

CHATTAHOOCHEE RIVER RESTORATION: REMOVAL OF CITY MILLS AND EAGLE AND PHENIX DAMS

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Abstract. The proposed aquatic ecosystem restoration project consists of breaching the Eagle and Phenix Dam (450 foot breach width) and the City Mills Dam (350 foot breach width) to restore a total of approximately 2.3 miles of the Chattahoochee River to an unimpounded condition. The Eagle and Phenix Dam and the City Mills Dam are located in Muscogee County, Georgia, and Russell County, Alabama, on the Chattahoochee River in the cities of Columbus, Georgia and Phenix City, Alabama. The proposed project reach on the Chattahoochee River extends from the tailwater area below the Eagle and Phenix Dam upstream to tailwater of the North Highlands Dam. This project is being developed under the U.S. Army Corps of Engineers Section 206 Environmental Restoration Program, by the Mobile District, along with the non-federal sponsor cities of Columbus, Georgia and Phenix City, Alabama.

INTRODUCTION

A significant amount of the Fall Line shoal riverine aquatic habitat in the southeastern United States has been impounded, some for almost two centuries. Figures 1 and 2 show the City Mills and Eagle and Phenix Dams, respectively. The objective of this Corps project is to breach these two dams in order to restore portions of the Fall Line shoal habitat. The Fall Line is a surface expression of underlying metamorphic rocks, representing the transitional zone between the Piedmont and Coastal Plain Physiographic Provinces. The Fall Line is expressed at the surface by underlying metamorphic rocks, getting its name from the relatively steep gradient the river assumes as it moves through this transitional zone. Unaltered rivers and streams traversing this physiographic feature are characterized by extensive areas of metamorphic rock outcroppings and are dominated by rapids, short pools, and occasional waterfalls. Figure 3 shows the location of the narrow Fall Line band in the southeastern United States. The Fall Line can also be clearly seen as the steep slope on the elevation profile of the Chattahoochee and Apalachicola Rivers on Figure 4.



Figure 1. City Mills Dam.

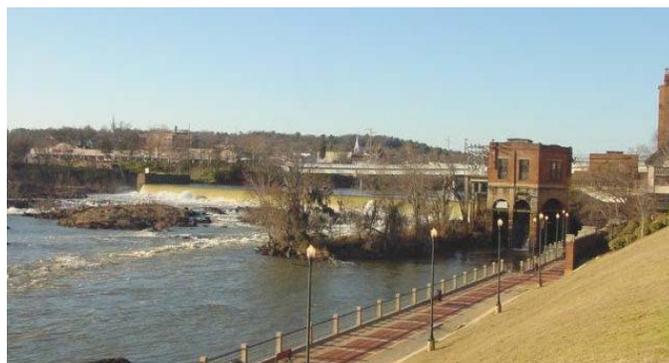


Figure 2. Eagle and Phenix Dam.

Both dams are constructed of rock and masonry materials, having been completed approximately 170 years ago for hydroelectric power generation purposes. The Eagle and Phenix Dam is 17 feet high, forming a 0.81-mile long run-of-the-river 45-acre reservoir. The City Mills Dam is approximately 10 feet high, and creates a 1.37-mile long 110-acre run-of-the-river reservoir. The City Mills Dam is no longer operational and the Eagle and Phenix Dam has suffered fire damage in the hydroelectric plant and is not capable of full power generation. These dams are

Impoundment of the Chattahoochee River has significantly impacted the riverine and shoal habitat dependent aquatic community. Species such as the endemic shoal bass (*Micropterus cataractae*), the State

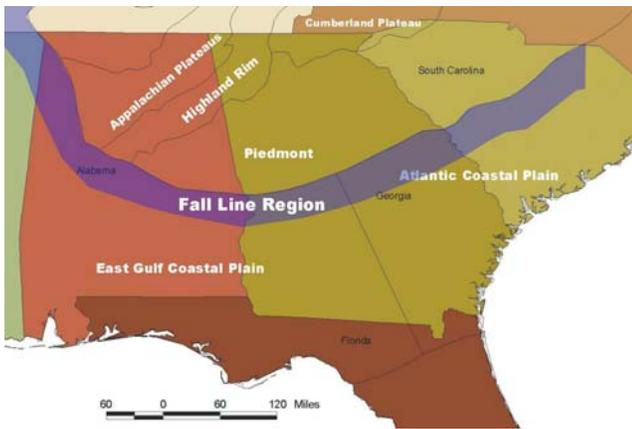


Figure 3. Fall Line region in southeastern U.S.

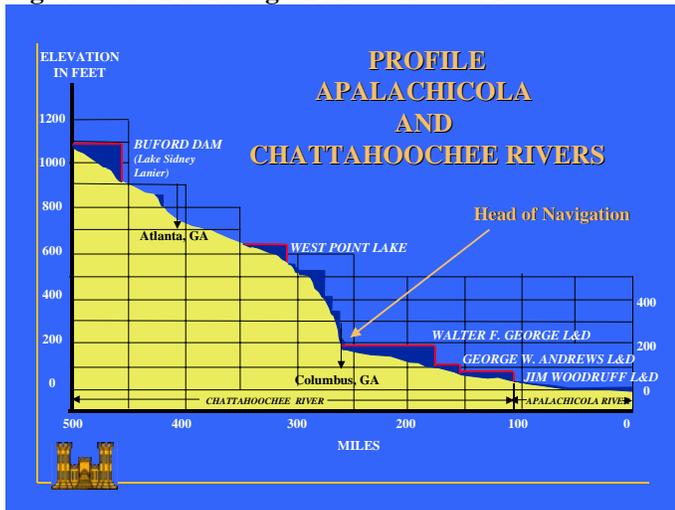


Figure 4. Apalachicola and Chattahoochee Rivers elevation profile.

threatened bluestripe shiner (*Cyprinella callitaenia*), State threatened alligator snapping turtle (*Macrochelys temminckii*), and State threatened Barbour's map turtle (*Graptemys barbouri*) are examples of aquatic species adversely impacted by impoundments that would benefit from dam removal. In addition, the project would provide habitat for the reintroduction of 13 species of freshwater mussels (four federally listed and nine State species of concern) and the greater jumprock (*Moxostoma lachneri*), an Alabama and Georgia species of concern. The shoals spiderlily, (*Hymenocallis coronaria*) a Georgia threatened species that grows in the Fall Line shoals reach of river; however, has not been found in the 2.3-mile project reach. The breaching of these two dams would provide increased habitat for expansion of these shoal aquatic species (USFWS 2004).

Also included in the project are ancillary recreational features that would be compatible with the primary aquatic habitat restoration goals. The recreation features would support ongoing efforts by local interests to develop the recreation and aesthetic potential of the

riverfront lands bordering the impoundments formed by the two dams.

PLAN DEVELOPMENT

Public involvement by the project team during the study process identified key stakeholders including environmental agencies (U.S. Fish and Wildlife Service; Alabama Division of Wildlife and Freshwater Fisheries and Georgia Wildlife Resources Division); upstream hydroelectric power interests (Georgia Power Company); cultural and historical interests; and local recreational interests. In addition to a no action (status quo) alternative, the Corps has considered a range of 71 alternatives for this project. The alternatives evaluate various increments of breaching (100-, 150-, 175-, 200-, 300-, and 400-feet) to complete removal (each spillway section is approximately 500-foot long) of one or both dams, plus various combinations of rock ramps and/or backwater refuges. As a result of the environmental, historical, and cost-benefit analyses/screening, the Corps is focusing on a final array of six alternatives:

- 1) No action;
 - 2) Total removal of Eagle and Phenix Dam and construction of a rock ramp [Excavation of approximately 16,800 cubic yards and fill of approximately 12,500 cubic yards];
 - 3) Total removal of Eagle and Phenix Dam and City Mills Dam and construction of rock ramps at both sites [Excavation of approximately 31,900 cubic yards and fill of approximately 27,500 cubic yards];
 - 4) National Ecosystem Restoration (NER) Plan: Total removal of Eagle and Phenix Dam and City Mills Dam, construction of rock ramps at both sites, and construction of a backwater refuge within Eagle and Phenix [Excavation of approximately 31,900 cubic yards and fill of approximately 37,700 cubic yards];
 - 5) Federally Recommended (FR) Plan: 450-foot breach at Eagle and Phenix and 350-foot breach at City Mills, rock ramps at both sites, and construction of a backwater refuge at Eagle and Phenix [Excavation of approximately 29,700 cubic yards and fill of approximately 37,800 cubic yards];
 - 6) Locally Preferred (LP) Plan: 450-foot breach at Eagle and Phenix and 350-foot breach at City Mills, plus a series of environmental, recreation, safety, and aesthetic features [Excavation of approximately 38,400 cubic yards and fill of approximately 63,300 cubic yards].
- The major differences between the LP plan and the NER and FR plans include the following LP plan features: excavation of bedrock at the Eagle and Phenix damsite

and use of a series of downstream sills in lieu of the fishway rock ramp at that dam (in NER and FR plans); excavation of an approximate 1,000-foot long recreation channel near the Total Systems site; and use of sills downstream of the Norfolk-Southern railroad bridge in lieu of the fishway rock ramp at the City Mills Dam and the rock/grout fill between a number of the midchannel islands to create the backwater refuge (in NER and FR plans).

All alternatives that involve breaching of the City Mills Dam include recommendation for construction of a tailwater weir immediately below the North Highlands powerhouse to keep from dewatering the turbine units during low flow conditions.

PLAN EVALUATION AND SELECTION

While the ecosystem benefits for the proposed aquatic restoration project are widely recognized, the quantification of the environmental benefits is not quite so straightforward. Since there is no universally accepted environmental quantification “tool” or “method”, the Corps (in consultation with the interagency team) developed a habitat-based approach to quantify environmental benefits associated with the various alternatives. In developing the method to quantify environmental benefits, several data sources and environmental tools were evaluated: USFWS Habitat Suitability Index species models; Georgia Power Company, Flow Study Report, Middle Chattahoochee Project FERC Relicensing (FERC Number 2177); and NRCS Stream Visual Assessment Protocol (National Water and Climate Center Technical Note 99-1, December 1998).

The project team members used elements from each of the above three references to formulate an environmental benefit tool for evaluation/quantification of the effects of various alternatives for the Restoration Project. The tool uses a series of eight metrics as relevant for restoration of aquatic fall line shoals habitat: unimpounded water velocities; connectivity with riverine habitat; percent pools; refuge sites from high flows; littoral shallows for vegetation; overfall fish barriers; conducive for native stream invertebrates; and riffle embeddedness. These metrics have been developed to address the entire range of aquatic species, including plants, invertebrates, and fish. Two of these metrics, restoration of unimpounded water velocities and restoration of connectivity with riverine habitats were ranked significantly more important than the other six due to their impact on the health and restoration for this particular reach of the Chattahoochee River. Because of their importance, these two metrics have their relative habitat scores doubled to reflect this aspect.

The removal of these dams would help restore connectivity with the mainstem of the Chattahoochee River downstream of Eagle and Phenix Dam. While the river in this area is impounded by the upper reaches of Walter F. George Dam, the approximate 21 miles of that Corps reservoir are more riverine in nature, with flows confined within the original river banks. Figure 5 shows this riverine section of the Chattahoochee River downstream of the Eagle-Phenix Dam and approximate 150 miles of named tributaries in this riverine reach. Major tributaries in this reach are Upatoi Creek (455 square miles) and Uchee Creek (334 square miles).

The project team then evaluated the alternatives with regard to the eight metrics and scores (1 to 10) were assigned based on best professional judgment. The size of each lake’s water surface area was used to “weight” the resulting habitat score for each alternative. That is the sum total score for each metric was multiplied by the surface area. The resulting highest weighted habitat value is for full removal of the overflow spillway sections at

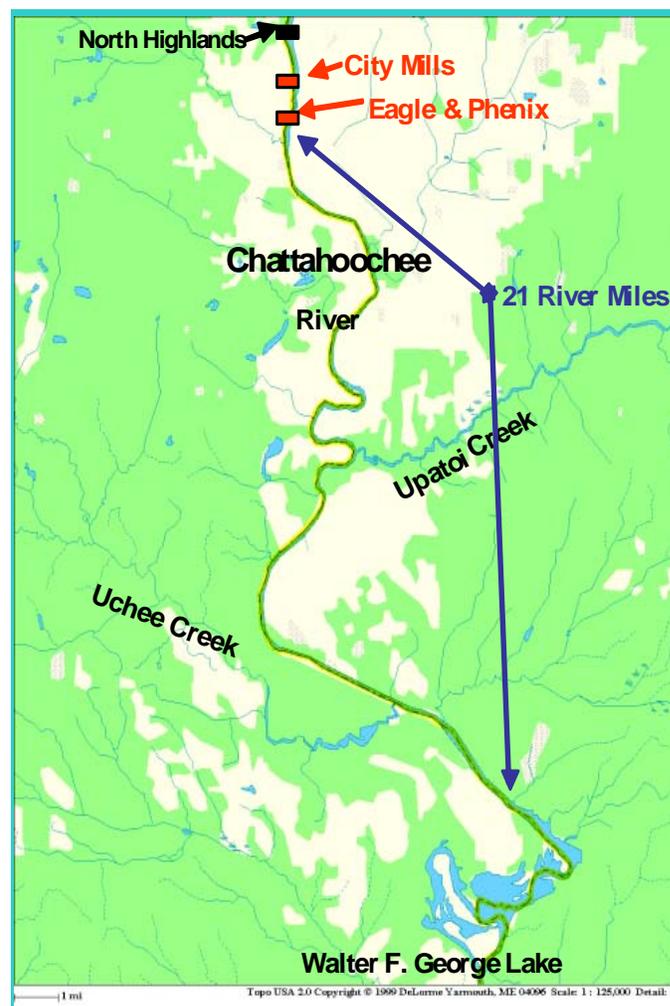


Figure 5. Riverine habitats connected by the Chattahoochee River restoration project.

both dams, construction of rock ramps at the overfalls greater than 2 feet high, and construction of a backwater refuge in the steeper reach within the Eagle and Phenix lake area. This alternative, the National Ecosystem Restoration Plan, provided 12,350 habitat units. The project team also evaluated a “balanced” alternative, the Federally Recommended Plan, which is based on consideration of other factors such as cultural resources, aesthetics, safety, costs, water quality (presence of CSO’s in the pools), and desires of the nonfederal participants in the study process. The “balanced” plan included a 450-foot breach at Eagle and Phenix Dam; 350-foot breach at City Mills Dam, and construction of rock ramps and the backwater refuge. This alternative would provide a total habitat restoration value of 11,700 habitat units, approximately 95% of the benefits produced by NER Plan, with full removal of both dams. Although not the highest ranking plan, the Locally Preferred Plan is heavily favored by the affected communities and has features compatible with the environmental restoration objectives and do not jeopardize the environmental benefits as discussed earlier in this report.

While the Federally Recommended Plan is identified by the Corps as the alternative best suited for ecosystem restoration goals, the Locally Preferred Plan is acceptable to the Corps, provided the nonfederal interests agree to fund the separable project features associated with recreation or aesthetic outputs. Currently, the Corps’ Ecosystem Restoration Report is being reviewed at the Atlanta office.

CONCLUSIONS AND FUTURE ACTIONS

Breaching of the City Mills and Eagle and Phenix Dams would restore the biologically significant Fall Line shoal habitat in the Chattahoochee River. Implementation of either the Federally Recommended Plan or the Locally Preferred Plan would provide significant aquatic restoration benefits.

Pending approval and funding of this ecosystem restoration project, construction activities are scheduled for a 2 to 3 year time frame. Initial activities would be to dewater the area and then to breach both dams. The construction of the backwater refuge and flow diversion structures at both dams would be concurrent with breaching of the dams in order to maintain a shallow water area in this reach which contains two large Combined Sewer Outfalls. The construction of the rock ramps would come later as an adaptive management measure if deemed needed by the local and state resource agencies. The tailwater weir at North Highlands dam would be constructed prior to breaching of the City Mills Dam. Avoidance of important spawning periods (late winter-summer) for aquatic organisms will be done to the

maximum extent practicable, preferring the fall low-water period to conduct the construction; however, the local hydrology may require some construction during the late winter or summer timeframe. Prior to any breaching of the dams, appropriate FERC-approved surrender of the license for the Eagle and Phenix Project (#2655) and the surrender of the exemption for the City Mill Project (#8519) will be required.

Monitoring of the project following construction would be an integral part of the proposed action in order to evaluate the resulting effects on the aquatic resources, cultural resources, structural stability, and human resource matters such as safety and compatibility of the environmental restoration and recreation features of the project.

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