might result from implementing the recommended alternative for a rock weir fish passage proposed to be constructed in place of the Lock and Dam, as mitigation for the assumed loss of population of the endangered shortnose sturgeon due to the Savannah Harbor Expansion Project.[1]

The stated intent of "the pool simulation was to allow members of the public and stakeholders along the Savannah River to observe the conditions they could expect with Alternative 2-6D, a fixed weir structure, in place of the current lock and dam." Among the goals was to demonstrate the anticipated pool level and extent during average flow conditions (between 5,000 and 8,000 cfs), and "to verify the predictions made with the riverine model for the depth attenuation through the pool. If necessary, adjustments will be made to the model to better represent the actual condition."[2]

Observations of water levels during the simulation showed water levels that were much lower than those predicted by the model (0.95 foot observed versus 3.3 feet predicted.) Therefore, it is obvious that the hydraulic models used in the Draft Report are all flawed and do not accurately represent the actual water surface profiles on the Savannah River.

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[1] US Army Corps of Engineers, Savannah District, "Operation Plan for Fixed Weir Pool Simulation, Savannah Harbor Expansion Project Fish Passage at New Savannah Bluff Lock and Dam," January 25, 2019, pp. 2-3, copy in the Office of the Mayor, North Augusta, SC.

[2] *Ibid.*

How might these drastic differences be explained?

**Purpose**

This report is intended to present the findings of our study of some of the probable causes of the differences between the observed water surface elevations and those predicted by the Corps of Engineers Draft Report dated February 2019.[3]

**Summary of Water Elevations: Observed and Calculated**

The following table summarizes the water levels from the Draft Report and from other sources as shown in the footnotes below it. While the chart may be used to make any number of comparisons that the reader may wish to study, it is noted that the actual water elevation was 111.23 (NAVD 1988) at the Fifth Street gauge, which was 3.0 feet less than the predicted water surface elevation of 114.2 (NAVD 1988) produced by the HEC-RAS model for Alternative 2-6d for a flow rate of 8,000 cfs.

***Table1: Water Level Comparisons***

| **Description** | **Water Elevations** | | | | **Notes** |
|---|---|---|---|---|---|
| **Location** | **Lock & Dam[a]** | | **Fifth Street Bridge[b]** | | |
| **Datum** | **NGVD 1929** | **NAVD 1988** | **NGVD 1929** | **NAVD 1988** | Assumed difference = 0.8' |
| **Normal pool per original design[c]** | 115.0<br>- 114.5 | 114.2<br>- 113.7 | 115<br>N/A | 114.2<br>N/A | |
| **Corps's current operations** | | | | | |
| "Normal"[d] | 114.0<br>-114.5 | 113.2<br>- 113.7 | 115.1 | 114.3 | |
| Range[e] | 112.0<br>- 115.3 | 111.2<br>- 114.2 | N/A | N/A | |
| **Usual Levels (non-flood) per USGS gauges[f]** | 115.0[g] | 114.3 | 115.0 | 114.3[h] | Approximate Water Year 2018 year-long medians, by inspection |
| **Alternative Simulations Q= 8000 cfs from HEC-RAS Summary[i]** | | | | | Elevations Produced from Questioned Model |
| Existing | 114.0 | 113.2 | 116.1 | 115.3 | Probably wrong |
| No Action Alt | 114.0 | 113.2 | 116.1 | 115.3 | Probably wrong |
| Alt 1-1 | 113.9 | 113.1 | 116.0 | 115.2 | Probably wrong |
| Alt 2-6a | 112.6 | 111.8 | 115.4 | 114.6 | Probably wrong |
| Alt 2-6d | 111.7 | 110.9 | 115.0 | 114.2 | Inconsistent with observations 2/15/2019 |

3 US Army Corps of Engineers, Savannah District, U.S. Army Corps of Engineers Report "Savannah Harbor Expansion Project, Georgia and South Carolina: Fish Passage at New Savannah Bluff Lock and Dam Integrated Post Authorization Analysis Report and Supplemental Environmental Assessment, February 2019.

| Description | Water Elevations | | | | Notes |
|---|---|---|---|---|---|
| **Location** | **Lock & Dam[a]** | | **Fifth Street Bridge[b]** | | |
| **Datum** | **NGVD 1929** | **NAVD 1988** | **NGVD 1929** | **NAVD 1988** | Assumed difference = 0.8' |
| **Actual Elevations February 15, 2019** | 111.08 | 110.28[j] | 112.03 | 111.23[k] | Flow rate at NSBLD was 7,270 cfs, near 8,000 cfs. |
| **Desired by Cities and Counties[l]** | N/A | N/A | 115.2 | 114.5 | |

Note: The actual instantaneous flow rates in the Savannah River on the morning of February 15, 2019, were 7,270 cfs at NSBLD and 5,422 cfs at Augusta Canal Diversion Dam

References:

1. Lock and Dam United States Geological Survey (USGS) gauge is located just upstream. Datum is NGVD 1929.
2. Fifth Street USGS gauge is located on first pier from Georgia side. Datum for the recording gauge is NAVD 1988. Zero of the recording gauge is 100.00. Note that the datum for staff gauge is NGVD 1929. Zero of the staff gauge (and previous recording records) is Elevation 102.06. Verified by field surveys by Cranston Engineering Group, P.C.
3. Construction plans: *Rehabilitation of Gates and Piers, New Savannah Bluff Lock and Dam*, Plate S-500, 12 March 1995; and Corps of Engineers, U. S. Army, Savannah, Georgia, District, *Special Flood Hazard Information Report, Savannah River, Augusta, Georgia*, August 1971, p. 7.
4. Draft Report, Appendix A, p. A-19. USGS records for Water Year 2018 contradict the Corps's assertion of operating range.
5. Draft Report, 2.2.2. Hydrology and Floodplains, p. 18.
6. Inspection of records of USGS gauge records for Water Year 2018 (October 1, 2017—September 30, 2018).
7. Gauge 02196999 at New Savannah Bluff Lock and Dam.
8. Recording Gauge 02126670 at Jefferson Davis (Fifth Street) Bridge.
9. Draft Report, Appendix A, Table 8. Summary of HEC-RAS Results, p. A-41.
10. Gauge 02196999 at New Savannah Bluff Lock and Dam.
11. Recording Gauge 02126670 at Jefferson Davis (Fifth Street) Bridge. Verified by actual field survey by Cranston Engineering Group, P.C.at Elev. 111.20 (NVGD 1988) on February 15, 2019 at 11:13 am EDT.
12. Resolutions by Augusta, North Augusta, Aiken County, and Columbia County.

### *Discrepancy in Definition of Existing Conditions Elevation*

Note that a separate salient issue that materially skews the conclusions of the Corps's Report is that the Corps assumed the low side of the current normal operating level range as the "Existing" conditions at the NSBLD to compare its hydraulic models for the alternatives, which is one (1.0) foot lower than the actual operating levels reported by USGS for the average day. The real ordinary operating level is Elevation. 114.2, not 113.2 (NAVD 1988).

### Problem Statement

The pool simulation was a prime opportunity to test the validity of the computer simulations models using the subject of those models: the Savannah River itself. On February 15, 2019, the

total water level drop in the reach from Fifth Street (111.23, NAVD 1988) to the Lock and Dam (110.28, NAVD 1988) was 0.95 feet.[4] This amount is only one-third of the difference of 3.0 feet predicted by the Corps's 8,000 cfs model.[5]

Using the actual drop over the 12.0-mile reach and the corresponding flow rate occurring at the Lock and Dam at the time of 7,270 cfs just downstream from the Lock and Dam, the input values for the model can be tested.[6]

An additional test can be made using the measured flow rate of 5,422 cfs at the Augusta Canal Diversion Dam upstream for the same time frame.[7] (See calculations under Analyses below.) This location is at the head of the Augusta shoals above the entrance to the reach in question; hence, the flow at the Canal Dam would be less than the real flow in the reach, because it does not include inflows from major creeks between the Canal Dam and the NSBLD.

A hypothesis to explain the observed discrepancies in water levels is that the Manning's "n" value, (the critical input value that quantifies the roughness of the channel in the basic Manning equation for open channel flow and used in the HEC-RAS simulations) does not reflect the actual physical conditions of the river bed and banks. Analyses of these observations will be performed to test the calibration of the HEC-RAS model.

**Analyses**

***Values of Manning's "n" for the River Channel***

The calculations on the following pages use a snapshot in time as a physical model to check the selection of Manning's "n" in the Corps's river channel in the HEC-RAS model for two measured flow rates that are a very similar bracket to the low flow conditions assumed by the Corps (5,000 cfs to 8,000 cfs) for Alternative 2-6d.

4 USGS Recording Gages 02196670, 02196999, and 02197000.

5 Corps of Engineers, Analysis Report, Appendix A, Table 8, p. A-41.

6 USGS Recording Gage 02197000. A corresponding flow rate of 5,422 cfs at the Augusta Canal Diversion Dam on the morning of February 15, 2019, supports the approximate flow through the reach. This does not include flows from major creeks between the Canal Dam and the NSBLD.

7 A corresponding flow rate of 5,422 cfs at the Augusta Canal Diversion Dam occurred on the morning of February 15, 2019.

## Table 2: Manning's "n" Values

**Estimate Manning's "n" from Drawdown**

Use snapshot in time as a physical model to check selection of Manning's "n" in the Corps river channel model for Q= 8,000 cfs for Alt 2-6d.

**Observations:**

February 15, 2019, 11:13 am

**Givens:**

Water Surface Elevations @ . . .

Fifth Street gage = 111.23 (1988)[a]

Check: Cranston Survey = 111.20

NSBL&D W.S. elev = 110.28 (1988)[b]

**Case I – Maximum Discharge 7,270 cfs**

Q = 7,270 cfs Downstream @ NSBL&D, from USGS[c]

Depth at 5th ≈ 9.5 – 1 = 8.5' (approximate, based upon Corps' average depth)[d]

Width at 5th ≈700' (approximate, scaled from Quad Sheet)

River Mile at 5th – 199.5[e]

River Mile at NSBL&D – 187.5

Velocity @ 5th = 0.08 fps (seems very small, might not be reliable; therefore ignore)[f]

Assume Cross Section at 5th Street approximates the reach.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $A$ | = | $d$ x $w$ | | | 8.5 | x | 700 | = | 5,950 | feet$^2$ |
| WP | ≈ | 700 + 2(8.5) | = | | 17 | | | = | 717 | feet |
| L | = | 199.5 - | 187.5 | = | 12 | miles, or | | | 63,360 | feet |
| h | = | 111.23 - | 110.28 | | | | | = | 0.95 | feet |
| S | = | 0.95 / | 63360 | | | | | = | 0.0000149937 | |
| V | = | Q/A = | 7270 / | | 5950 | | | = | 1.222 | feet/sec |
| R | = | A/WP = | 5950 / | | 717 | | | = | 8.298 | |

Manning's Equation

$V = 1.486 / n \times R^{2/3} \quad S^{1/2}$

$n = 1.486 / V \times R^{2/3} \quad S^{1/2}$

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| n | = | 1.486 / | 1.222 | = | 1.216 | x | 4.099 | x | 0.00387 | = 0.019 |

Minimum "n" value = 0.019 *

* Compare to 0.033 and 0.031 used by the Corps.

**Case II – Minimum Discharge - 5,422 cfs**

Q = 5,094 new[g]
\+ 328 leakage through dam
5,422 cfs

Depth at 5th ≈ 9.5 – 1 = 8.5
Width at 5th ≈700' (scaled from Quad Sheet)
River Mile at 5th – 199.5
River Mile at NSBL&D – 187.5
Velocity @ 5th = 0.08 fps (seems very small, might not be reliable; therefore, ignore)

Assume that Cross Section at 5th Street approximates the reach.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A | = | d x w | | 8.5 x | 700 | = | 5,950 | feet$^2$ | |
| WP | ≈ | 700 + 2(8.5) | = | 17 | | = | 717 | feet | |
| L | = | 199.5 - | 187.5 = | 12 miles, or | | | 63,360 | feet | |
| h | = | 111.23 - | 110.28 = | | | | 0.95 | feet | |
| S | = | 0.95 / | 63360 = | | | | 0.0000149937 | | |
| V | = | Q/A = | 5,422 / | 5950 | | = | 0.911 | feet/sec | |
| R | = | A/WP = | 5950 / | 717 | | = | 8.298 | | |

Manning's Equation

V = 1.486 / n x $R^{2/3}$ $S^{1/2}$
n = 1.486 / V x $R^{2/3}$ $S^{1/2}$
n = 1.486 / 0.911 = 1.631 x 4.099 x 0.00387 = 0.026

Maximum "n" value = 0.026 *

* Compare to 0.033 and 0.031 used by the Corps.[h]

Conclusion:

The Corps' selections of Manning's "n" understate the water level drops in the reach (i.e. overstate the resulting stages). This is consistent with the dramatic drops observed on February 15, 2019, compared to their prediction of "one to two feet." In fact, the water level at 5th Street was three (3) feet lower than their prediction for Alternative 2-6d. (114.2 - 111.23 = 3.0')

References:


a. USGS Recording Gage 02196670 (1988 Datum)
b. USGS Gage 02196999 (1929 Datum)
c. USGS Gage 02197000
d. Corps Cross Section, powerpoint slide for Alt 2-6d. Less one foot, observed
e. 1971 Corps Flood Hazard Report
f. USGS Gage 02196670
g. Records at Augusta Canal Diversion Dam. See next page hereof.
h. Corps Report, February 2019. Appendix A, p. A-16

**Check Q by Augusta Canal Diversion Dam**

| | | | |
|---|---|---|---|
| Elevation of crest | = | 157.1 | |
| Water level 2/15/19 | = | 158.1 ± | [i] |
| Length | = | 1,650 feet | |
| Q = 3.087 L $H^{3/2}$ | = | H913.087(1650)(1)$^{3/2}$ | [j] |
| Q = | | 5,094 cfs | |
| Leakage through the dam | = | 328 cfs | |
| TOTAL ESTIMATED FLOW | = | 5,422 cfs | |

Note: Augusta Canal was drained at the time.

Conclusion: Therefore, Q=7,270 cfs seems a reasonable estimate for the current purpose.

i. From Augusta Utilities Dept. records.
j. King & Brater, *Handbook of Hydraulics, Fifth Edition, p. 5-24.*

The analyses of the approximate test conditions show that Manning's "n" probably lies between 0.019 and 0.026. These values are much different from either the 0.031 or 0.033 estimates used by the Corps.[8] Their Draft Report states the following concerning this subject, "Manning's n values for natural channels are difficult to quantify outside of a laboratory setting and are subject to the professional judgement and experience of the hydraulic engineer."

***Values of Manning's 'n' for the Weir***

The Draft Report also covers selection of Manning's n values for the weir itself, adapting the figures from the rock weir structure of the Cape Fear River Dam Removal and Fish Passage, which ranged from 0.056 to 0.078, and "ultimately landed on a conservative n-value for the rock ramp of 0.08"[9] (Emphasis added.) Their adopted value lies outside the range from which it was derived. In fact, for low flows the higher n-value is not conservative at all. It will predict higher upstream stages than would result from choosing a lower value. This would produce the same type of erroneous elevation difference between predicted and actual that was observed during the February 2019 drawdown.

**Discussion of Results and Conclusion**

The drawdown furnished the best "laboratory setting" of all, the full-sized physical model of the Savannah River itself. The river itself proved that the water level drop at Fifth Street was at least

8 Corps of Engineers, Analysis Report, Appendix A, p. A-15.
9 Draft Report, Appendix A, 2.1.2. Geometry Modifications, p. A-5.

three times that which the Corps's simulations had predicted.[10] The real difference was 0.95 foot vs. the predicted difference of 3.3 feet, a variance of 2.35. Thus, the HEC-RAS model was off considerably in its prediction of the water surface elevation. This variation is very significant where small differences in elevation make big changes in usefulness of the waterway. The analyses above show that the discrepancy may be explained, at least in part, by a difference or inaccuracy in selection of the input values for Manning's "n".

In conclusion, the hydraulic models used in the Draft Report are obviously flawed and do not accurately represent the actual water surface profiles on the Savannah River, bringing into question all of the conclusions of the entire Corps Draft Report based on the flawed water surface profiles.

Respectfully submitted:

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Georgia PE No. 11289
South Carolina PE No. 7408

Peer Reviewed:

Richard E. McLaughlin, PE

SEALS:



10 One of the Goals and Objectives of the drawdown was to "verify the predictions made with the riverine model for the depth attenuation through the pool. If necessary, adjustments will be made to the model to better represent the actual conditions." See "Operation Plan for Fixed Weir Pool Simulation, Savannah Harbor Expansion Project Fish Passage at New Savannah Bluff Lock and Dam", January 25, 2019, pp. 2-3, copy in the Office of the Mayor, North Augusta, SC. Because the predictions and the actual conditions of elevation were grossly different, all of the hydraulic models are likely similarly wrong, so that adjustments must be made to model and all of its simulations that underlie the report. The report must be amended or republished. The Cities reserve the right to make additional comments when the corrected data is made available, because the Draft Report is erroneous.

# APPENDIX D
# Hydraulic Modeling and Discrepancies Observed During Drawdown

McLaughlin Whitewater design group
A DIVISION OF MERRICK & COMPANY

# New Savannah Bluff Lock and Dam

## Hydraulic Modeling and Discrepancies Observed During Drawdown

4/15/2019

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## Introduction

This memorandum summarizes an initial review related to the hydraulic modeling results and implications related to the prediction of the water surface elevations and hydraulics within the alternatives and upstream of the New Savannah Bluff Lock and Dam (NSBLD) as presented in the Savannah Harbor Expansion Project, Georgia and South Carolina: Fish Passage at New Savannah, Bluff Lock and Dam, Integrated Post Authorization Analysis Report and Supplemental Environmental Assessment, Dated February 2019 by the U.S. ARMY CORPS OF ENGINEERS SAVANNAH DISTRICT (USACE), herein referred to as the Draft Report. Note that water surface elevations upstream of the NSBLD are sometimes referred to as pool elevations as the river is impounded upstream of the NSBLD and is controlled by modulating the gates in the NSBLD to near lake-like or "pool" conditions over the vast majority of the time. Various alternatives including an alternative recommend by the USACE are presented in the Draft Report include modification or replacement of the lock and dam with a river-wide rock ramp or parallel rock ramp fish passage to provide passage for various species of fish including the Atlantic and Short Nose Sturgeon.

This initial review also compares hydraulic modeling results with gage data from the USGS recorded during the drawdown conducted during the third week of February 2019.

Other comments and observations on the Draft Report and drawdown including more detailed discussions on impacts of the observations and expert opinions expressed below are presented in the Technical Comments of the Cities of Augusta, Georgia and North Augusta, South Carolina, April 15, 2019 (Technical Comments), and in the Legal Comments of the Cities of Augusta, Georgia and North Augusta, South Carolina. April 15, 2019 (Legal Comments).

## General Observations and Opinions

The following observations are based upon information provided in the Draft Report, HEC-RAS hydraulic models provided by the USACE, various calculations, and expert opinion.

**GO-1. Lowering the Upstream Pool.**

All presented alternatives presented will lower the historic water surface elevations and decrease the depths within the upstream pool. All alternatives will lower the pool surface water elevation. Some alternatives will lower the upstream pool through an approximately 17-mile-long upstream reach of the Savannah River. All will increase velocities in the pool upstream of the NSBLD. Lowering of the pool and resulting affects is the most significant impact to the upstream reach through the greater Augusta area, particularly both Augusta and North Augusta. Impacts from lowering of the pool have significant detrimental implications as outlined in the Technical and Legal Comments.

Because of the importance and obvious sensitivity, supporting prediction in the upstream pool elevation in the evaluation of alternatives should be paramount in the development, analysis, evaluation, costing, and ultimate selection of the alternatives.

*Lowering of historic water surface in the pool upstream of the NSBLD was predicted in the Draft Report, however the degree of the lowering of the pool elevations upstream were vastly under-predicted by the Corps as outlined below. The extent upstream of the lowering was not presented for each alternative.*

*Figure 1*
*Photo Taken During the Drawdown*

**Presented alternatives that include a river-wide rock ramp fish passage, and in some cases the other alternatives, will also:**

***GO-2.*** **Increase Flooding**

Alternatives will result in increases in upstream water surface elevations experienced during flood flows and/or significant excavation and construction of a channel (referred to in some alternatives as a Floodplain bench) in the park adjacent to the NSBLD (NSBLD Park). This excavation is needed to create a "floodplain bench" – essentially an overflow channel or flood conveyance channel. This a result of efforts to off-set the reductions is flood capacity (conveyance) resulting from placing tens of thousands of cubic yards of rock and fill within the river bed to form the rock ramp fish passage.

*Alternatives that increased the 100-year flood level were reportedly dropped from consideration. However, invalid or questionable assumptions related to fish passage requirements and the acceptability of eliminating most of the NSBLD Park and its desirable attributes may alter or eliminate the presented alternatives. Some hydraulic analysis was presented for lesser flood flows (such as the 2-year) that occur more frequently and are known to cause damage to land owners, however these results were not adequately included in the assessment of impacts, costs, or selection criteria of the alternatives.*

**GO-3. Increase Fluctuations in the Seventeen Mile Reach**

All alternatives will increase the variability in the water surface upstream of the dam in the pool. The pool level will fluctuate much more frequently below flows of 25,000 cfs or about 95% of the time. Current stability in the pool elevation is provided by the five 60-foot long vertical gates of the NSBLD that are operated to manage pool levels, thereby creating stable lake-like conditions upstream of the dam.

*Identification and related significance of this issue was not made in the Draft Report. Evaluation, presented data, analysis, impacts or mitigation efforts and costs, and related criteria were not provided in the Draft Report. Criteria of 0.5 ft/day of variation was stated in the Operation Plan for Fixed Weir Pool Simulation, Savannah Harbor Expansion Project Fish Passage at New Savannah Bluff Lock and Dam, January 25, 2019, however failure of a wall occurred during the drawdown and no application or evaluation of this criteria for future conditions was provided.*

**GO-4. Sediment Impacts and Scour**

Alternatives will decrease the sediment carrying capacity, impact the sediment bed, and change bathymetry and benthic conditions upstream of the NSBLD. In addition to stabilizing the elevation of the pool upstream of the NSBLD, the combined 300 feet of large gates act as sediment sluicing gates as they draw off the bottom of the channel. This substantial sluicing system will be eliminated in the presented alternatives. Evaluation of the increased deposition due to removal of the gates, such as sediment transport modeling, was not provided.

*Qualitative opinion was presented supporting a conclusion of no significant impact, however based upon experience including extensive multi-dimensional sediment modeling efforts on a recent project on another river with a sediment-trapping upstream reservoir, acceptance of the provided opinion with no supporting analysis is not prudent or acceptable.*

**GO-5. Require Construction Related Hydraulic Analysis**

Hydraulic analysis was not conducted for conditions created during the construction of the rock ramp or project accoutrements. Significant structures possibly as tall or taller than the existing dam, such as coffer dams and divider berms will be needed during construction. Large bypass channels and/or widening of the river adjacent to the rock ramp will also likely need to be constructed around the proposed rock ramp dam through the NSBLD Park and along the south bank to convey the large and continuous flows during construction. Structures needed to control water during the construction phase will be extensive and impactful to project costs, impacts to surrounding and upstream areas, sediment releases, aquatic resources, etc.

*Hydraulic analysis is needed and appropriate at this phase as considerations will impact the development, analysis, evaluation, and selection of the recommended alternative.*

*As a result of impacts related to these and other issues, most all recreational uses of the pool will be significantly diminished, conditions of banks will be altered, aesthetics negatively impacted, property values may decrease, and other economically impactful consequences will occur. These are more thoroughly described in the Technical and Legal Comments.*

## Prediction of Pool Lowering

The Draft Report included estimates of impacts, namely lowering of the pool upstream of the NSBLD for the various alternatives furthered for consideration in the selection of their Recommended Alternative. These predictions were based upon hydraulic modeling using a program called HEC-RAS. The HEC-RAS model is appropriate for this level of analysis as well as much more refined analysis and is the standard of the industry and likely the most used hydraulic model for these types of projects in the country. However, reliable results of this or any other hydraulic model are dependent upon:

- Modeling the appropriate range of conditions,
- Appropriate selection of a wide variety of input parameters such as the Manning's Roughness Coefficient or "n" value, and
- Appropriate accuracy of the geometry.

## *Historic Water Surface Elevations*

Establishment of existing or historic water surface elevations is critical to any evaluation of impacts. Within active rivers, this relates to a range of water surface elevations as the elevations can vary with flow, or in this case, by adjustment of the gates in the NSBLD. For this and many projects that include recreational uses and aesthetic consideration of a pool upstream of a dam, rock ramp, or other impounding structure, these flow ranges can be considered:

- **Minimum Levels.** Minimum or at least extreme lower levels of pool elevations are critical for historic and existing recreational uses and aesthetic considerations.
- **Typical Levels.** Normal pool levels can also be evaluated for comparative proposes.
- **Flood Flows.** Higher pool elevations occur during high flow ranges including various levels of flood flows. These are typically referenced by a probably type rating such as the 2-year, 10-year, 100-year, and even higher events. The definition of this nomenclature can be confusing, but as an example, a flow at least as high as the 10-year event will, on the average, occur once every 10 years.

Dams upstream of the greater Augusta area and the large upstream hydrologic basin provide this reach of the Savannah River with relatively consistent levels of flows as compared to many rivers. These consistent flows combined with the significant regulation of the pool elevations provided by the operation of the large gates at the NSBLD provide for near lake-like conditions in the pool upstream of the NSBLD.

## *Appropriate Flows for Alternative Evaluation*

The Draft Report often references and reports pool elevations based upon a normal flow rate of 5,000 cfs. From the Draft Report: *"The flow used to evaluate the project impacts, with the exception of impacts to water supply intakes, is 5,000 cfs, the low average of the normal flow."* It is not clear why this flow rate was selected and we are not aware of a definition for "*the low average of the normal flow".* However, flows lower than this occur over 25% of the time. This can be observed on Figure 7 of the Draft Report**. One-quarter of the time is very significant.** It can also be observed on this figure that the curve is quite "flat" from 3,600 (0.1%) to 8,000 cfs (66%). This again indicates that flows within this range occur much (66%) of the time and that there is a steep drop-off after 3,600 cfs.

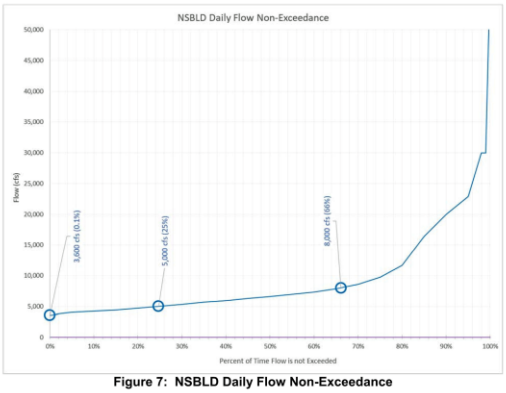



Figure 7: NSBLD Daily Flow Non-Exceedance

*Figure 2*
*Non-Exceedance Curve from Draft Report*

## *Pool Elevations at the NSBLD*

On page 18 of the Draft Report it states that: "*The gates at NSBLD are used to help maintain a pool elevation between 111.2 and 114.2 NAVD88 upstream of the dam and are operated remotely from J. Strom Thurmond Dam"*. The report also states that flows are controlled up to 25,000 cfs. Furthermore, the basis of comparison used for the alternatives is 113.2 at the NSBLD. This is shown in Figure 3 which comes from Table 8 on page A-41 of the Appendix A of the Draft Report and can be verified in descriptions of the Alternatives such as in this description of the results for Alternate 2-6d.

> *A hydraulic model (HEC-RAS) of the Savannah River incorporating the geometry configuration of this alternative was used to compute water surface elevations, depths, velocities, and flooding extents for the with-project condition. A range of flows for normal conditions (3,600cfs to 8,000cfs) and flood conditions (50% to 1% ACE) were evaluated using the hydraulic model. The results of the model indicate that this alternative would provide normal pool elevations between 109.7 and 110.9 NAVD88 near the lock and dam, with an elevation of* ***110.2 NAVD88 (3.0ft lower than existing) being representative of normal conditions.*** *The pool at 5th St. Bridge would be around elevation 112.4 NAVD88 (1.9 feet lower than existing) during normal flow conditions. Figure 31 shows where this alternative aligns slightly below the existing condition band.*

Adding three feet to the reported elevation of 110.2 (also shown in Figure 3 @ 5,000cfs) yields a water surface elevation upstream of the NSBLD of 113.2. This elevation does not appear to be supported by a provided statistical analysis. Such an analysis is readily easy due to the proximity of USGS gages; however, one was not readily found in the Draft Report.

### USGS Gages Referenced

There is a stream gage (2197000) downstream of the NSBLD that records flow and water surface elevation, one upstream (2196670) that records water surface elevation, and one (2196999) at 5$^{th}$ Street Bridge that records water surface elevation. Note that the lower two gages (2197000) (2196670) record elevations in NVGD29 and 0.8' is subtracted from elevations provided at these gages to arrive at the NAVD88 datum as covered in the Draft Report.

## *Reduction of the Pool Elevation upstream of the NSBLD*

A cursory check was made based upon data available off the USGS website. The analysis included about four years of data starting in March 16$^{th}$ of 2015 through March 12$^{th}$, 2019 and included 15-minute increments. This date range was used as a quick check and a more in-depth analysis using a longer period of record and a review of the hydrology is needed. Based upon this limited range, an average of water surface elevation of 114 resulted. This elevation or higher also occurred about 50% of the time. **A water surface elevation of 113.2 or lower only occurred less than 5% of the time** over this four-year period**.**

*In conclusion, the referenced water surface elevation of 113.2 is not justified and appears to be lower than gage records indicate.*

Pool elevations for the various alternatives including the SHEP are shown below in Figure 3 and were provided in Table 8 on page A-41 and A-42 of Appendix A of the Draft Report. Some results of various alternatives are plotted in Figure 4.

| 113.3 and 115.3 National Geodetic Vertical Datum 1929 (NGVD29; 112.5 and 114.5 North American Vertical Datum of 1988 [NAVD88]) at the dam under the range of "normal" flows ("average" normal pool of 114.5 NGVD29). | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | (NAVD 88) | | | | |
| **Pool Elev @ 3600 cfs (NAVD88)** | | | | | | | | | |
| | **Station** | **Existing** | **SHEP** | **Alt 1-1** | **Alt 2-6a** | **Alt 2-6b** | **Alt 2-6c** | **Alt 2-6d** | **Alt 2-8** |
| | NSBLD | 113.2 | 112.7 | 111.6 | 111 | 107.9 | 108.8 | 109.7 | 111.1 |
| | 5th Street Bridge | 113.9 | 113.5 | 112.5 | 112.1 | 110.5 | 110.9 | 111.4 | 112.2 |
| | | | | | | | | | |
| **Pool Elev @ 5000 cfs (NAVD88)** | | | | | | | | | |
| | **Station** | **Existing** | **SHEP** | **Alt 1-1** | **Alt 2-6a** | **Alt 2-6b** | **Alt 2-6c** | **Alt 2-6d** | **Alt 2-8** |
| | NSBLD | 113.2 | 113.2 | 112.1 | 111.6 | 108.3 | 109.3 | 110.2 | 111.9 |
| | 5th Street Bridge | 114.3 | 114.2 | 113.5 | 113.2 | 111.6 | 112 | 112.4 | 113.4 |
| | | | | | | | | | |
| **Pool Elev @ 8000 cfs (NAVD88)** | | | | | | | | | |
| | | **Existing** | **SHEP** | **Alt 1-1** | **Alt 2-6a** | **Alt 2-6b** | **Alt 2-6c** | **Alt 2-6d** | **Alt 2-8** |
| | NSBLD | 113.2 | 113.2 | 113.1 | 111.8 | 109.1 | 110 | 110.9 | 112.5 |
| | 5th Street Bridge | 115.3 | 115.3 | 115.2 | 114.6 | 113.6 | 113.9 | 114.2 | 114.9 |
| | | | | | | | | | |
| **Pool Elev @ 50% Annual Chance Exceedance (2-year) (NAVD88)** | | | | | | | | | |
| | **Station** | **Existing** | **SHEP** | **Alt 1-1** | **Alt 2-6a** | **Alt 2-6b** | **Alt 2-6c** | **Alt 2-6d** | **Alt 2-8** |
| | NSBLD | 114.8 | 114.6 | 114.6 | 115.3 | 114.1 | 114.5 | 114.8 | 114.5 |
| | 5th Street Bridge | 122.6 | 122.5 | 122.5 | 122.7 | 122.5 | 122.5 | 122.6 | 122.5 |
| | | | | | | | | | |

*Figure 3*
*Summary Table of Alternatives – Data from Table 8 on page A-41 of Appendix A of the Draft Report*

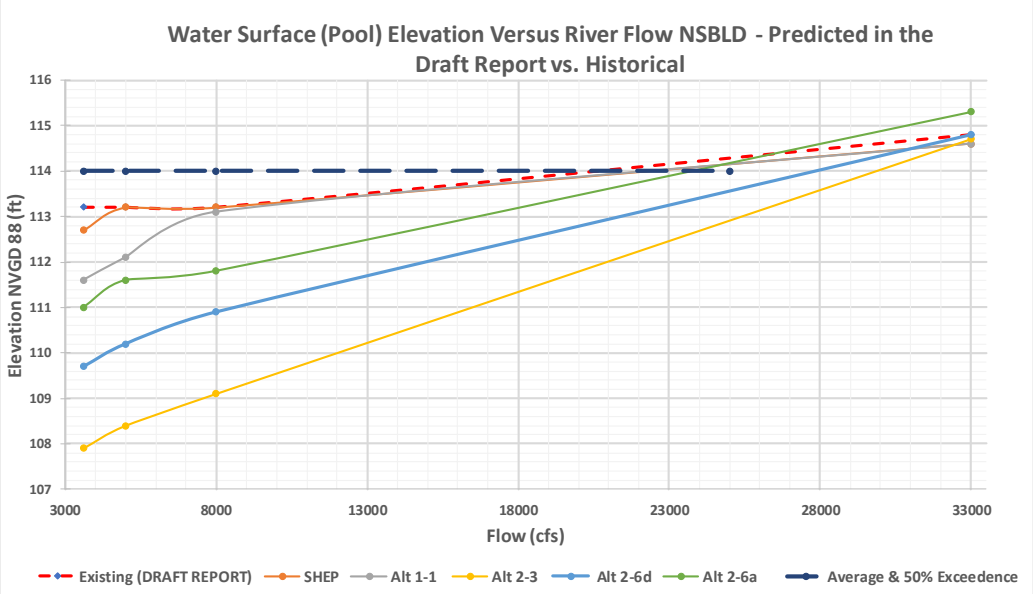



*Figure 4 -Pool Elevations Upstream of the NSBLD – as Provided in Table 8 of the Appendix A of the Draft Report*

*Based upon the provided data and stream gage records, the rock ramp alternatives will result in a much lower pool elevation upstream of the NSBLD than historical conditions.*

## *Rock Ramp*

Review of the modeling that is used to predicted water surface elevations just upstream of the NSBLD for the alternatives was not reviewed in detail. At the proposed grade of 2% and the roughness coefficients provided, it is likely that the flow will be in a supercritical state, or at least go through critical depth at the crest of the rock ramp. Therefore, of primary concern is the configuration of the crest of the rock ramp. Figure 5 is a cross-section of the rock ramp fish passage of alternative 2-6d from the Draft Report. All the rock ramps in the various alternatives with rock ramps appear to be of a similar configuration.

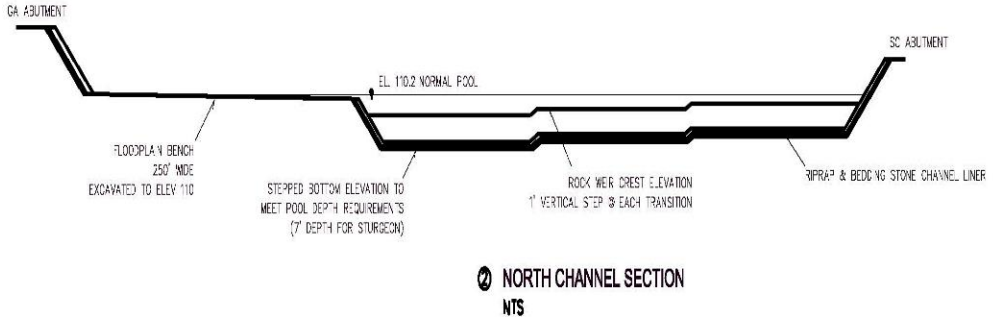



*Figure 5*
*Crest Section of the Rock Ramp (Alternative 2-6d)*

Figure 6 is a velocity output of the HEC-RAS model for Alternative 2-6d. The model provides estimation of the crest accurately because the geometry of the crest has a substantial impact on the water surface elevations predicted for the various alternatives with a rock ramp.

The Draft Report states that *"The weir would have an average crest elevation of 108.2 feet (NAVD88, 109.0 NGVD29)."* Concerns regarding the predicted high velocities in the fish passage and shallow depths at the crest may not be satisfactory to pass the targeted species. Therefore, the alternative concept for the crest and resulting rock ramp fish passage, as presented in all the alternatives with a river-wide rock ramp fish passage, may not satisfy passage requirements. While there are several ways to reduce velocities and increase depths, adaptations are likely to have a significant impact on the ability of the crest (of the rock ramp) to maintain the upstream pool elevations during lower flows while not raising flood flows or requiring further conveyance structures around the rock ramp.

*Adaptations to the crests of the alternatives with a full-river width rock ramp may be necessary to create effective passage of target fish species. These adaptations are likely to require changes in the alternatives, lower upstream pool elevations more than currently predicted, cause other impacts, and ultimately influence a well-informed selection process.*

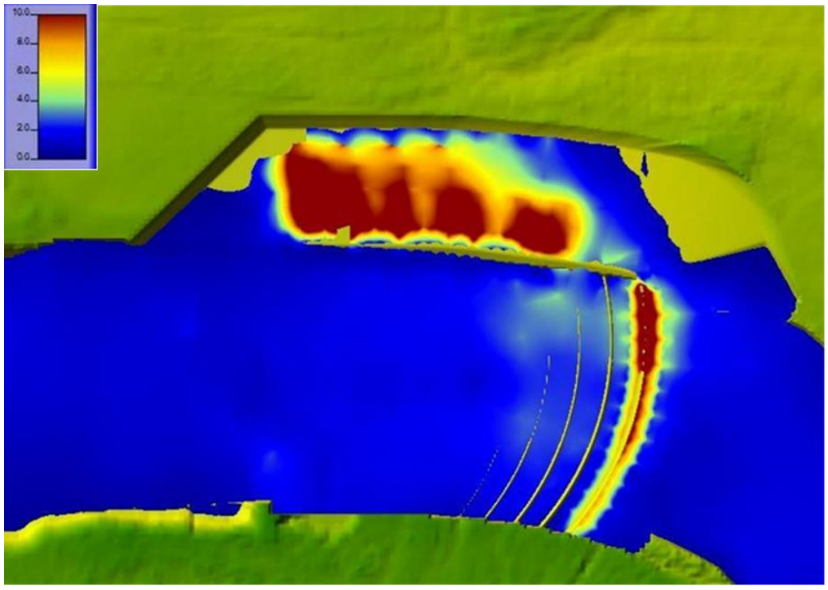


*Figure 6*
*Velocity Output Figure of Alternative 2-6d at 8,000 cfs*

## *Reduction of the Upstream Pool Elevation*

Comparison of water surface elevations at the 5th Street gage were emphasized in the descriptions and evaluations of the alternatives. Furthermore, there is a USGS Gage on the 5th Street Bridge that records the water surface elevation. For consistency and brevity, we will also focus on the impacts to the water surface elevation at 5th Street to somewhat quantify impacts farther upstream of the NSBLD.

### Drawdown

A drawdown was conducted during the third week of February. The goals and objectives were stated in the Operation Plan for Fixed Weir Pool Simulation Savannah Harbor Expansion Project Fish Passage, at New Savannah Bluff Lock and Dam January 25, 2019.
This document states that:

*There are several objectives for the simulation, outlined below, that will benefit the Corps and members of the public:*

1. *Demonstrate to the public and stakeholders in the Augusta and North Augusta area the anticipated pool level and extent with a fixed crest weir in place of the NSBLD during average flow conditions (between 5,000 and 8,000 cfs). This simulation would allow the public and stakeholders to view the projected pool conditions for the recommended alternative for the SHEP Fish Passage Project (2-6D).*
2. *Verify the 2018 hydraulic analysis and calculations that concluded lowering the pool causes no issues with municipal and industrial water intakes located along the river within the pool. Communications with each water user will take place before, during, and after the simulation.*
3. *Verify the predictions made with the riverine model for the depth attenuation through the pool. If necessary, adjustments will be made to the model to better represent the actual conditions.*

4. *Review the depths of the training wall and validate the areas that may need marking for compliance with Section 106 for historically significant cultural resources.*
5. *Capture aerial imagery of the simulated pool to further improve the shoreline mapping tool. The shoreline mapping tool was presented during a public meeting in November 2018 and can be found online at: [http://water.sas.usace.army.mil/nsbld/](http://water.sas.usace.army.mil/nsbld/).*

The document goes on to state that:
*The target pool level for the simulation is elevation 111 ft NGVD29* (converts to 110.2 NAVD88) *as measured and observed at the USGS gage located just above the NSBLD (02196999). This is 1.5 feet below the normal minimum operating range at the NSBLD.*

*The pool WILL NOT be lowered quickly. It will be lowered slowly over several days targeting a pool change of no more than 0.5 ft per day. Lowering the pool slowly will ensure the river bank remains stable during the simulation.*

Verification of the "riverine model for depth attenuation within the pool" has not been received as of this date. To review the accuracy of the HEC-RAS hydraulic modeling, we have reviewed gage data just upstream of the NSBLD and at 5th Street. Results of this review are shown in Figure 7. Figure 7 includes just a portion of the gage data during the drawdown. An extended plot of the gage data shows higher fluctuations in the flows and water surface elevations at the gages before and after the period shown from 2/13/2019 to 2/14/2019. Even during this period, there are fluctuations in flow and water surface elevations, however review of the gage data in other ways showed similar results. While there is error in applying steady state results to unsteady conditions and in how the gage data is interpreted, this initial review should be useful in interpreting impacts at this juncture and in driving home the needs for further investigation and to determine if further reconfiguration or redevelopment of the alternatives is prudent.

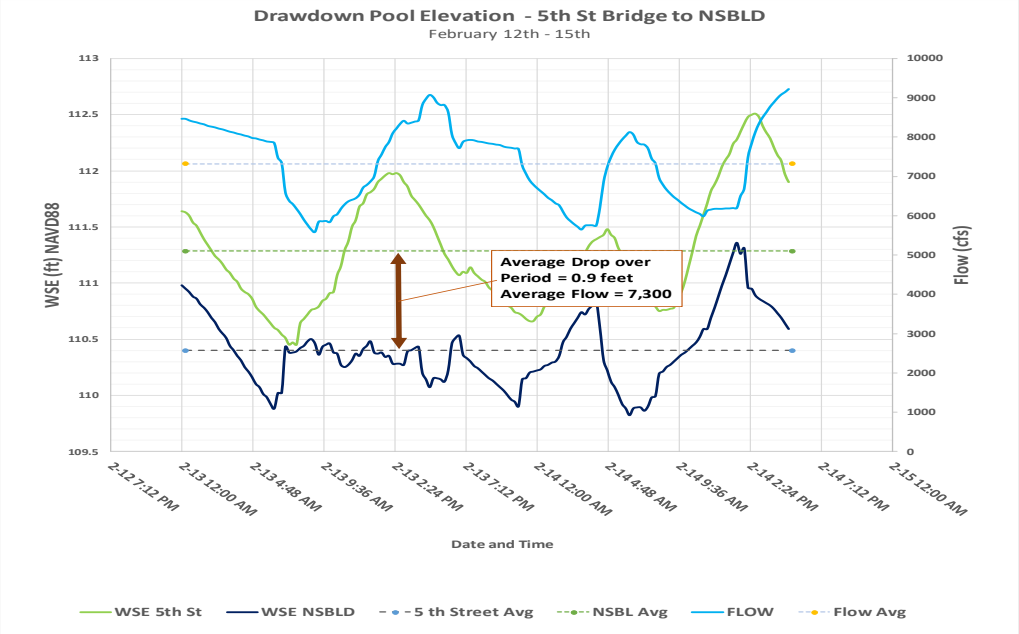



*Figure 7*
*Observed Water Surfaces during the February Drawdown*

The average flow during this period was about 7,300 cfs. The average pool elevation just upstream of the NSBLD was 110.4 (NAVD88) and the average elevation was 111.3 (NAVD88) at the 5th Street Bridge. These flows and surface water elevations are shown on Figure 7.

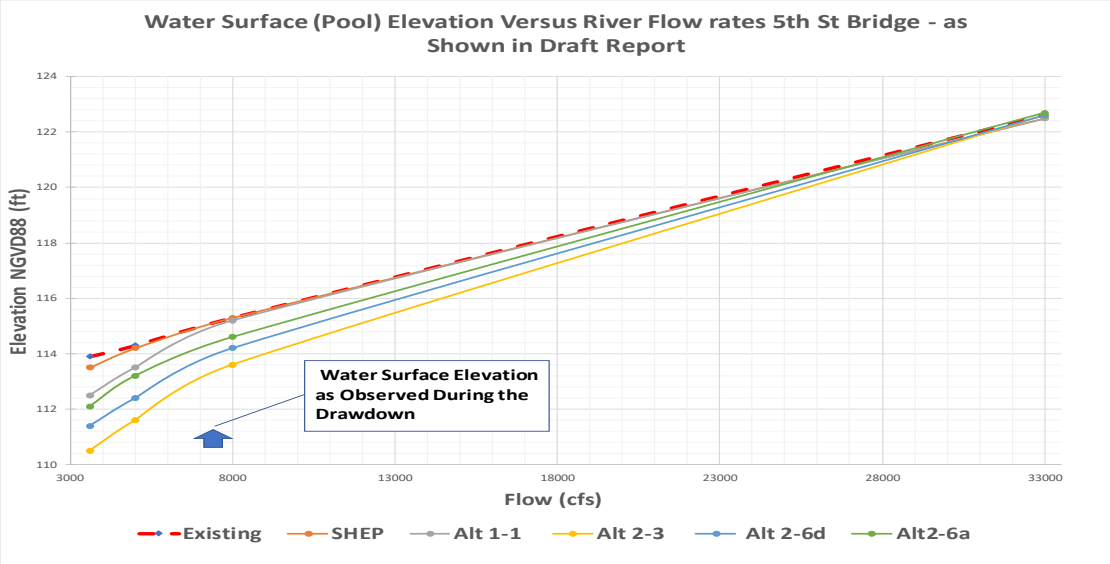



*Figure 8*
*Predicted Pool Elevations at 5th Street*

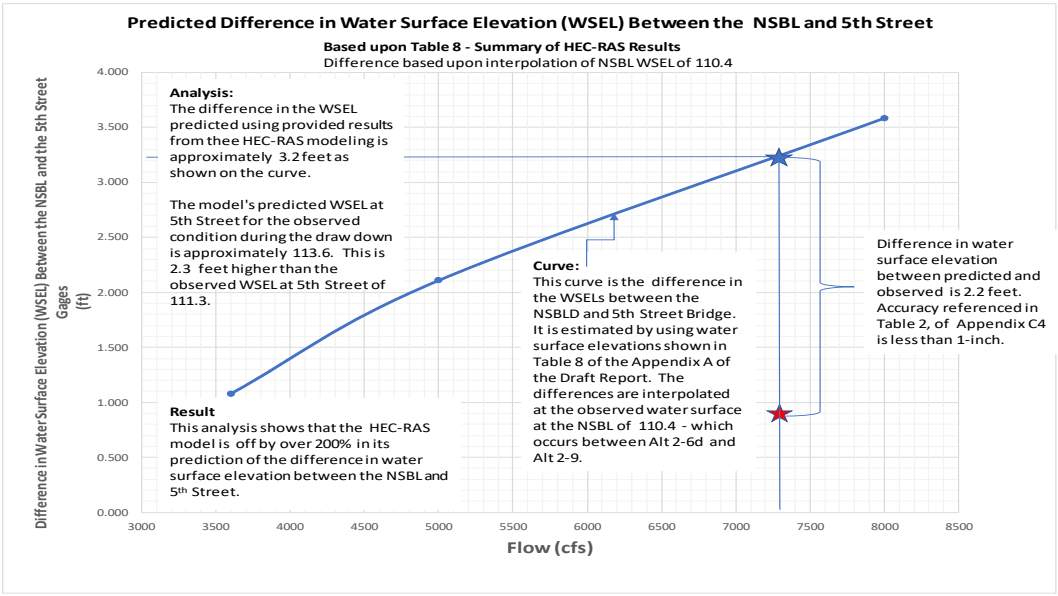



*Figure 9*
*Comparison of Observed and Predicted Pool Elevations at 5th Street*

In reviewing and comparing Figures 7, 8, and 9, it can be concluded that the elevations observed during the drawdown in the Pool at 5th Street are significantly lower than those predicted by the hydraulic model and presented in the Draft Report. The difference in water surface elevations between the gage just upstream of the NSBLD and that at 5th Street, is a practical and useful parameter in the evaluation of the accuracy of the HEC-RAS hydraulic modeling conducted by the USACE. The model predicted over three feet of difference in the water surface elevation between the gages, whereas the observed difference as estimated herein is less than one foot.

While this estimate may ultimately prove to be higher or lower, an error of a small fraction of this would not be acceptable – both in terms of modeling accuracy and for the purposes of developing, analyzing, evaluating, and selecting an alternative.

*This represents an error of over 200% in the modeling accuracy.*

It is likely that the selected Manning's Roughness Coefficient used in the HEC-RAS modeling in the impounded reach upstream of the rock ramp is too high and doesn't account for the depth of flow. However, given the recreation, economic, environmental, and other impacts related to decreases in the pool elevation; calibration and validation of the hydraulic model should have been conducted before the evaluation and even development of the alternatives.

By: Richard E. McLaughlin, P.E.

# APPENDIX E

## Savannah River Sediment Chemistry Data

**Table of Savannah River Sediment Chemistry Data**

**River Miles 202, 298, and 190.**

**2006-2008**

Note: Refer to Section I.2. for explanatory narrative.

Average concentrations from sediment samples

| | RM 215 | SC | RM 202 | RM 198 | HC | RM 190 | BC | RM 185 | RM 179 | RM 148 | RM 119 | RM 61 | units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **% Solids** | 74.7 | 69.3 | 62.5 | 76.1 | 75.3 | 76.8 | 37.1 | 77.1 | 75.0 | 77.6 | 77.2 | 80.3 | % |
| **2,4,5-T** | ND | 28 | 35 | ND | ND | ND | 568 | ND | ND | ND | ND | ND | ug/kg |
| **2,4,5-TP (Silvex)** | ND | 17 | 120 | ND | 25 | ND | ND | ND | 22 | ND | ND | ND | ug/kg |
| **2,4-D** | ND | ND | ND | ND | ND | ND | 850 | ND | ND | ND | ND | ND | ug/kg |
| **2,4-DB** | 22 | ND | 440 | 89 | ND | ND | ND | 33 | 43 | ND | ND | ND | ug/kg |
| **4,4'-DDD** | ND | ND | ND | ND | ND | ND | 18 | ND | ND | ND | ND | ND | ug/kg |
| **4,4'-DDE** | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.5 | ND | ND | ug/kg |
| **4,4'-DDT** | ND | ND | ND | ND | ND | ND | 25.0 | ND | ND | ND | ND | ND | ug/kg |
| **Aldrin** | 1.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **alpha-BHC** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **alpha-Chlordane** | ND | ND | 1.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Aroclor 1016** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Aroclor 1221** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Aroclor 1232** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Aroclor 1242** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Aroclor 1248** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Aroclor 1254** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Aroclor 1260** | ND | ND | ND | ND | ND | ND | 270 | ND | ND | ND | ND | ND | ug/kg |
| **Arsenic** | 1.2 | 1.0 | 1.2 | 0.8 | 0.8 | 0.7 | 3.9 | 0.5 | 0.9 | 0.9 | 0.8 | 0.6 | mg/kg |
| **beta-BHC** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Cadmium** | 0.0 | 0.1 | 0.0 | 0.0 | ND | 0.0 | 1.1 | 0.0 | ND | 0.1 | 0.1 | 0.0 | mg/kg |
| **Calcium** | 422.5 | 390.0 | 1117.5 | 262.5 | 102.0 | 265.0 | 2225.0 | 210.0 | 302.5 | 198.0 | 255.0 | 220.0 | mg/kg |
| **Chromium** | 9.9 | 10.5 | 13.7 | 7.5 | 24.3 | 4.4 | 32.5 | 5.4 | 3.8 | 3.2 | 4.4 | 2.6 | mg/kg |
| **Copper** | 2.3 | 4.9 | 8.0 | 2.3 | 2.2 | 1.5 | 33.2 | 1.7 | 1.3 | 0.9 | 1.5 | 0.8 | mg/kg |
| **Dalapon** | ND | ND | ND | ND | ND | ND | ND | 450.0 | ND | 550.0 | ND | ND | ug/kg |
| **delta-BHC** | ND | ND | 7.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Dicamba** | ND | ND | 57.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Dichloroprop** | ND | ND | 132 | 170 | ND | 20 | 13000 | ND | 38 | 24 | 20 | ND | ug/kg |

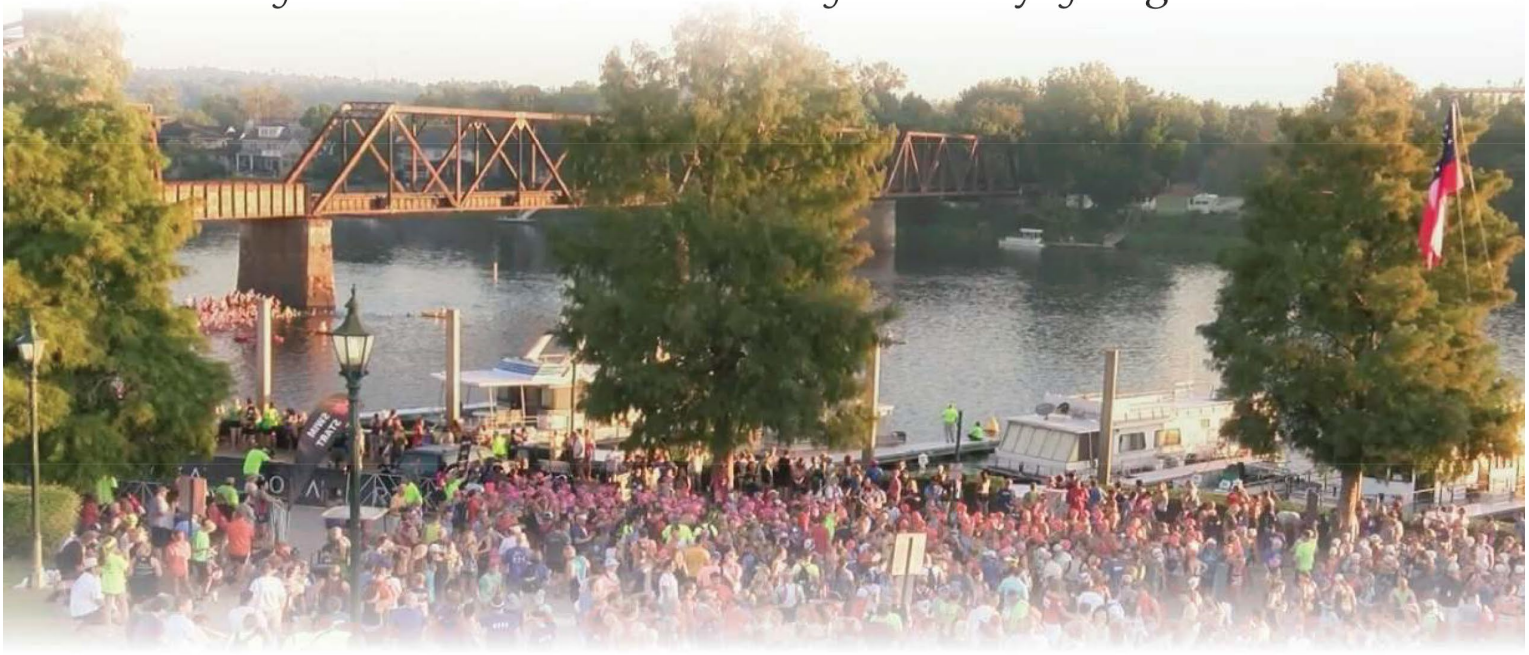
| | RM 215 | SC | RM 202 | RM 198 | HC | RM 190 | BC | RM 185 | RM 179 | RM 148 | RM 119 | RM 61 | units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dieldrin** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Dinoseb** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Endosulfan I** | ND | ND | 2.2 | ND | ND | ND | 1.9 | ND | ND | ND | ND | ND | ug/kg |
| **Endosulfan II** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Endosulfan sulfate** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Endrin** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Endrin aldehyde** | ND | ND | ND | ND | ND | 1.0 | ND | ND | 1.2 | ND | ND | ND | ug/kg |
| **Endrin ketone** | ND | ND | ND | ND | ND | 2.6 | ND | ND | ND | ND | ND | ND | ug/kg |
| **gamma-BHC (Lindane)** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **gamma-Chlordane** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Heptachlor** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Heptachlor epoxide** | 1.6 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Iron** | 5400 | 7550 | 12500 | 4750 | 3025 | 3350 | 21375 | 3125 | 3225 | 2475 | 3650 | 2400 | mg/kg |
| **Lead** | 2.0 | 3.4 | 5.4 | 3.2 | 3.0 | 1.6 | 54.3 | 1.6 | 1.5 | 1.3 | 1.7 | 1.4 | mg/kg |
| **Magnesium** | 230.0 | 477.5 | 1377.5 | 425.0 | 130.0 | 108.7 | 1707.5 | 140.0 | 115.3 | 94.0 | 190.0 | 94.0 | mg/kg |
| **Manganese** | 1325.0 | 390.0 | 1555.0 | 735.0 | 73.8 | 465.0 | 1065.0 | 1375.0 | 1242.5 | 900.0 | 925.0 | 345.0 | mg/kg |
| **MCPA** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **MCPP** | ND | ND | ND | 4700.0 | ND | ND | 160000.0 | ND | ND | ND | ND | ND | ug/kg |
| **Mercury** | ND | ND | ND | ND | ND | ND | 0.5 | ND | ND | ND | ND | ND | mg/kg |
| **Methoxychlor** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Nickel** | 4.1 | 3.4 | 9.7 | 4.4 | 3.8 | 3.8 | 16.3 | 1.9 | 3.0 | 2.4 | 2.5 | 1.2 | mg/kg |
| **Potassium** | 170.0 | 327.5 | 1075.0 | 200.0 | 88.7 | 81.0 | 1177.5 | 105.3 | 88.5 | 73.0 | 123.5 | 50.0 | mg/kg |
| **Selenium** | 0.2 | ND | 0.4 | 0.3 | ND | 0.4 | 0.9 | 0.9 | 0.5 | ND | ND | 0.4 | mg/kg |
| **Sodium** | 50.0 | 93.0 | 133.0 | 89.5 | 95.0 | 84.0 | 623.3 | 82.7 | 76.7 | 88.0 | 30.5 | 61.0 | mg/kg |
| **TOC** | 145.0 | 1130.0 | 1400.0 | 1050.0 | 915.0 | 535.0 | 36145.0 | 450.0 | 8750.0 | 490.0 | 615.0 | 260.0 | mg/kg |
| **Toxaphene** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ug/kg |
| **Zinc** | 13.2 | 27.5 | 55.3 | 26.7 | 19.0 | 24.6 | 272.8 | 22.7 | 18.5 | 26.7 | 31.5 | 25.5 | mg/kg |

# APPENDIX F

***River Vision Plan for the Savannah River for the City of Augusta, April 2019.***

# River Vision Plan

## for the Savannah River for the City of Augusta



McLaughlin Whitewater design group

A DIVISION OF MERRICK & COMPANY

April 2019

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# SECTION I – River Vision for the Savannah River

## INTRODUCTION

In 2018, The City of Augusta, Georgia engaged the Mclaughlin Whitewater Design Group and their team of consultants to develop a vision for the section of the Savannah River from the Thurmond Dam area down to the New Savannah Bluff Lock and Dam Park. This vision involves developing an in-river and river bank activation concept, focused on downtown Augusta, as well as evaluating the feasibility of adding a whitewater park to the New Savanah Lock and Dam Park (NSBLD Park). The park site itself is adjacent to the historic Lock and Dam structure. The Unite States Army Corps of Engineers (Corps) is proposing to remove the Lock and Dam and convert the NSBLD Park into a floodplain bench. The Corps's evaluation and work is ongoing, however the study of a whitewater venue at this location was evaluated prior to the release of the Corps's current preferred alternative. The Corps's current alternative eliminates most of the NSBLD Park and negates the opportunity of a whitewater venue at the NSBLDP. The preservation of the park is keenly important to the overall vision plan described in this document. The park site is the anchor to the entire 36-mile vision plan, and it is our hope that through the Corps's process, the NSBLD Park will be maintained, and the future potential of the park can be realized.

The feasibility study and concept alternatives were developed with the following primary project goals:

- Healthy Ecosystem – connect upstream and downstream reaches and provide passage for sturgeon, shad, and bass.
- Safety – improve the safety of the river for all users.
- River/Whitewater Recreation – A basic objective identified was to connect upstream and downstream reaches for recreationalists. At the high end of the recreation spectrum, a "destination" whitewater park alternative was developed, with an objective to improve river access along the entire river reach.
- Utilize the Corps's Proposed Alternative – The Corps's objective at NSBLD is to create fish passage while maintaining current pool elevation and recreational components along the river reach. They have five (5) alternatives in total, with one (1) the preferred alternative. The City requested that we use a non-preferred alternative for the final concept.

## PROJECT GOALS

The overarching goals of the River Vision Plan are to identify new recreation opportunities that capitalize on the benefits of the Savannah River as an underutilized asset for the city of Augusta. This vision plan will include nearly a 36-mile stretch of the Savannah River, beginning at Thurmond Dam area, then down through the heart of Augusta, continuing along a picturesque stretch of river to the NSBLD Park. This recreation corridor will identify new areas of connectivity to the river, highlight opportunities for enhanced recreation, and provide new social activities that utilize the river. The recreation corridor, once established, can have a significant impact on the city of Augusta by improving the economy and improving the quality of life for the residents and visitors through new ways to recreate, socialize and entertain. Figure 1 shows the stretch of river included in this vision.

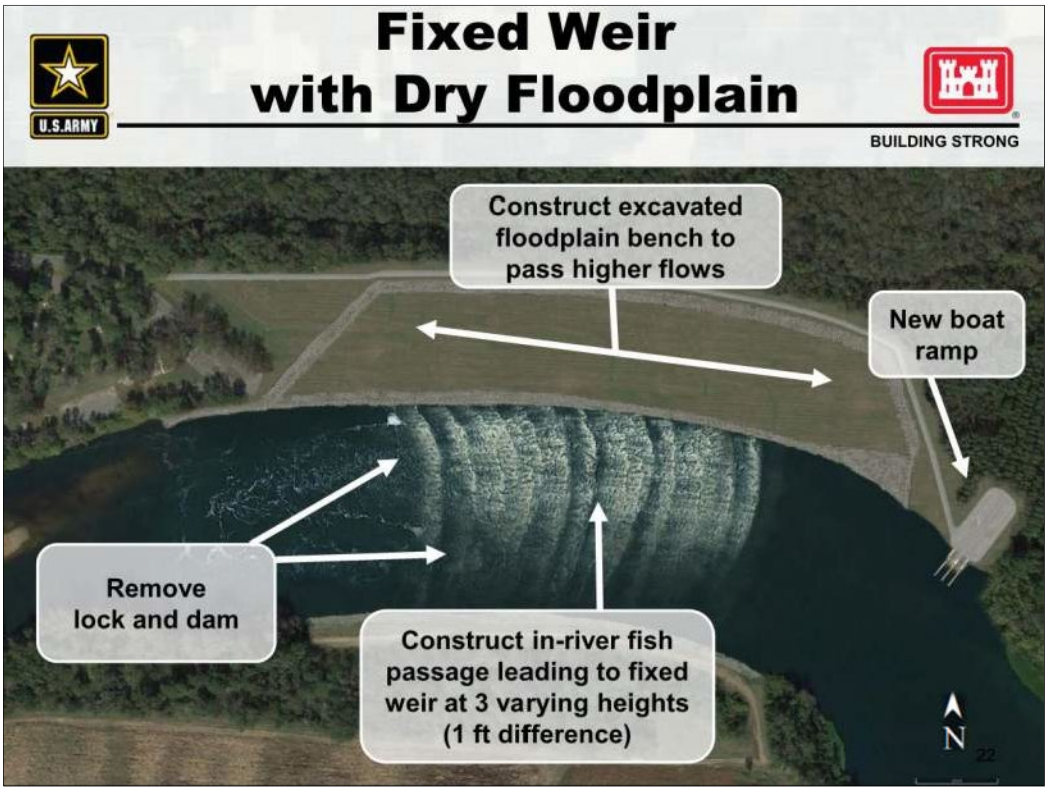

1. *Figure 1 - River Reach Vicinity Map*

## BACKGROUND

Necessary elements for whitewater are flow, drop, and access. The stretch of river between Thurmond Dam and New Savannah Bluff Lock and Dam has all the required elements to create several world class whitewater courses. Along with current plans for modifications to the NSBLD, Steven's Creek Dam and the Augusta Canal Diversion Dam are also slated for future modification that may include fish passage and river habitat restoration. These projects provide a regional wide opportunity to create a river recreational corridor from Thurmond Dam to New Savannah Bluff Lock and Dam.

With existing infrastructure along the reach, which includes river trails and docks, and potential future plans, some of which are discussed in this study, there is incredible potential to create a river recreationalist's dream with multiple exit points along the way for users to explore the city, stop for food, and enjoy other activities along the shoreline. Additionally, the New Savannah Bluff Lock and Dam Park's proximity to the Levee trail make it the perfect candidate for a unique destination for river recreation, outdoor adventure, and exploration. With Corps's current plans for the NSBLD, the city of Augusta hopes to use the opportunity to improve the Park and turn it into a whitewater venue and implement some of the ideas explored in their Augusta Destination Blueprint Plan, Events Plan, and the 2016 Parks Master Plan.

The current Corps's preferred plan is to remove the lock and dam and replace it with a fixed weir for fish passage. To maintain a similar pool elevation and mitigate flooding, the plan is to excavate the park and turn it into a dry floodplain. Their alternatives were designed to address required mitigation solutions due to SHEP and satisfy the WIIN Act. See Figure 2 below for a visual of the Corps's preferred alternative (Alternative 2-6d).




2. *Figure 2 – Corps' Preferred Plan*

This plan is seen to adversely impact the City of Augusta and they want to see an alternative plan chosen. The whitewater concept created for this study uses the Corps's Alternative 1-1 design, which is discussed later in this study.

## HISTORICAL CONTEXT AND EXISTING USES

The residents of Augusta enjoy the river reach though a variety of activities. There are a number of hike and bike trails, such as the Augusta Canal Historic Trail and River Levee Trail, and boating activities are a popular pastime on the water. A private marina and rowing center provide direct access to the river, and many people kayak at the shoals. An Iron Man race is also held each year in front of the Riverfront Marina Warehouse. Public access is limited to boat ramps at the NSBLD Park, which are an important historical and cultural space for the City.

In 1906 the Augusta Levee was constructed to control flooding in downtown Augusta, Georgia, and expanded in 1936. Initially, the Levee greatly restricted the public's access to Augusta's riverfront from downtown to the mouth of Butler Creek, but with the 1937 completion of the New Savannah Bluff Lock and Dam, and the adjacent, the Corps's public Park provided direct access to the Savannah River.

The Corps's creation of this public space allowed the locals a place to interact with the river for these past several decades. It has been a point of access for fishing, boat launching, and a gathering place for

the entire community. Indeed, its importance to the City, especially those who reside in South Augusta where fewer recreational amenities are available, cannot be understated.

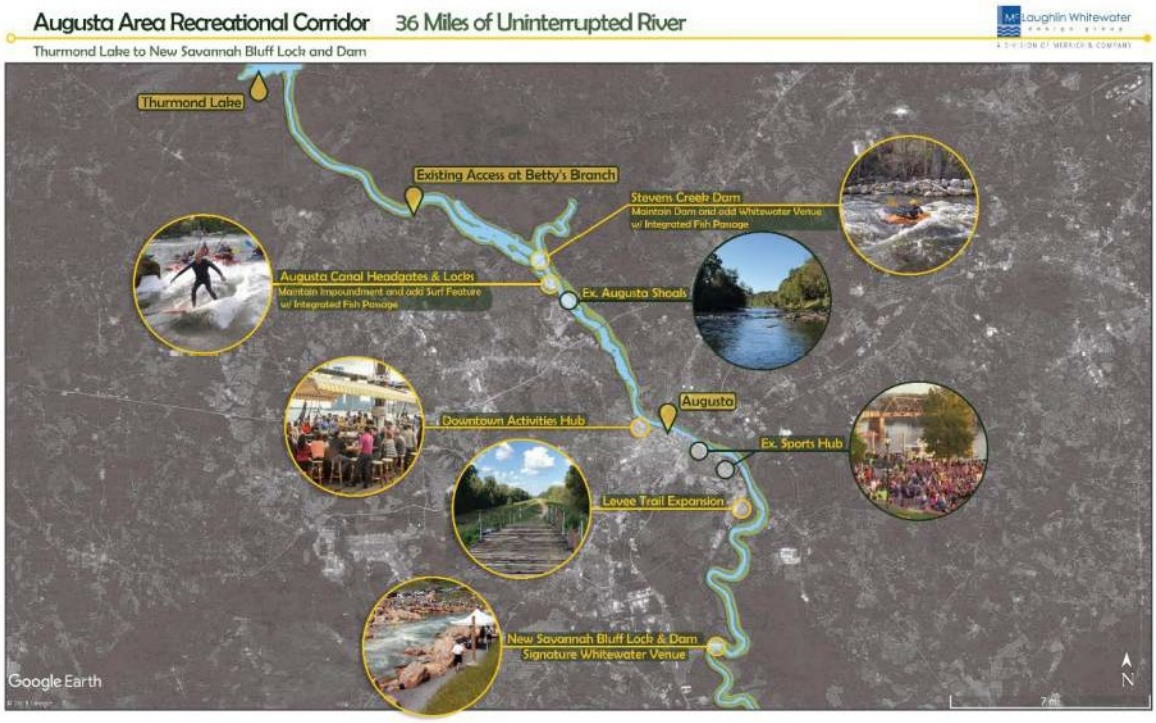
A key historical component to the inclusivity of the Park showed itself during the 1950-70s when the majority of the City of Augusta was segregated but the Park was not. It has served as a gathering place for all our citizens for over 65 years. Its pavilions have provided the location for hundreds, if not thousands, of family reunions, birthday parties, and civic meetings over time. It is an amenity that should remain with the community, and future plans must ensure the site's importance is recognized and maintained for future generations.

This site has been one of the main access points for bank fishing since at least the early 1950s, maintaining that access is imperative to the surrounding community to foster inclusivity and prevent gentrification. The two boat ramps that currently exist above and downstream of the dam are expected to undergo changes, however access to navigation between the current lock and dam site to the Lower Savannah Region, including to Savannah and the coast, should not be impeded.

Additionally, NSBLD Park sits on the confluence of two emerging bike/nature/walking trails whose development is ongoing. The levee, which starts above the remaining shoals approximately 20 miles upstream from the Park, creates an elevated path and contiguous trail through downtown Augusta ending at the Park. Over three-quarters of this levee has been converted into a trail with remaining miles slated for conversion in the next few years. The Butler Creek trail starts at Lombard Mill Pond near Fort Gordon Gate 5 and running the length of the creek ending at the NSBLD park. That trail is 20% completed and is slated to be finished in coming years.

## River Activation and Upland River Reach Concepts

In developing an overall river vision concept plan for the Savannah River from Thurmond Dam, through Downtown Augusta and ending at the New Savannah Bluff Lock and Dam site potential ideas for community programming and activation were explored. Potential site locations focused on publicly owned property along the river within the city limits of Augusta. This plan would tie into the overall regional vision of the recreational corridor, providing both in-river and riverside activities along the entire reach for recreationalists and spectators. Main components of the vision include a whitewater course at Steven's Creek Dam, a surf feature at Augusta Canal, and a larger scale whitewater venue at New Savannah Bluff Lock and Dam. Recreationalists could put in above Steven's Creek Dam and float or boat all the way to New Savannah Bluff Lock and Dam or stop in downtown Augusta at the planned activities hub. See Figure 3 below.




3. *Figure 3 - River Vision Concept*

Three publicly owned sites were identified which include the Riverwalk, Marina Park, and the Lock and Dam site. Future redevelopment along Columbia Nitrogen Drive near the I-520 Bridge and the potential future redevelopment of the Depot Project near Marina Park may also bring increased activation east of downtown. These redevelopment sites are located along the Levee Trail and can provide an additional opportunity to connect to the river and a broader circulation connection along the riverfront.

Several potential programming and activation ideas were explored. The ideas were generated from community sessions held in September 2018 by Merrick and through background information including the Fall 2016 Report "Reshaping Augusta's Relationship with the Savannah River". Potential ideas include a whitewater course, ropes course, zipline, water taxi, river cruise, fireworks display, fishing access, boat access, event pavilion, gathering spaces, destination playground, trails, outdoor markets, disc golf course, and historic markers.

All of these ideas have potential compatibility with the lock and dam site and a potential synergy with the Phinizy Swamp Nature Park located just west of the Lock and Dam Park site. The water taxi, river cruise, zipline and fireworks display could be sited at the Riverwalk, Marina Park or the Lock and Dam site. These were explored in greater detail along with recommendations for markets and festivals at the Riverwalk and opportunities for the Levee Trail. See Figure 4 for a visual of the whitewater venue concept.

Water Taxi

- Potential to operate back and forth from North Augusta, SC to Augusta, GA as a privately operated service.
- Could connect the existing trail systems on both sides of the Savannah River.
- Potential stops at the Riverwalk, Marina, and Lock and Dam Park site.
- Could provide a regular service.
- A feasibility study should be conducted for further assessment and viability.

River Cruise

- Potential to operate between downtown Augusta and destinations along the river.
- Potential stops at the Riverwalk, Marina, and Lock and Dam park site.
- Could be rented/reserved for special events, such as a birthday party at the Lock and Dam Park, or day cruises on the weekend.
- A feasibility study should be conducted for further assessment and viability.

Zipline

- Potential location at the Riverwalk, Marina Park, or Lock and Dam park site.
- Operated privately by an outdoor recreation company.
- If located at the Riverwalk or Marina Park, it could operate as a standalone attraction that could provide connectivity across the river and a visual vertical element at the river.
- If located at the Lock and Dam Park, it could be combined with a ropes course/adventure destination.

Markets / Festivals

- Programming the Riverwalk could help bring people to the river.
- Potential redevelopment at the 'Riverfront at the Depot' may include a future entertainment venue that could attract people and visitors to the riverfront.
- Explore opportunities to enhance visual connection across the levee:
    - Enhance existing and/or building new pedestrian bridges and underpasses.
    - Provide more pedestrian access points through the levee. Would be required to have flood gates that would be closed during flood events.
    - Develop vertical elements along the Riverwalk that are visible from Downtown and draw attention and curiosity to the river side of the levees. Example might be art installations or pedestrian bridges with a strong vertical entrance.

Levee Trail

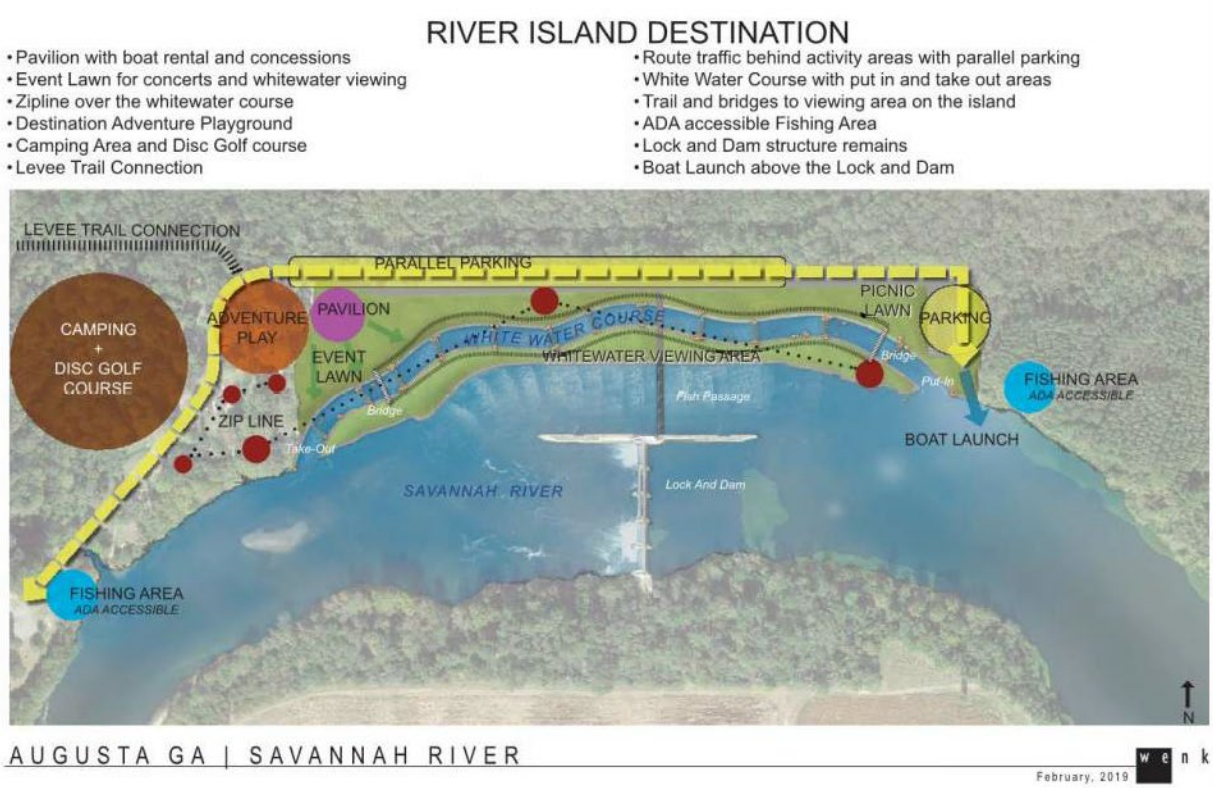
- Potential to be a city and regional destination.
- Create distinct character zones along the Levee trail as it passes through the urban areas to more rural and natural areas. Each zone could have its own identity and character that draws interest and a sense of discovery.
- Activation could draw people to the Downtown Riverwalk and encourage multi-modal transportation to the Lock and Dam park site.

Cities across the country are starting to look at infrastructure as opportunities for public space. Precedent examples include the Indianapolis Cultural Trail, Chicago's 606, Atlanta's Beltline, and New York's Highline. An option was developed for potential site programming for the Lock and Dam site which includes the amenities and programs identified for the site from the overall river vision. This option creates a "River Island Destination". The concept utilizes the Corps's preferred concept of maintaining the existing lock and dam and providing an adjacent fish passage; and Merrick's alternative of an adjacent whitewater course next to the fish passage. This alternative creates a destination island between the fish passage and whitewater course providing an ideal viewing area for the in-river recreation activities and the viewing of the fish passage channel. Two proposed pedestrian bridges connect to the island creating a walking and recreation loop through the site.

Access to the site could be via the water taxi or river cruise, via car, or via bicycle/pedestrian access along the Levee Trail.

A 'Recreation Hub' anchors the northern area of the site, creating an active focal point at the vehicular entrance. The pavilion is located in the center of the recreation hub and provides a gathering node for the event lawn, adventure play area, and zip line course. The pavilion would include restrooms and could include potential boat and tube rental for the whitewater course, concessions, and a small indoor event venue. The event lawn wraps the pavilion. A stage could be set up on the lawn for special events and performances along the river. The zip line crosses the river and meanders through the tree canopy adjacent to the adventure play area. The adventure play is also nestled in the tree canopy and could include a tree house theme, boardwalks, or ropes course. The adventure play is in close proximity to the Phinizy Swamp Nature Park and should complement the character and themes of the nature preserve. A camping area and disc golf course expands the recreation hub across the road to the north.

Parking is dispersed through the site along the entry road with a main parking and boat launch area at the upstream of the Lock and Dam. A picnic lawn and an ADA accessible fishing area is located in close proximity to the main parking area. A second picnic area is located along the creek near the entrance to the site.




4. *Figure 4 - New Savannah Bluff Lock and Dam Whitewater Venue*

## COMMUNITY BENEFITS

There is tremendous opportunity with the modification of the dams to enhance the river system to restore natural function and habitat for the endangered sturgeon, to increase recreational use, improve safety, create economic development, and elevate the livability of the community. To achieve these objectives the project must improve access to the water, address existing safety hazards, enhance upland park spaces, make stronger connections into and through the river corridor, and create diverse and unique river recreation that will draw tourists and elevate the livability of the City.

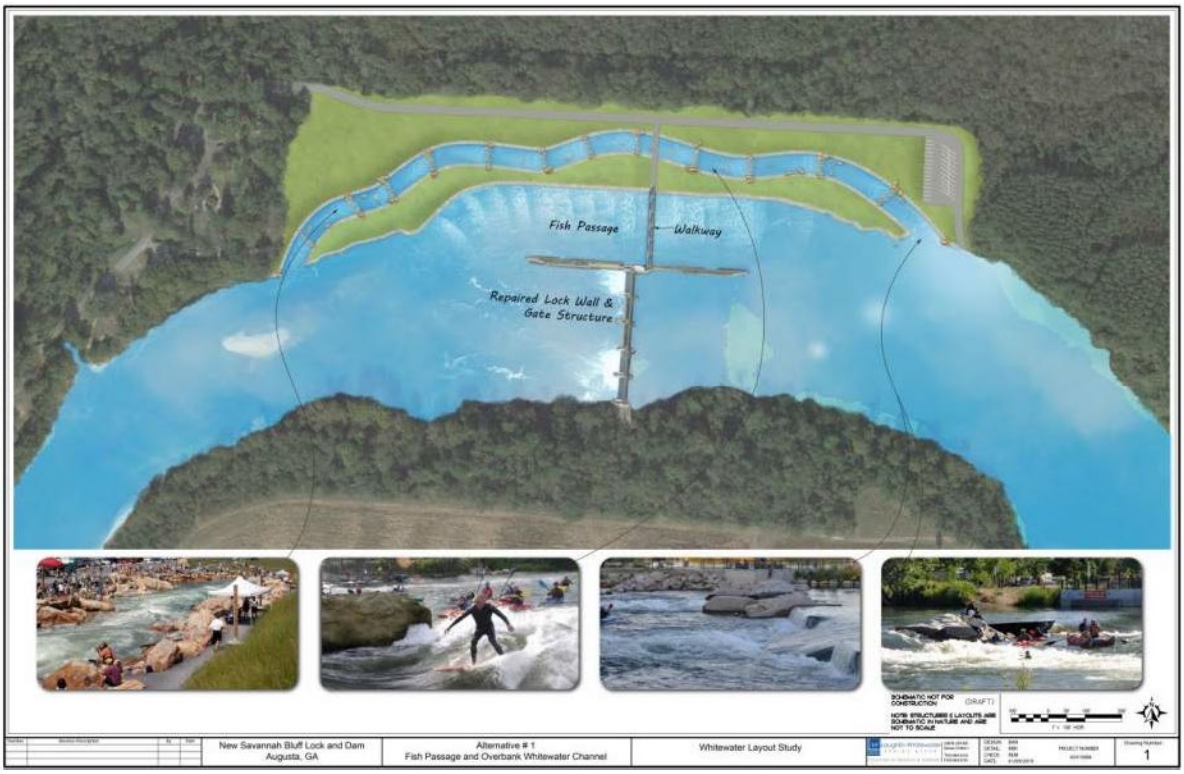
River improvements that connect adjacent communities to the water and attract tourists have shown to create positive economic development. Economic Impact studies of river recreation projects in the USA show that the annual economic impact for a community can range from $500k/yr to over $40M/yr. There are many factors that influence these outcomes. Although an economic impact study has not been completed for this project, similar projects have produced annual economic impacts of over $1M/yr. One example is in Columbus, GA where their local river was enhanced to improve ecology, access and water-based recreation. In 2016, an economic report was generated for Columbus, GA, and they showed considerable positive economic impact. The city has seen $74 million in capital investment, along with 42 new businesses, several university extensions, 400 new jobs, and $24 million in gross revenues, according to Uptown Columbus. Livability, city branding/image, attracting residents and retaining residents are additional positive economic impacts beyond these figures.

One unique aspect of this project is that modification to the dam to allow low hazard river passage would connect up to 36 miles of unimpeded river to be floated and paddled, which would be further enhanced by modification to Steven's Creek Dam and the Augusta Canal. The recreational value and likely economic impact for Augusta would be significant. By connecting upstream and downstream reaches, the river could support guided float and fishing trips, as well as, provide a great recreational experience for local residents. Such a recreational amenity would be marketable to attract tourists, fisherman and other river users from the region.

MWDG recommends that if economic impact and development is identified as a primary project goal that an economic study be completed for the project. A shorter memorandum was completed for this vision and is included in Appendix D.

## WHITEWATER CONCEPTS AT NSBLD

The concept created is based on Alternative 1-1 from the Corps. Alternative 1-1, removes the lock structure but retains the dam (and gates) to maintain pool elevation upstream. A fish ramp is added in place of the lock. A portion of the existing park area is also cut away to make room for the fish ramp. The whitewater concept demonstrates the possibility for an Olympic style whitewater park, with an overbank course and island for recreation and viewing. The course would be approximately 2000-feet long with a 1-percent slope, beginning just upstream of the fish ramp and ending towards Butler Creek. Several whitewater features can be placed along the course. See Figure 5 below.




5. *Figure 5 - Concept 1 Whitewater Course with Dam*

## NEXT STEPS

The required modifications to the dam structures at NSBLD, Stevens Creek Dam and the Augusta Canal Head gates and Locks opens a 36-mile river passage. The City of Augusta, and the region at large have been given an enormous opportunity to redefine how the Savannah River is used and perceived. The River Vision plan described in this report identifies a number of ways to capitalize on the coming changes to the area. Augusta is in a prime position to capitalize on this vision, as the Savannah River runs through the Heart of the City and terminates along the southern end of the reach.

The River Vision is a long term plan that will require years to complete, but provides a new roadmap that will allow the city of Augusta to plan for the positive changes that are ahead. The current Corps process, specifically related to the NSBLD and park will need to be resolved in a positive manner for the city of Augusta. The current alternative presented by the Corps, Alternative 2-6d, negatively impacts the city of Augusta, as it negates the future use of the park as a future outdoor recreational hub.

The NSBLD is the first dam along the system that will be modified, and as such it will set the precedent for future work within the river corridor. The importance of getting the first one right, cannot be overstated. The first, next step, is to ensure the park is protected in modifications to the lock and dam structure. Preserving the park, which is to serve as the future anchor of the new river recreational system, is critical to the success of the entire River Vision Plan. If the City is successful in saving the park, then the future of the river corridor can be established and implemented over time. Setting the right precedent at this first opportunity will set the stage for the entire river reach and will allow the City to reap the economic benefits, social benefits and environmental benefits of a new vision for the Savannah River.

SECTION II - APPENDICES

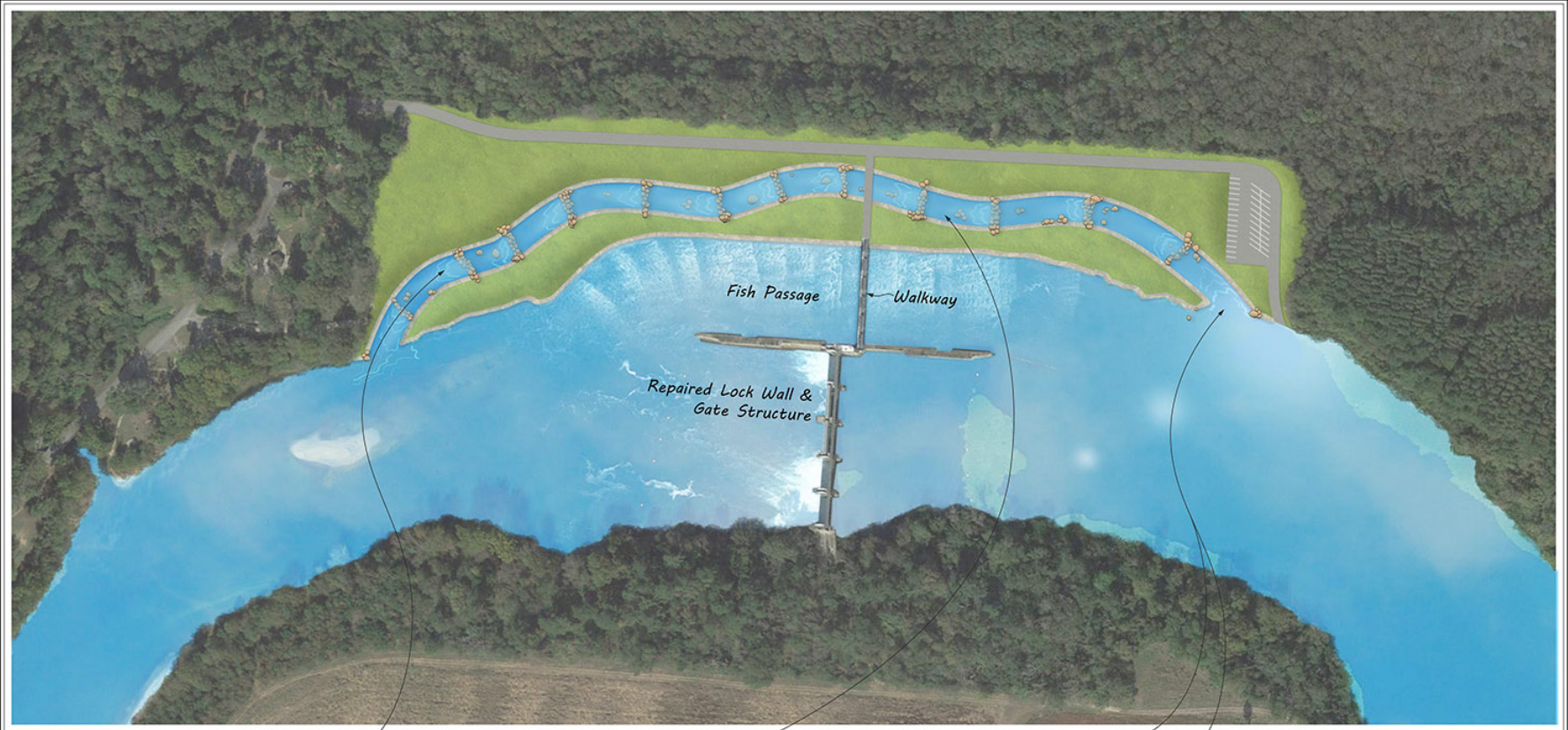
Appendix A – Concept 1 Whitewater Course with Dam

Appendix B – Whitewater Venue Concept

Appendix C – River Vision Concept

Appendix D – Economic Memorandum

# APPENDIX A – Concept 1 Whitewater Course with Dam




100' 0 50' 100' 200'
1" = 100' HOR.

| Number | Revision Description | By | Date |
|---|---|---|---|
| | | | |

New Savannah Bluff Lock and Dam
Augusta, GA

Alternative # 1
Fish Passage and Overbank Whitewater Channel

Whitewater Layout Study

McLaughlin Whitewater Design Group
A DIVISION OF MERRICK & COMPANY
2450 W. 26th Ave.
Denver, CO 80211
T 303.964.3333
F 303.964.3355

DESIGN: BAN
DETAIL: RRH
CHECK: REM
DATE: 01/09/2019

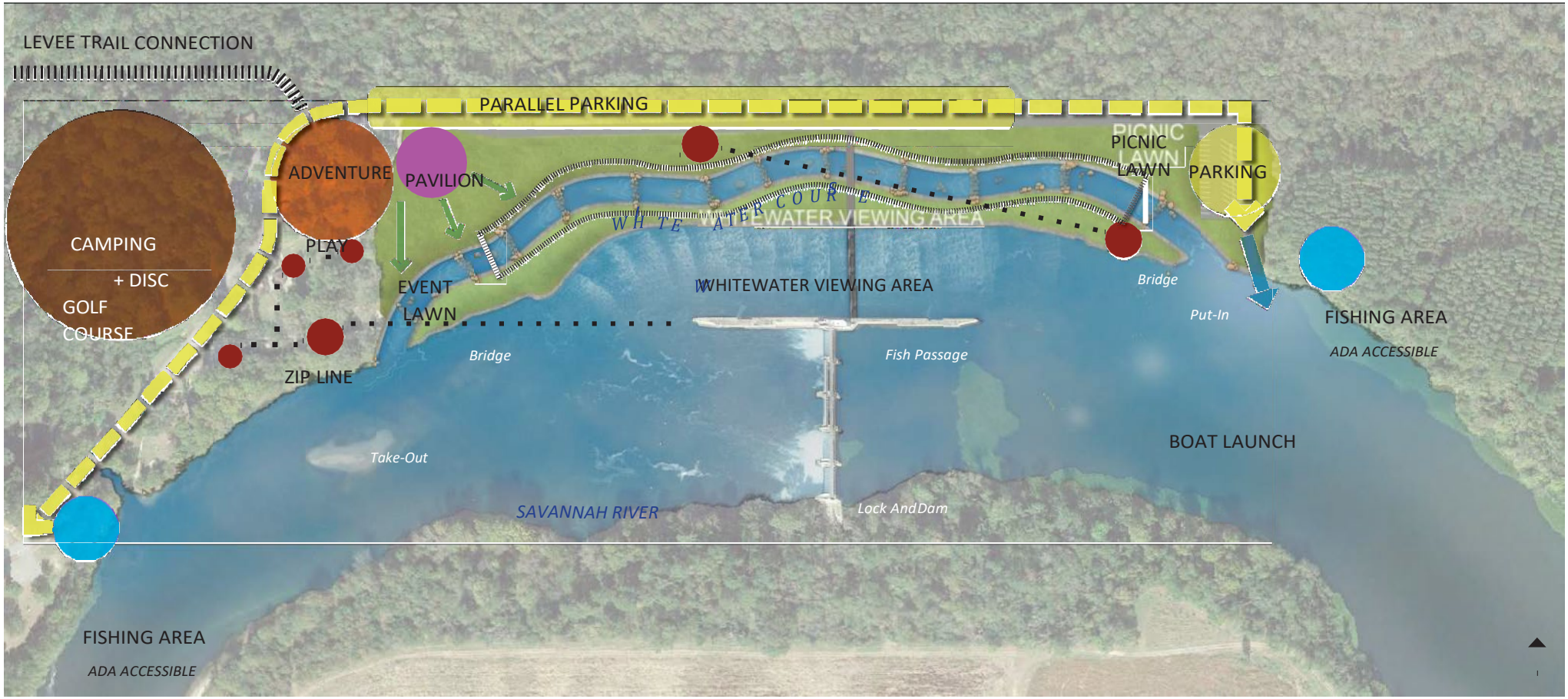
PROJECT NUMBER
65419988

Drawing Number:
1

# APPENDIX B – Whitewater Venue Concept

# RIVER ISLAND DESTINATION

- Pavilion with boat rental and concessions
- Event Lawn for concerts and whitewater viewing
- Zipline over the whitewater course
- Destination Adventure Playground
- Camping Area and Disc Golf course
- Levee Trail Connection
- Route traffc behind activity areas with parallel parking
- White Water Course with put in and take out areas
- Trail and bridges to viewing area on the island
- ADA accessible Fishing Area
- Lock and Dam structure remains
- Boat Launch above the Lock and Dam

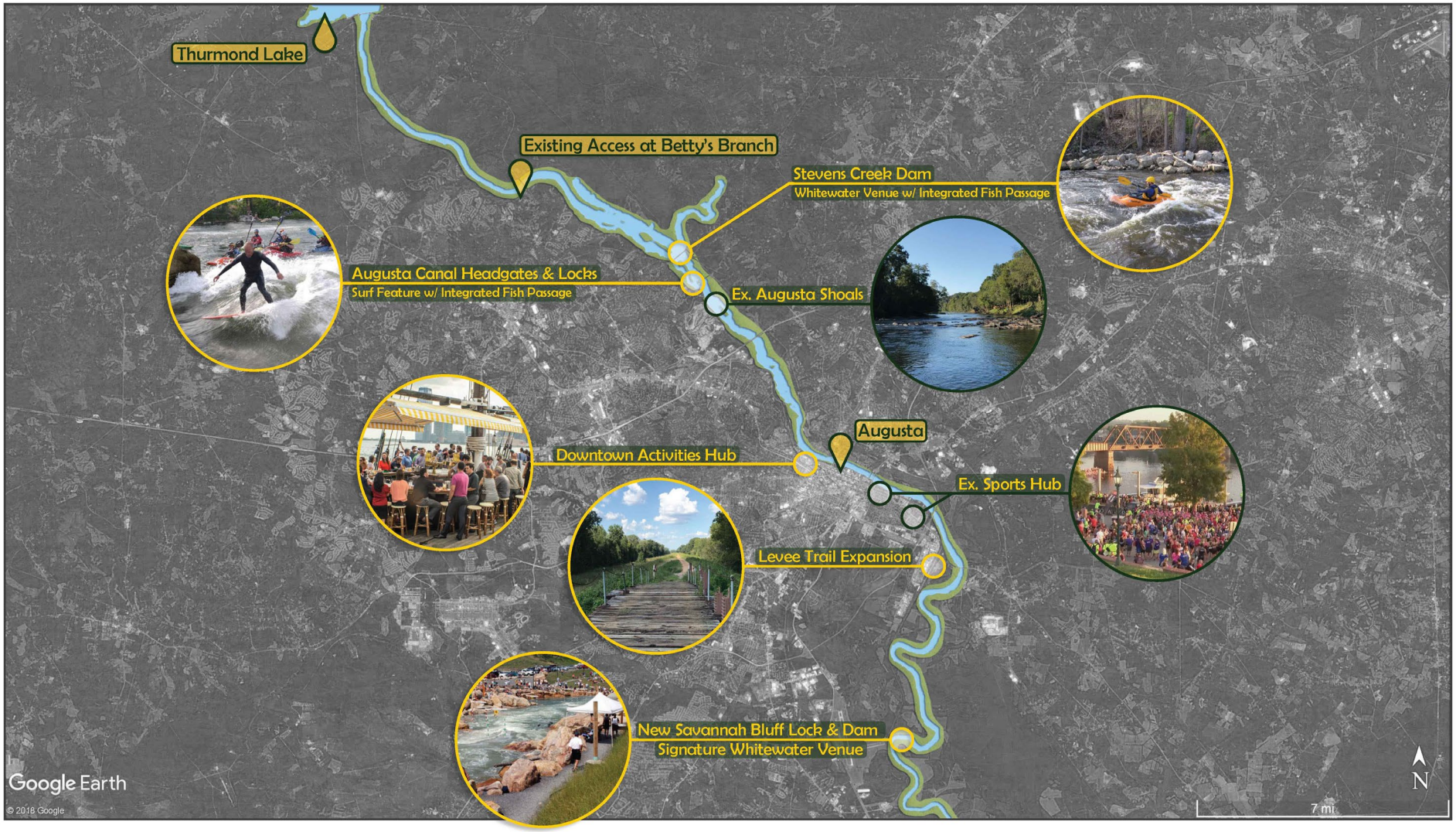


# APPENDIX C – River Vision Concept

# Augusta Area Recreational Corridor 20 Miles of Uninterrupted River

Stevens Dam to New Savannah Bluff Lock and Dam

McLaughlin Whitewater design group
A DIVISION OF MERRICK & COMPANY



# APPENDIX D – Economic Memo

# Economic and Quality of Life Impacts Related the Proposed Savannah River Recreational Improvements

## INTRODUCTION

From the late 19th through the mid-20th centuries, cities and communities throughout the United States located alongside rivers focused primarily on protecting themselves from the devastating impacts of flood events by isolating and often "walling" the rivers that ran through them. Rivers were channelized, leveed and dammed in order to control and contain them. They were largely seen as a solely an infrastructure asset that easily could be a threat to the community. Over the last 30 years, however, that paradigm has dramatically shifted as communities have come to recognize the tremendous natural asset their river can be for beautification, recreation, unique economic development opportunities, and enhancement to overall quality of life.

The proposed recreational improvements of the Savannah River near Augusta, Georgia, follow this same change in paradigm. This brief report provides an overview from an expert opinion on the nature and general order of magnitude of those potential impacts based on real and similar projects in Georgia and from around the United States.

## PROPOSED RECREATIONAL IMPROVEMENTS

In 2018, McLaughlin Whitewater Design Group (MWDG), and division of Merrick & Company, completed a draft feasibility study and alternatives analysis for river and upland recreation improvements that would work in tandem with the Corps's analysis of fish passage infrastructure enhancements at the NSBLD site on the Savannah River, approximately 19 miles downstream from the City of Augusta, Georgia. While primarily focused on the in-river enhancements, the MWDG analysis proposed recreational improvements that could support and allow for the following diverse amenities and experiences at and related to the site:

- Whitewater course
- Ropes course and zip-lines
- Water taxi
- River cruise
- Boat access
- Fishing access
- Event pavilion and gathering spaces
- Destination playground
- Trails
- Outdoor market area
- Disc golf course
- 36-miles of unimpeded river floats and paddling opportunities

**A VIBRANT AND GROWING REGION**

The Greater Augusta region already enjoys rich economic impact from recreation-based tourism being the home of the Masters Tournament. This event alone brings over 250,000 annual visitors to the area and creates over $110 million in yearly economic impact. Additionally, the region is experiencing a significant growth in specific industries such as cyber security, advanced manufacturing and healthcare services, that is drawing a younger work force to the area.

In February 2017, a "Destination Blueprint" was presented to the Augusta Convention and Visitor's Bureau that highlighted several priorities and opportunity areas to further establish the City as a regional and national tourism destination. Among those opportunity areas were "Connectivity to the Savannah River", "Outdoor and Adventure", "Amateur Sports", and "Events and Festivals" as thematic areas of potential growth. While this blueprint was focused on opportunities specifically within the City of Augusta, the proposed recreational improvements at the NSBLD site would directly augment and enhance the efforts of developing the area as a regional and national tourism destination with broad and far-reaching appeal. The experiences made possible by these improvements would also support the quality of life attributes most attractive for new and relocating employers targeting a younger work force.

**COMMUNITY IMPACTS OF RIVER / ADVENTURE RECREATIONDEVELOPMENTS**

River and adventure sport recreation developments have become popular enterprises for communities throughout the United States, where there are natural or built resources that can support them. These are unique additions and attractors to an area that bring a multitude of economic and social benefits, provides communities the opportunity to strengthen and diversify their economies, and enhances quality of life for local residents by enriching the recreational opportunities available to them, as well as serving as an attraction for destination tourism. The economic impacts of these developments include direct, indirect and induced impacts through direct visitor spending, job creation, supporting new business development, increases in personal income for local residents, and increases in local and state tax revenues generated. Some of the larger existing whitewater and adventure sport destinations are attracting more than 100,000 user days each year, not including spectators and ancillary participants.

One of the most relevant examples of what is possible and even probable with the proposed river and adventure recreation developments at the NSBLD site is that taken from the whitewater and adventure park developed in Columbus, Georgia. This park offers guided rafting at multiple skills levels, self-guided kayaking, and zip-line experiences. Since the opening of that park in 2013, which is operated by a third-party, private concessionaire, the City of Columbus has seen a 45% increase in annual gross receipt sales in its Uptown area reaching $46.5 million in 2016. Additionally, 75 new business have opened in Uptown since the whitewater park opened, rental unit occupancy has increased to 98%, and over two million people visit the venue annually with the vast majority of those being spectators. Total guided rafting participation is now nearing 100,000 users annually.

A river and adventure recreation destination in the Augusta area has the possibility of even greater potential economic performance than the Columbus site due to a few distinguishing facts:

- Augusta is only a 30-minute drive further from Atlanta than Columbus, but has many other attractions and amenities to draw and enrich the visitor experience.

- The surrounding region within a three-hour drive of Augusta has more numerous, more populated, and more diversified target markets including Savannah, GA; Charleston, SC; Columbia, SC; and Greenville-Spartanburg, SC.

- The Masters Tournament already draws 250,000 visitors each year to the area.

There have been several economic impact analyses performed for whitewater recreation venues across the United States, most often with the same methodology. The process for determining total economic impact typically involves the following steps:

1. Evaluate national, state, and local trends with regard to whitewater recreation.
2. Determine total commercial user days, visitor expenditures, and multiplier effects of those expenditures.
3. Calculate total non-commercial user days, visitor expenditures and multiplier effects.
4. Investigate total formalized event use of the venue including competitions, classes, and private party equipment rentals, expenditures and multiplier effects.
5. Sum total economic impacts of whitewater recreation to the local economy.

The table below features data from economic impact analyses performed for other whitewater / river recreation destinations currently in operation or planned around the United States.

| Site | Total Economic Impact | Total Job Support |
|---|---|---|
| U.S. National Whitewater Center, Charlotte, NC | $36,678,700 | 690 |
| Lower Animas, Durango, CO | $19,397,633 | 268 |
| Des Moines Water Trails, Des Moines, IA | $27,991,000* | 151* |

**This is a projection provided by an analysis based on current plans and estimated Year 1 operations of the site.*

Finally, while the entire area and City of Augusta will be significant beneficiaries of the economic and social benefits of this potential project, the local neighborhoods and community within the immediate vicinity of the NSBLD site stands to benefit most. A destination of this nature will bring new energy, unique identity, and economic revitalization that is based in a context of recreation, outdoor fun, and family experiences. Visitor spending will fuel a cascading effect of new opportunities for the growth and development of boutique businesses, support services, public recreation opportunities, public infrastructure enhancements, and local beautification efforts.

***Brian Trusty*** has enjoyed a 26-year career in parks and recreation, land and habitat management, tourism, and economic development that includes senior executive management responsibilities in private for-profit, private non- profit, and public organizations. Brian's career includes managing an outdoor adventure company he founded that operated in 22 U.S. states, Canada, and Mexico; managing Lower Colorado River Authority's system of nature parks in Texas; leading the development and operation of the premier adventure sports destination on the east coast; performing strategic planning and management consulting for parks and recreation agencies throughout the United States; and leading National Audubon Society's conservation and environmental education programs throughout the Central Flyway. His successful public/private partnership at the Adventure Sports Center International in Maryland earned him an "Innovator of the Year" award in 2007 given by the Daily Record, Maryland's leading legal and business journal. Brian currently serves as Chair of the Texas State Parks Advisory Committee and is on the advisory board of the Advanced Environmental Research Institute for the University of North Texas. In March 2019, Brian was recognized with the Leslie M. Reid Alumni Award from the graduate program of the Recreation, Parks and Tourism Sciences Department at Texas A&M University for distinguished service in the field.

Aside from constructing and operating the Adventure Sports Center International re-circulating whitewater park in Maryland, Brian has completed operations and market analyses for whitewater projects on the Mississippi River in Minneapolis, MN; Arkansas River in Tulsa, OK; Illinois River in western Oklahoma; and the Des Moines River in Des Moines, IA. He is widely regarded as an expert in whitewater and adventure park operations and the impacts these projects can have on their communities.

# APPENDIX G
# Detailed Comments on Corps Report Line by Line

# DETAILED REVIEW COMMENTS

# ON

# SAVANNAH HARBOR EXPANSION PROJECT, GEORGIA AND SOUTH CAROLINA: FISH PASSAGE AT NEW SAVANNAH BLUFF LOCK AND DAM, INTEGRATED POST AUTHORIZATION ANALYSIS REPORT AND SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT PREPARED BY U.S. ARMY CORPS OF ENGINEERS, SAVANNAH DISTRICT, FEBRUARY 2019

## PAGE BY PAGE REVIEW COMMENTS AND QUESTIONS

**PREPARED BY**

**CRANSTON ENGINEERING GROUP, P.C.**

Thomas H. Robertson, PE, AICP, RLS

**Draft Finding of No Significant Impact (FONSI)**

Page i, paragraph 1, last line – With the weir crest elevation at 108.2 and the flood plain bench (runaround) at 110, the water would rise 1.8 feet before engaging the bench.

Page i, second paragraph, fifth line – With the pool elevation at the weir fluctuating between 110.2 and 111.2 feet this would mean that the flood plain bench runaround would be engaged most of the time at depths from 0.2 to 1.2 feet deep.

Page i, second paragraph, last line – The boat ramp would require purchase of additional land and extinguishing and mitigating a conservation easement.

Page i, third paragraph, fifth line –Would the recommended plan not be expected to improve the existence of the federally listed species, not merely not jeopardize?

**Executive Summary**

Page i, second paragraph, ninth line – This Section (i) requires maintaining the pool as existed when the WIIN Act was enacted. This is misinterpreted by the Corps of Engineer's guidance document. The Act says "the pool," the Corps says "a pool." This section requires allowing safe passage over the structure of the shortnose sturgeon, Atlantic sturgeon and other migratory

species. The Act provides expanded purposes for the project beyond the original navigation to include water supply and recreation.

Page i, second paragraph, last line – Note that this section (ii) states different purposes from (i) in that it is not required to maintain the pool for navigation, but only for the new purposes of water supply and recreational activities. Note also that this section of the Act does not require the structure to allow safe passage of any fish.

Page i, third paragraph, fourth line – Maintaining the functionality of the pool for written purposes is a major difference in interpretation between the plain language of the Act and the Corps interpretation which admits ready manipulation.

Page ii, third paragraph, third line – Passing fish is not required Section ii of the Act.

Page ii, third paragraph, last line – Why is alternative 2-6d classified under Section (ii)? The weir as actually being constructed over the dam; so, would the structure not be more properly classified as being under Section (i)?

Page ii, fifth paragraph, fifth line – The adjacent park and recreation area would contain the often-inundated flood bench that would not be an asset to the park, but rather a maintenance problem, for which the City of Augusta would be always responsible.

Page viii, Acronyms and Abbreviations – The acronym chart is not complete and limits the reader's ability to comprehend the text of this report. For example, what do AM, CONUS, NLF, and others represent?

## 1.0 Introduction

Page 1, first paragraph, last line – Question the definition of functionality and also the WIIN Act requires passing fish under Section (i), not (ii).

Page 1, second paragraph, last line – Because this project is much different from the 2012 one, would it not be appropriate to have a new Environmental Impact Statement rather than Finding of No Significant Impact?

Page 1, third paragraph, last line – If the 2012 design is not consistent with the WIIN Act, then how can it be considered be considered as an actual No Action Alternative (NAA)? The conclusion that the original design should be used as the basic comparison is totally illogical and does not flow from the "inconsistency" sentence via the word "therefore." Using an alternative that is inconsistent with the WIIN Act as the base masks the fact that it had effects on the water surface levels of the pool different from the actual existing elevations experienced by the communities every day. This choice will make the alternatives in the report look as if they have lesser effects than they really do.

## 1.1 Study History

### 1.1.1 New Savannah Bluff Lock and Dam

Page 2, third paragraph, last line – There are unauthorized purposes that were acquired by the New Savannah Bluff Lock and Dam due to other federal legislation. These have been enumerated

by Augusta Attorney Noel Schweers from legal research, and further study would be needed to quote the actual purposes and sources.

### 1.1.2 Savannah Harbor Expansion Project

Page 3, first paragraph, last line – If the WIIN Act does not authorize a bypass outside the federal channel, then how does it authorize a flood plain bench outside the federal channel, which, incidentally, ruins a very nice waterfront park?

### 1.1.3 Study Authority and Related De-Authorization*

Page 4, What does the asterisk in the section title refer to?

Page 7, second line – (A)(i) includes three purposes including navigation. The Corps interprets navigation as being only within the pool. A plain reading of the WIIN Act reveals the obvious intent that the lock should remain in place should include rehabilitation for navigation up and down the river, not just in the pool.

Page 7, seventh line – (A)(ii) has only two purposes (different from (A)(i)): water supply and recreational activities only. There is no mention of authority for a fish passage under Alternative (ii).

Page 7, tenth line – The park and recreation area to be conveyed ends up being a pretty poor park and requires significant on-going maintenance of a soggy and/or scoured flood runaround.

Page 7, nineteenth line – More information is needed to understand better the cost-sharing policy of the project, because it affects local communities and the position of various stakeholders who may stand have to pay, or gain various costs.

### 1.1.4 Study Sponsor

Page 7, first paragraph second line – Both Georgia Ports Authority (GPA) and Georgia Department of Transportation (GDOT) are the collective non-federal sponsors. Most stakeholders may not be aware that GDOT is a party to the project along with GPA.

## 1.3 Purpose and Need*

Page 9, Title – What does the asterisk refer to?

## 1.4 Problems, Opportunities, Objectives, and Constraints*

Page 9, Title – What does the asterisk refer to?

### 1.4.3. Objective

Page 10, second paragraph, last line – Note that Alternative 2-6d does not provide for the navigation objective.

### 1.4.6 Assumptions

First bullet, second line – This is a flawed assumption. Why would one assume a No Action Alternative that cannot be built? And, why is logical or why does it matter that the 2012 SHEP

Plan requires some form of mitigation? That makes no sense. The No Action Alternative, by contrast, should be the Existing Conditions.

Second bullet, fifth line – Selecting the 2012 SHEP plan as the No Action Alternative makes the pool elevations from that plan be the existing for comparison purposes. The SHEP plan levels are lower than the real no-action (existing) levels. This assertion should be quantified.

## 2.2 General Existing Conditions*

Page 13, first paragraph, sixth line – Even if one assumes that the navigation function is the only purpose for the dam (which it is contended that it is not), the project does not "incidentally" serve water supply and support water-related recreation and tourism. It may have "incidentally" at one time, but the WIIN Act 2016 specifically authorizes these purposes in addition to navigation. Therefore, the provision of these functions is not merely incidental.

Page 13, first paragraph, last line – It has been reported that the lockages were able to pass a majority of the migratory and anadromous fish species until the lock was closed. Operating the lock in this fashion and continuing to operate a restored lock in this fashion would be a low-cost method of accomplishing the fish passage purpose. ZEL Engineers has proposed some changes to the lock that would make it more desirable for sturgeon. These alterations need to be further explored.

Page 13, third paragraph, third line – The current condition of portions of the project are probably very poor, but the overall condition of the project is not entirely poor. In fact, previous inspection before 2014 did not classify it as being that bad. It was reported that previous inspections did not describe such dire circumstances in parts of the project other than the lock wall. The reported structural issues have been present for a very long time and do not appear to be as dire one might think upon looking at cracked concrete.

Page 14, last line – The Savannah District had previously refused to provide the cost estimate updated in 2017 of the SHEP project including the structural repairs necessary to reduce the risk of a catastrophic failure of the dam and insure proper hydraulic operation of the fish passage. Such cost estimates would be useful in making independent judgements about the future of the dam. They should be requested.

### 2.2.2 Hydrology and Floodplains

Page 17, second paragraph, sixth line – Why is the flood control benefit from J. Strom Thurmond Dam described as "limited"? That project has always been touted by the Corps as furnishing flood control as the major benefit for the Savannah River downstream.

Page 17, second paragraph, third to last line – The Augusta Canal Diversion Dam is also located upstream approximately one mile downstream of Stevens Creek Dam. It was built in 1876 and is maintained by the City of Augusta currently. It is a run of the river overflow weir structure. Note that the New Savannah Bluff Lock and Dam is the youngest of the three dams near the Augusta/North Augusta area and it is in the worst condition. Who is responsible for that?

Page 18, third paragraph, third line – The pool elevations of 111.2 and 114.2 NAVD88 are equivalent to elevation 112.0 and 115.0 in the NGVD 1929 datum, the original datum for the

construction of the lock and dam. Elevation of 115 is shown on the plans for the dam. Where does elevation 112 come from?

Page 19, first paragraph, last line – The two-year return interval flood is also a good proxy for the mean annual flood, the average flood discharge that might be expected every year.

Page 19, second paragraph, last line – The original design discharge was 550,000 cfs, lessened to 500,000 cfs to conform to more modern freeboard standards.

Page 19, fifth paragraph, first line – USGS reports that the 1929 flood had peak stages of 45.1 and 46.3 on September 27, 1929 and October 2, 1929. These figures are gauge readings and the NAVD88 has no meaning for them. That is there is no need to adjust gauge readings which are not related to the datum.

Page 19, fifth paragraph, third line – The USGS reported discharge rates of 343,000 and 350,000 cfs for these two flood peaks respectively. Note that the peaks occurred in different Water Years. Reference USGS Water Supply Paper 1673, *Magnitude and Frequency of Floods in the United States, Part 2-A South Atlantic Slope Basins, James River to Savannah River*, 1964, pages 318-19.

Page 19, fifth paragraph, seventh line – Where is the Butler Creek gauge located?

Page 20, second paragraph, first line – If one defines "flood control function" as controlling the discharge of waters downstream, this is correct. However, it is misleading because the New Savannah Bluff Lock and Dam does re-regulate flood flows from intermittent generation at Thurmond and from uncontrolled runoff from drainage basins upstream, particularly the large Stevens Creek watershed. The dam gates are adjusted numerous times per day to maintain the slack-water pool at Augusta within operational limits. More importantly, the gates are often raised entirely to pass floods equal to the bank-full stage flood or greater magnitudes. This function reduces the severity of smaller floods and while still being able to be manipulated to maintain the pool at existing levels.

### 2.2.3 Aquatic Resources and Aquatic Habitat

Page 21, third paragraph, last line – The Savannah Bluff Lock and Dam may have inundated a portion of the Augusta shoals, but it did not eliminate the habitat for the Rocky Shoals Spiderlily, as populations of those plants occur at various locations in the rocky shoals upstream and beyond the effect of the New Savannah Bluff Lock and Dam.

### 2.2.4 Wetlands

Page 23, Paragraph 2, first line – Country Highway should be County Highway. Is this road Gum Swamp Road?

### 2.2.6 Threatened and Endangered Species

Page 27, first paragraph, third line – Where did the gravel bar come from? And when? It did not exist in the 1960's and 70's. It blocks the former navigation channel now. It is speculated that the material for this bar may have come from the deep hole immediately under and downstream of the lock and dam.

### 2.2.9 Cultural Resources

Page 33, second paragraph, third line – Where are the lay-down and access areas on private property?

Page 33, Figure 14 – Red boundary is erroneous and does not encompass all the lands owned by the United States. The red boundary does not match the plat of leased lands included in Figure 33 NSBLD Park on page 110.

Page 35, first paragraph, last line – While steamboats may have hauled some cotton goods from the mills, most of the cargo was baled cotton from the major inland market at Augusta. Barge traffic in oil and timber also included major shipping for bricks manufactured in the Augusta/North Augusta area.

Page 37, Figure 16 – The National Register boundary should be adjusted to cover all of the areas impacted by the proposed alternatives including other areas on the Georgia side. The boundary should be enlarged to include the lock-tender's residence site, an adjacent colonial era cemetery, and the downtown lands to the end of the bluff. Also, there is a possibility of previous occupations of Native Americans. In the historical period the Chickasaw Indians were known to have occupied the site. Collections at the Augusta Museum of History include a fine shell gorget recovered from the borrow pits adjacent to this property, indicating that other remains might be discovered or disturbed.

Page 39, second paragraph, fifth line – There are two early to mid-19th Century railroad bridges across the Savannah River, but one is upstream of the Fifth Street Bridge and the other piers downstream. These are historic "rolling lift bridges." In addition, there are stone pools from the former South Carolina Railroad bridge upstream of the Fifth Street Bridge. In addition, the Fifth Street Bridge itself, with a superstructure completed about 1935, is a historic property itself.

Page 40, first paragraph last line – The main training wall in the slack water pool extends from the South Carolina bank to the center of the river at the Norfolk Southern Railroad bridge at Sixth Street and extends roughly down the center of the river for a mile. This structure has been referred to as Gardner's Bar training wall or jetty. It was constructed by the Corps of Engineers prior to 1915 to divert the main flow of the river to the Georgia side to keep the docks at Augusta scoured out to prevent shoaling. This wall is constructed of timber piles, cribs and rock. At the existing water levels this training wall is not a major impediment to navigation and recreational use, but at lower stages of the pool the wall becomes a hazard to navigation and at the lowest level it even protrudes from the surface of the water. If water levels are to be lowered, the Corps should include in the project mitigation measures for the wall including selective demolition to lower the top elevation so that vessels might safely pass over in the future.

### 2.2.11 Recreation

#### 2.2.11.1 Boat Docks

Table 5 – Shows the existing depths at boat docks. Is this existing the real existing conditions or does it reflect the No Action Alternative?

### 2.2.11.2 Special Events

Page 42, third paragraph, second line – Which datum do the elevations 113 and 115 refer to, NGVD 1929 or NAVD 1988? Do the measurements of the water stages at the Fifth Street Bridge refer to the physical staff gauge on the bridge pier or to the elevations from the recording gauge?

Page 42, third paragraph, third line – Where is the New Savannah Bluff Lock and Dam gauge physically located?

Page 42, third paragraph, last line – When and if the pool elevation is lowered, it is likely that sculls, sweep rowers, and rudders will impact the training wall.

### 2.2.13 Water Supply

Page 43, fourth paragraph, last line – It is likely that the NSBLD changes would have no effect as to raw water pumping station intake that leads to the Highland Avenue Treatment Plant.

Page 44, Table 6 – Why is the analysis of pump cavitation prevention based on pool elevations in NVGD 29? This is confusing with respect to the alternatives which are expressed in NAVD 88.

Page 45, Table 7 – Why is the analysis of pump cavitation prevention based on pool elevations in NVGD 29? This is confusing with respect to the alternatives which are expressed in NAVD 88.

## 3.0 Formulation of Alternative Plans

### 3.1 Planning Strategy

Page 48, fourth paragraph, last line – Using the SHEP2012GRR/EIS Fish Bypass Design as the NAA for comparison of alternatives is a completely flawed logic. Either the SHEP 2012 Plan should be considered as an actual alternative that could be constructed, or, in the alternative, it should be eliminated and actual existing conditions as of the date of enactment of the WIIN Act should be used instead. If the authorized project modifications include only the construction of an in-channel fish passage, moreover, then the modifications would not allow for the out of channel flood bypass either as proposed in several of the alternatives, including Alternative 2-6d.

### 3.1.1 Evaluation Criteria

Page 48, second bullet item – The impacts to water supply intakes should include not only the number of commercial water intakes affected, but also the cost implication of both first costs and ongoing operational costs.

Page 49, Table 14, second row – The dollar cost should also be a measure of the impacts. Then impacts from induced floods of various flood events, the depths of flooding and elevations should also be considered, not just the area inundated. Impacts for real estate, how are impacts measured? Dollars?

#### 3.1.1.1 Rating Criteria

Page 49, second paragraph, fourth line – The initial assumption that each alternative would have the ability to pass fish equally was not held constant through the end of the analyses, even though

there is no additional scientific evidence to the contrary that was not already known at the outset. Therefore, the initial assumptions should be constant throughout.

#### 3.1.1.1.1 Navigation

Page 50 first paragraph, last line – To say that an operational lock is not required is entirely to mis-interpret the clear language in the 2016 WIIN Act. The first option of the WIIN Act provides for navigation, and the fish passage over the dam does not take out the lock. Therefore, retention of the lock is to provide navigation around the fish passage structure is clearly the intent. Retaining the lock also would provide another means of passing fish upstream which has been successful in the past and which could be left as an adaptive management feature for the future in the likely event that the fish passage is not successful in passing the targeted species. ZEL Engineers, Inc. has proposed a method of accomplishing this passage for the sturgeon.

#### 3.1.1.1.3 Recreation

Page 51, fourth paragraph, fourth line – Recreational boat docks are currently used by the owners under existing stages of the pool, not those theoretical ones that would occur under the No Action Alternative. Therefore, this analysis using the NAA as the base understates the adverse impacts of lowering the pool on the usefulness of these boat docks.

#### 3.1.1.1.4 Flooding

Page 52, first paragraph, fifth line – The gates at the New Savannah Bluff Lock and Dam to reduce adverse impacts by high flows will be lost as a function under all alternatives, except Alternative 1-1.

Page 52, first paragraph, eleventh line – "rose" should be "raised."

Page 52, second paragraph, eighth line – The detailed flood models should be made available to local interests and the Cities, so that independent evaluation of the effects can be made. Also, does the more detailed model result in differing flood elevations for the 100-year flood from that which is predicted by the FEMA hydraulic model? Note also that the FEMA effective hydraulic model was itself developed by the Corps of Engineers.

Page 52, second paragraph, last line – "asses" should be "assess."

### 3.2 Management Measures

Page 53, first paragraph, last line – Neither a fish passage, floodplain bench, or bypass channel is authorized under (ii) of the WIIN Act.

#### 3.2.1 Location of Fish Passage Structure along River

Page 53, second paragraph, last line – "projecting" should be "project."

Page 53, third paragraph, last line – This paragraph indicates the recognition that you can't have it both ways, keeping the pool and not causing flooding, or not causing flooding and lowering the pool. This is what local interests have been telling the Corps all along.

### 3.3 Formulation of the Initial Array of Action Alternatives

Page 54, fourth paragraph, last line – The term "in-channel" is an important manufactured word that allows the Corps of Engineers to distinguish among alternatives as to whether or not the fish channel occurs within the river or in a "bypass" channel. The approach is silent on whether or not other project features can be located on the side of the river, such as the flood bench and run-around channels. This in-channel definition would by their thought process eliminate the SHEP 2012 plan even though it is the NAA that the first two alternatives in Table 17 are authorized by paragraph (i) while the last three are authorized by paragraph (ii.). Completely different authorizations.

Page 55, third paragraph, thirteenth line – All of the six weir alternatives hold the South Carolina bank of the river as existing. Why? This selection seems arbitrary, especially because the 2012 plan is included as the No Action Alternative.

Page 55, fourth paragraph, second line – "a" pool and "the" pool are not the same thing. The WIIN Act refers to "the pool."

Page 56, second paragraph, second line – The local interests should request both the HEC-RAS 2D model and the HEC-RAS 1D model for independent analysis as required by the Information Quality Act.

Page 56, fourth paragraph, last line – Why were reformulation refinements needed for the alternatives in the 1D HEC-RAS model? Was the model itself wrong, or were the input parameters wrong?

### 3.4 Alternatives Eliminated from Further Consideration

Page 58, Table 20 – It is important to note that both of the Corps of Engineers original plans on which the WIIN Act language was based were discarded. While this might indicate the success of the first stakeholder comments, it does point out that the value engineering proposals were flawed from the beginning and led to the passage of a flood WIIN Act in 2016. The 2016 WIIN Act Alternative 1-2 is one of the value engineering plans and the 2016 WIIN Act Alternative 2-5 is the other value engineering plan.

### 3.5 Final Array of Alternatives with Refinements

Page 59, Table 21 – As stated before the selection of the SHEP 2012 Plan A as the No Action Alternative is logical nor representative of existing and future conditions in a straight forward manner.

#### 3.5.1 Description

##### 3.5.1.1 No Action Alternative

Page 61, first paragraph, last line – Choosing the 2012 SHEP Plan as the No Action Alternative has been pointed out as not being logical several times earlier in these comments… but is it or is it not authorized now?

### 3.5.1.2 Alternative 1-1 – Repair Lock Wall Georgia Side Fish Passage (Recommended for further consideration)

Page 61, third paragraph, last line – This alternative does not provide for navigation as a strict reading of the WIIN Act provision would require.

Page 61, fifth paragraph, last line – The annual operation and maintenance costs that include the annual cost of a major rehabilitation of the structure at fifty years is not a valid cost to assign to this analysis. There will not be a sinking fund established for the project, just as there was not for the previous fifty years. Therefore, these costs should be considered in arrears as has been the case in the past and not in advance as these costs are proposed to be. In fact, they are not real costs, but they are figures which skew the decision among otherwise valid alternative plans.

### 3.5.1.3 Alternative 2-3 – Fixed Crest Weir (500' Wide at Elevation 106.2' NAVD88) (Recommended for further consideration)

Page 63, third paragraph, fourth line – How is siltation build-up behind the fixed weir to be handled for this alternative as well as all of the fixed weir alternatives considered?

### 3.5.1.4 Alternative 2-6a – Fixed Crest Weir (500' Wide at Elevation 109.2 NAVD88) with Bench (Recommended for further consideration)

Page 64, first paragraph, eighth line – These two sets of elevation figures indicate that the difference between the 1929 and 1988 elevation datums is either 0.78 feet or 0.80 feet.

### 3.5.1.7 Alternative 2-6d – Fixed Crest Weir (500' Wide at Elevation 108.2') with Bench (Recommended for further consideration)

Page 67, fourth paragraph, third line – Using the elevation difference from page 64 it appears that the base of the dam in the NGVD29 datum would be 92.00. What physical part of the dam does this represent? The plans for the Lock and Dam show the top of the downstream apron at elevation 90.5 (NVGD 1929) and the gate sills at about 99.0.

Page 67, fourth paragraph, eleventh line – The water in the floodplain bench would flow when water level is only 1.8 feet above the crest of the weir. (110.0 – 108.20 = 1.8 feet) The language states that the floodplain bench would be partially inundated for the one-year return interval flow; however, it seems likely that this run around bench would be inundated much more often than implied by the one-year flood. It would also be subject to scour.

## 3.6 Environmental Effects*

Page 70, first paragraph, last line – Why would the SHEP 2012 fish passage as the No Action Alternative not be included here, for comparison, but is elsewhere in the analyses?

### 3.6.1 Climate Change – Upstream River Effects

Page 70, second paragraph, sixth line – What is CONUS?

### 3.6.2 Hydrology and Floodplains

Page 70, fourth paragraph, sixth line. It is noted that the gates are operated to pass flood waters only and are not affected in adjusting daily flows in the pool, which are controlled by the fish passages.

Page 71, second paragraph, second line – Which HEC-RAS model is referred to here? 1D, 2D, FEMA Effective?

Page 71, third paragraph, sixth line – The two-year flood is similar to the mean annual flood or the flow rate that would occur on the average once per year. (Some sources in the literature refer to this as the 2.33-year flood.)

Page 71, fifth paragraph, fourth line – Note that the flood level differences among alternatives are greater at the dam site and converge upstream.

Page 71, fifth paragraph, last line – What is base elevation of the existing condition profile? Why was it not presented along with the alternatives, so that the real difference from current conditions on the date of enactment can be judged?

#### 3.6.2.1 Future Conditions with No Action Alternative:

Page 73, first paragraph, first line – Is this HEC-RAS the 1B, 2B, or FEMA effective?

Page 73, first paragraph, eighth line – A comparison of the No Action Alternative elevations on the future conditions with Alternative 1-1 are inconsistent with elevations of existing conditions. Which are correct? If the pool is 114.2 NAVD 88 (0.8 feet lower than existing), then the 1988 elevation of the existing pool is elevation 115. If this elevation is converted to NGVD 29, the difference is approximately 0.8 feet or the 1929 elevation would be 115.8. See below for calculations under Alternative 1-1, which indicate a different existing elevation.

#### 3.6.2.2 Future Conditions with Alternative 1-1:

Page 73, third paragraph, ninth line – If the elevation of the pool were to be 113.5 NAVD 88, then the existing pool would be elevation 114.3 and converted to 1929 datum would yield 115.1, this is approximately 0.7 feet different on the existing conditions between those described in these two alternatives. Which is correct?

#### 3.6.2.3 Future Conditions with Alternative 2-3:

Page 73, fifth paragraph ninth line – Similar to the comments above if the existing 1988 elevation of the pool is calculated from the data given, the existing situation would be elevation 114.3 or in 1929 terms, 115.1. Therefore, it appears that the future conditions with No Action Alternative elevations in paragraph 3.6.2.1 are erroneous.

#### 3.6.2.7 Future Conditions with Alternative 2-6d:

Page 75, third paragraph, ninth line – Similar to calculations above these figures indicate an existing elevation at Fifth Street of 114.3, which is consistent with most of the alternatives.

### 3.6.3 Aquatic Resources and Aquatic Habitat

#### 3.6.3.1 Future Conditions with No Action Alternative

Page 76, fourth paragraph third line – The assertion that the challenge of finding the bypass structure under the No Action Alternative would be challenging is erroneous. All of the average flow of the Savanah River was trained to go through the fish bypass under this alternative so that there would be little or no flow going through the gates.

#### 3.6.3.2 Future Conditions with Alternative 1-1

Page 77, third paragraph, last line – The same beneficial impact due to increased dissolved oxygen that are listed for Alternatives 2-3 and 2-6A-D in the section below could be included under Alternative 1-1, "Long term beneficial impacts could occur to aquatic species from the potential local increased dissolved oxygen due to turbulence at rock weir." Also, the existing upland park habitat that will be converted to rocky shoals habitats said not to be rare or unique to the project area; however, the bluff land open to the public for recreational purposes along the river is pretty unique and the loss of the New Savannah Bluff park for mankind is also the loss of a valuable habitat.

#### 3.6.3.3 Future Conditions with Project Alternatives 2-3 and 2-6a-d:

Page 77, sixth paragraph, third line – What does this sentence mean where the rock weir would also improve habitat in general by improving habitat diversity. That seems unsupported and illogical.

Page 78, fourth paragraph, last line – It has been stated above the existing upland park habitat is quite rare for the benefit of mankind in this area.

### 3.6.4 Wetlands

#### 3.6.4.2 Future Conditions with Alternative 1-1

Page 80, table 23 – Alternative 1-1 has the least impact on wetlands of any of the alternatives.

### 3.6.6 Threatened, Endangered and Protected Species

Page 84, fifth paragraph, third line – What is PBF?

Page 85, first paragraph, last line – Why is it important that the area above New Savannah Bluff Lock and Dam was not designated a critical habitat? If it is not critical habitat, why is it important to pass the fish into it from the area below which is critical habitat?

#### 3.6.6.2 Future Conditions with Alternative 1-1:

Page 86, second paragraph, last line – How is it concluded that Alternative 1-1 will not function as effectively as other designs being evaluated? How is it known that this alternative would be the most likely one to cause the downstream gravel bar to shift locations? It will be re-established. But, what difference would that make if the fish go upstream? The gravel bar has not always been there at all. It lies where the navigation channel used to be.

### 3.6.9 Cultural Resources

#### 3.6.9.1 Future Conditions with No Action Alternative

Page 89, third paragraph, last line – It is not true that the existing pool operations would remain the same. The NAA elevations are lower than existing.

Page 89, last paragraph, third line – How do we know?

Page 89, fifth paragraph, last line – There is only railroad bridge downstream of downtown Augusta. There is one railroad bridge at Sixth Street in downtown Augusta and the stone pier remains of the South Carolina Railroad bridge and the adjacent Fifth Street Bridge.

Page 90, second paragraph, last line – A Phase I archaeological investigation is very important because the New Savannah Bluff was occupied by mankind for a very long time, including prehistoric occupations, Chickasaw Indians, colonial settlements, and post-colonial occupations, including the development of the New Savannah Bluff Lock and Dam and its appurtenant structures themselves. The entire bluff should be included.

Page 90, fifth paragraph, second line – Not true.

Page 90, fifth paragraph, eighth line – This is a Public Safety concern.

Page 90, fifth paragraph, thirteenth line – Lowering the pool exposes parts of the wall and kills water events.

### 3.6.11 Recreation

Page 91, third paragraph, last line – The reader needs to understand what is meant the "impact zones."

Page 91, table 25 – What is the breakdown of existing docks by impact zone? There are 161 total existing docks, but the owner of each one would undoubtedly wish to know what the difference between the current conditions, i.e. existing, and not the fictitious SHEP Plan A (NAA). What about damages in dollars?

#### 3.6.11.9 Future Conditions with No Action Alternative and Project Alternatives 1-1, 2-3, 2-6a-d, and 2-8:

Page 93, first paragraph, second line – The selection of Alternative 1-1, with modifications, could change or even lessen the flood impacts on special events. This benefit would not be present with the other alternatives.

#### 3.6.12.2 Future Conditions with Project Alternatives 2-3, 2-6a-d, and 2-8:

Page 93, third paragraph, fourth line – The observations in this paragraph are entirely the opinions of the writer and may not be applicable to every reader.

### 3.6.13 Water Supply

Page 93, Table 27 – What are the low flow existing conditions for each of the water intakes? The only comparison given here is with the fictitious No Action Alternative. For example, the Hicks

Raw Water Intake requires modification under Alternative 2-6c but not under alternative 2-6d even though the water surface elevation is only 0.6 feet different. It seems that, given the uncertainty of the elevations in the alternatives, this difference might not be significant and to have an adequate factor of safety. Perhaps alterations might be needed for Alternative 2-6d also. This recommendation is included in the observation on Page 94. Moreover, the modification considers only the current withdrawal flow, but not the ultimate capacity of 60 mgd for which intake pipes are already in place. Who pays?

### 3.6.13.2 Future Conditions with Project Alternatives 2-3, 2-6b, and 2-6c:

City of Augusta Proposed Modifications:

Page 94, third paragraph, last line – Although the Corps of Engineers analysis as given in Table 28 does not require pump station modifications to be made, there are recommended modifications for Alternative 2-6d, which increase the safety factor for the operation.

### 3.6.16 Cumulative Impacts

Page 98, seventh paragraph, second line – The diversion dam of the Augusta Canal System does not currently have an operating license from Federal Energy Regulatory Commission (FERC).

Page 99, first paragraph, last line – What about negative cumulative effects, including the loss of the Lock and Dam Park itself, the loss of fishing, etc. The project eliminates a fine city park and hence possible additional whitewater feature for the selected plan.

### 3.7 Plan Selection

Page 100, table 29 – There are numerous scoring deficiencies in the final analysis. The fish passage is not even required for (ii) alternatives, which include 2-6d. The fish passage scoring of 1-1 and the No Action Alternative were scored as a zero, because the risk of failure to reach the spawning ground is an unacceptable risk. Documentation in the report did not establish that it is an unacceptable risk. And who says it is unacceptable? Under navigation both the NAA and 1-1 should be scored zero instead of one, because they do not provide for navigation even though it is a purpose of (i) alternatives. Conversely, 2-6d should be scored a negative one instead of a plus one, because navigation is not required for (ii) alternatives. All of the alternatives eliminate real navigation along the river up and down. If scored in this manner the No Action Alternative and Alternative 1-1 would come out with a score of three, and all other alternatives would be two or less. On the remaining cost comparison the No Action Alternative and 1-1 are virtually the same. In short, the selection matrix is flawed and should be re-evaluated.

Page 101, third paragraph, first line – The selection matrix is flawed and should be re-evaluated.

Page 101, sixth paraph, second line – There are no reasons stated why Alternative 2-6d was selected as the recommended plan. What are the other reasons?

### 4.1 Plan Components

Page 102, second paragraph, third line – The 15 percent concept level design conflicts with 35 percent as shown in Section 4.4.1.

Page 102, second paragraph eleventh line – The elevation of 110 is only 0.8 above the weir. How often would the floodplain bench be engaged? Also, earlier in the report it says that crest of the weir would be at elevation 108.2. Why is there a difference?

Page 103, first paragraph, fifth line – What is TCPS?

Page 103, third paragraph, first line – Why is sales tax of 7 percent used, when the prevailing sales tax at the site of the new Savannah Bluff Lock and Dam is greater than that. Does the costing not consider Local Option Sales Taxes? Is this a loss of revenue to Augusta/North Augusta/Aiken County?

### 4.3 Cost Sharing

Page 104 – The reader needs to understand the cost sharing formulas better, as the provision of money will drive the positions of the non-federal GPA and GDOT and perhaps the local communities as well. Moreover, the formulas should be correctly applied.

Page 104, Table 31—What do the asterisks refer to?

Page 105, first paragraph, second line – The guidance documents refers to the provision of the WIIN Act that the cost of either alternatives shall not be greater than the share as provided WRDA 2014 for the most cost-effective fish passage structure. "Therefore the post-authorization document must also detail what would have been the cost of such fish passage structure." This directive needs to be presented in the summary document, so that the reader may understand the cost-sharing arrangement. The costs must be updated to today's dollars, also.

Page 105, first paragraph, last line – Once again, alternative (ii) do not require a fish passage nor navigation features.

#### 4.4.1 Design Consideration

Page 105, second paragraph, second line – The 35 percent design effort conflicts with the 15 percent given in paragraph 4.1.

Page 105, fourth paragraph, second bullet – Are there to be new comfort stations as part of the new boat ramp facility?

#### 4.4.2 Construction Methods

Page 107, second paragraph, first line – The reader needs to review in more detail the sequence of construction to understand its details.

### 4.5 Lands, Easements, Rights-of-Way, and relocations LERR

Page 108, first paragraph, second line – The NFS (non-federal sponsor) is made up jointly of Georgia Ports Authority and Georgia DOT.

#### 4.5.1 Lands

Page 108, second paragraph, last line – Conservation easements released would need compensatory mitigation to be provided.

### 4.6 Operations

Page 111, third paragraph, fourth line – Eliminate "the."

### 4.10 Risk and uncertainty

Page 112, fifth paragraph, tenth line – Modifying the slope to steepen it would seem to be counterproductive with making the fish passage more successful, as it would take more energy for fish to traverse the slope.

Page 112, fifth paragraph, fourteenth line – The statement that "It is anticipated that the proper design of this alternative will result in successful fish passage," is questionable. Where is the proof that this type of structure will work, given that failures have occurred at the Cape Fear River passage which is usually cited as the model and is the only one? Currently the Cape Fear River Watch is asking the Army Corps of Engineers to let that organization overhaul the structure, because the passages are too narrow to serve the striped bass, which is much smaller than the Atlantic sturgeon (which are lazier, too).

Page 113, first paragraph, fourth line – The length of delay in fish looking for the passage was not determined and would require additional study and modeling effort. Nevertheless, the project final analysis used this fictitious anticipated delay, the unknown amount of delay, to assert that Alternative 1-1 and others were not as good in passing fish as 2-6d. This conclusion is totally without basis in scientific study or fact. Also, ZEL Engineers has suggested that the project could install an underwater wall to guide the bottom-travelling sturgeon toward a fish passage a modest cost. The borderline between the need for making modifications and the desirability is a very small change in elevation. If the modifications are desired by the city, they should be paid for by the SHEP project.

Page 113, third paragraph, last line – The web application tool which was published in 2018 as a measure of the effect of the pool lowering was not very helpful. It was difficult for the trained technical person to understand, much less the laymen and the owners of docks. It was not very helpful. By contrast the physical drawdown was more informative and very telling.

### 5.13 Public and Agency Review

Page 116, fourth paragraph, second line – Actually, the draft integrated report was issued on February 15, 2019 and thirty-day public review period was revised to 60 days.

Page 116, fourth paragraph, fifth line – What will the supplemental environmental assessment cover and when will it be available for review?

Page 116, fourth paragraph, last line – Why is a new Environmental Impact Statement not needed, as this project is materially different from the previously approved No Action Alternative presented?

### 5.4.1 Regulatory Compliance

Page 118, first bullet – The Finding of No Significant Impact (FONSI) is very questionable. It is likely that a new Environmental Impact Statement should be prepared.

Page 120, last paragraph, last line – This turbulence and air entrainment runs counter to the assertion elsewhere in this report that dissolved oxygen will be enhanced in fishway path.

Page 121, third paragraph, last line – The response for Alternative 2-6a seems adequate as far as it goes, but, how do Alternative 2-6d and the other alternatives change the response to this recommendation? Or do they?

Page 121, fifth paragraph, last line – It appears that the response does not answer the question posed by USWS. It appears that the bench will be engaged very often. How is that managed? How will grass grow and be maintained under these circumstances? Will it not scour out?

Page 122, first paragraph, fifth line – Are adaptive management strategies to be implemented within the project? If so, what are they?

## 6.0 Mitigation

Page 122, Title -- What is the meaning of the asterisk?

Page 122, eighth paragraph, first line – What is AM?

Page 123, first paragraph, fourth line – The "most cost-effective fish passage" is a requirement of the WIIN Act for alternatives under (ii).

Page 123, Table 33 – States that calculations for OMRRR are included in the current cost estimate. These costs are non-federal. How are they determined and how are they to be enforced? How are they to be funded? Although the calculations for these costs are not included herein in this table, they are included in plan comparisons elsewhere in the report. Why are they not in both places?

Page 123, last paragraph, ninth line – When and how will the agencies, parties and governments be advised of modifications and afforded opportunities to comment?

# Appendix H
# Other Alternatives That Have Been Proposed

**Other Alternatives that Have Been Proposed**

There are many other alternatives including those not-favored by the Corps and those proffered by Augusta/North Augusta citizens and groups. Four examples are included herein.

**A. Proposed Rock Ramp with Crest Gates & Recreational Bypass Option**

Integration and incorporation of recreational and safety features for in-river users into fish passages on rivers – particularly those that impact the full river width is not new. The project in the figure above is a full-river width fish passage project that was design and constructed by the Corps. The authors also designed the first FERC-regulated project in the 1990s that provided for fish passage, safety for a wide variety of powered and paddled craft, and created a recreational venue that has operated since its construction with no structural maintenance issues or serious mishaps – traits demonstrated in all of the integrated fish and recreational whitewater projects designed by the authors.


**This Whitewater Park in Pueblo, CO was Designed and Built by the Corps for Passage of Fish**

Incorporations of some type of hydraulic gates, crest gates, flashboard, etc. in projects that maintain an upstream pool elevation is commonplace on many impounding structures built in the US. While the author is not aware of any statistics, it is likely that the majority of man-made structures built in rivers to reliably maintain an upstream pool elevation have some type of hydraulic gate.

It is highly likely that any alternative will need to include gates and/or require a significantly widened rock ramp (much wider than the proposed 500 feet) to meet fish passage and maintenance of the upstream pool objectives. However, a gate type or configuration different from those currently installed at the NSBLD is advantageous to readily integrate with a rock ramp passage as proposed in most of the presented alternatives.

Automated crest gates (sometimes referred to as flashboards) are used on many different dam and fish passage projects across the country. These gates have proven quite durable and require relatively minimal maintenance costs – particularly compared to the existing gates. Furthermore, the controls and operating systems have shown to be low-

maintenance and easily automated. A proposed option using automated crest gates is proposed for consideration. This arrangement is shown schematically in the following illustration. This option would be a variation on the proposed rock-ramp alternatives. The major difference is that a series of crest gates in maybe 10 to 20-foot or more foot sections would be aligned along the crest of the rock ramp. The height of the gates would need to be determined as outlined below but could be on the order of 4 to 7 feet.

1. **Operational Approach.** The operational tactic entails that the crest gates not be significantly over-topped when raised. This is desired for both fish passage and safety concerns for in-river users. Rather, sections of crest gates would be raised or lowered so that flow over the crest of the rock ramp would be routed around the raised crest gates toward one or more parallel channels or sections of the downstream rock ramp. The individual sections of the crest gates would be raised or lowered to maintain more consistent depths and velocities over the crest and within the rock ramp for a wide range of flows.

2. **Potential Advantages.** This option has the potential to increase the water surface in the upstream pool during lower flows (as compared to a fixed crest rock ramp) while reducing the elevation of higher frequency flood flows providing some level of flood control. Overall the advantage of a crest gate system is adjustability and flexibility with demonstrated low life-cycle costs. From a fish passage perspective, crest gates could improve passage conditions in that they can maintain minimum target depths while effectively reducing passage velocities. Another benefit is that the addition of crest gates would reduce variations in peak velocities throughout a wider range of flows. The downstream rock ramp could be configured or "tuned" for much a wider variety of flow or passage conditions provided via control of the crest gates. This allows for adjustments by regulatory entities to accommodate changes in fish passage parameters based upon observational data and applying adaptive management concepts common to species protection. Crest gate operations could be adjusted over the year or on a much more frequent basis to optimize conditions for passage of different fish and/or seasons.

3. **Recreational Bypass.** A recreational whitewater bypass is proposed to be routed around the rock ramp through NSBLD Park. The bypass, along with a series of guide buoys and signage, would provide increased safety by encouraging users of the proposed water trail and other "flat-water" recreationalists to route around the rock ramp fish passage. The whitewater course would act as the anchor for the proposed outdoor adventure sports venue bring significant economic and quality of life improvements to the surrounding communities. This is outlined further in the *River Vision Plan.* The whitewater bypass may also provide for conveyance of additional higher flows and minor flow regulation to stabilize upstream water surface elevations. The outlet of the whitewater bypass could be extended further downstream (perhaps as far as if desired to further separate it from the rock ramp. Additionally, the outlet could be configured to discourage or perhaps prevent entrance of some species of fish from entering.

4. **Development and Refinements**. Analysis and configuration of this option needs to be further developed to demonstrate desired fish passage requirements, safety considerations, and recreational objectives. The height and width of the crest gates, corresponding "fixed" invert elevation of the crest of the rock ramp, configuration of the downstream

rock ramp, and orientation of the rock ramp in the river need to be determined by further refinement, analysis, and evaluation of:

- Water surface elevation criteria,
- Fish passage hydraulics,
- Safety considerations
- Hydraulic analysis for higher frequency flood flows and regulatory flood flows,
- Hydraulic analysis to avoid increased flooding at Lock and Dam Park.
- Avoidance of encroachment into Lock and Dam Park.

One design concern to be addressed is in preventing sturgeon ascending the rock ramp from getting stuck or trapped behind a raised crest gate. Attention to this potential issue is no different from other rock ramp design issues and particularly with alternatives maintaining upstream pool elevations. There are several ways and combination of ways this could be addressed. One approach would be to create a variety of parallel routes through the rock ramp that would "connect" to specific groups of crest gates. These routes could be optimized for specific lower flow ranges as well as fully inundated conditions. Specific sills in the rock ramp downstream of the crest gates could also be configured to route sturgeon toward lowered crest gates. Additional traditional fish exclusionary measures can be employed.

Another design related issue is localized velocities at the crest and adjacent to raised sections of gates. Arrangement of mid-stream features could be investigated to improve hydraulic and passage conditions. Concept development and verification of this area could be accomplished using a CFD hydraulic model (3-dimentionsal) or even physical model to evaluate depths and velocities over a wide range of flows and conditions.

Integration of the recreational bypass also needs further development to promote user safety, maintain objectives in the NSBLD Park, and integrate into the City of Augusta's river corridor planning.

**Summary**

This option is similar to the alternatives presented in the Draft Report in that it is a full river-width rock ramp that spans the entire river. Crest gates and a bypass are included to maintain the upstream pool elevation, provide for safety, and can provide recreational uses to mitigate for lost recreation including the lock, and integrate with current recreational uses of the Savannah River and the City of Augusta's river corridor and economic planning. Crest gates are used on a wide range of large and small river projects. They have proven cost effective on many hydropower, diversion, and projects that have included fish passages. Whitewater bypasses and promotion of whitewater and safety of in-river users have also been included on many in-river projects that include fish passage and impounding structures. A good example of this, is the fish passage venue built by the Corps in Pueblo, Colorado, which was designed and built for fish passage with accommodation of recreational whitewater users.

## B. Proposed Fish Lift System

Thomas Brothers Hydro, Inc. has proposed retrofitting the existing lock with a modular fish lift to move fish similar to the process in place at the Holyoke Dam on the

Connecticut River. The company states that this facility could be installed instead of the rock weir or ramp at a fraction of the cost. See further details at www.savannahriver.org.

**C. Proposed Reauthorization and Rehabilitation of Lock and Dam with Modest Fish Passage Similar to 2012 SHEP Fish Passage (or Fish Lift).**

The Save the Middle Savannah River citizens group has proposed a "common sense" solution – reauthorization and repair of the Lock and Dam and construction of a modified structure such as a fish lift or modest-sized fish bypass to pass the sturgeon – that addresses all of the concerns outlined in these comments and protects the vital interests of both the CSRA and those of the SHEP project.

According to the group's website, there is a solution that would align the environmental mitigation requirements of the Savannah Harbor Expansion Project (SHEP) with most of the goals of the Corps of Engineers, the Consortium for the Lock and Dam and the vital interests of both the Central Savannah River Area (CSRA) businesses and the broader Middle Savannah River communities under a commonsense, workable plan, at a reasonable, if not substantially lower, cost than the other solutions. It is already environmentally vetted, and is virtually shovel-ready. The solution includes the following major components:

- **Rehabilitation of the New Savannah Bluff Lock and Dam** consistent with the intent of the WIIN Act and the mitigation needs of the SHEP project, thereby protecting: navigation and recreation, control of the pool for some flood regulation, and to support the many events that depend on a pool that can be easier regulated, such as the Augusta Drag Boat Races, Iron Man, etc.

- **Construction of a Fish Bypass (or Fish Lift)** around the Lock and Dam as previously planned and approved for SHEP mitigation, similar to the already approved 2012 Fish Passage, along with the rehabilitation efforts listed above. Part and parcel to this, Save the Middle Savannah is asking the Corps to meet with South Carolina and Georgia DNR to ensure that the size of the bypass should be minimized to the amount necessary for sturgeon and other migratory fish, but no more, in an effort to control cost.

- **Evaluation of localized spawning habitat restoration projects** for endangered species downstream and elsewhere. There is much published material that neither a bypass of direct overpass will effectuate a facility that will be used by the sturgeon. Save the Middle Savannah is very much a proponent of using its influence to help ensure that, whatever alternative is decided for the sturgeon, that there is sufficient science to warrant success (versus simply checking a "mitigation box")

This common-sense solution would cost the least of all the alternatives heretofore proffered and would be the quickest to implement and the most beneficial for the SHEP initiative.

See https://www.savethemiddleriver.com/

**D. Proposed Lock Modifications and/or Fish Lift and Downstream Fish Guiding Wall**

ZEL Engineers, Inc. has proposed making modifications to the existing lock to take out the vertical steps in the floor levels and replace them with a sloping floor as a more suitable travel path for migrating sturgeon. The plan also includes installing a diagonal training wall submerged on the downstream side of the dam to shield bottom-travelling fish from the strong currents from the gates and to guide them toward the lock.[38]

## C. Other Alternatives to Be Considered

Consideration should also be given to other alternatives that meet the goals of SHEP and the Augusta and North Augusta communities, and the Central Savannah River Area.

[38] Letter from Jorge E. Jimenez, P.E. to Savannah District, U.S. Army Corps of Engineers, Planning Division, Attn: Ms. Robin Armetta (PM-P), dated March 12, 2019.

# Appendix I

# Transcript of City of Augusta Public Meeting, Lock and Dam Meeting, March 31, 2019

**In The Matter Of:**

*CITY OF AUGUSTA PUBLIC MEETING*

*LOCK AND DAM MEETING*

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*March 31, 2019*

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*Augusta Scribes Court Reporters, LLC*

*4 George C. Wilson Ct.*

*Suite A*

*Augusta, GA 30909*

Original File 032119LockandDam1.txt

**Min-U-Script® with Word Index**

CITY OF AUGUSTA PUBLIC MEETING

LOCK AND DAM MEETING

March 31, 2019

Commencing at 5:00 p.m.

City of Augusta

Commission Chambers

535 Telfair Street

Augusta, Georgia 30901

Brittany N. Draper, CCR, CVR



P R O C E E D I N G S

MS. JACKSON: We welcome all of you to the commission chamber today for this very important occasion. This has been a topic of conversation in our community for many, many years. We're now at a critical juncture and it's very important that we have public input, and we can share with the decision makers and the federal government what the views really are -- people in our community.

Our park, Lock and Dam park, our river, all of the things that are associated with it have been tremendous assets for us. And we appreciate your concern for the protection of those assets. We appreciate you being here today.

We do have sign-in sheets, I think, at either podium. I know there's one over here for sure. So if you have not signed in already, you may still do so. We just wanted to do so so we have record of everyone who has attended and who wanted to speak. We also have a court reporter with us so that we can record those comments and



we'll have a full text of all of the comments that have been made here today.

However, before we get started with that, I would like to recognize all of the elected officials who are with us today. I notice a couple more have come into the room, so hopefully I will not miss anyone.

I will start off with our elected officials from Augusta. Those include Mayor Hardie Davis, sitting up front, The Commissioner Sean Frantom from District 7, Commissioner John Clarke from District 10, Commissioner Dennis Williams from District 2, Commissioner Ben Hasan from District 6, Commissioner Elect Bobby Williams from District 5, Commissioner Sammie Sias from District 4, and Commissioner Bill Fennoy from District 1.

Also, we're privileged to have representatives from our neighboring communities in South Carolina. Mayor Bob Pettit is here from North Augusta. Aiken County Chairman Gary Bunker, as well as Aiken County Councilman Chuck Smith are all in attendance, many of whom will have



remarks for us this evening.

In addition, we are also pleased to have with us two members of Congress, one being Congressman Joe Wilson of South Carolina. I know he's in here somewhere -- there he is. Okay. And Congressman Rick Allen, who represents Augusta, is here as well.

We thank all of you for being a part of this. We'll proceed now with a general overview and objective of our meeting by Tom Wiedmeier. He's our director of the Augusta Utilities Department.

MR. WIEDMEIER: Good evening. Okay. So the original SHEP plan was to build a fish passage around the Lock and Dam. This was put forth in probably 2012. A problem with this was that it didn't touch the existing Lock and Dam, it did no repairs or upgrades to that.

An interesting point is it's been pointed out that this, which is considered the no-action alternative by the Corps, this is what they compare all the alternatives to, could not be constructed

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by the current legislation. What the Corps arrived at as their preferred option is a fixed weir with floodplain bench. This is a rock dam spanning the river, it removes the existing Lock and Dam, constructs a rock dam with a fixed weir, and then it excavates through the park a floodplain bench which we essentially dig out about 10 feet. That bench would be about a foot higher than the water surface.

So the Corps' modeling predicted that the water depth at 5th Street would drop from 11 and a half feet to 9 and a half feet. A 1- to 2-foot impact is what they were predicting by their modeling. This is, in fact, what we saw, much, much greater than a 2-foot drop, I would guess 4-plus feet.

So what the City has advocated, both cities, Augusta and North Augusta are advocating for is an alternative that they consider and actually scored as high as their recommended alternative, which is to rehab the dam, build a fish passage on the Georgia side. It would tear out the

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existing lock and build a fish passage.

So in their evaluation, you'll notice that both alternatives, 1-1 is what the City is advocating for, 2-6d is what the Corps arrived at. Both scored equally at a four. At the time that they revealed their evaluation back in November, Augusta's preferred alternative was priced at $61 million in capital costs and the Corps' preferred alternative was 68.9.

The difference was the annual O&M cost. They predicted $950,000 a year would be needed to maintain 1-1. Their alternative, they projected $45,000 a year.

Now, some new information was just received this week by the letters to mayors, both mayors, and the numbers have changed dramatically. And they're using a different basis. I thought that this was in present value, Mayor Pettit doesn't think that that's the case, but regardless, the price for 1-1 for present value, or something like that, is now $380 million, which includes all your O&M.

And by the way, they're doing this on

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a 100-year lifecycle, so -- and their preferred alternative has a present value of $105 million.

So I make that point to say that we're kind of dealing with a lot of changing numbers and we're trying to respond to that.

I'd like Tom Robertson, who is a consultant that's been retained by both cities, to make a comment on the dilemma that a fixed weir presents.

MR. ROBERTSON: Thank you, Tom.

I don't have any pictures of this, but I'd like to just point out that -- sort of how we got to where we are. That the Corps came up with what they call two value engineering alternatives, so before this WIIN Act was put in place, one of those was to construct a rock ramp or fish passage over the top of the Lock and Dam, keeping the lot, by the way. And then the second alternative was to build a rock weir or pile of rocks about a mile upstream. And those two alternatives were what was used to draft the legislation, either a rock

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ramp over the dam or a separate structure elsewhere. Well, those would be fixed so you couldn't open the gates and let the floodwaters through like you could before on either one of those alternatives.

So of the alternatives that are now before us, those two alternatives are two that the Corps has summarily X'd out, so neither one of those of the original alternatives is even feasible. And the reason for that is is that by the federal regulations on floodplain, you can't raise the 100-year flood, and the Act itself says you can't lower the pool.

So if you put a pile of rocks in the middle of the river and you can't open the gates anymore, then, I mean, the hand of God isn't going to reach down and pull that out of the way when the flood came. So you can't have it both ways. You're either going to raise the floods or you're going to lower the pool.

So that's why we think that the 1-1 is the superior -- or really the only option that the Corps has on the table

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today that actually can do what the WIIN Act says, and that is to save the gates. So I'd just like to point that out. And I'll step down. Thank you.

MR. CAMPBELL: All right, ladies and gentlemen. What we are about to do now is have brief comments by our special guests and our mayors.

Congressman Wilson, if you would like to come up, and he'll be followed by Congressman Allen, then Mayor Davis, Mayor Pettit, and then Chairman Bunker.

CONGRESSMAN WILSON: And ladies and gentlemen, it's really inspiring to see the friends of the Savannah River of Georgia and South Carolina together.

It was really inspiring to me to come in with Roy Simkins. He was the person who took me to the Lock and Dam years ago and said -- and told me how important it was. And I saw what a great asset that is, and how it needs to be maintained.

And then I'm very grateful that Mayor Davis and I met in Washington on this issue. And we've had wonderful meetings.

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And then Mayor Pettit, I'm really grateful, mentioned to me that when he was sworn in, one of the first topics that we discussed was the importance of maintaining the Lock and Dam, maintaining the pool.

And another person that I really want to give so much credit to is Congressman Rick Allen. There's not a day that goes by that Congressman Allen and I, on the House floor, do not strategize and plan letters and different efforts to maintain the pool.

And we also have the opportunity to work with Senator Tim Scott and Senator Lindsey Graham. And they will be having representatives actually visit the lock tomorrow.

And the point is that we understand that the congressional intent of the language of the Water Infrastructure Improvement for the Nation Act, the WIIN Act, is to interpret that the pool must maintain the physical level of the heighth on the date of enactment, which was December the 16th, 2016.

According to information from the

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U.S. Geological Survey, the water level of the Savannah River at the 5th Street bridge varies between 113.5 feet and 114.5 feet. And the pool should be maintained at 114.5 feet, which is largely what it is today.

The Corps' draft recommended plan would lower the pool as a -- has been indicated, but we know that it's catastrophic what happened. This was not just a minor 1- or 2-foot drop, but it was a catastrophic drop.

And I believe that it's simply not within the law because the WIIN Act provides that the physical level be maintained on the date of enactment.

I also believe that the water level of 114.5 is what should be approved. It's disappointing to me that the Corps of Engineers has misinterpreted the intent of the WIIN Act, but we know that the physical level is what was intended.

I want everyone to know that our office is available to help anyone on comments. We have Martha Ruthven here. Martha is at our office at the

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administration building in Aiken and assisting anyone with comments.

And then we have on the board that I brought, that we have ways by postal mail or by email to make comments, because I just know that the Corps of Engineers has already taken one step, which is good, by providing for an additional 30 days to comment, through Tuesday, April the 16th, at 4:00 p.m.

And I'm just so hopeful that with the persons who are here tonight, with the messages that you will be providing, that the Corps will pay attention to the citizens of this community and in particular see how incredible it is bistate and, I understand, even bipartisan.

And so this is an amazing, remarkable circumstance. I wouldn't want to point out anybody who might be of a different party, but hey, this has united the community in such a positive way and the people who are here can make a difference. God bless you. Thank you.

CONGRESSMAN ALLEN: Joe also failed

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to tell you, he's a ranking member on the Armed Services Committee and has been very generous with his time and efforts in working.

This is under the United States Army. You know, we fund the Department of Defense and, of course, the SHEP funding is a separate -- it's under the Transportation and Infrastructure Committee and, of course, that's how the work on the Lock and Dam is going to be funded. So Joe has been a great partner and, Joe, thank you for everything.

In fact, we delivered, or hand delivered, a letter to the -- Joe had a meeting with the Secretary of the Army, yeah, and we went right to the top and we delivered a letter.

And, basically, the letter said that the Corps had been very untruthful with two members of Congress. We think that is subordination and it should be dealt with. And so we're hoping -- we've asked for a follow-up meeting and we're hoping that we get some results out of that 'cause,

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frankly, I am absolutely tired.

As the President says often to me, he said, this is just common sense, you know. I mean, yeah, we have a pool of water we've maintained since the '30s. This dam is an engineering marvel. This thing works. I mean, I've been down there, y'all, and the water has been the same level on both sides during this rainy season and the gates have been wide open. So we know it works.

The fish -- the fish ladder, you know, I have studied that and studied that and studied that, and I -- you know, I don't want to get into all the details on that, but we have spoken with NOAA, we've met with those folks, and frankly we think we got some better ideas there, but let's deal with this first.

We have got to get the Corps of Engineers to understand that there will be no exceptions, none whatsoever. That Lock and Dam is going to stay in place. It's going to be repaired and it's going to be maintained, period.

I met with them in April of 2015 and

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that was the words out of my mouth. They went behind my back and somehow got this legislation in a water bill that I could not vote on because I knew nothing about the legislation. But the good news is it did maintain the level of the pool and I was assured that that pool would be maintained and we would look at some option.

Well, folks, we're out of options. And what I don't want to happen is for us to -- we have to get that port deepened. It's the number four port in the country. We don't want to delay the deepening of that port. What we want the Corps to do is get this thing done, get the design done, get the fish ladder done, and let's get under construction and be done with it.

You know, the idea is we have got to get this under construction by 2021. And, you know, every time, you know, like 1-1 comes up, they say, okay, it's going to delay the project. And we got NOAA to commit to, like, 130-day review -- by the way, this is Lauren Hodge, and Lauren,

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this -- she has lived the life of this thing since the -- since this -- since our first meeting in April of 2015. So if you need to know any details or want any correspondence from our office and how we're dealing with this thing, Lauren has it all, and she has all the documentation on it.

But the bottom line is, we have got to get the Corps to go ahead, move forward in this process. I do not trust their numbers. In the first meeting, they came to me, they said the fish passage was going to cost 30 million and the repair to the dam was going to cost 20 million. And I said, well, what's the problem? They said, we don't have the money to repair the dam.

I'm looking at numbers here. I don't believe this. And if we have to, we will remove the Corps from this project. We will put the Georgia DOT in charge of this thing and we will do it for a portion of those funds.

So as you can tell, I'm a little passionate about this because I just don't

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like the way some of these agencies do business, which is one of the biggest problems the United States Congress had.

I can't -- I gotta tell you real quickly, Roy called me one day and he said, who in the heck is in charge up there? The United States Congress or the Corps of Engineers? I said, Roy, we're doing the best we could do. And we are. We're fighting it all the way.

Roy, thanks for all your work on this, and your attorney who has done wonderful work in helping us get through this process.

But that's where we are. Thank you for being here today. The reason you're here today is to convince the Corps of Engineers that we're right. And this is just common sense.

Thank you for being here. Thank you for sharing this with us. And just -- we've just got to get it done. That's just all it is, just common sense. Thank you very much.

MAYOR DAVIS: I do want the citizens

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of Augusta to know that that's my Congressman.

I want to, one, thank everybody for coming out tonight. And these will be generally referred to as my comments that will go into the official record along with the work that's being done by our team, with Tom Wiedmeier, Robertson, and the expert group who's helping them.

I want to direct these comments to Governor Kemp, Lieutenant Governor Duncan, Speaker Ralston, to our two senators on the Georgia side who have been noticeably absent in this conversation, Senators Perdue and Isakson, and I wanted to direct these comments to the Corps and the Georgia Ports Authority and GDOT.

Governor Kemp, I'm sure that you're aware of the situation in Augusta, Georgia, regarding the New Savannah Bluff Lock and Dam and the United States Army Corps of Engineers' desire to replace the dam with a lowered fixed crest weir with a dry floodplain bench, that has been referred to as Alternative 2-6d.

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In February, the Corps conducted a fixed weir pool simulation to allow members of the public and stakeholders along the Savannah River to experience the conditions that accompany Alternative 2-6d.

The Army Corps of Engineers assured the cities of Augusta and North Augusta that our riverfront would not be significantly impacted. The simulation demonstrated that the Army Corps of Engineers was wrong.

The leadership, the citizens, and the stakeholders of Augusta, Georgia, North Augusta, South Carolina, have made it clear that the conditions of the river during the simulation was not and is not what we want to see every day, 24 by 7, 365 days of the year.

The consolidated government of Augusta, Georgia, and their citizens have come to rely and depend on the pool of water that the dam has created since 1937 when the dam originally when into service.

It is unacceptable for the Corps or anyone to believe that it's morally or

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ethically right or appropriate to sacrifice our communities, our life, our health, our welfare and safety, so that the Savannah Harbor Expansion Project could continue without any consideration for those of us who are upstream.

And as a result of that, laws and regulations across every level of government have acknowledged the fact that clean water is the first step along the critical path for assuring the health of a community.

The Savannah River's clean water has financed healthy growth in Augusta for hundreds of years. In Augusta, over a thousand miles of pipeline deliver the Savannah's water to folks as far away as Fort Gordon. One of the only installations that continues to grow as a part of the DOE -- DOD complex, providing drinking water, bathing water, and on-demand resources for other uses.

The Georgia Environmental Protection Division projects a 20 percent jump in our area's population over the next 30 years.

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As a result of that, by 2050, Mayor Pettit, Augusta's water needs will increase by 34 percent. Augusta has incorporated these projections into our new comprehensive plan from last year that we're calling Envision Augusta, a Plan for 2035. The Corps, likewise, relies on EPD's 2050 numbers in the management of their assets throughout the water basin.

Despite all of this, the plan for Augusta fails to take our future needs into account. They've counted our intakes, they reviewed our permits, and determined that their plan will not have an adverse impact on our water supply.

A legitimate analysis would reflect the reality of stocking our drastically downsized pool with two species of endangered fish that to this very day I still have not seen, and then asking that same pool to support the needs for withdrawal, discharges, recreation, navigation, development, and special events of a 20 percent larger population.

The Army Corps of Engineers is aware

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that the river provides for nearly 90 percent of Augusta's water needs, and their failure to legitimately address their project's impact on our area is unacceptable.

Their analysis should address head on the very real possibility that their plan should either compromise -- could either compromise the health and well-being of our growing city or cut that growth off at the knees. That is unacceptable. And we will not stand by silently, but we will pursue every avenue to make amends and get this corrected.

The City of Augusta and our neighboring communities have stood silently in support of an alternative that we did not develop, but rather the Corps themselves provided us, and that was Alternative 1-1, which scored the same as Alternative 2-6d on the Corps' matrix, which as I might add, the numbers you see there are astronomically different than what we were provided during the matrix.

And so I close my comments with this:

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We are one community, we are one river, and we have been told we are one Georgia, not two Georgias. We have been told that we will put Georgians first, and I submit to you that putting Georgians first includes those of us in Augusta, not just in Savannah.

MAYOR PETTIT: I've been mayor for nearly 2 years and the thing I've gotten best at is lowering microphones.

Thank you for the eloquence and the passion, and I think I'm going to fall down on the side of passion. I unfortunately or fortunately am an engineer just like Mayor Davis, and so I love details and becoming a wonk when it comes to looking at all the documents that are provided to us. But I want to talk at a different level today.

You know, as -- I am the Mayor of North Augusta, South Carolina. The impact of what the Corps of Engineers is talking about will be devastating to our cities. And this is all for their harbor in Savannah, Georgia, so it can be deepened, and I understand the importance of that.

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You know, the recent simulation was advertised to prove to us that the Corps' alternative would have minimal impact. In fact, the Corps said before it started that we would -- there wouldn't be any noticeable difference really. You know, obviously, that was far from what we saw. That was far from reality.

We saw boat docks sitting on dry land far from the water, riverfront homes purchased with probably life savings now without a river. I find it frightening, quite honestly, to find that the Endangered Species Act is being used to damage our cities and this community.

And this isn't really about the WIIN Act, it's about the Corps of Engineers wanting to get rid of the Lock and Dam. You know, the Corp's finally found a fish to help get it done, even though in the previous 14 years, there was not an effort expended to get the money to help that fish.

Now, SHEP will provide the money, but in my opinion, North Augusta and Augusta

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and you are paying the price. Thank you.
MR. BUNKER: Good afternoon, everyone. I'm Gary Bunker, Chairman of the Aiken County Council. And I've learned every time I follow Mayor Pettit, I have to raise the microphone on these.
I am very honored to be here representing Aiken County, being able to come over to this side of the river in order to work on a project of mutual and common interest here.
I do want to recognize my colleague Chuck Smith, who serves District 4, Aiken County Council, represents the City of North Augusta, and has been also a very strong advocate in regards to the Lock and Dam issue.
I do intend to read into the record the comments, and I'm going to submit a hard copy in regards to this issue.
The recent drawdown of the Savannah River to simulate the implementation of option 2-6d on the New Savannah Bluff Lock and Dam was a real eye-opener. My understanding is that the estimated drop in

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the water surface elevation between the status quo at approximately 114.3 feet to the simulated 112.4 feet for option 2-6d should have totaled 1.9 feet. The observed change was greater than predicted.
Is there an explanation for this discrepancy, and what have we learned about the reliability of these forecasting models?
A small example of what we saw during the drawdown occurred at the Horse Creek Wastewater Treatment Plant in Aiken County. We witnessed foaming conditions at the outfall, which became level with the surface of the pool. This didn't inhibit plant operations, but it is not an optimal solution.
If option 2-6d results in the pool being lowered to this level, then Aiken County taxpayers will foot the bill to lower and extend this outfall structure.
The Aiken County Council has been concerned about the future of the New Savannah Bluff Lock and Dam for nearly 20 years. In the year 2000, it passed a

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resolution requesting that the dam not be closed. It cited the importance of the current pool level for industrial users, water utilities, recreation, and tourism. And nearly 20 years ago, the millions spent by the cities of Augusta and North Augusta on riverfront development were already a concern.
In 2017, the Aiken County Council supported repair and rehabilitation of the dam, including a fish passage to preserve the pool to current level and to mitigate flooding risks in Augusta and North Augusta.
Council thought the primary objectives under the Water Infrastructure Improvements for the Nation, or WIIN, Act included the maintenance of the pool for water supply, recreation, flood control.
And this past January, the Aiken County Council officially endorsed option 1-1 over option 2-6d. This option would best meet the WIIN Act requirement that any mitigation project must maintain the pool at the elevation existing at the date of

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its adoption.
On the other hand, any significant lowering will create operational issues for industry and local government along with aesthetic and recreational issues, putting at risk millions of dollars of investment along the riverfront. North Augusta's Riverfront Village doesn't want to become North Augusta's mudflat village.
And in a further development, the South Carolina General Assembly passed a budgetary proviso prohibiting the South Carolina Department of Health and Environmental Control from assisting any efforts on the New Savannah Bluff Lock and Dam that are inconsistent with the existing water quality and navigability conditions.
The proviso explicitly references the 114-foot elevation, quote, "for the preservation of adequate and sufficient water quality, navigation, water supply, and recreational activities," unquote.
Aiken County favors option 1-1. From what we've seen, the recent drawdown has done nothing to convince us otherwise. If

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this is what option 2-6d looks like, then the Aiken County Council wants nothing to do with it. Thank you very much.

MR. SMITH: Good afternoon. I'm Chuck Smith and I represent District 4, North Augusta, and thousands of people along that river on the side of North Augusta.

This would be a devastation to our community I don't think we know the likes of until it happens. The unintended consequences of letting that river run dry will be economically devastating to this area for many, many, many years to come.

How many times do we have to learn this lesson? In 2000, we let the river run dry again to see what the damage would look like, and it was devastating. The walls started falling inside on each other, our community lost millions of dollars of property damage. How many times do we have to learn it?

We did it again to look at the drawdown. As the Corps said, there's not going to be any damage. The damage was

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tremendous, and if they would've allowed it to go full -- the full test, the damage, I'm sure, would've been just as bad as it was in 2000 when they let it run dry.

The thousands of people that would lose their livelihoods and their investments in that river would be tremendous. We have invested hundreds of millions of dollars in that river, and we're talking about $275,000 of difference after we get -- after we lose the $8 million on the other plan to this option 2.6.

Option 1.1 is the only option. Otherwise, we're going to lose hundreds of millions of dollars over the years to come and the unintended consequences the Corps has no idea of.

So I think this is great that we have everybody together to rally around. The benefits of these communities and what that river means to us. We gotta fight this thing to the -- to the dire end. Thank you.

MR. CAMPBELL: All right. So,

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briefly, what I would like to do is just go over what I like to call some rules of engagement before the comment period.

If you'd like to provide public comments, please completely fill out the sign-in sheets located at each podium to my left and to my right. Please speak into the mic to be heard clearly. We have a court recorder present, and we would like for her to be able to capture everyone's comments accurately.

In an effort to ensure everyone is heard, each person will have no more than three minutes to provide public comment. Please do not interrupt the speaker until their time has expired or they have completed their statement.

To effectively use the time permitted, please consider yielding your opportunity to speak if someone before you has clearly stated your comment.

Please use the forms in the back if you would like to provide written comments, or you can email your comments to mayordavis@augustaga.gov. And last but not

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least, be nice. Y'all have a good evening.

Also, when you come to the mic, please state your first and last name and the address of your residence. Thank you.

First -- first, we'll have a Mr. Todd, Moses Todd.

MR. TODD: Good evening. I've submitted comments to Mayor Davis, but I'll read them for the record.

UNKNOWN SPEAKER: Name and address.

MR. TODD: My name is Moses Todd. My address is 2115 Noland Connector, Augusta, Georgia. And I'm in Representative Allen's district.

So I'm a resident of Georgia who fish the Savannah River. In addition to fishing, we rely on the Savannah River for water pool for drinking water, boating, and recreation use. Georgia industrial -- industry rely on the Savannah River for water for the production of their products. Georgia Power, Southern Company rely on the Savannah River for cooling water for four nuclear reactors.

I am in support of keeping the Lock

and Dam. It's essential to the City of Augusta that the pool level upstream from the Savannah Bluff Lock and Dam be remained at the average current level and the Lock and Dam be repaired and kept as part of the Savannah River infrastructure.

I represent today here 1,000 members of Plumbers and Steamfitters Local 150. If you know anything about plumbers or pipefitters, steamfitters, without water, you know, it's kind of like Mr. Wiedmeier said, the director of our utilities, that water is life and to us as pipefitters and plumbers, water is life. And without that river, without the support of the water for industry, you know, we don't -- we don't have jobs. We're talking about tens of millions, if not hundreds of millions in economical development on that river that we rely on as blue collar workers, you know, for jobs.

So I would like for the Corps to consider that when they're considering cost, that there's costs outside of the hundred-year projection that they give us



and there's -- and they mention a cost, but they didn't mention the revenue. You know, that we understand that there's trust funds, you know, for upstream and for the harbors, and there's funds that's -- revenue that's raised, you know, over this hundred-year period.

So we want them to be fair to consider everything and consider the people as well as the fish in that river. Thank you.

MR. MONTGOMERY: My name is Erick Montgomery. I live at 606 Overland Road in Augusta. I'm also the Executive Director of Historic Augusta, which is located at 415 7th Street.

The New Savannah Bluff Lock and Dam is a historic structure completed in 1937 and has historic significance in both the states of Georgia and South Carolina. The Lock and Dam was determined eligible for listing in the National Register of Historic Places in both 1996 and again in 2001 by the Historic Preservation Division of the Georgia Department of Natural



Resources under provisions of the National Historic Preservation Act.

Brockington and Associates completed an additional assessment in 2013 summarizing the history of the Lock and Dam. This included revealing archival photos and drawings as well as current assessments. I have here with me a copy of the relevant parts of that report.

These determinations and assessments have consistently recommended preservation and rehabilitation of the New Savannah Bluff Lock and Dam, while introducing the required fish passage in a sensitive manner that would not detract from the historic structure in any significant way.

Although the Brockington study was commissioned to only assess the area immediately surrounding the Lock and Dam, we submit that the entire water impoundment that was created by the structure is of historical significance, having been in place well over 50 years, now 82 years, and this -- this would include the entire pool up through downtown Augusta and North



Augusta.

The National Register of Historic Places criteria calls for buildings, sites, structures, objects, and districts to be at least 50 years old, which means the New Savannah Bluff Lock and Dam easily meets the age requirement for the National Register eligibility.

The Georgia State Historic Preservation office has determined that the Lock and Dam is eligible for the National Register under criterion A and C of the National Historic Preservation Act.

Criterion A says that properties that are associated with the events that have made a significant contribution to the broad patterns of our history are eligible. And according to the determination of eligibility, the New Savannah Bluff Lock and Dam meets this threshold because of its association with transportation history due to the locks and the water connection between the upper Savannah River and the Atlantic Ocean.

Under Criterion C is for -- which is

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for properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual destruction.

According to the determination of eligibility, the New Savannah Bluff Lock and Dam meets this threshold because of its design as a significant -- as significant examples of architecture and engineering, as well as various structures associated.

To conclude, we urge the U.S. Army Corps of Engineers to select the option that will preserve the New Savannah Bluff Lock and Dam, rehabilitated in such a way that it can -- that it will continue to maintain the historic pool level that was -- that was -- that existed between Richmond and Aiken counties for over 82 years, and allow that pool to continue to serve the citizens of the United States for the purposes of water supply, industrial

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needs, recreation, and overall quality of life amenities. Thank you very much.

MR. AMIN: Good evening, everyone. My name is Parin Amin. I live at 3641 Foxfire Place, Columbia County, Martinez, Georgia. And I just want to start by addressing some of the things that have been going on here.

I've been to a bunch of these meetings, I've called some of my representatives, and the Army Corps on numerous occasions has told us that the way the WIIN Act is being interpreted at 114.5 feet is not accurate.

There's nothing in the WIIN Act that mentions any specific level that is protected. It says specifically that the uses of the pool are protected, and those uses are water supply, navigation, recreation.

So for those of us that think that the specific level has to be the exact same as it was on that date is just not an accurate interpretation of the WIIN Act.

If any of us here had spent the time

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before this body passed a resolution that said that they were going to go on with what the Save the Pool People wanted, had done their due diligence, they would have seen that that's the way it is.

Now, we have a couple of options here. We don't have to take the Army Corps option, but the option 1-1, when you saw the -- the matrix up there, and they did both score the same, but if you looked at the very first category which said Fish Passage, it was a zero for keeping the Lock and Dam and the one for their alternative.

Now, the fish passage is the number one goal of this project. That's why it's funded. So repairing the Lock and Dam and having a fish passage on one side simply doesn't meet the requirements of the lawsuit that was settled on by numerous parties from both states, South Carolina DNR, Georgia DNR, Savannah Riverkeeper, Ducks Unlimited, and the many other groups that sat down and discussed all these options.

Now, we aren't stuck with the Army

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Corps' only option. There are -- there is another option that's being worked on, but a lot of people haven't heard it. The Savannah Riverkeeper is working on another option, but a lot of us here, and I know 'cause I've seen these faces before, have something against the Savannah Riverkeeper's office.

I don't work for them. I don't volunteer for them. I'm just a regular person who's been following this. Nobody wants to hear her option, which would give us a higher pool, still pass the fish, and still allow for recreation and water supply.

MR. CAMPBELL: Sir, one minute.

MR. PARIN: One minute? Okay.

This option doesn't cost much. I don't know the specifics of it, but it's a modification of the rock weir design, and it would work. And it will also allow us to save the park and have a whitewater park, should we choose to fund that in the future. It doesn't mean we have to do that right now, but we could keep the park and

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not make it a floodplain bench.
So I just wanted to point out there's a lot of information out here that a lot of people aren't -- just aren't willing to go dig down into or find the details about this. And I understand there's going to be some people that want to keep their docks the way they are, but I don't think it's very unfeasible to ask somebody to move their dock to a river that still exists.
As we could see in the pictures, the river didn't dry up and go anywhere. It just moved a couple of feet over.
(Comments from the audience.)
MR. AMIN: I've seen the pictures, y'all. It's okay. It's all right.
UNKNOWN SPEAKER: Dreamer.
UNKNOWN SPEAKER: That picture is my property.
MR. AMIN: Yeah.
UNKNOWN SPEAKER: That picture is my property.
MR. AMIN: That one?
UNKNOWN SPEAKER: I have 5 feet on my dock. I don't have water there if this

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happens; okay? I've invested my life savings. For 15 years, I've invested my life savings. I'm left with nothing. That's my property. Everybody look at that picture. This is my face. I own that property. Explain to me why I should have to move my dock out with a permanent (inaudible).
UNKNOWN SPEAKER: Why did you build in a hundred-year floodplain anyway?
MR. CAMPBELL: Excuse me. Ladies and gentlemen. Ladies and gentlemen. Ladies and gentlemen. Let's collect ourselves. We know this is a passionate and emotional topic. Please limit your comments to three minutes; okay?
Next person that is up is Ashley Holmes.
MS. HOLMES: Hey guys, I'm Ashley Holmes. I was born and raised here in Augusta, Georgia. Grew up fishing on the Savannah River with my father. Have seen an abundance of species throughout that, and my interactions as an undergraduate at Augusta University in ecology, this is my

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background. I've gotten pretty muddy in our area in research and in volunteer work. I have thousands of hours of volunteer work in our area. And that's just my background.
My interests here are to try to unify us as a community, try to engage with -- there are not a lot of people my age and younger who are engaging on this topic right now. I feel like that's a -- that's a travesty because whatever we decide is -- 30, 40, 50 years into the future, folks younger than me are going to be dealing with the ramifications of those decisions. And so that's part of why I'm here.
I'm not particularly good at public speaking. I don't have to do it very often, so bear with me if I kind of get lost in it.
So we need to consider options that benefit our whole community. We're experiencing a strong interest in recreation. That is a growing -- growing economic boom in our area. We have a lot of kayaking companies popping up, fishing,

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tourism, all kinds of stuff that's kind of coming up in our area. We need to consider that. Safe non-motorist boat passage is part of that, so kayakers who would like to maybe go down the full length of the river from maybe up, you know, above Savannah Rapids Pavilion or in there, all the way down past the locks, if they want to, you should be able to do that, and I think that that's something that we can work into, whatever option we decide.
I do want to touch up on, as an ecologist, we have to do the fish passage by law, but it's not just one species we're talking about. Sturgeon is the poster child for this. We have dozens more -- or more of fish species to consider, bass, mullet. We used to have a thriving shad commercial fishery on our Savannah River before we started damming it up. If you guys haven't thought of that, that's something we need to consider.
We want to push for a fish passage, pool level maintenance, safe boat passage, fishing access, park improvement at the

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Lock and Dam park, maybe even whitewater. These are all things that would benefit our community. So I just want to make sure that everyone considers all the options. We don't have to settle for those two. We can come together; okay? Thank you.

MS. SANCKEN: Thank you. I'm not very good at public speaking, but I thank Rick Allen, I thank South Carolina, Mayor, I thank you all for our representatives. I do not live on the river today. I used to live on the river. I am at the River Club.

UNKNOWN SPEAKER: Name and address.

MS. SANCKEN: Joyce A. Sancken. 373 East Shoreline Drive.

This river, to keep it as high as it is, is so important. We don't -- I don't really care about these fish; okay? Fish is one thing. People, their livelihood, you know, their lives, they -- they've worked all their lives to be and to own this property and I don't agree with the riverkeepers. Thank you.

MS. HANNER: Hello, I'm Susan Hanner. I live at 1315 Waters Edge Drive. I do

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live on the river, and as we were discussing the drawdown with the Savannah -- well, I guess he's really the Corps of Engineers Representative, he gave us the information that they took the boat and they measured at each one of these docks, and at our dock, it was 2 feet lower than what they had said. Exactly what fell into their plan. However, we were 6 feet of dry land before we got to our dock, only because we have a long catwalk.

So I don't feel comfortable with the measurements that they've given us, but regardless, if it's going to happen, it's going to happen. I'll do everything I can to keep it from happening.

The things that I think that are most important is that the tourism in Augusta will be significantly impacted by a riverwalk that does not have an adjacent river.

The other -- the other areas that I think are important is the health issues with pest control. If you take the water away, we're going to have nothing but

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mosquitos.

And recreation, regardless of what you say, we try to put everybody in this much water instead of this much water, it's going to -- it will diminish.

I do believe that we can repair the locks for navigation, not just for people who live on the river, but also for people maybe in Savannah, people want to come up this way. I think it would be a good idea to have the locks repaired and the dam rehabilitated. Thank you.

MR. HANNER: Hi, I'm Alfred Hanner. I too live at 1315 Waters Edge Drive in Augusta. And for me, it's a question of what's right. What solution allows everything to happen?

With option 2-6, how does the Corps of Engineers believe that the same level of recreation and economic activity will be maintained with almost no water running down the middle of the Savannah, with substantial number of docks sitting on the ground, with no room to pass boats going through the navigable channels.

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The pool level is critical, critical for the economic viability of downtown areas, both North Augusta and Augusta, as well as for the entire CSRA. River activities such as the Rowing Regattas, the Ironmen bring in millions of dollars into our economic sear. Thus, the solution to maintain the current pool is critical. It's just common sense to keep the economic development viable within our region.

Option 1.1 may be slightly more expensive to build, and a big portion of the cost is the O&M cost long term, so we'll have to cover those later on in life. But how can we trust the assessments of the Corps of Engineers when they say they're going to draw the river down and it's not going to affect anything and those of us who saw the river go, so this is nothing. It was an unmitigated disaster, with extensive property damage, recreational damage.

So the question I ask is, what is the solution that allows the deepening of the Savannah Harbor, which is a viable economic

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need, and maintaining our economic development within the region of Augusta and the CSRA? There has to be a solution. Both are viable, both are critical, and both need to be addressed. Thank you.

MR. SYMMS: Hello. Andrew Symms, Andrew Fitz-Symms, Augusta, Georgia. Born and raised in National Hills. Currently reside at 1128 Magnolia Drive.

I live, train, and fish in the Savannah River. I was a Marine from 1990 to '98. I became an Ironman last year. And I'll tell you this, I had no idea -- and I'm ashamed of this fact. Born and raised in National Hills right across the street from the Augusta National, of course, I am very much aware of what our number one economic impact is, the first full week in April.

The second largest impact to the CSRA is Augusta Half Ironman, last year at an estimated $4.8 million. I do not believe that Ironman will sign another contract. I believe we have two more years on the contract. 2000 -- 2020, they -- they're

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gone.

And Parin, to address your -- your level comment, the WIIN Act does actually state in black and white that the pool will be maintained at the level that the WIIN Act was signed into law, December 16th, 2016. It does. It actually does. It actually does.

(Comments from the audience.)

MR. CAMPBELL: Ladies and gentlemen, if you can focus your comments to the public, not to each other; okay? Thank you.

MR. SYMMS: And I'd like to end in -- in this. We, in years past and growing up here in Augusta, we -- unfortunately, I believe we were two separate communities. We were Augusta, North Augusta, Georgia, South Carolina.

I've got many friends and many family members that live across the river, and I am so very, very proud of the two communities and the fact that we have come -- been able to come together in our two governments, and I am very, very

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pleased, and I thank y'all very, very much.

MR. GREENBAUM: Ladies and gentlemen, elected officials, I too must praise the governments of North Augusta and Augusta for coming together --

MR. CAMPBELL: Sir, can you give your name and address, please?

MR. GREENBAUM: Oh, I'm sorry. Lowell Greenbaum, 1343 Waters Edge Drive.

Gloria and I have been involved in this situation way back since 2000. At that time, we also were threatened by the Corps of Engineers, and Gloria and I organized SOS, Save Our Savannah. We had people from both South Carolina -- over a hundred people together from South Carolina and from Augusta.

Gloria and I went to Washington and spoke with Charlie Norwood at the time and the current senator from South Carolina. They were impressed, especially when we held up the hundred people who had signed on the SOS petition.

They went to President Clinton, who approved it, and it was sent to Congress,

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where it died. Appropriation was not submitted to the Congress for the fix of the Lock and Dam.

So what is very important is the legislation and our legislators, who we saw here today together, and who must pound on the -- on the rostrum that they have to get funds to fix the Lock and Dam from the Congress. Thank you.

MR. GARDINER: Good evening, ladies and gentlemen. My name is Thomas Gardiner, 2837 Tobacco Road.

Now, I moved to Augusta whenever I was stationed here with the United States Marine Corps at Fort Gordon, and I stayed here. I'm not a South Carolina or an Augusta native, but I stayed here. I lived in South Carolina for a number of years and I moved across here. And I would like to address a couple of things first.

Our economic viability is something that keeps coming up. And we mentioned -- we heard mentioned earlier something about the -- the Ironman, the Half Ironman that comes here; right? So whenever that

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drawdown happened, it didn't affect actually any of the channels that they use. Didn't affect any of them.

Our economic viability for folks and any of our businesses along the river, they don't depend on the few docks that happen to be dropped down; right? Our economic viability is so much more than that. It is so much more than that.

There are options on the table other than 1.1 that could help boost our economic viability. It could help bring tourism and help bring other dollars into the state from other regions and other places all the way around.

Now, the Army Corps of Engineers, who many of you don't like, and I hate to be the bearer of bad news for many of you, but they posted on a post on their website this week that 1.1 was no longer a viable option for them. Was no longer a viable option.

So all of these arguments about 1.1 are really just blowing against the wind. That is out. We need to take a look at some of these other options that are on the

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table.

Now, this started as a conversation about whether we could start and have a fish passage for endangered species. And I've heard several people say they don't care about fish. You don't care about some fish. Well, guess what, we eat fish. We need wildlife to live. We need those things to sustain our own viability.

And if we don't do what we need to do to protect what we have and what our resources are, then how are we going to survive and sustain ourselves; right? That's -- that's a big part of it.

So some people here are fighting for 1930's technology that is designed to serve 1930's purposes. This community is growing and it is getting younger and we are bringing people here for cyber and for other issues that are 21st century issues, and it's time that we take a look at other options and that we develop technology and take advantage of the river for 21st century purposes, not 1930's purposes. Thank you.

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MR. LASHER: Good evening. Thank you for taking the time to hear me. I --

UNKNOWN SPEAKER: Name -- name and address, please.

MR. LASHER: My name is Lawrence Lasher. I'm at 746 Riverfront Drive, which is Goodale Landing, which isn't on the river. You've probably heard of it. And, also, I am a member of the Augusta Rowing Club, have been for years, so I have some interest in the river.

Before I start, I do just want to say one thing. You know, we heard about Save Our Savannah. Thought that was -- I didn't know about that, but almost 30 years ago, there was another saying. Anybody recognize that? Archibald Butt, 15th Street Bridge? Well, this is ours now, Raise Our River or Save Our Savannah.

We need to get behind our legislators, our people in office that can -- that can help push this forward. And we, as citizens, need to -- need to be involved in this.

I called -- is it Lauren; right?

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She's in D.C. I called Allen's office. And she listened to me for probably 30 minutes rambling on about different things. She said it's important for us to call our constituents -- I mean, the people that represent us, so...

So I had a little something here written up and it says -- it says, in our previous meeting with the U.S. Corps of Engineers, I talked with Colonel Daniel Hibner and his related managers, engineers, and specialists, and it was related to me that the only way they would switch from the rock weir to the dam, with a fish passage, would be if there is a significant human impact from the weir due to an effect from one or more of the following effects on the environment.

So, in other words, the only way they're going to switch from the weir to -- to what we want, where we can raise our water pool level, was some -- an effect on the human environment, and he listed the water supply, he listed the navigation, he listed recreation.

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And just me personally being involved with the Augusta Rowing Association, we hold the -- you know, they mentioned about the triathlon. Well, ours, I think, generates the fourth most amount. It's an event here. We have a regatta, and that comes once a year.

The -- if we have this drawdown, it's going to narrow the passage to where if -- we won't be able to sufficiently or safely have our regatta. We would probably have to move it down river where it is wider, but then the people that come to see it, over thousands of people come to see it, they -- they wouldn't be able to observe it, so there -- that would be not adequate.

There's other recreation impacts, kayaking along the Savannah River, the powerboat races. We mentioned the triathlon. These are one of those three things, recreation, that are being affected, and I wanted to submit that to be submitted to the Corps. Thank you.

MAYOR DAVIS: All right. I'm going to ask, before that individual comes, I

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have a very good friend in the room, our representative from across the river, Representative Bill Hixon, I want to ask him to come and give some comments.

MR. HIXON: Thank y'all. Yeah, I am Bill Hixon. I have House District 83 in Edgefield and Aiken County. I represent all of North Augusta.

That was my proviso that I put in the South Carolina budget, along with the rest of the Aiken County delegation. I can tell you, South Carolina, I'm proud of them, what we're trying to do over there. We have some other ideas that I will let you know later, but we have some other ideas that we're working on.

I'm proud of North Augusta and I'm proud of Augusta, and it's been said before, I think this is one of the greatest times we had to work together, with North Augusta and Augusta. And I'm proud of you, Mayor Hardy and Mayor Pettit, and all of the people in Aiken County and Edgefield County and Richmond County and Columbia County, what we're trying to do.

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My main goal is to keep South Carolina's riverfront, not South Carolina's creek front, and I want to keep Augusta's riverfront, not Augusta's creek front. So we have some more stuff that we'll be doing in South Carolina. I'm not at liberty to say, but our Attorney General and our Governor is dead on it.

And we have a meeting tomorrow with some high-powered folks coming from Washington, and so we will be -- we're working on it in South Carolina.

And, Georgia, I appreciate what y'all are doing, too. And thank you very much. Thanks.

MR. BRAUN: My name is Erich Braun. I live at One 7th Street, Unit Number 1203, which is the pink building, as everybody refers to it. My wife and I have been there two years. Prior to that, we lived at Waters Edge for 12 years. We're transplants from Florida. We've been here a total of 15 years, and I've never ever had such a desire to get involved as I have after hearing and reading and conflicting

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and not knowing who to believe, what to believe, looking at convenient numbers that I -- I just can't trust.

And I'd really like to ask our officials if they could get grassroots with us and tell us what we can do. Can we write, can we email? Sure we can. But I would ask everybody in here, who has emailed or written on this subject to somebody in our elected officials?

Great. I've gotta tell you, I haven't yet, but this motivates me to think that we really can make a difference. And guys, we thank you very much. Just lead us and tell us what we need to do.

MR. ARNOLD: Hello. My name is Steve Arnold. I live 316 Cherokee Drive, North Augusta. I don't have property on the river, but I do own property, I'm a taxpayer, so I have an interest in it.

Many of y'all enjoy the river, just being on the surface, fishing, swimming. Mine's a little different. I'm on the Richmond County Dive Team. I SCUBA dive on the river for over 20 years now. I'm the

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one that's at the bottom of the river waving at y'all when you pass by. It's not an alligator, it's me.

I get called out there to help out with a lot of different things, the Ironman race, the Rowing Regatta. Quite frankly, I'll be very blunt, I don't give a damn about the stupid fish. There's a lot of others out there.

Also, too, whatever we need to do, the river needs to stay at its full pool. Yeah, the -- if we lower the river, the Ironman course will still be the same, but the support boats that are out there for safety and security, they won't be able to get out there. And this is not just a little race, this is the second largest Ironman race in the world, and every year, it gets bigger because it's that good.

Same with the Rowing Regatta. The passage will be smaller, so the boats that are out there, like mine, for safety and backup, we won't be able to get out there. It'll be a narrow pool. And that's going to be more millions lost every year.

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Thing is, though, I'm at the bottom of this river. I go out there recreationally. I look for stuff people have lost. We go digging for old bottles and things, and there's a lot of things in that river that y'all don't know about that if we lower it down, it's going to make the river even more impassable.

Now, something else, too. There's several boat ramps out there. There's a boat ramp at 5th Street Marina, Riverfront Drive, the warehouse facility, Waters Edge, North Augusta. Practically every boat ramp is going to be unusable; okay? They're going to have to be extended. Who do you think's going to foot bill for that? You know it's not going to be the Corps. That's going to fall on taxpayers, both in Georgia and Carolina.

Now, along with that -- excuse me -- when they lowered the river back in 2000, it damaged the wall at Water -- at Goodale Landing. At that point, the Corps said, well, we gave people ample opportunity to move any property that was going to be

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damaged. Someone asked the Corps, said, how are you going to move the jetty wall? They said, that's your problem, not ours.

This last time when they lowered it, they said the wall was not properly designed, which is why it was damaged. I can promise you any property that is damaged, destroyed, or left unusable, the Corps will find an excuse to not pay for it. It's going to fall on everybody else.

So whatever we need to do, that river needs to stay at the level it is. Thank y'all.

MR. PENIX: David Penix, 724 Greene Street, Apartment 1415 in the downtown. I'm a Clemson graduate. I have 12 courses completed to get me a designation in commercial marketing, commercial real estate. I come to you from that perspective.

The annual visitor's and convention's income for the year for Augusta is something like $400 million. Folks, you're going to negatively impact that if you don't keep the Lock and Dam. Homes --

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homes on the river from 5th Street up to the rock where you can walk across the river, I'd estimate over $100 million. That's a lot of power. Maybe another 50 million on the -- on the Georgia side, same distance. That gives it a lot of power. Those people are not going to give up on the river level.

The present Lock and Dam, you know, we used to put boats in the -- in the locks and lower the level and let them out the bottom level. Why can't we leave the bottom level docks open and set up a program to attract the fish and take the water level up and let them go at the higher level? Save 25-, $30 million on a -- on a rock passage, period.

But that is a program to let the fish come upstream. And an ongoing program could be maintained continually to justify getting rid of the -- or to justify the rock weir.

Maybe $150 million a year, recreation use and what have you and -- and associated with -- with the use of the river and its

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attachments or its relationship to the annual visitation, parts of that 400 million.

That's it, folks. I just -- I come at it from a commercial market standpoint, and money is very important to us, and that river level up where it should be, a hundred -- it's a hundred -- it's 16 feet now. I went by and looked at it a little while ago. Is a main item in that equation of success and continued economic viability for Augusta.

MR. WILLIFORD: Hey, y'all. I'm Josh Williford. I live in -- I live at 65 Century Circle, Greenville, South Carolina, and I've been following this for quite a while as well. I'm a river user, I'm a kayaker, fisherman, river guide up on the Chattooga.

And, initially, when I heard about all this, tell you the truth, I didn't care much about it. I'm not a big fan of dams. I actually studied them quite a bit, hydrology, environmental science, that type of stuff. But the more I learned about how

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it affected people around here and how much y'all care about it, I started reading more about this specific structure, and I definitely support the rock weir, although I think that there's definitely ways to make it taller so that the level could be raised.

Like, if you look at certain hydroelectric structures, they've got sluiceways, where big flood comes, you can let it out the gates through the bottom or through the sides around the dam. So the rock weir doesn't have to be several feet lower to accommodate big floods. It could still be at the same -- relatively the same height and allow more flows to come through, because, believe me, I think some of y'all know the river does flood.

And if you study dam failures from the past, pretty much all of them happen because of situations where people did nothing, and that was driven by greed or a lack of interest, and environmentalism wasn't even a part of that conversation.

So I definitely support fish passage.

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The reason why you don't see them is 'cause they're in danger, and we do depend on them, even if we don't all know why.

So I support a compromise. I support the City working with the Corps and figuring out a way that they can make a taller rock weir so that everybody can be happy and move on, right, 'cause this thing is definitely a bullet train headed for your town. And the City is going to lose money either way. Whether you do plan one or plan two, it's going to lose money, but at the very least, you can salvage what's -- what's salvageable and do the right thing. Thank you.

MR. STEPHENS: My name's Bucky Stephens. I live at 820 Riverfront Drive. Thank you, gentlemen.

I don't know if anybody saw what actually happened when the drawdown just happened. It looks like we had earthquakes around our seawall. I don't think anybody put that on TV. Channel 12 did.

But we need people to pay attention to what property's being damaged, and

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that's some serious accolades there. I mean, the seawall, it was given to us, but now it's hanging out 3 feet. The Corps' not going to come back and fix it. What's going to happen?

There's some serious property damage. I don't believe there's been fish up the river since '37, has it? I think they survived quite well since then, hadn't they? Thank you.

MR. JIMENEZ: Hello. My name is Jorge Jimenez. I own 435 Telfair Street in Augusta. I've been here 55 years.

I'm concerned about a lot of the same things you're concerned, and I don't want to repeat what everybody else has said, but at the meeting that the Corps had, they let us know that the only way that the Corps could proceed meant that they were -- I mean, they are obliged to choose the alternative with the highest probability of meeting the goal of passing the sturgeon species above New Savannah Lock and Dam. That is the purpose, the only purpose, really, that counts.

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Now, I -- I have some background in this stuff. Since 1978, I've been working in the Augusta area in the Savannah River being the FERC liaison for Augusta in their pursuit of a license, working in the canal, and we have to do the in-stream fish. IFIM is the initials. And we know that if the fish come up, then they'll have a place to spawn, if the surgeon come up.

The question, though, is, how do you get that done? And the only real way to do it is to get rid of the dam altogether. They've been after that for 20 some years. Unfortunately, that causes a lot of pain.

Now, it would seem that a solution with the highest probability -- one minute?

MR. CAMPBELL: Yes, sir.

MR. JIMENEZ: Oh, man, that's bad.

A solution should necessarily have succeeded somewhere. Their solution hasn't succeeded anywhere. Zero fish have passed that rock dam at Cape Fear. Even the striped bass won't pass it. You know they move pretty good, so -- and then the only other thing I have to say is this, but I

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know I'm out of time, but, you know, I'm Cuban. I don't understand how the Riverkeeper got standing to file a suit against the Georgia Ports Authority and Augusta doesn't have standing to file a suit against the Corps of Engineers.

MR. NIXON: Well, I'm a returnee to Richmond County. I've been gone for 50 years in -- in that city called Atlanta for 46. My name's Hudson Nixon. I live at 2349 Williams Street in Augusta and a proud member of the community since the end of October.

And Mayor Davis, I -- and Mayor Pettit, I'd like to thank y'all for your interest in helping save the Lock and Dam.

I'm a financial person by background, and I looked at the -- I've been told, for all the family members that are interested in what's going on here today, that the estimates have sort of gone all over the board for repairing the dam -- I mean, the -- well, the Lock and Dam and possibly making a fish ladder out of part of it. And I recall something like a $60 million

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number and now I see a $380 million number.

Mayor, when was this building that we're in right now built, around late '50s, early '60s?

MAYOR DAVIS: Around '68.

MR. NIXON: Did they -- when they budgeted to build this building, did they allocate the money, you think, for how much was spent on redoing this building recently? About 70?

MAYOR DAVIS: No. About 32.

MR. NIXON: 32? Okay.

Back in 1960, if you'd put $32 million on the game plan for, what, 60 years, you wouldn't have built this building. So I don't know where the rationale is coming from.

I have heard a lot of people talk about recreation, aesthetics, and so forth. The one thing -- and I understand you can't just have the government pay for repair and replacement of things. You can do it for the fish, but you can't do it for the people.

And you -- you also -- but if

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something that is for the people is supposedly -- well, what about a flood? And just 'cause we have Clark Hill doesn't mean you can -- what about the development of the waterfront of -- oh, both sides of the river.

Anyway, I just -- I'm a concerned citizen and I just wanted to say my peace. Thank you.

MR. SCHAEFER: Thank you, Mayor Davis, for this opportunity. Good evening, everybody. I'm Keith Schaefer. I live at 712 Riverfront Drive. I represent 48 owners and the board of directors of the Goodale Landing Homeowners Association. We have personal experience with the Corps, as is in our pocketbooks.

We have owners that have had to spend upwards of $10,000 on their homes to have the cracks that were done from the last drawdown repaired. Some of them still haven't been repaired.

We object to everything the Corps is doing with this. They don't want the Lock and Dam. That's been very clear. We'd

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like it replaced or rebuilt. We'd like the lock working. We'd like a fish lift or a fish ladder. They can make all this happen if they choose to, but they chose not to because they don't like the Lock and Dam. They don't want to be bothered by it.

We'd like it because they can use it for flood control. They've admitted they use it for flood control now. Their rock pile that they want to put across the river does not provide for flood control. It also takes a huge section of the New Savannah Bluff Lock and Dam park, which is a beautiful park, needs to be improved.

We're in favor of maximizing the City of Augusta's opportunity at the Lock and Dam, whether it's rebuilt, replaced, but we need flood control, we need fish migration, and there are lots of ways. The Corps is aware of them. They've only chosen one. There are many more other than that. We are hopeful that we could have power generation from that dam. It's set up right now for power generation.

The Corps has in their plans

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apparently, as the last speaker said, added the cost of replacing the dam in 50 years to their figures. Well, if that's true, I'm very nervous about Thurmond. I mean, that's coming up on 50 now. Are they going to replace that? So if it's not good for 50 years, we're in kind of a problem with the Corps.

So Goodale Landing owners who have had to personally pay for the Corps' irresponsible drawdown of the river back 15 years ago, we don't want to see it happen again. We want the pool raised, and we'd like the Corps to do what this community would like to see done, which is maximize our beautiful riverfront. Thank you very much.

MR. GRIFFIN: I'm Griff Griffin. I live it Riverwood Manor on Greene Street. I'm your former National Guard Combat Engineer Nominee of the Year. I'm your current crime stopper who set a record of lowering crime from 2010 to 2015. I recommend you conveying grand juries to look into this matter because of all the

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tax money that is being used that looks very much like a bribe.

I sit on the river all the time, and we have seen seismic activity break out each time we dropped our river. The last time we dropped our river, a fire truck fell into a sinkhole, a Harley fell into a sinkhole, a lady in a car fell into a sinkhole. You're going to suffer sinkholes all through your city. Some of your building foundations are going to split. You are going to have chasms open all over your city.

Right now, you have a water table. If you want to see your work table, go to the river, look at the river. That's your water table. That water table goes out in a straight line -- right, Tom -- all the way from here to Hephzibah, all the way up through the region, everywhere.

When we drop our water table, we drop the hydraulic supports that are in the chambers below the ground, and those chambers will fall in again.

We can use locks right now. For 80

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years, the locks have passed all of the up-river migratory fish that I'm aware of. And the Coast Guard, other people have studied these migratory fish, and they have been documented as coming through the Lock and Dam.

Let's use the Lock and Dam. There's a washout down river in a down river wall. You give me my National Guard unit back with my equipment and I'll have you fixed up so fast your head will swim.

I'm a National Guard combat engineer and I'm here to make it happen; okay? Use the locks. The fish will spawn. SHEP will finish. Bring billions many years earlier, this is a no-brainer. Thank you for your time.

MS. WILHELMI: My name is Marcie Wilhelmi and I live at 2928 Bransford Road in Augusta, nowhere near the river. My perspective is as so many others are here different than others. I have worked on economic development, different projects around our city for four decades. I can assure you everything was focused around

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our river.
And so we now have two amphitheaters between two cities. We have two states working together. What a novel idea. And while I'm not as up on the particulars, I happen -- I know Mr. Robertson leading the charge will do a fine job, Mr. Wiedmeier and all the others involved.
I think I agree with the speaker that said first order of business is call and call and call and call, two state senators, your local representatives, both sides of the river, the two mayors, and anybody else you can think of. It's worth an hour and a half of your lifespan, because we have got hundreds of millions of dollars, and future generations just discovering this river for the first time.
It is a crime to think we have a bunch of bureaucrats and not unforeseen fish knocking us out of the saddle. Clearly, Washington has lost their damn mind. And the day when bureaucrats can't listen to Congressman, the only way that's ever going to change is if people will get

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serious about it, start blasting them out of their socks.
It's worked before. I remember when Doug Barnard went to have the locks -- the pieces in the levy so that we could develop Riverwalk. That's 40 years ago, 35 for sure. But it took a hell of a lot of people hammering on them.
And so for all of you sitting here, for all future generations, if you give a damn about kids, you want to keep them home, if we want to see everything this community is pouring into cyber, we need to preserve our river. So everybody, knock them dead.
MR. CAMPBELL: Ladies and gentlemen, the sign-up list is now closed. Next will be Stephen Schroeder.
MS. BALL: Hello, everyone. Thank you for your time today. Representatives, thank you both so much for your time. My name is Melinda Ball and I live at 165 River North Drive.
My reason for coming tonight is because I am concerned about our river and

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we need to save our river park -- river pool. My concern is for my family sitting right over there, my daughter Melanie and my husband Landon Ball.
Melanie is my reason for being here. I'm concerned for her and for her future. And for her future, we need to have a river, we need to have a river pool, because our cities depend on it.
I am a meteorologist. I can predict the weather. We cannot make the weather, but I can tell you that if we put this rock weir in, we are not going to have any way of controlling our river level.
I have sat and watched it pour down rain, and I have sat and watched that river rise because of all the -- more rainfall that has fall across the -- fallen, excuse me, across the region, and we need some way of controlling our floodplain and controlling our river levels. And that is one of the reasons why we have a dam there in the first place.
So damn those damn fish. Forget the fish. God put us humans at the top of the

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food chain for a reason, and there is no reason why we should put the fish above our needs. Thank you very much.
MR. CAMPBELL: We have two more names remaining.
MR. SCHROEDER: Good evening. My name's Steve Schroeder. I live at 75 Alberclauss Drive right there on the river. So I just recently moved down to the river and one of the reasons, 'cause it's very beautiful.
And there's several comments that have been said, and I'm trying not to repeat any of them, but, you know, even if the Corps of Engineers decides to compensate for damages or for lost property value, let's just say they do, who cares? We want to live down on the river and we come there for the view, not to see a stream; okay?
And the gentleman right there, I do not understand why they just can't raise the elevation of this new damn. Why does it have to drop the water? And on top of that, property value. Property value will

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drop. And what does that mean? Tax base goes down. There will be less taxes going into Augusta, less taxes going in North Augusta. And we have to look at that cost; okay? It goes beyond just all the damages and everything else.

Flood control, I mean, what do we do for flood control then? It's kind of like when you get the economy going and you -- and keep on dropping the -- the interest rates, you can only drop them so far. And if that economy crashes on you, then you have nothing to do. So that's the same thing with this new dam proposal.

And then the last thing is is the website with the Corps of Engineers. I read that plan. A third grader could have came up with a better plan than that. It's like, here's a Google map, here's the old -- the current dam, and we're going to put a new dam there.

They have no detail what it looks like, what the flow is going to be. I am completely clueless of what they're going to do. And if they didn't -- if they were

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more upfront and more clear what they want to do, I think there would be a little bit less resistance, maybe a little bit more input from the public, but they've kind of done it to themselves. Thank you.

MR. DONOHUE: I'm Steve Donohue. I live at 316 East Shoreline Drive, North Augusta. Excuse me. Thank you, Mayor Davis, for putting this on.

Who's missing here? They're not here. Almost feel like we're spinning our wheels, although I appreciate what the Mayor did.

Colonel Hibner, don't come back here again unless you're willing to listen to all of us. Don't come back.

In my prior life, I used to be a lobbyist, I hate to admit it, and I know how the sausage is made, so here's how the fix went in. The Corps of Engineers for a long time doesn't want that Bluff and Dam, they don't want it, and they didn't want to repair it, so they had an opportunity to kill two birds with one stone.

They want to deepen the Savannah

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Harbor. I got an idea. Let's justify it on bringing the sturgeon up 180 miles back to Augusta and we'll rip down the dam so we can make a fish passage.

I want you to think about it. If you were concerned about sturgeon -- I am, by the way. I'm concerned about it. I guess it's endangered. Would you make them swim 180 -- I don't care if they were here 80 years ago. By the way, most of them have died. They don't remember where they were born. Would you bring them 180 miles, alligators, birds of prey, and all the other things, looking for the rope?

You know, think about it, being a male sturgeon. It's about time to spawn. Hey, honey, you want to go 180 miles? There's about 10 miles up the river and would work pretty good for me.

Think about that. If you're concerned about the sturgeon, put them at less risk. Come up 10 miles, 15 miles. That's A.

B, Augusta, Georgia, is the second largest city in Georgia, and they're making

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the deepening of the Savannah Harbor -- they're putting it on the backs of everybody in this room and people in North Augusta.

And I'm calling on Senator Isakson, Senator Perdue, Lindsay Graham, Tim Scott, Joe Wilson, who was here earlier. The law got by y'all. Corps put the fix in, 'cause now they say, that's what the law requires. You know, the fix is in.

You know, how do you want to die? You want poison, a noose, a gun? The premise is, oh, do I have to die? So the premise is wrong. They put it into the law and now they stand before you and say, that's what the law requires, that it all happened right here.

It's wrong and the only thing they're going to listen to is a lawsuit; okay? The riverkeeper filed one, they settled it for $99 million, to oxygenate the harbor in Savannah. $99 million would've gone a long way up here; okay? That money is probably now exhausted.

The only thing they're going to

listen to is a lawsuit. You're going to have to sue them for violating the National Environmental Policy Act or something else. They're not going to listen to anybody else unless you file a lawsuit, like the riverkeeper did. They got their 99 million. We should get ours. Thank you very much.

MR. CAMPBELL: Ladies and gentlemen, we'll have closing remarks by Ms. Janice Jackson, our City Administrator.

MS. JACKSON: Just briefly, we just want to thank everyone for coming out, particularly those of you who have stayed for the entire time to listen to the comments of your neighbors. We also appreciate, obviously, the opportunity to exercise our right to free speech. So we appreciate all of you being here.

There are a couple of next steps that we want to make you aware of. First, we have engaged a technical team comprised of Tom Wiedmeier, our utilities director, who you heard from earlier; Tom Robertson, local engineer who you also heard from



earlier; as well as a firm that specializes in water resources management. That team will advise our elected officials in terms of what the possibilities are for us in our next steps. We expect to have their report back on April 10th.

The end of the comment period, as was referenced earlier, for the Corps of Engineers is April 16th, so we'll have our comments -- our technical team will have comments prepared for submission during that period as well.

With that, I think we are closing out. If there's anything else you all would like to say, we appreciate again hearing from you, and we'll continue to try to represent your interests as best we can.

[Meeting concluded at 7:00 p.m.]

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C E R T I F I C A T E

E OF GEORGIA:
TY OF RICHMOND:

I hereby certify that the foregoing proceedings were taken down, as stated in the caption, and reduced to typewriting under my direction, and that the foregoing pages 1 through 86 represent a true, complete, and correct transcript of said proceedings.

This, the 9th day of April, 2019.

BRITTANY N. DRAPER, CCR, CVR

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# Appendix J
# Aiken Standard News Article, February 19, 2019

TOP STORY

# CSRA officials react to Savannah River drawdown

## Aiken County, North Augusta and Augusta differ from Army Corps' suggestion

By Lindsey Hodges lhodges@aikenstandard.com Feb 19, 2019

This photo taken Feb. 13, shows the river levels near River North in North Augusta during the Savannah River drawdown.

Submitted photo

**U.S. Army Corps of Engineers extends comment period for the Lock and Dam project**

Those wishing to send comments to the U.S. Army Corps of Engineers about the future of the New Savannah Bluff Lock and Dam will now have an ex...

**North Augusta City Council to again discuss new public safety facilities**

The future of the North Augusta Department of Public Safety will again be the topic of discussion during City Council's study session Monday.

The Savannah District of the U.S. Army Corps of Engineers held a drawdown simulation of the Savannah River last week demonstrating their preferred alternative for the Savannah Harbor Expansion Project fish passage project and received a lot of backlash for the effects it had on the river level.

Under the Water Infrastructure Improvements for the Nation (WIIN) Act, the Corps is required to provide fish passage for endangered species, specifically the shortnose sturgeon. The WIIN Act also deauthorized the New Savannah Bluff Lock and Dam.

The simulation showed the level the river pool would be under the Corps' preferred alternative, Alternative 2-6d, or a fixed rock weir with a dry floodplain bench on the Georgia side of the river.



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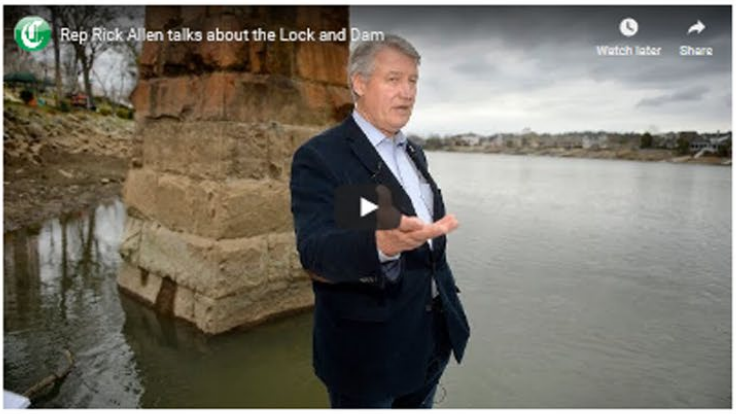
# APPENDIX K
# Augusta Chronicle News Article, February 16, 2019

# Cost differences in options for lock and dam project questioned




By Tom Corwin
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Posted Feb 16, 2019 at 9:57 PM
Updated Feb 16, 2019 at 10:06 PM

A draft report from the Savannah District of the U.S. Army Corps of Engineers shows a significantly higher price for its preferred alternative for New Savannah Bluff Lock and Dam and the plan favored by local communities to save it and maintain a higher pool of water in the Savannah River. Local leaders are discussing ways they could pay for it if needed.

A draft report was posted Friday but was removed after questions were raised by The Augusta Chronicle about some of the significant differences in costs attached to analyses of the options studied, as well as some apparently missing information. Corps district spokesman Russell Wicke said the report was accidentally posted incomplete and would be reposted once the missing information was added. It was back up by Friday night.

Also on Friday night, the Corps decided to bring an early end to its simulation of conditions that would exist under its preferred option – with a much lower pool of water in the river – after finding a bank potentially crumbling in the Goodale Landing area of east Augusta. It said water levels should return to normal by Sunday.

The Corps' preferred plan is to remove the lock and dam and build a 500-foot rock weir at the site of the current dam to allow endangered shortnose and Atlantic surgeon to pass through on their way to historic spawning grounds in the Augusta shoals. It would also mean a significant flood plain that would pass through the current Lock and Dam Park, allowing high flows to pass around the structure.

The river level would drop about three feet at the lock and dam and just under two feet at the Fifth Street Bridge but would be maintained for water supply and recreation, as required by federal law. The cost in that draft report would initially be more than $87 million and, with an annual operation and maintenance cost of $45,000 over the 100-year life of the plan, would exceed $91 million.