FINAL DETERMINATION OF THE
U.S. ENVIRONMENTAL PROTECTION AGENCY'S
ASSISTANT ADMINISTRATOR FOR WATER
PURSUANT TO SECTION 404(c) OF THE CLEAN WATER ACT
CONCERNING THE PROPOSED LAKE ALMA IMPOUNDMENT
AND PROPOSED MITIGATION OF
ASSOCIATED ENVIRONMENTAL IMPACTS
ALMA, BACON COUNTY, GEORGIA

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I. INTRODUCTION

Section 404(c) of the Clean Water Act (33 U.S.C. §1251 et seq.) provides that, if the Administrator of the U.S. Environmental Protection Agency (EPA) determines, after notice and opportunity for public comment, that unacceptable adverse effects on municipal water supplies, shellfish beds, fishery areas (including spawning and breeding areas), wildlife, or recreational areas would result from the discharge of dredged or fill material, he may exercise his authority to withdraw or prohibit the specification, or deny, restrict or withdraw the use for specification, of any defined area as a disposal site for dredged or fill material. Before making such a determination, the Administrator must consult with the Chief of the Army Corps of Engineers (Corps), the property owner(s), and the applicant where there has been an application for a §404 permit. The procedures for implementation of §404(c) are set forth in the Code of Federal Regulations, 40 CFR 231.

EPA's regulations for implementing §404(c) establish procedures to be followed in exercising the Administrator's authority pursuant to that Section. Three major milestones in the process are: 1) the Regional Administrator's proposed decision to withdraw, deny, restrict or prohibit the use of a site (Proposed Determination); 2) the Regional Administrator's recommendation to the Administrator to withdraw, deny, restrict or prohibit the use of a site (Recommended Determination); and 3) the Administrator's final decision to affirm, modify, or rescind the Regional recommendation (Final Determination). The Administrator has delegated the authority make final decisions under §404(c) to the Assistant Administrator for Water, who is EPA's national Clean Water Act §404 program manager.

This Final Determination concerns the proposed placement of dredged or fill material for the purpose of creating a recreational impoundment and mitigation reservoirs on Hurricane Creek and unnamed tributaries in the City of Alma and in Bacon County, Georgia. Figure 1 shows the location of the proposed project on a regional scale. Figure 2 shows the location of the proposed impoundment and the proposed mitigation reservoirs relative to Hurricane Creek and the City of Alma.

EPA Region IV's Regional Administrator has recommended withdrawal of specification of the disposal site necessary for construction of the proposed impoundment described in Permit No. 074 OYN 003752. The Recommended Determination further recommends that EPA also restrict specification or use of described waters of the United States, including wetlands, as a disposal site for dredged or fill material in connection with the construction of any lake and reservoirs in mitigation thereof. Region IV's Regional Administrator has based the recommendations upon his finding that the discharge of materials in connection with the above described activities would have an unacceptable adverse effect on wildlife.

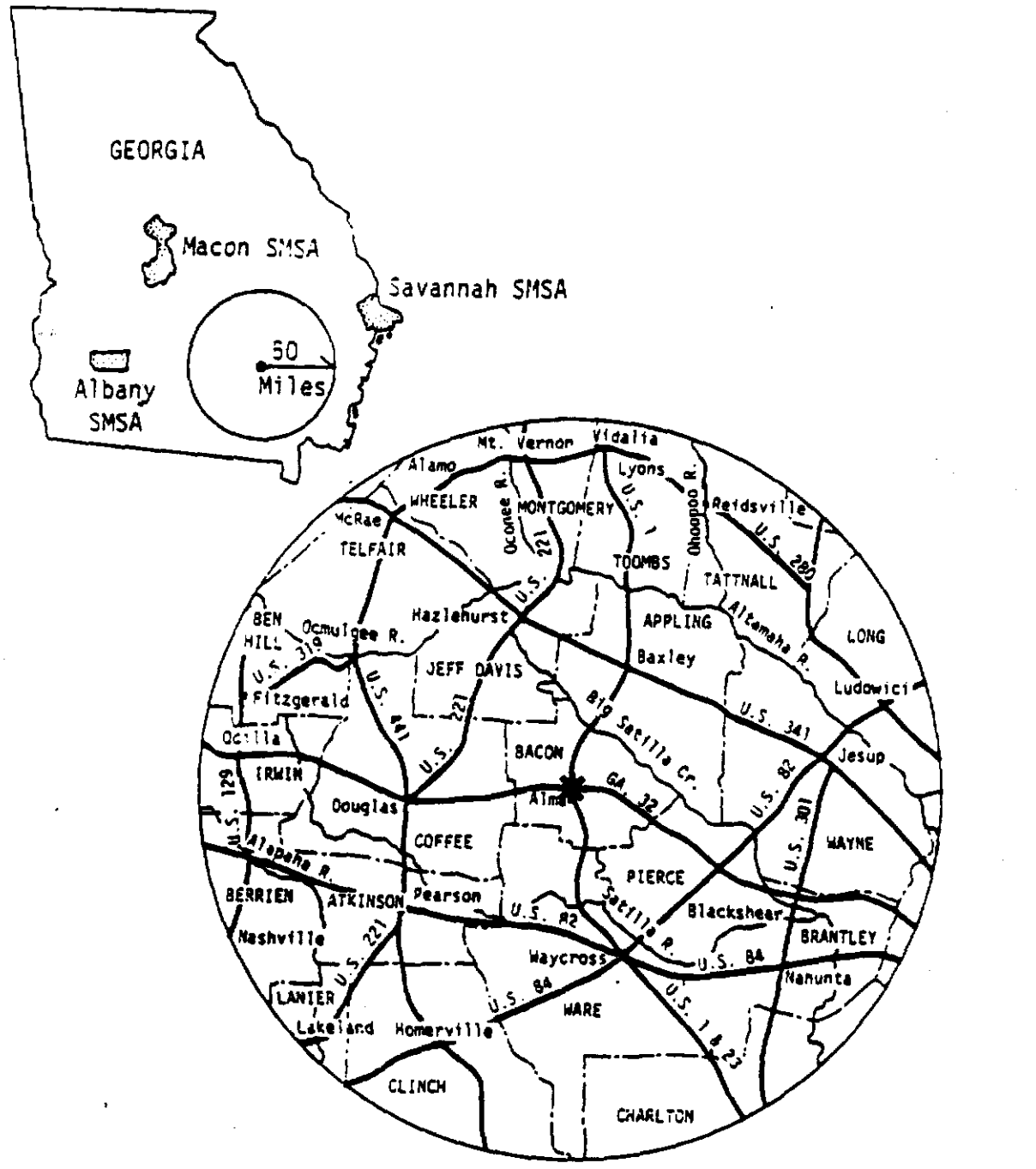

Figure 1. Regional map of Lake Alma project area.

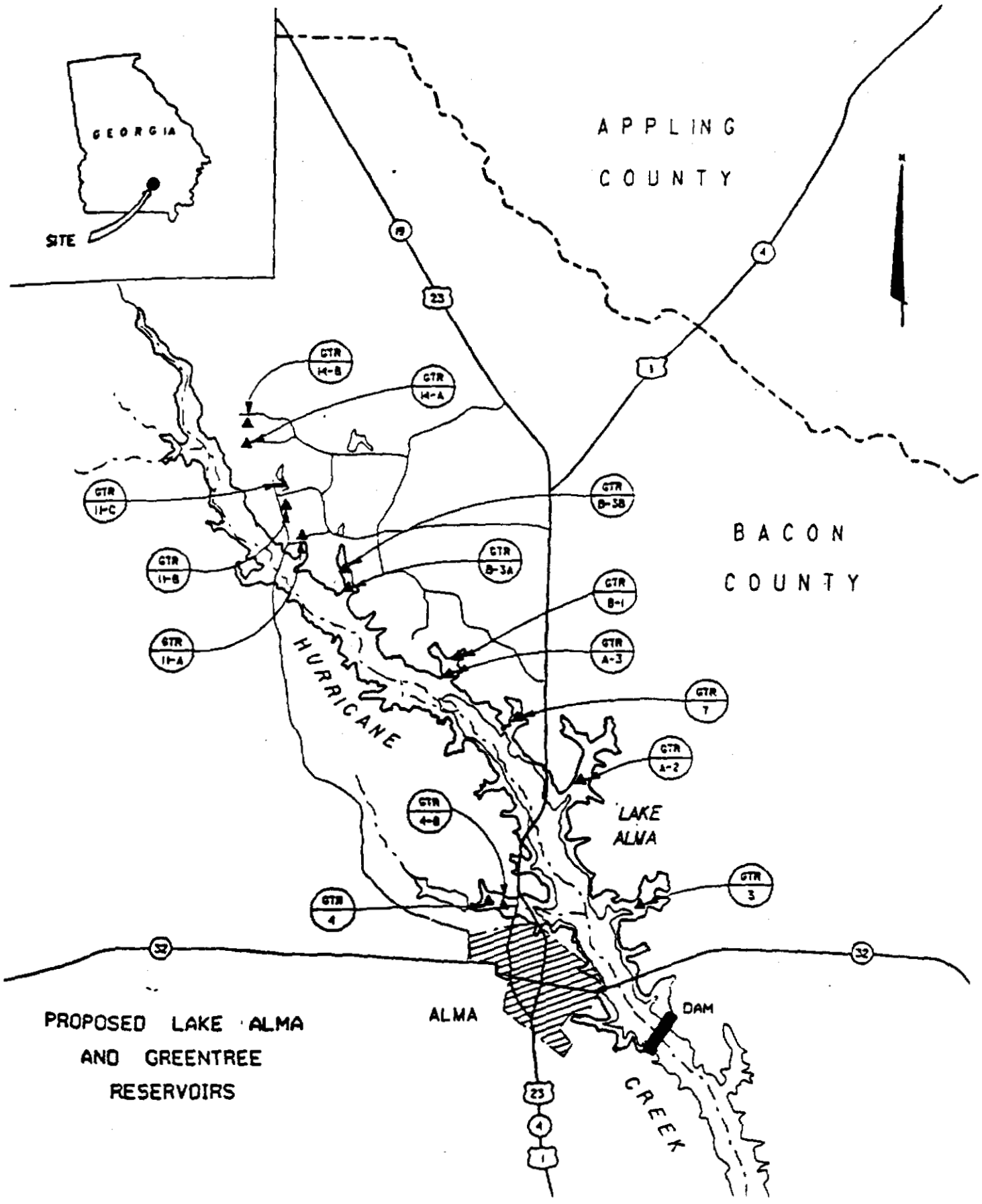

Figure 2. Location map for proposed Lake Alma and greentree reservoirs.

This Final Determination is based on consideration of the record developed by EPA and by the Corps in this case, including public comment submitted in response to the Regional Proposed Determination, comment received at the public hearing and comment from other Federal and State agencies. This Final Determination also reflects comment and information received during EPA Headquarters' consultation pursuant to §231.6 of the Clean Water Act §404(c) regulations.

As described in detail below, it is the finding of this Final Determination that the proposed Lake Alma project, including activities proposed to mitigate adverse impacts, would result in the destruction and loss of vegetated wetland habitat that ... of vital importance to wildlife in the Hurricane Creek bottomland hardwood wetlands system and associated areas and would adversely limit the present ability of the Hurricane Creek forested wetland floodplain to function as a corridor for the movement, dispersal and migration of wildlife species. These findings lead to the conclusion that the discharge of dredged or fill material in connection with the proposed Lake Alma recreational impoundment and associated mitigation impoundments would result in unacceptable adverse impacts to wildlife. This Final Determination therefore affirms the Regional Recommended Determination and restricts the designation of the subject waters of the United States as discharge sites for dredged or fill material. EPA's §404(c) action is based on adverse impacts of activities associated with creation of any reservoir, lake or impoundment on described waters, including wetlands, of Hurricane Creek and unnamed tributaries to Hurricane Creek and as such prohibits the placement of fill for that purpose. This Final Determination does not pertain to other types of filling activities. Other proposals involving the discharge of dredged or fill material on the wetland sites at issue will be evaluated on their merits within the Corps of Engineers' §404 regulatory program.

II. PROJECT DESCRIPTION AND BACKGROUND

A. PROJECT DESCRIPTION:

This Final Determination concerns waters of the United States affected by the proposed impoundment known as Lake Alma and activities proposed as mitigation for adverse environmental impacts thereof. Review of the Recommended Determination and the administrative record pertaining to this case confirms that EPA Region IV's Recommended Determination accurately reflects the proposed project and mitigation plan descriptions. Section III of the Recommended Determination, NATURE OF PROPOSED DISCHARGE (pages 3-4), is hereby adopted as part of this Final Determination. Below is a summary description of the proposed project and mitigation plan based on the Recommended Determination and administrative record.

1. The Recreational Impoundment

This §404(c) action, in part, addresses proposed placement of dredged or fill material in waters of the United States as described in Department of the Army Permit Application No. 074 OYN 003752. As described in the §404 permit application, the applicant would create an impoundment on uplands and wetlands owned by Bacon County. The impoundment would inundate portions of Hurricane Creek and unnamed tributaries to Hurricane Creek near Alma, Bacon County, Georgia. The impoundment is proposed principally to provide water-oriented outdoor recreational opportunities to the city of Alma, Bacon County and surrounding areas. This would be accomplished through construction of a dam across Hurricane Creek and its floodplain, approximately 4,000 feet downstream from Georgia Highway 32. The dam structure would require discharge of 412,000 cubic yards of fill material. The dam would be 2,400 feet in length, 20 feet wide at its top, 235 feet wide at its base and 25 feet in height (157 feet above sea level). As described in the permit application, the damming of Hurricane Creek and subsequent flooding of portions of the Hurricane Creek floodplain would create a lake seven and two tenths of a mile in length with a surface area of 1,400 acres. The lake would average 1,900 feet in width and would range from three feet to 19 feet in depth with an average depth of seven and one half feet at a pool level of +149 feet from mean sea level.

Based on information in the administrative record, the Lake Alma recreational reservoir would be divided into three use areas. Recreational Use Area I, comprising approximately 800 surface water acres, located between U.S. Highway 1 and the dam site, would have maximum water depths ranging from 10 feet at the U.S. Highway 1 bridge to 19 feet at the dam site, and is proposed to support active water-oriented uses (boating, water-skiing, swimming). Recreational Use Area II, consisting of approximately 400 surface water acres and ranging in depth from 10 feet at the Highway 1 bridge to six feet in the upper portions of the area, is proposed to support

less active water-oriented uses (fishing and sailing). Recreation Use Area III, comprising the approximately 200 remaining surface water acres, would remain in a "natural" state which would support fishing and nature study activities. At the time of initial construction, the Lake Alma impoundment site would be cleared of vegetation from the dam site to the upper portion of the impoundment, to a point approximately 1,500 feet north of U.S. Highway 1. All non-water-tolerant trees would be removed above that point in floodplain areas perennially inundated by the recreational reservoir.

2. The Mitigation Plan

This §404(c) action also addresses proposed plans, as described in permit application No. 074 OYN 006129, for mitigating adverse environmental impacts associated with construction of the proposed Lake Alma recreational impoundment. As described in the permit application, the applicant would create 14 discrete impoundments on Hurricane Creek and unnamed tributaries of Hurricane Creek in Bacon County, Georgia. Construction of an emergency access road and the 14 earthen dams for the mitigation impoundments would involve the discharge of approximately 99,030 cubic yards of fill material into waters of the United States. The mitigation impoundment dams would vary from four to nine feet in height and 320 to 865 feet in length, and would have a top width of approximately 12 feet.

As described in the supplemental environmental impact statement, the mitigation reservoirs would be managed primarily for waterfowl production. Seven of the 14 impoundments would be managed as "greentree reservoirs," six would be managed as combination duck brood areas and greentree reservoirs and one would be dedicated to duck brood production. In order to attract migratory waterfowl, impoundments created by the mitigation plan would be allowed to fill annually beginning November 1. Those impoundments used as greentree reservoirs would be drawn down annually before February 15.

It is clear from the record that management of a greentree reservoir is almost exclusively management for waterfowl production. As stated in the Lake Alma Draft Mitigation Management Plan, "[G]reentree reservoirs provide food and shelter for local and migratory wood ducks and other migratory waterfowl, primarily mallards and black ducks."

B. PROJECT HISTORY:

Review of the Recommended Determination and the administrative record associated with this case confirms that Region IV's Determination accurately reflects events leading to consideration of the Regional decision. Section VI of the Recommended Determination, PROJECT HISTORY AND PROCEDURAL BACKGROUND (pages 8-12), is hereby adopted as part of this Final Determination.

C. EPA HEADQUARTERS ACTIONS:

After the close of the public comment period on EPA Region IV's Proposed Determination and prior to the end of the time-frame established by the §404(c) regulations, EPA Region IV submitted the Recommended Determination to EPA Headquarters. As stated above, EPA Region IV's Regional Administrator recommends withdrawal of specification of the disposal site necessary for construction of the proposed impoundment described in Permit No. 074 OYN 003752. The Recommended Determination further recommends that EPA restrict specification or use of described waters of the United States, including wetlands, as a disposal site for dredged or fill material in connection with the construction of any lake and reservoirs in mitigation thereof. Region IV's Regional Administrator has based his recommendations upon the finding that the discharge of materials in connection with the above described activities would have an unacceptable adverse effect on wildlife. The Recommended Determination is dated October 5, 1988, and was received at EPA Headquarters October 6, 1988. The administrative record was received at EPA Headquarters October 17, 1988. Pursuant to §231.6 of the §404(c) regulations EPA Headquarters' deadline for issuing the Final Determination for the proposed actions was thus December 16, 1988.

Pursuant to §231.6 of the §404(c) regulations, EPA initiated consultation with the Mayor of the City of Alma, the Chairman of the Bacon County Board of Commissioners, and the Corps of Engineers, by letters dated November 7, 1988. The letters stated that the opportunity for consultation is provided so that the §404 permit applicant and Corps may present information which reflects the intent to take corrective action to prevent unacceptable adverse effects from the subject activities.

The Corps responded to the consultation notification in a letter from Carl Cable, Acting Chief, Operations and Readiness Division, dated November 22, 1988. The letter stated the Corps Headquarters' belief that, based on previous review of the case and the Savannah District's proposed decision on the subject permits, further Corps action was not warranted. Notwithstanding Corps Headquarters' support for the Savannah District, the letter stated that the Recommended Determination "is appropriately focused on 'effect on wildlife habitat' associated with the loss of wetlands."

The City of Alma and Bacon County responded to the consultation notification by requesting a meeting, which was held the afternoon of December 2, 1988, at the EPA Headquarters office in Washington, D.C. A summary of that meeting has been entered into the record. Major points raised by those in attendance on behalf of Alma and Bacon County were that: there is a genuine need for the project to enhance livability and economic development in the area; they believe the project is environmentally sound; they have cooperated with all requirements to date, and would consider additional actions to enhance environmental protection; the project was

conceived over 20 years ago and current policies and regulations should not be applied to it; EPA has changed its position in this case and is now taking a position inconsistent with at least one other case; and the project has been approved or supported by the Corps, the U.S. Fish and Wildlife Service, the Georgia Department of Natural Resources, and local cities and counties. No additional information on specific environmental impacts was provided; the representatives of Alma and Bacon County indicated that they would rely on wildlife and other environmental information provided by the Georgia Department of Natural Resources. It was agreed that supplemental information provided by that agency, dated September 16, 1988, would be included in the administrative record.

While the applicants failed to supply any new information pursuant to §231.6 of the §404(c) regulations, the applicants and Georgia Department of Natural Resources had already raised substantive issues during EPA Region IV's §404(c) Proposed Determination process. Attachment D to the Recommended Determination addresses the aforementioned issues and is hereby adopted as part of this Final Determination. In addition to Attachment D, major issues raised by the Georgia Department of Natural Resources are summarized below and addressed in summary.

1. Summary of Georgia DNR comments and EPA response:

Ga DNR comment: The present site where Lake Alma would be located provides little wildlife habitat due primarily to tree size and mast type.

EPA response: In making this statement, Georgia Department of Natural Resources has greatly discounted the value of a diverse assemblage of tree and shrub vegetation for wildlife habitat purposes other than as a food source and as a source of food for species utilizing materials other than hard mast. Further, the rationale for this statement is information provided in Appendix D of the draft supplemental environmental impact statement which references limited field observations made in 1978 of tree diameter. Those same field observations noted, "[M]ixed hardwoods such as these [found in the Lake Alma site] are conducive to wildlife for they contain species with various periods of fruition, resulting in a staggered mast and fruit production, therefore making food available for a variety of wildlife throughout the year." In that same report, the presence of various species of oak in a range of diameters was noted as important to the stability of mast production. In 1978, over half of the Water Oak found in the area were of the size where they begin mast production. Because mast production is directly proportional to diameter, it is reasonable to assume that in the ensuing years, as the diameter of oak species has increased with growth, the mast production has increased as has the value of the area for wildlife habitat. In summary, the argument that the area provides negligible wildlife habitat is not based on current

information, does not reflect food requirements for species of wildlife which are not dependent on hard mast production as a food source and does not reflect other wildlife habitat values provided by the vegetation of the site.

Ga DNR comment: The acreage of wetlands which would be lost due to the proposed project is not significant.

EPA response: Research by various Federal agencies and academic groups indicates that historically, southeast coastal Atlantic states have experienced substantial losses of bottomland hardwood wetlands similar to those found in the proposed project site. While important to EPA's review of any action under §404 of the Clean Water Act, this factor is not pivotal to EPA's decision on the Lake Alma project. Rather than the acreage of the proposed wetland losses, EPA's findings rest primarily upon the unacceptability of the adverse environmental impacts associated with a project. The physical extent of the proposed project relative to adjacent wildlife habitat and associated upstream and downstream wildlife habitat are also accounted for in EPA's evaluation of adverse environmental impacts associated with the proposed project.

Ga DNR comment: Denial of the Lake Alma proposal will set a precedent which will prohibit construction of projects such as fishing lakes and water supply reservoirs in Georgia.

EPA response: EPA is not predisposed to object to all impoundments proposed by the State of Georgia. In accordance with responsibilities set forth in the Clean Water Act, EPA reviews §404 permits for compliance with the §404(b)(1) Guidelines and each proposal and permit is reviewed on its merits. EPA's action on the §404 permits for Lake Alma is based on a finding of unacceptable adverse impacts to wildlife and it can be presumed that any future proposals which EPA determines have unacceptable impacts will also be considered candidates for EPA actions under §404(c). However, there is no reason to believe that even most future projects would be unacceptable; in fact, permits have already been issued for a number of water supply impoundments. It is noted that EPA Region IV is currently participating in the Task Force created by the Georgia Department of Natural Resources which will evaluate proposals for water supply impoundments in the State.

Ga DNR comment: EPA has changed its position regarding the Lake Alma project.

EPA response: It is true that in October of 1981, EPA Administrator Gorsuch, in a response pursuant to §404(q) of the Clean Water Act to the Assistant Secretary of the Army for Civil Works, stated that EPA would not request additional review of the recreational impoundment permit application by the Secretary of the Army. Ms. Gorsuch's decision not to pursue EPA's original concerns with the original permit through the §404(q) process does not deprive a subsequent Administrator (or

delegatee) of authority to act with respect to the project if the subsequent Administrator makes a reasoned determination that the fill in question would have an unacceptable adverse effect.

Ga DNR comment: Lake Alma is consistent with the policies and plans for other projects planned by the Georgia Department of Natural Resources.

EPA response: EPA recognizes the value of state planning initiatives as a tool for effective management of natural resources and applauds the State for recent initiatives to preserve and protect valuable wetland habitat. Although the Lake Alma proposal would further the goals of present Georgia Department of Natural Resources policies, the Lake Alma proposal was not developed under the current management framework and EPA knows of no other recreational impoundment proposal within the State which is similar in scope or impact to the Lake Alma project. Notwithstanding the Georgia Department of Natural Resources' endorsement, EPA findings have resulted in the determination that the Lake Alma project is not consistent with, and does not comply with, relevant sections of the Clean Water Act.

Ga DNR comment: U.S. EPA lacks the expertise in wildlife habitat evaluation to adequately determine impacts of the proposals.

EPA response: EPA is the Federal Agency provided with the authority to restrict or prohibit the use of a site for the discharge of dredged or fill material when certain statutorily-specified environmental effects are determined to be unacceptable. EPA has the authority and the scientific expertise to determine impacts to aquatic ecosystems, including bottomland hardwoods such as those found in the project site. With respect to EPA's findings on the Lake Alma proposal, the administrative record in this case, which contains substantial credible scientific information from the U.S. Fish and Wildlife Service and the Corps of Engineers, more than adequately supports EPA's findings.

Ga DNR comment: The §404 permit process allows for the project proponent to mitigate for habitat losses; if this process is not followed, water supply reservoirs in Georgia could not be constructed.

EPA response: EPA's action with regard to Lake Alma does not indicate a reluctance on the Agency's part to accept mitigation for adverse environmental impacts which cannot be avoided. As stated earlier, EPA is not predisposed towards objecting to all proposed impoundments in the State of Georgia and will evaluate each proposed project on its merits, including proposals for mitigating adverse environmental impacts associated with the project. Where all other regulatory requirements have been satisfied, EPA will accept mitigation which is adequate to address adverse environmental impacts.

Ga DNR comment: The proposed §404(c) action is not consistent with past EPA policies.

EPA response: EPA's approach towards Agency responsibilities under the Clean Water Act and protection of wetland resources is not stagnant, but reflects the state of the art in scientific knowledge and developing trends in the wetland resource. As such, EPA policies have matured with the increasing availability of knowledge regarding the value and vulnerability of wetland resources. EPA's action on Lake Alma is not a departure from past policies but rather a reflection of current data and understanding of the importance of bottomland hardwood wetland habitat functions. Moreover, with the one exception of Ms. Gorsuch's letter, EPA has voiced major concerns over this project since 1974.

Ga DNR comment: The current Lake Alma site and Hurricane Creek have low utilization for hunting, fishing, and recreation; the proposed lake would increase the ability of the area to support a recreational fishery.

EPA response: While the administrative record confirms that Hurricane Creek and the associated bottomland hardwood floodplain are used for recreational fishing and hunting, EPA recognizes that the proposed impoundment would allow greater utilization of the area for recreation. EPA's decision regarding the §404 permits for the project, however, is based primarily on adverse environmental impacts which would result in the elimination of or damage to important wildlife habitat functions of the present system. While the game fish and game bird population of the area would undoubtedly increase as a result of the proposal, this increase would be at the expense of and would not offset the loss of other wildlife species. Under the Clean Water Act, game species are accorded no special weight or consideration over non-game species.

Ga DNR comment: The creation of Lake Alma would improve the migratory corridor for waterfowl in southcentral Georgia and would provide excellent wintering habitat.

EPA response: EPA concurs with the Georgia Department of Natural Resources statement that the proposed lake would benefit certain species of waterfowl by creating open water habitat. The present Hurricane Creek forested wetlands, however, currently provide substantial intrinsic habitat for species of waterfowl, including migratory waterfowl, and other bird species as well as other wildlife species. Moreover, U.S. Fish and Wildlife Service studies indicate that open water habitat is the only type of freshwater aquatic habitat which has increased in recent history, at the same time that the acreage of bottomland hardwood habitat has declined. While the proposed impoundment would undoubtedly attract certain species not now found in the area, this condition would be at the expense of and would not offset the loss of habitat for indigenous wildlife species.

III. DESCRIPTION OF PROJECT SITE

This Final Determination concerns waters of the United States affected by the proposed impoundment known as Lake Alma and activities proposed as mitigation for adverse environmental impacts thereof. Review of the Recommended Determination and the administrative record pertaining to this case confirms that Region IV's Recommended Determination accurately reflects environmental descriptions of the proposed project and mitigation plan sites. Section IV of the Recommended Determination, CHARACTERISTICS AND FUNCTIONS OF THE PROJECT SITE (pages 4-6), is hereby adopted as part of this Final Determination. For additional information on the physical and environmental characteristics of the subject sites, the draft and final supplemental environmental impact statements prepared by the Corps of Engineers provide a substantial amount of relevant material, although certain observations noted below update the information contained in those documents. Below is a summary description of the proposed project and mitigation plan sites based on the Recommended Determination and the administrative record.

A. SITE DESCRIPTION:

The administrative record is unclear as to the exact acreage of wetlands which would be impacted by the proposed Lake Alma impoundment. The original Department of Housing and Urban Development environmental impact statement for the project, which was adopted by the Corps of Engineers in the supplemental environmental impact statement, states that the "[C]onstruction of Lake Alma would eliminate 1,400 acres of bay and branch swamp habitat." The Corps final supplemental environmental impact statement, however, states that lands below the 149 foot contour, the level of the proposed lake, include approximately 1,350 total acres. Of this total, 182 acres are defined as upland, 200 acres are identified as a "natural area" which would continue to function as wetlands, and 11 acres are identified as relict waste water treatment oxidation ponds which would become open water habitat if the recreational impoundment were completed, and the remaining acres are wetlands which would be filled or flooded. In summary, the Corps concludes that 957 acres of wetlands would be lost as a result of the construction of Lake Alma. In developing the mitigation plan for impacts resulting from construction of the proposed impoundment, the U.S. Fish and Wildlife Service (USFWS) recognized a loss of 1,400 acres of wooded swamp and bottomland hardwood wildlife habitat, noting that Recreational Use Areas I and II of the lake include what is now 1,136 acres of wooded swamp and that Recreational Use Area III includes 200 acres of what is now wooded swamp. The USFWS concluded that the construction of Lake Alma would convert the 1,136 acres in Areas I and II to "open lake," and the 200 acres in Area III to "wooded lake."

Accepting the Corps assertion that lands within the 149 foot contour contain approximately 182 acres of uplands and based on the statement in the supplemental

environmental impact statement and the USFWS mitigation plan that the 200 acre wooded swamp area in Recreational Use Area III would be selectively cleared to remove non-water-tolerant trees and then flooded by impounded waters, calculation of the actual acreage of wetlands which would be impacted by the construction of the proposed Lake Alma impoundment results in a figure of approximately 1,155 acres.

Construction of the emergency access road and mitigation reservoirs would fill approximately 3.1 acres and flood approximately 31.9 acres of existing wetlands and would create 23 acres of wetlands through inundation of existing uplands, thus resulting in a net physical loss of 12 acres of vegetated wetlands. The proposed mitigation plan would also "enhance," through controlled flooding, an estimated 137 acres of existing wetlands. Thus, the open water surface area created or managed by the mitigation reservoir impoundments would total approximately 192 acres.

1. Hydrology

The Hurricane Creek watershed encompasses approximately 228 square miles of land and can be described as a relatively narrow basin ranging from 280 feet above mean sea level at its headwaters to less than 100 feet above mean sea level at its confluence with the Alabaha River. This relatively undisturbed basin is approximately 75 miles from the Atlantic coast with the portion of the Creek which would be affected by the proposed impoundment proposal lying approximately half-way down the watershed. The average stream gradient of Hurricane Creek is 2.3 feet per mile with a stream gradient of approximately 2.8 feet per mile within the proposed recreational impoundment site. The creek channel is fairly well defined at the upper and lower ends of the proposed recreational lake but is not well defined within the floodplain between Georgia Highway 32 and U.S. Highway 1, where the creek channel is generally braided.

The average annual precipitation in the Alma area is approximately 47 inches with precipitation exceeding evaporation potential from late autumn to spring. Although the mean daily discharge rate of Hurricane Creek averages 112 cubic feet per second, the discharge is highly variable ranging from zero flow to flood flow seasonally. According to the administrative record, because of the low gradient of the basin and the generally broad floodplain, the duration of high water events in the Hurricane Creek floodplain often exceeds three to five days. The administrative record also indicates that the Hurricane Creek-Alabaha River-Satilla River system is hydrologically unbroken and unobstructed from the headwaters of Hurricane Creek to the Atlantic Ocean. There is no indication that activities or structures are planned, other than the instant project, which would alter these circumstances.

The aquatic and hydrologic environment associated with Hurricane Creek affects species composition and richness, primary productivity, accumulation and transport of

organic material and nutrient cycling in associated wetland systems. The creek serves as a source of food for consumers such as mink and fish-eating waterfowl; it serves as habitat for aquatic species of mammals such as otter and beaver; and it serves as primary habitat for fish species. When seasonally flooded, the floodplain also serves many of these same functions and may do so in an enhanced manner, over non-flooded conditions, due to greater surface area and increased opportunity for fish and certain species of wildlife to utilize previously unavailable habitat.

The current Hurricane Creek floodplain system functions to absorb flood waters and nutrients and release them over time to downstream aquatic systems. Nutrients absorbed by the vegetated system aid in leaf production and are thereby transformed into plant material which is deposited on the floodplain floor as organic material. Moreover, because the Hurricane Creek wetland system is "open" to hydrologic transport, inorganic material, dissolved organic matter and particulate organic matter are currently exported from the system and transported to downstream systems. These materials contribute to the normal dissolved and particulate organic materials which eventually enter the Atlantic Ocean through the Satilla River system estuary near Brunswick, Georgia. The unbroken/unobstructed hydrologic pathway of the Hurricane Creek-Alabaha River-Satilla River system also allows the free dispersal, movement and migration of aquatic wildlife and fish, including anadromous (*i.e.,* migrating from sea water to fresh water) and catadromous (*i.e.,* migrating from fresh water to sea water) species. According to the administrative record, fish movement throughout the Hurricane Creek system is limited to months when flow is adequate to support such movement. This period generally occurs from late autumn well into spring, and coincides with the spawning period for a significant number of species of fish occurring in the proposed impoundment area.

2. Vegetation

The major vegetation types within the proposed recreational reservoir and mitigation reservoirs include species typical of bay and branch swamp communities in the southeast. While the main floodplain of the recreational impoundment site is characterized by a bay swamp community of broadleaf evergreen and deciduous hardwood species, the understory of the area is relatively open compared to the transition zone to upland areas. The administrative record indicates that the lack of understory vegetation in the main floodplain may be due to periodic flooding of Hurricane Creek or to shading of understory areas by the canopy of trees present in the area. Overstory coverage in the bay swamp averages 90 to 100% with tree species dominated by sweet gum, sweet bay, and black gum. The transition zone between the bay swamp and adjacent uplands includes a mix of overstory deciduous and evergreen tree species and a relatively dense mosaic of shrubs and understory vegetation. The relatively undisturbed Hurricane Creek floodplain contains dead hardwood trees in various states of decomposition.

According to the administrative record, the proposed mitigation sites include both tree species common to the main floodplain, and tree species such as pines and yellow poplar, which are more common to upland and transitional areas. Unlike the proposed recreational impoundment area, the proposed mitigation sites support a dense understory of shrubs, vines and vegetation.

The administrative record supports the assertion that current bay and branch swamp communities in the proposed project impact site exhibit valuable and diverse habitat values for wildlife. Specifically, the Corps' Lake Alma Field Investigations Report for the recreational impoundment states, "Creek-swamps such as this,[*sic*] oak, gum, cypress,[*sic*] assemblage are some of the most productive wildlife habitat in the southeastern United States." Further, the Corps supplemental environmental impact statement states, "[T]he bay and branch swamp habitat probably supports the greatest diversity and number of terrestrial and semi-aquatic wildlife species in the Lake Alma study area." The bay and branch swamp trees and shrubs provide protection, resting and roosting areas for a variety of wildlife species as well as providing the standing dead trees and snags important for habitat to some terrestrial and aquatic animals. During flooding, the forested floodplain itself becomes a feeding area for fish and a staging area for migratory waterfowl. The vegetation serves to shade the floodplain, thus ameliorating temperature fluctuations and creating a more hospitable environment for wildlife; it stabilizes the creek stream bank, preventing or slowing erosion; and the vegetation produces leaf litter, which serves as habitat for litter dwelling fauna and contributes to nutrient cycling through physical and chemical litter breakdown. As noted in the Recommended Determination, the proposed impoundment area contains tree species with various periods of fruiting, resulting in staggered mast (*i.e.,* seeds or nuts) and fruit production, therefore making food available for wildlife throughout the year.

On a regional scale, the importance of habitat values from woody species of plants in the proposed recreational and mitigation impoundment areas is underscored by the other land uses in the surrounding area. The Hurricane Creek bottomland hardwood bay and branch swamp wetlands provide the majority of natural vegetated habitat in an area where urban, agricultural and pine plantation development dominate land use. Of equal importance, the linear vegetated riparian zone along Hurricane Creek provides an integral link in a protective wetland corridor for the dispersal, movement and migration of mammals and birds among wildlife habitats in the watershed of Hurricane Creek and associated watersheds of tributaries to the Satilla River.

B. FISH AND WILDLIFE:

As noted previously, Region IV's Regional Administrator has based his Recommended Determination upon the finding that the discharge of materials in connection with the proposed Lake Alma recreational impoundment and proposed mitigation reservoirs would have an unacceptable adverse effect on wildlife. While the above section of this Final Determination dealt primarily with describing wildlife habitat of the Hurricane Creek impoundment areas, this section will focus on species of wildlife which are either commonly found in areas similar to the proposed project area and are within the appropriate range for that species or species which have actually been identified as occurring in the subject area. The species included in these lists include species which one could reasonably expect to see on the project site due to species habitat requirements and range. Lists presented in this section are a compilation of information contained in the administrative record and represent wildlife evaluations and surveys conducted on the site by the Corps, the U.S. Fish and Wildlife Service, the Georgia Department of Natural Resources, Gulf South Research Institute and EPA Region IV. It should be noted that the administrative record indicates that the majority of the field visits which were undertaken by the various Federal and State agencies were made during the summer months. It can be assumed, that wildlife field observations therefore do not fully portray the diverse wildlife community which is likely to occur in the project area nor do the lists of observed species represent the seasonal wildlife populations which certainly utilize the Hurricane Creek forested floodplain. Figures for the number of species positively identified as occurring in the area should be considered the lower limit of the actual number of species likely to occur. Further, because the wildlife habitat in the Hurricane Creek area has not changed during the last twenty years and indeed has probably gotten more hospitable due to factors such as increased tree diameter and decreased stream pollution from the waste treatment facility, it is reasonable to assume that the number of species observed would be greater if field surveys had been conducted more recently, not to mention during all seasons.

The lists of species observed are further supported by casual observations made by individuals while using the Hurricane Creek area for recreational activities such as fishing and hunting. Many of these sightings were noted in correspondence submitted in response to EPA Region IV's Proposed Determination. The species lists also include wildlife information provided by Mr. Delano Dean at the request of EPA Headquarters. Mr. Dean is a long time resident of the Hurricane Creek area. (It is noted that Mr. Dean is an opponent of the proposed Lake Alma project. This fact was taken into consideration in developing this Final Determination.) Finally, the species lists were checked by EPA to ensure conformity with available scientific knowledge on species range and habitat requirements. Species specifically identified in the administrative record as known to occur on the project site are noted with an asterisk.

Many of the non-aquatic wildlife species identified as occurring in bottomland hardwood wetlands are species which use the area non-preferentially (*i.e.,* they are not dependent on the wetland characteristics of the site per se) but which tend to thrive in the vegetated and relatively undisturbed forested floodplain environment. This conclusion regarding bottomland hardwood habitat is supported by research which indicates that due to an abundance of available food and habitat, forested floodplains have been found to support twice the number of Whitetail Deer and up to two and a half times as many Wild Turkey as an equivalent area of upland forest. Below is a summary of project impacts on species which the wildlife habitat of the Hurricane Creek is likely to support.

1. Mammals

Table 1 identifies mammal species that are either known to occur, or can reasonably be expected to occur, in the area of the proposed Lake Alma project, including the proposed mitigation sites. The table recognizes 48 species of deer, bats, squirrels, and other mammals that are commonly observed in areas with habitat characteristics like those exhibited in the proposed project impact area. Of those 48 species, 15 species have been positively identified as occurring in the impact area. The remaining 33 species are known to utilize areas during all or part of their life cycles exhibiting habitat characteristics (*e.g.,* food sources, cover, climate and other physical requirements) like those of the impact area. On this basis these fauna can reasonably be expected to be present in the project area during at least a part of the year. It should be noted that many of the species identified as possibly occurring in the project area, such as the bats and shrews, are generally nocturnal and are therefore not commonly sighted during field surveys unless trapping is carried out.

Species on the mammal list which are almost exclusively found in wetland areas include the Marsh Rabbit, Mink, River Otter, and Beaver. Many other mammal species identified as occurring in the project area are species which utilize the area non-preferentially, including the Whitetail Deer, Gray Squirrel and various bats. While several of the mammal species, including the Whitetail Deer, the Eastern Cottontail and the Gray Squirrel, are game species, a large percentage of species in the area includes small mammals such as shrews and mice, which represent an important food source for raptors and larger predatory mammals. The presence of small mammals is confirmed by correspondence from Mr. Dean, which states that while he has been unable to positively identify the species, he has seen numerous shrews in the Hurricane Creek floodplain area. Table 1 also includes the Black Bear and the Federally endangered Florida Panther. While the administrative record indicates that it is unlikely that these species are current residents of the proposed project site, both species are unique in their requirement of substantial available range and unbroken travel corridors to prosper, and therefore may utilize the proposed project site as part of their range. The potential for use of the area by the Black Bear is supported by the fact that one was

Table 1. Mammal Species possibly occurring or known to occur in the proposed Lake Alma site including proposed mitigation sites

* = species known to occur within project site

Opossum *Didelphis marsupialis* *
Southeastern Shrew *Sorex longirostris*
Shorttail Shrew *Blarina brevicauda*
Least Shrew *Cryptotis parva*
Eastern Mole *Scalopus aquaticus*
Little Brown Myotis *Myotis lucifugus*
Eastern Pipistrel *Pipistrellus subflavus*
Big Brown Bat *Eptesicus fuscus*
Red Bat *Lasiurus borealis*
Seminole Bat *Lasiurus seminolus*
Hoary Bat *Lasiurus cinereus*
Eastern Yellow Bat *Lasiurus intermedius*
Evening Bat *Nycticeius humeralis*
Eastern Big-eared Bat *Plecotus rafinesquei*
Mexican Freetail Bat *Tadarida brasiliensis*
Armadillo *Dasypus novemcinctus*
Eastern Cottontail *Sylvilagus floridanus* *
Marsh Rabbit *Sylvilagus palustris* *
Eastern Gray Squirrel *Sciurus carolinensis* *
Eastern Fox Squirrel *Sciurus niger* *
Southern Flying Squirrel *Glaucomys volans*
Southeastern Pocket Gopher *Geomys pinetis*
Beaver *Castor canadensis* *
Marsh Rice Rat *Oryzomys palustris*
Eastern Harvest Mouse *Reithrodontomys humulis*
Oldfield Mouse *Peromyscus polionotus*
Cotton Mouse *Peromyscus gossypinus* *
Golden Mouse *Peromyscus nuttali*
Hispid Cotton Mouse *Sigmodon hispidus*
Eastern Wood Rat *Neotoma floridana*
Pine Vole *Microtus pinetorum*
Muskrat *Ondatra zibethica*
Black Rat *Rattus rattus*
Norway Rat *Rattus norvegicus*
House Mouse *Mus musculus* *
Coyote *Canis latrans*
Red Fox *Vulpes fulva*

Table 1. (cont)

Gray Fox *Urocyon cinereoargenteus* *
Black Bear *Ursus americanus*
Raccoon *Procyon lotor* *
Longtail Weasel *Mustela frenata*
Mink *Mustela vison* *
Striped Skunk *Mephitis mephitis*
River Otter *Lutra canadensis* *
Florida Panther *Felis concolor coryi*
Bobcat *Lynx rufus* *
Wild Boar *Sus scrofa* *
Whitetail Deer *Odocoileus virginianus* *

killed by hunters within the proposed project site approximately twenty years ago. As noted previously, wildlife habitat in the Hurricane Creek area has likely improved during the last twenty years.

2. Fish

Table 2 identifies fish species that are either known to occur, or can reasonably be expected to occur, in the area of the proposed Lake Alma project, including the proposed mitigation sites. The table recognizes 106 species of catfish, crappie, sunfish, and other fish that are commonly observed in areas with habitat characteristics like those exhibited in the proposed project impact area. Of those 106 species, 31 species have been positively identified as occurring in the impact area. The remaining 75 species are known to utilize areas during all or part of their life cycles exhibiting habitat characteristics (*e.g.,* food sources, cover, bottom type and other physical requirements) like those of the impact area. On this basis these fauna can reasonably be expected to be present in the project area during at least a part of the year. It should be noted that the type of sampling performed to collect fish species residing in the Lake Alma site does not allow capture of a fully representative collection of species and the timing of the sampling represents only summer populations.

The list of fish species known to occur in the proposed Lake Alma project site contains several game fish species including Redfin Pickerel, Chain Pickerel, Channel Catfish, Warmouth, Largemouth Bass and several species of sunfishes. The administrative record indicates that the area of Hurricane Creek proposed for the project is currently used for recreational stream fishing in the Alma, Bacon County area. Recreational fishing in the affected portion of the creek has been further mentioned and described in outdoor recreation magazines.

Fish species positively identified as occurring in the proposed Lake Alma site also include the American Eel, a catadromous species which moves downstream into coastal waters, eventually moving out into the sea. The presence of this migratory species is further evidence that the Hurricane Creek stream can be considered available habitat for anadromous and catadromous fish species, and "open" to the dispersal, movement and migration of mobile aquatic species between Hurricane Creek and associated aquatic environments including the Atlantic Ocean.

Included on the list of potential species in the project site are the American Shad and the Blueback Herring, both of which are anadromous species which would be capable of utilizing Hurricane Creek. The list of potential fish species occurring in Hurricane Creek also includes the Shortnose Sturgeon, a fish species which is currently endangered throughout its range. Although this species has not been identified as occurring in the project impact area, the species generally inhabits coastal rivers and may travel great distances upstream if unimpeded by dams. The USFWS has stated

Table 2. Fish Species possibly occurring or known to occur in the proposed Lake Alma site including proposed mitigation sites

* = species known to occur within project site

Chestnut Lamprey *Icthyomyzon castaneus*
Shortnose Sturgeon *Acipenser brevirostris*
Atlantic Sturgeon *Acipenser oxyrhynchus*
Spotted Gar *Lepisosteus oculatus*
Longnose Gar *Lepisosteus osseus* *
Florida Gar *Lepisosteus platyrhincus*
Alligator Gar *Lepisosteus spatula*
Bowfin *Amia calva* *
American Eel *Anguilla rostrata* *
Blueback Herring *Alosa aestivalis*
Hickory Shad *Alosa mediocris*
Alewife *Alosa pseudoharengus*
American Shad *Alosa sapidissima*
Gizzard Shad *Dorosoma cepedianum*
Threadfin Shad *Dorosoma petenense*
Eastern Mudminnow *Umbra pygmaea*
Redfin Pickerel *Esox americanus americanus* *
Chain Pickerel *Esox niger* *
Stoneroller *Campostoma anomalum*
Central Silvery Minnow *Hybognathus nuchalis*
Bigeye Chub *Hybopsis amblops*
Redeye Chub *Hybopsis harperi*
Rosyface Chub *Hybopsis rubrifons*
Bluehead Chub *Nocomis leptocephalus*
Golden Shiner *Notemigonus crysoleucas* *
Ocmulgee Shiner *Notropis callisema*
Ironcolor Shiner *Notropis chalybaeus*
Greenhead Shiner *Notropis chlorocephalus*
Dusky Shiner *Notropis cummingsae*
Pugnose Minnow *Notropis emiliae*
Spottail Shiner *Notropis hudsonius*
Sailfin Shiner *Notropis hypseloptrus* *
Ohoopee Shiner *Notropis leedsi*
Yellowfin Shiner *Notropis lutipinnis*
Taillight Shiner *Notropis maculatus*
Coastal Shiner *Notrpis petersoni*
Altamaha Shiner *Notropis xaenurus*

Table 2. (cont)

Bullhead Minnow *Pimephales vigilax*
Blacknose Dace *Rhinichthys atratulus*
Creek Chub *Semotilus atromaculatus*
Quillback *Carpiodes cyprinus*
Highfin Carpsucker *Carpiodes velifer*
White Sucker *Catostomus commersoni*
Creek Chubsucker *Erimyzon oblongus*
Lake Chubsucker *Erimyzon sucetta* *
Sharpfin Chubsucker *Erimyzon tenuis* *
Northern Hog Sucker *Hypentelium nigricans*
Spotted Sucker *Minytrema melanops*
River Redhorse *Moxostoma carinatum*
Suckermouth Redhorse *Moxostoma pappillosum*
Blacktail Redhorse *Moxostoma poecilurum*
Smallfin Redhorse *Moxostoma robustum*
Striped Jumprock *Moxostoma rupiscartes*
White Catfish *Ictalurus catus*
Yellow Bullhead *Ictalurus natalis* *
Brown Bullhead *Ictarulus nebulosus* *
Flat Bullhead *Ictarulus platycephalus*
Channel Catfish *Ictarulus punctatus* *
Tadpole Madtom *Notorus gyrinus* *
Speckled Madtom *Notorus leptacanthus* *
Pirate Perch *Aphredoderus sayanus* *
Banded Topminnow *Fundulus cingulatus*
Marsh Killifish *Fundulus confluentus*
Mummichog *Fundulus heteroclitus*
Striped Killifish *Fundulus majalis*
Starhead Topminnow *Fundulus notti* *
Pygmy Killifish *Leptolucania ommata*
Mosquito Fish *Gambusia affinis* *
Least Killifish *Heterandria formosa*
Brook Silverside *Labidesthes sicculus* *
Striped Bass *Morone saxatilis*
Mud Sunfish *Acantharchus pomotis*
Rock Bass *Ambloplites rupestri*
Flier *Centrachus macropterus* *
Everglades Pygmy Sunfish *Elassoma evergladei* *
Okefenokee Pygmy Sunfish *Elasomma okefenokee**
Banded Pygmy Sunfish *Elassoma zonatum* *

Table 2. (cont)

Blackbanded Sunfish *Enneacanthus chaetodon*
Bluespotted Sunfish *Enneacanthus gloriosus* *
Banded Sunfish *Enneacanthus obesus*
Redbreast Sunfish *Lepomis auritus* *
Green Sunfish *Lepomis cyanellus*
Warmouth *Lepomis gulosus* *
Bluegill *Lepomis macrochirus* *
Dollar Sunfish *Lepomis marginatus* *
Longear Sunfish *Lepomis megalotis* *
Redear Sunfish *Lepomis microlophus*
Spotted Sunfish *Lepomis punctatus* *
Largemouth Bass *Micropterus salmoides* *
White Crappie *Pomoxis annularis*
Black Crappie *Pomoxis nigromaculatus*
Naked Sand Darter *Ammocrypta beani*
Savannah Darter *Etheostoma fricksium*
Swamp Darter *Etheostoma fusiforme* *
Harlequin Darter *Etheostoma histrio*
Christmas Darter *Etheostoma hopkinsi*
Johnny Darter *Etheostoma nigrum*
Tessellated Darter *Etheostoma olmstedi*
Goldstripe Darter *Etheostoma parvipinne*
Cypress Darter *Etheostoma proeliare*
Sawcheek Darter *Etheostoma serriferum*
Banded Darter *Etheostoma zonale*
Yellow Perch *Perca flavescens*
Logperch *Percina caprodes*
Blackbanded Darter *Percina nigrofasciata*
Banded Sculpin *Cottus carolinae*

that the reasons for the endangered status of the Shortnose Sturgeon include the damming of large tidal rivers. As stated previously, the administrative record confirms that the Hurricane Creek floodplain is open to the migration of anadromous and catadromous fish species. If the Shortnose Sturgeon does utilize the area of Hurricane Creek which would be upstream of the impoundment, the construction of a dam would block its normal passage.

3. Reptiles

Table 3 identifies reptile species that are either known to occur, or can reasonably expected to occur, in the area of the proposed Lake Alma project, including the proposed mitigation sites. The table recognizes 57 species of snakes, lizards, turtles, and other reptiles that are commonly observed in areas with habitat characteristics like those exhibited in the proposed project impact area. Of those 57 species, 16 species have been positively identified as occurring in the impact area. The remaining 41 species are known to utilize areas during all or part of their life cycles exhibiting habitat characteristics (*e.g.,* food sources, cover, climate and other physical requirements) like those of the impact area. On this basis these fauna can reasonably be expected to be present in the project area during at least a part of the year. Two reptile species of particular importance that are known to posses habitat requirements like those provided by the project area are the American Alligator and the Eastern Indigo Snake, which are included on the Federal list of threatened species. This list was reviewed for accuracy by Mr. Wynne Seyles of the Savannah Science Museum in Savannah, Georgia.

4. Amphibians

Table 4 identifies amphibian species that are either known to occur or can reasonably expected to occur, in the area of the proposed Lake Alma project, including the proposed mitigation sites. The table recognizes 38 species of salamanders, frogs, toads, and other amphibians that are commonly observed in areas with habitat characteristics like those exhibited in the proposed project impact area. Of those 38 species, 16 species have been positively identified as occurring in the impact area. The remaining 22 species are known to utilize areas during all or part of their life cycles exhibiting habitat characteristics (*e.g.,* food sources, cover, climate and other physical requirements) like those of the impact area. On this basis these fauna can reasonably be expected to be present in the project area during at least a part of the year. Species of particular importance that are known to possess breeding requirements for habitat comparable to habitat found in the project site are the Striped Newt, the Florida Gopher Frog, and the Flatwoods Salamander. This list was reviewed for accuracy by Mr. Wynne Seyles of the Savannah Science Museum in Savannah, Georgia.

Table 3. Reptile Species possibly occurring or known to occur in the proposed Lake Alma site including proposed mitigation sites

* = species known to occur within project site

American Alligator *Alligator mississippiensis* *
Common Snapping Turtle *Chelydra serpentina* *
Eastern Mud Turtle *Kinosternon subrubrum subrubrum* *
Striped Mud Turtle *Kinosternon bauri*
Loggerhead Musk Turtle *Sternotherus minor*
Stinkpot *Sternotherus odoratus* *
Florida Cooter *Chrysemys floridana floridana* *
Yellow-bellied Turtle *Chrysemys scripta scripta* *
Eastern Chicken Turtle *Deirochelys reticularia reticularia*
Spotted Turtle *Clemmys guttata*
Gopher Tortoise *Gopherus polyphemus* * (sandhills)
Eastern Box Turtle *Terrapene carolina*
Florida Softshell Turtle *Trionyx ferox* *
Gulf Coast Spiny Softshell Turtle *Trionyx spiniferus*
Green Anole *Anolis carolinensis*
Southern Fence Lizard *Sceloporus undulatus undulatus*
Six-lined Race Runner *Cnemidophorus sexlineatus sexlineatus*
Five-lined Skink *Eumeces fasciatus*
Northern Mole Skink *Eumeces egregius similis*
Southeastern Five-lined Skink *Eumeces inexpectus*
Broad-headed Skink *Eumeces laticeps* *
Ground Skink *Scincella lateralis*
Eastern Slender Glass Lizard *Ophisaurus attenuatus*
Eastern Glass Lizard *Ophisaurus compressus*
Mimic Glass Lizard *Ophisaurus mimicus*
Northern Scarlet Snake *Cemophora coccinea copei*
Southern Black Racer *Coluber constrictor priapus*
Southern Ringneck Snake *Diadophis punctatus punctatus*
Eastern Indigo Snake *Drymarchon corais couperi*
Corn Snake *Elaphe guttata*
Yellow Rat Snake *Elaphe obsoleta quadrivittata*
Eastern Mud Snake *Farancia abacura abacura* *
Rainbow Snake *Farancia erytrogramma* *
Eastern Hognose Snake *Heterodon platyrhinos*
Southern Hognose Snake *Heterodon simus*
Common Eastern Kingsnake *Lampropeltis getulus getulus* *
Scarlet Kingsnake *Lampropeltis triangulum elapsoides* *

Table 3. (cont)

Eastern Coachwhip *Masticophis flagellum flagellum*
Red-bellied Water Snake *Nerodia erythrogaster*
Banded Water Snake *Nerodia fasciata fasciata* *
Brown Water Snake *Nerodia taxisplota* *
Northern Red-bellied Snake *Storeria occipitomaculata occipitomaculata*
Eastern Garter Snake *Thamnophis sirtalis sirtalis*
Rough Earth Snake *Virginia striatula*
Eastern Smooth Earth Snake *Virginia valeriae valeriae*
Eastern Cottonmouth *Agkistrodon piscivorus* *
Eastern Diamondback rattlesnake *Crotalus adamanteus*
Canebrake Rattlesnake *Crotalus horridus*
Dusky Pygmy Rattlesnake *Sistrurus miliarus barbouri*
Rough Green Snake *Opheodrys aestivus*
Florida Pine Snake *Pituophis melanoleucus mugitus*
Eastern Glossy Water Snake *Reginia rigida rigida*
Swamp Snake *Seminatrix pygaea*
Florida Brown Snake *Storeria dekayi victa*
Eastern Coral Snake *Micrurus fulvius*
Peninsula Ribbon Snake *Thamnophis sauritus sackeni*
Southern Crowned Snake *Tantilla coronata*

Table 4. Amphibian Species possibly occurring or known to occur in the proposed Lake Alma site including proposed mitigation sites

* = species known to occur within project site

Greater Siren *Siren lacertina*
Eastern Lesser Siren *Siren intermedia intermedia*
Dwarf Siren *Pseudobranchus striatus*
Two toed Amphiuma *Amphiuma means* *
Central Eastern Newt *Notophthalmus viridescens lousianensis*
Striped Newt *Notophthalmus perstriatus*
Flatwoods Salamander *Ambystoma cingulatum*
Spotted Salamander *Ambystoma maculatum*
Marbled Salamander *Ambystoma opacum* *
Mole Salamander *Ambystoma talpoideum*
Eastern Tiger Salamander *Ambystoma tigrinum tigrinum*
Southern Dusky Salamander *Desmognathus auriculatus*
Gulf Coast Mud Salamander *Pseudotriton montanus flavissimus*
Slimy Salamander *Plethodon glutinosus* *
Southern Two-lined Salamander *Eurycea bislineata cirrigera*
Three-lined Long-tailed Salamander *Eurycea longicauda guttolineata*
Dwarf Salamander *Eurycea quadridigitata* *
Eastern Spadefoot *Scaphiopus holbrooki*
Oak Toad *Bufo quercicus* *
Southern Toad *Bufo terrestris* *
Southern Cricket Frog *Acris gryllus* *
Southern Gray Treefrog *Hyla versicolor* chrysoscelis *
Green Treefrog *Hyla cinerea* *
Spring Peeper *Hyla crucifer* *
Pine Woods Treefrog *Hyla femoralis* *
Barking Treefrog *Hyla gratiosa*
Squirrel Treefrog *Hyla squirellla*
Southern Chorus Frog *Pseudacris nigrita*
Ornate Chorus Frog *Pseudacris ornata*
Little Grass Frog *Limnaoedus ocularis* *
Eastern Narrow-mouthed Toad *Gastrophryne carolinensis* *
Florida Gopher Frog *Rana areolata*
Bullfrog *Rana catesbeiana* *
Bronze Green Frog *Rana clamitans clamitans* *
Pig Frog *Rana grylio*
River Frog *Rana heckscheri*
Southern Leopard Frog *Rana sphenocephala* *
Carpenter Frog *Rana virgatipes*

5. Birds

Table 5 identifies bird species that are either known to occur, or can reasonably be expected to occur, in the area of the proposed Lake Alma project, including the proposed mitigation sites. The table recognizes 159 species of ducks, hawks, herons, warblers, and other birds that are commonly observed in areas with habitat characteristics like those exhibited in the proposed project impact area. Of those 159 species, 84 species have been positively identified as occurring in the impact area. The remaining 75 species are known to utilize areas during all or part of their life cycles exhibiting habitat characteristics (*e.g.,* food sources, cover, nesting sites and other physical requirements) like those of the impact area. On this basis these fauna can reasonably be expected to be present in the project area during at least a part of the year. The table is divided into two major groupings: those species that preferentially use river swamps/bottomlands in the southeastern Georgia area during some portion of the year and those species that use such habitat, but generally not preferentially. Each major grouping reflects species under one of two headings: actually observed at the project site, or possibly found at the project site based upon normal range and preferences.

Table 5. Bird Species possibly occurring or known to occur in the proposed Lake Alma site including proposed mitigation sites

	Species that use swamps/ bottomlands preferentially		Species that may use swamps/ bottomlands non-preferentially	
Species	Observed	Possible	Observed	Possible
Pied-billed Grebe			x	
Double-crested Cormorant				x
Anhinga	x			
Great Blue Heron	x			
Green-backed Heron	x			
Little Blue Heron			x	
Cattle Egret			x	
Great Egret			x	
Snowy Egret			x	
Yellow-crowned Night Heron	x			
Wood Stork	x			
White Ibis	x			
Mallard		x		
American Black Duck		x		
Gadwall		x		
Northern Pintail				x
Green-winged Teal		x		
Blue-winged Teal				x
American Wigeon				x
Wood Duck	x			
Ring-necked Duck				x
Hooded Merganser		x		
Turkey Vulture			x	
Black Vulture			x	
Swallow-tailed Kite		x		
Mississippi Kite		x		
Sharp-shinned Hawk			x	
Cooper's Hawk			x	
Red-tailed Hawk			x	
Red-shouldered Hawk	x			
Broad-winged Hawk			x	
Bald Eagle		x		
Osprey				x
American Kestrel			x	
Northern Bobwhite			x	
Wild Turkey			x	

Table 5. Bird Species (cont)

Species	Species that use swamps/ bottomlands preferentially		Species that may use swamps/ bottomlands non-preferentially	
	Observed	Possible	Observed	Possible
King Rail	x			
Virginia Rail		x		
Sora				x
Yellow Rail				x
Purple Gallinule		x		
Common Moorhen				x
Solitary Sandpiper		x		
Spotted Sandpiper		x		
American Woodcock	x			
Common Snipe			x	
Mourning Dove			x	
Yellow-billed Cuckoo			x	
Black-billed Cuckoo			x	
Barn Owl				x
Eastern Screech-Owl			x	
Great Horned Owl			x	
Barred Owl	x			
Long-eared Owl				x
Northern Saw-whet Owl				x
Chuck-will's-widow			x	
Whip-poor-will			x	
Common Nighthawk			x	
Ruby-throated Hummingbird			x	
Belted Kingfisher	x			
Northern Flicker			x	
Pileated Woodpecker			x	
Red-bellied Woodpecker			x	
Red-headed Woodpecker		x		
Yellow-bellied Sapsucker			x	
Hairy Woodpecker			x	
Downy Woodpecker			x	
Eastern Kingbird			x	
Great Crested Flycatcher			x	
Eastern Phoebe			x	
Acadian Flycatcher	x			

Table 5. Bird Species (cont)

Species	Species that use swamps/ bottomlands preferentially		Species that may use swamps/ bottomlands non-preferentially	
	Observed	Possible	Observed	Possible
Eastern Wood-Pewee			x	
Tree Swallow				x
Northern Rough-winged Swallow		x		
Blue Jay			x	
American Crow			x	
Fish Crow	x			
Carolina Chickadee			x	
Tufted Titmouse			x	
White-breasted Nuthatch				x
Brown Creeper				x
House Wren				x
Winter Wren			x	
Bewick's Wren				x
Carolina Wren	x			
Gray Catbird			x	
Brown Thrasher			x	
American Robin			x	
Wood Thrush	x			
Hermit Thrush			x	
Swainson's Thrush		x		
Gray-cheeked Thrush				x
Veery		x		
Eastern Bluebird			x	
Blue-gray Gnatcatcher			x	
Golden-crowned Kinglet				x
Ruby-crowned Kinglet			x	
Cedar Waxwing			x	
White-eyed Vireo	x			
Yellow-throated Vireo				x
Solitary Vireo				x
Red-eyed Vireo			x	
Black-and-white Warbler			x	
Prothonotary Warbler	x			
Swainson's Warbler		x		
Worm-eating Warbler				x

Table 5. Bird Species (cont)

Species	Species that use swamps/ bottomlands preferentially		Species that may use swamps/ bottomlands non-preferentially	
	Observed	Possible	Observed	Possible
Golden-winged Warbler				x
Blue-winged Warbler				x
Bachman's Warbler		x		
Tennessee Warbler				x
Orange-crowned Warbler				x
Northern Parula Warbler	x			
Yellow Warbler		x		
Magnolia Warbler				x
Cape May Warbler				x
Black-throated Blue Warbler				x
Yellow-rumped Warbler				x
Black-throated Green Warbler				x
Cerulean Warbler		x		
Blackburnian Warbler				x
Yellow-throated Warbler		x		
Chestnut-sided Warbler				x
Bay-breasted Warbler				x
Blackpoll Warbler				x
Pine Warbler			x	
Kirtland's Warbler				x
Prairie Warbler				x
Palm Warbler			x	
Ovenbird				x
Northern Waterthrush		x		
Louisiana Waterthrush	x			
Kentucky Warbler	x			
Common Yellowthroat			x	
Connecticut Warbler				x
Yellow-breasted Chat			x	
Hooded Warbler	x			
American Redstart				x
Red-winged Blackbird			x	
Orchard Oriole	x			
Northern Oriole			x	
Rusty Blackbird		x		

Table 5. Bird Species (cont)

Species	Species that use swamps/ bottomlands preferentially		Species that may use swamps/ bottomlands non-preferentially	
	Observed	Possible	Observed	Possible
Common Grackle			x	
Brown-headed Cowbird			x	
Scarlet Tanager				x
Summer Tanager				x
Northern Cardinal			x	
Rose-breasted Grosbeak				x
Evening Grosbeak				x
Purple Finch				x
Pine Siskin				x
Rufous-sided Towhee			x	
Bachman's Sparrow				x
Dark-eyed Junco				x
White-crowned Sparrow				x
White-throated Sparrow				x
Fox Sparrow				x
Lincoln's Sparrow				x
Swamp Sparrow			x	
Song Sparrow			x	

Description of Table:

This table is extracted from Table B-15 of the supplemental environmental impact statement for the proposed Lake Alma project. Species have been eliminated which are 1. presumed extinct (*i.e.*, Ivory-billed Woodpecker), 2. introduced "pest" species, and 3. not likely to be found in the river swamp/bottomland habitat of the proposed project site. No species have been added.

Species are listed in the order of, and using the nomenclature of, the American Birding Association Checklist, Second Edition (1982). Habitat information was based upon Gulf South Research Institute (*i.e.*, Table B-15), Field Guide to the Birds of North America, second edition (National Geographic Society), and A Field Guide to the Birds East of the Rockies (Roger T. Peterson, 1980). Observation data from Gulf South Research Institute (Table B-16; "Bay Swamp" and "Branch Swamp") and Milton N. Hopkins, Jr. (transmittal of December 3, 1988).

IV. ADVERSE IMPACTS OF PROPOSED ACTION

This Final Determination concerns waters of the United States affected by the proposed impoundment known as Lake Alma and activities proposed as mitigation for adverse environmental impacts thereof. Review of the Recommended Determination and the administrative record pertaining to this case confirms that Region IV's Recommended Determination accurately reflects the adverse impacts of the proposed project and mitigation plan. Section V of the Recommended Determination, ADVERSE IMPACTS OF PERMIT ISSUANCE(pages 6-8), is hereby adopted as part of this Final Determination. Below is a summary of the adverse environmental impacts which would result with implementation of the proposed project and mitigation plan. This summary is based on the Recommended Determination and administrative record.

A. DIRECT IMPACTS:

Implementation of the proposed Lake Alma recreational lake project would initially involve the destruction and removal of all vegetation within the Hurricane Creek floodplain project site. Clearing of vegetation from the project area would be complete except for approximately 200 acres of forested wetlands at the northern end of the project site where water-tolerant trees would be selectively protected. Within the mitigation sites, removal of vegetation would also be selective, leaving only hard mast species. The majority of vegetation present in the mitigation reservoir sites would be removed. Reservoir clearing activities would result in the direct destruction and loss of approximately 957 acres of productive bottomland hardwood wetland habitat and would significantly reduce the wetland habitat functional values of approximately 200 more acres. Implementation of the proposed mitigation plan would destroy approximately 35 acres of functional wetland habitat while creating 23 acres of wetlands of unknown quality, resulting in a net physical loss of 12 acres of vegetated wetlands. As a direct result of clearing, less mobile wildlife species unable to escape from the project area would likely perish in the preparation of the proposed lake site for inundation. Although the degree of impact to wildlife would vary with the season, direct loss of arboreal, terrestrial and aquatic species from the physical impact of clearing would be profound. Further, elimination of the vegetation would effectively halt leaf production in the impoundment area and thereby eliminate the principal biologic source for critical elements of nutrient cycling in the wetland system.

As noted previously, the administrative record supports the assertion that current bay and branch swamp communities in the proposed project impact site exhibit important and diverse habitat values for wildlife. The area provides food, cover, and water and reflects the classic "ecotone" for habitat with a high species abundance and diversity, and currently supports a broad diversity of vegetated wildlife habitat in bay and branch swamp communities adapted to a pulsed hydrologic regime. Implementation of the Lake Alma project as proposed would destroy or adversely affect

those values in a large portion of the Hurricane Creek forested wetland floodplain. Elimination of the vegetated canopy of present bay and branch swamp communities would remove the damping effect those communities have on floodplain habitat micro-climatic conditions. Clearing of the vegetation from the floodplain would result in the loss of trees and shrubs which provide protection, resting, breeding, denning, roosting and spawning areas for a variety of terrestrial, arboreal and aquatic wildlife. The removal of mast producing vegetation from the majority of the Hurricane Creek floodplain area would reduce the available food source for a broad range of wildlife species. Finally, clearing of the Lake Alma project site would also remove the standing dead trees and snags important as resting, nesting and denning habitat for numerous wildlife species.

In addition to the wildlife habitat losses associated with the destruction of the vegetated wetlands in the project site, the physical blocking of Hurricane Creek by the dam structure and the alteration of the habitat along a seven and two-tenths mile section of Hurricane Creek will have significant effects on the ability of the floodplain to function as a corridor or pathway for the movement of wildlife species. The linear vegetated riparian zone along Hurricane Creek provides an integral link in a protective wetland corridor for the dispersal, movement and migration of mammals and birds among wildlife habitat in the watershed of Hurricane Creek and associated watersheds of tributaries to the Satilla River. The placement of a 25 foot high dam structure in the floodplain would present a substantial physical obstruction to the migration of mammal and fish species which may currently simply pass through the area and which would be directly affected by the proposed project. Further, the creation of a seven and two tenths mile long stretch of flat water with only limited vegetated buffer areas would undoubtedly hinder the passage of terrestrial mammals as well as bird species, although to a lesser degree.

1. Mammals

Construction of the proposed recreational reservoir would essentially destroy currently available habitat for a majority of mammal species likely to occur or occurring in the project area. Clearing of the vegetated Hurricane Creek floodplain and subsequent impoundment of waters would destroy habitat for the following mammal species: Opossum, Southeastern Shrew, Shorttail Shrew, Least Shrew, Eastern Mole, Little Brown Myotis, Eastern Pipistrel, Big Brown Bat, Red Bat, Seminole Bat, Hoary Bat, Eastern Yellow Bat, Evening Bat, Eastern Big-eared Bat, Mexican Freetail Bat, Armadillo, Eastern Cottontail, Marsh Rabbit, Eastern Gray Squirrel, Eastern Fox Squirrel, Southern Flying Squirrel, Southeastern Pocket Gopher, Marsh Rice Rat, Eastern Harvest Mouse, Oldfield Mouse, Cotton Mouse, Golden Mouse, Hispid Cotton Mouse, Eastern Wood Rat, Pine Vole, Black Rat, Norway Rat, House Mouse, Coyote, Red Fox, Gray Fox, Black Bear, Raccoon, Longtail Weasel, Striped Skunk, Florida Panther, Bobcat, Wild Boar, and Whitetail Deer. The proposed impoundment would

also substantially reduce the available habitat for the following species: Beaver, Muskrat, Mink, and River Otter.

In summary, the removal of the majority of the vegetation from the Hurricane Creek floodplain and subsequent creation of a 1,400 acre lake would destroy habitat for a significant number of mammal species of wildlife and substantially reduce habitat for remaining species. Creation of the recreational lake would totally eliminate habitat for all but a few resident mammal species and would preclude migration into the area by others. In addition, creation of the recreational lake would severely limit the dispersal, movement and migration of terrestrial mammals. The proposed lake would not provide habitat for these mammals.

2. Fish

Impact assessments contained in the supplemental environmental impact statement of fish populations in the affected portions of Hurricane Creek indicate that, of the limited species collected by the Gulf South Research Institute, the American Eel and the Speckled Madtom would be adversely impacted. According to the supplemental environmental impact statement the Speckled Madtom would experience "serious damage," and the American Eel would be eliminated from the site as a result of the proposed action. The supplemental environmental impact statement concludes that all other species collected would experience either minimal or no impact from the proposed project, but does not offer impact assessments for those species of fish which were not collected but which are likely to occur in the area. It is reasonable to assume, however, that inundation of the present aquatic complex would significantly alter the species composition of the affected area. The managed game fishery proposed for the recreational impoundment would eliminate the balanced indigenous fish population of Hurricane Creek and replace them with a less diverse population more typically adapted to life in a relatively static flat-water aquatic system. Further, and certainly significant, the construction of the dam would close the open aquatic pathway currently available for the natural movement and migration of fish species such as the American Eel, herring, shad, and possibly the Shortnose Sturgeon.

3. Reptiles

Wildlife assessments in the supplemental environmental impact statement indicate that of the species of reptiles that are likely to be found in the project area, or have been positively identified as occurring in the project area, a majority would experience moderate to serious habitat damage as a result of the vegetation removal and subsequent permanent flooding of the floodplain. According to the supplemental environmental impact statement, the American Alligator, which is on the list of Federally threatened species, would experience adverse impacts from initial clearing and construction activities.

Table 3 also lists other reptile species which could be adversely affected by the proposed impoundment, including the Eastern Indigo Snake, which is listed by the USFWS as a Federally threatened species. Because this species has been shown to spend part of its life cycle in the heavily vegetated areas of forested wetlands, inundation of these areas by the proposed impoundment would eliminate critical portion of habitat for this species. Other reptile species which could also be adversely impacted by the proposed project, particularly by the loss of suitable breeding habitat, include the Loggerhead Musk Turtle and the Gulf Coast Spiny Softshell Turtle.

Generally, clearing of the floodplain vegetation prior to inundation would eliminate available habitat for protection and resting of arboreal lizards and skinks, and would decrease the success of snake species which utilize vegetation as a base for attacking aquatic prey species. Further, inundation of the floodplain floor would significantly reduce available habitat for ground dwelling turtles and snakes. In summary, removal of vegetation and subsequent inundation of the floodplain would substantially reduce the overall amount of habitat available for use by reptiles and would decrease the suitability of the site for specific uses such as breeding.

4. Amphibians

Destruction of the diverse forested wetland system by implementation of the proposed project would significantly reduce the available habitat for amphibian species. By the very nature of amphibian life requirements for both land and water habitats, amphibians in the project area would be adversely impacted by implementation of the project. The present pulsed hydrology of the Hurricane Creek floodplain produces ephemeral aquatic habitat which in turn provides abundant safe breeding and nesting habitat for amphibians. In contrast, the proposed impoundment would have limited available habitat to support amphibian species. As a result of the loss of the temporary pond habitat, amphibian species such as the Striped Newt, Flatwoods Salamander, and Florida Gopher Frog would experience a major loss of suitable breeding habitat and, if present, would be eliminated from the project site. Other adverse impacts to amphibian species include: the clearing of the vegetation and dead wood from the floodplain, which would eliminate available resting, escape and cover habitat for amphibian species; and the creation of the recreational lake managed for the enhancement of predatory fish species which would markedly increase predation on amphibian species. In summary, the proposed project would decrease the overall availability of habitat for which amphibians are particularly suited and would specifically impair the suitability of the area as breeding habitat for selected species. These habitat losses, in association with increased mortality due to fish predation, would decrease both the diversity of amphibian species and the number of individuals utilizing the area.

5. Birds

Clearing of the vegetation from the Lake Alma site would eliminate habitat for a significant number of bird species which utilize the floodplain during some part of their life cycle. Those species listed in Table 5 as preferentially using bottomland hardwood sites would experience the greatest adverse impact from the loss of the bottomland habitat. These include what are referred to as "interior" or "area-sensitive" species, which are species that are intolerant of the effects of impacts such as roads and clearings. Examples of such species include, Swallow-tailed Kite, Red-shouldered Hawk, White-eyed Vireo, Prothonotary Warbler, Bachman's Warbler, and Swainson's Warbler. These interior species are habitat specialists that depend upon bottomland hardwood forests and swamps for virtually all aspects of their life cycle. Destruction of the Hurricane Creek forested wetland system and conversion of the area into open water would render the area unsuitable as habitat for these species. Because of continued loss of bottomland hardwood habitat throughout the southeast U.S., many of the interior species adapted to that habitat have experienced significant declines in both range and population.

In addition to adverse impacts to interior species, birds with more general habitat requirements would also be adversely affected by the proposed project. The forested wetlands of Hurricane Creek provide breeding and foraging habitat for many species of wading birds, ducks, raptors, woodpeckers, game birds, and passerines. The area provides breeding habitat for colony nesting birds such as herons and egrets, as well as snags for cavity nesting species such as owls, woodpeckers, and many species of songbirds. By its very structure, the vertical stratification of the floodplain vegetation allows for substantial bird nesting and resting habitat without competition for territory. Further, because the productive tree species found in the Hurricane Creek bottomland hardwood wetlands provide a food source for a substantial population of herbivorous insects which feed on the tree leaves, they in turn provide a primary food source for a diverse population of bird species. This circumstance is particularly important to migratory species of waterfowl and neotropical migrants such as warblers, which utilize the rich insect fauna characteristic of these ecosystems during critical periods of their migration. In summary, implementation of the proposed recreational lake project would eliminate habitat critical to the life cycles of certain species, would decrease the ability of the area to support a considerable and diverse population of birds and would force many bird species to abandon the area for alternative habitats in surrounding areas.

B. SECONDARY AND CUMULATIVE IMPACTS:

In addition to the direct impacts of implementation of the Lake Alma project, the proposed recreational impoundment would have secondary impacts on ecosystems outside of the project area. As noted previously, on a regional scale, the importance of

the wildlife habitat values associated with the vegetated systems generally found in the proposed recreation and mitigation impoundment areas is highlighted by the other land uses in the surrounding area. The Hurricane Creek bottomland hardwood bay and branch swamp wetlands provide the majority of natural vegetated habitat in an area where urban, agricultural and pine plantation development dominate land use. The loss of these wetlands systems will alter local wildlife habitat availability and would decrease available food supply. Further, mobile species evicted from the project area by clearing of the land and inundation of the area would be forced to compete with other species outside of the project area for food and habitat. This situation would place increased stress on both the wildlife community and the supporting environment.

Placement of a dam structure in the Hurricane Creek floodplain would significantly modify the seasonal hydroperiod of Hurricane Creek. This occurrence would alter present organic export and could adversely affect food chain support for downstream fish and wildlife communities. Where there is a seasonal release of organic materials which accompanies the natural climatic events associated with a watershed, fish and wildlife communities downstream from that watershed tend to develop in a manner which reflects those events. Alteration of the hydrologic regime through management of water levels in the proposed impoundment would alter the current pulsed export of materials into the stream system. Because water level management in the proposed lake would be for control of nuisance aquatic growth and maintenance of suitable game fisheries populations, it is unlikely that the timing of large volume release events from the proposed impoundment would coincide with present natural high flow events for Hurricane Creek. Further, the alteration and restriction of input into downstream flow which would accompany the management of the impoundment could decrease water availability to downstream aquatic and wetland ecosystems. The likelihood of reduced input to downstream systems and possible dewatering of downstream systems would be increased by the enhanced loss of available water due to evaporation from the proposed lake surface, which would be greater than amounts which currently are lost from the forested system.

Bottomland hardwood wetland systems and the ecosystem functional values they support have declined significantly in the relatively recent past. Studies conducted by the USFWS reveal that during the period from the mid-fifties to the mid-seventies over five and one-half million acres of forested wetlands were destroyed in the southeast, accounting for 92 percent of the overall national loss of that wetland type during that same time period. Moreover, that same study showed that during that same time period, open water aquatic systems (especially man-made ponds and reservoirs) in the southeast increased by 500,000 acres. Another assessment, by Turner *et al. (1981)*, of the changes in bottomland hardwood systems in the southeast estimates that net losses in the region between 1960 and 1975 totaled 6.4 million acres. The same assessment indicates that while the greatest losses occurred in the lower Mississippi River valley, of the southeastern states on the Atlantic Coastal Plain, the state of Georgia lost more

acres of bottomland hardwoods than any other state. While the exact acreage of bottomland hardwood losses in the southeast is not crucial to this decision, the trends revealed by these figures are germane to the Lake Alma proposal due to the extent of losses that would be associated with the project, the relatively limited amounts of remaining habitat of the type to be lost, and the relative abundance of existing habitat of the type of aquatic environment which would be created by the proposed impoundment.

As indicated above, review of the Recommended Determination and the administrative record reveals that the proposed project would have significant direct adverse impacts to wildlife based on losses of wildlife habitat at the project site. However, this review also took into consideration the impacts of this project in conjunction with other discharges into wetlands of this type in the southeastern United States. Further because of the relatively large scope of the Lake Alma proposal, assessment of the overall environmental impacts of the project must address not only direct impacts of the discrete action, but must also recognize incremental and cumulative impacts which the proposal might have on associated aquatic environments. Recognition of the impacts of EPA's decision on directly associated ecosystems is important since these cumulative impacts would be in addition to the direct impacts. This information reinforces the gravity of the adverse environmental effects of the proposal although it is not dispositive.

C. MITIGATION:

The mitigation plan developed to compensate for adverse environmental impacts associated with the Lake Alma recreational impoundment falls substantially short of accounting for those impacts. As stated previously, the proposed mitigation plan is directed primarily at developing waterfowl habitat. Altnough some other wildlife would benefit peripherally from the plan, the mitigation plan calls for the construction of 1- discrete impoundments which would be constructed and managed predominantly for the benefit of selected duck species. Project-associated wildlife impacts to other important wildlife species, such as songbirds, mammals and amphibians, are not addressed by the mitigation plan. As such, the mitigation plan does not adequately account for wetland wildlife values which would be lost by construction of the proposed recreational lake.

The conclusion that the proposed mitigation would not adequately address adverse environmental impacts of the proposed project is confirmed by the USFWS study of the proposed mitigation plan. In developing the mitigation plan, in cooperation with the state of Georgia, the USFWS concluded that the "land acquisition of the scope necessary to accomplish total [wildlife impact] mitigation is not feasible." The USFWS also noted that based on their Habitat Evaluation Procedures, the method used to evaluate wildlife habitat values of a site, "approximately 7,246 acres of wooded swamp managed to the same degree as proposed or presently owned project lands would be

required to compensate for the total net wildlife loss incurred [as a result of the proposed project]." The USFWS further concluded that the impacts of the project, including the proposed mitigation plan, would result in a net loss of 87 percent of the wildlife habitat units currently available in the proposed project area. In other terms, the proposed mitigation plan would account for only 13 percent of the wildlife habitat values lost as a result of the construction of the proposed recreational impoundment.

The USFWS conclusions regarding the adequacy of the wildlife mitigation aspects of the proposed plan are particularly significant in light of the fact that the plan is directed primarily at offsetting some of the waterfowl habitat losses associated with the proposed project. Adverse impacts to other habitat functions associated with the existing vegetated Hurricane Creek floodplain (*i.e.*, use of the area as a migratory travel corridor or the benefits of the area for resting, breeding and nesting habitat for songbirds) were not addressed in development of the mitigation plan and would not be compensated by the plan. Further, the mitigation plan was designed to address only wildlife values lost to the proposed recreational impoundment and as such does not account for project-related impacts to other non-habitat wetland functions that are related to the §404(c) resources at issue.

As noted previously, in addition to adverse impacts to wildlife habitat, the proposed recreational impoundment will eliminate or limit other important functions associated with the Hurricane Creek bottomland hardwood wetland system. Wetland values which are now associated with the Hurricane Creek system, including food web support, detrital export, and modification of stream hydrology, would be adversely modified by the proposed impoundment and are not addressed by the mitigation plan.

In summary, the proposed mitigation plan for adverse environmental impacts associated with the Lake Alma impoundment does not adequately compensate for wildlife habitat losses which would be associated with implementation of the project. Further, the mitigation plan does not account for and would not compensate for the loss of other non-habitat functions and values associated with the bottomland hardwood wetland system in the Hurricane Creek floodplain.

V. CONCLUSIONS AND FINDINGS

This Final Determination under §404(c) of the Clean Water Act addresses unacceptable adverse effects to wildlife. The §404(c) regulations define an unacceptable effect as impact on an aquatic or wetland ecosystem which is likely to result in significant degradation of municipal water supplies or significant loss or damage to fisheries, shellfishing, or wildlife habitat or recreation areas. Under §231.2(e) of the §404(c) regulations, the evaluation of the unacceptability of such impacts should consider the relevant sections of the §404(b)(1) Guidelines.

Those portions of the Guidelines relating to significant degradation of waters of the United States (40 CFR 230.10(c)) and to the determination of cumulative effects on the aquatic ecosystem (40 CFR 230.11(g)) are of importance to evaluating the unacceptability of adverse environmental impacts in this case. Also germane to the evaluation of impacts in this case are potential impacts on biological characteristics of the aquatic ecosystem including aquatic organisms in the food web (40 CFR 230.31) and other wildlife (40 CFR 230.32), and impacts to wetlands (40 CFR 230.41). Compliance with the Guidelines requires that no discharge of dredged or fill material shall be permitted if it causes or contributes to significant degradation of waters of the United States. Effects contributing to significant degradation include, but are not limited to, damage or loss of fish and wildlife habitat or impairment or loss of the biological productivity of wetlands. Compliance with the Guidelines also requires consideration of information concerning secondary and cumulative impacts of the proposed action during the permit decision-making process.

Review of the Regional Recommended Determination and the administrative record for this case demonstrates that the sites for the proposed Lake Alma recreational impoundment and mitigation reservoirs exhibit wetland functions typical of forested bottomland hardwood wetlands in the coastal plain province of Georgia. The subject sites support wildlife habitat and contribute to the wildlife species diversity of the region. The sites also represent an important link in a forested wetland corridor which is significant to mobile species of the region and facilitates the processing and transport of nutrients in associated wetland and aquatic systems. As revealed in Section III.B., FISH AND WILDLIFE, of this Final Determination, the subject sites support a diverse and abundant wildlife assemblage in an area where land use is dedicated to urban, agricultural and managed silvicultural activities.

The administrative record confirms that the proposed Lake Alma project would have an adverse effect on a significant percentage of wildlife species using the subject sites. Further, the impacts associated with the loss of a substantial portion of the bottomland hardwood wetlands in the Hurricane Creek floodplain in Bacon County and the impacts of the elimination of an integral link in the forested wetland corridor which is generally undisturbed by major obstructions from the headwaters of Hurricane Creek

through the Alabaha and Satilla Rivers to the Atlantic Ocean, would have an adverse cumulative effect on wildlife habitat.

This Final Determination concludes that the proposed Lake Alma sites, including sites for proposed mitigation reservoirs, provide important wildlife habitat which would largely be eliminated if the sites are developed for the proposed impoundments. EPA has also determined that while available open water wildlife habitat in the southeastern United States has increased in recent times, a significant percentage of wildlife habitat associated with bottomland hardwood wetlands has been eliminated and the proposed Lake Alma project would exacerbate these circumstances particularly given its large scale and its setting. EPA therefore concludes that, considering the site specific and cumulative impacts, the discharge of dredged or fill material in connection with the construction or creation of any reservoir, lake or impoundment on described waters, including wetlands, of Hurricane Creek and unnamed tributaries to Hurricane Creek in Alma, Bacon County, Georgia, would result in unacceptable adverse effects to wildlife for the purposes of §404 of the Clean Water Act. This Final Determination therefore affirms the Regional Recommended Determination and restricts the designation of the subject waters of the United States as discharge sites for dredged or fill material. EPA's §404(c) action is based on adverse impacts of activities associated with creation of any reservoir, lake or impoundment on described waters, including wetlands, of Hurricane Creek and unnamed tributaries to Hurricane Creek and as such prohibits the placement of fill for that purpose. This Final Determination does not pertain to other types of filling activities. Other proposals involving the discharge of dredged or fill material on the wetland sites at issue will be evaluated on their merits within the Corps of Engineers §404 regulatory program.

_____ _____

Rebecca W. Hanmer
Acting Assistant Administrator
for Water

Date

RECOMMENDED 404(C) DETERMINATION TO WITHDRAW AND RESTRICT THE SPECIFICATION OR USE OF PORTIONS OF HURRICANE CREEK FLOODPLAIN AND PORTIONS OF UNNAMED TRIBUTARIES OF HURRICANE CREEK

I. SUMMARY

On July 16, 1988, EPA Region IV gave notice in the Federal Register (53 Fed. Reg. 26859) of its "Proposed 404(c) Determination to Withdraw, Deny or Restrict the Specification or Use of Portions of Hurricane Creek Floodplain and Portions of Unnamed Tributaries of Hurricane Creek." The waters of the United St es subject to the proposed 404(c) action include a segment of Hurricane Creek extending 7.2 miles upstream of a point approximately 4000 feet south of Georgia Highway 32 (the planned location of the main Lake Alma dam), certain unnamed tributaries flowing into Hurricane Creek, and the wetlands lying adjacent to both the creek segment and these tributaries. The announcement also provided notice of a public hearing on the Proposed Determination which was held in Alma, Georgia on August 30, 1988. As EPA Region IV Administrator, I designated Mr. Al Smith as the hearing officer for the public hearing.

I have considered the administrative record in this case, including comments received at the public hearing and during the public comment period, from federal, state, and local agencies, the public, and affected property owners. Following my review I have determined that the filling and inundating the above-described waters including wetlands in connection with the construction of Lake Alma in Bacon County would have unacceptable adverse effects on wildlife habitat, as more fully set forth below.

Under 40 CFR Part 231.5, I, therefore, recommend that EPA withdraw specification for the Corps of Engineers issued Section 404 Permit No. 074 OYN 003752 for discharges required for construction of Lake Alma. I further recommend that EPA restrict specification or use of the above described waters of the United States, including wetlands, as a disposal site for dredged or fill material in connection with the construction of any lake and greentree reservoirs in mitigation thereof pursuant to Section 404(c) of the Clean Water Act, (CWA).

II. LEGAL AUTHORITY

Under Section 404 of the CWA (33 U.S.C. 1251 et seq), any person who proposes to discharge dredged or fill material into the waters of the United States, including wetlands, must first obtain a permit from the Secretary of the Army, acting through the Chief of Engineers. However, CWA Section 404(c) authorizes the EPA Administrator to withdraw, prohibit and/or restrict any area defined by him if he determines after notice and opportunity for public hearing that discharges of dredged or fill material there would have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. EPA's procedures for implementing Section 404(c) are set forth in 40 CFR, Part 231.

Under §231.3 of the regulations, Section 404(c) proceedings begin when the Regional Administrator issues a proposed determination that a site should be prohibited, withdrawn, or restricted for use as a disposal site because of unacceptable adverse environmental effects. This proposed determination does not represent a judgment that discharge of dredged or fill material will result in unacceptable adverse effects; it merely means that the Regional Administrator believes that the issue should be explored. The Regional Administrator then consults with the Corps, if no corrective actions are agreed upon, he issues a public notice, inviting public comments on the proposed determination. The Corps has agreed that if there is a permit application pending, such notice will serve to stay its issuance of the permit.

If there is enough interest, the Regional Administrator or his designee holds a public hearing under §231.4 to supplement the public comments. After the comment period and the hearing, if one is held, the Regional Administrator or his designee reviews the information available to him and decides whether to withdraw his proposed determination to prohibit, restrict, or withdraw a site. If he withdraws the proposed determination, he gives public notice of that step, and the matter drops (unless the Administrator decides to review). Otherwise the Regional Administrator or his designee sends a "recommended determination," and the record on which it was based, to the Administrator for a "final determination." The Administrator or his designee then reviews that material, and makes a final determination whether a discharge of dredged or fill material will result in unacceptable adverse effects warranting the prohibition or restriction of the disposal site. This determination and reasons therefore are then made public.

These regulations define "unacceptable adverse effect" in Section 231.2(e) as:

> Impact on aquatic or wetland ecosystem which is likely to result in significant degradation of municipal water supplies or significant loss of or damage to fisheries, shellfishing, or wildlife habitat or recreation areas. In evaluating the unacceptability of such impacts, consideration should be given to the relevant portions of the Section 404(b)(1) Guidelines (40 CFR Part 230).

The preamble to 40 CFR Part 231 explains that one of the basic functions of Section 404(c) is to police the application of the Section 404(b)(1) Guidelines. Those portions of the Guidelines relating to significant degradation of waters of the United States (40 CFR 230.10(c)), as well as consideration of cumulative impacts (40 CFR 230.11(g)), are of particular importance in the evaluation of the unacceptability of environmental impacts in this case. Section 230.10(c) of the Guidelines requires that

no discharge of dredged or filled material will be permitted that contributes to significant degradation of waters of the United States. Section 230.10(d) requires that no discharge of dredged or fill material shall be permitted unless appropriate steps have been taken which will minimize potential adverse impacts. Within the decision-making process, Section 230.11(g) requires that the permitting authority collect, analyze, consider, and document information relevant to cumulative impacts resulting from the subject action. Thus, it is appropriate under Section 404(c) to take into account whether significant degradation of waters of the United States will occur as a result of individual and/or cumulative fill activities and whether appropriate steps have been taken to minimize adverse impacts.

The Administrator's Section 404(c) authority may be used either to veto a permit which the Corps has determined it would issue (as in the case of the mitigation application described below) or to withdraw an issued permit (as in the case of the 1981 permit for the reservoir construction noted below). Under his Section 404(c) authority, the Administrator may totally prohibit all discharges of dredged or fill material in a defined area or he may impose some partial prohibition, such as a restriction on discharges from a particular type of activity. This proposed Section 404(c) determination is limited to a prohibition on discharges resulting from lake and reservoir construction for the above mentioned sites, including withdrawal of the 1981 permit.

III. NATURE OF PROPOSED DISCHARGE (PROJECT DESCRIPTION)

As indicated above, the discharges being proposed are intended to create a recreational lake covering some 1400 acres by means of damming Hurricane Creek and thereby causing the flooding of adjacent tributary and wetland areas. In November 1981, the Corps of Engineers issued Section 404 Permit No. 074 OYN 003752 to the applicant, City of Alma/Bacon County, for discharges required for construction of an earthen dam and spillway. This permit authorized the discharge of 412,000 cubic yards of fill material into Hurricane Creek and its adjacent wetlands to create Lake Alma. The placement of fill and the resultant impoundment would have destroyed, stressed, or inundated approximately 1200 acres of floodplain wetlands and other waters.

Construction of the proposed lake was delayed, however, by a 1983 decision of the Eleventh Circuit Court of Appeals. This decision held that a Supplemental Environmental Impact Statement (SEIS) was required to evaluate the impacts of the proposed "greentree reservoirs" plan which had been developed to mitigate some of the adverse effects of lake construction (see "Project History" section below). After completion of this SEIS, the Corps of Engineers indicated its intent in May of this year to issue a second Section 404 permit to the City of Alma/Bacon County (Application No. 074 OYN 006129) authorizing

additional discharges needed to implement this mitigation plan.

This second permit would allow discharge of an additional 99,030 cubic yards of fill material for the purposes of constructing 14 earthen dams and an emergency access road. The proposed dams would create 14 greentree reservoirs (forested impoundments) with an aggregate surface area of approximately 194 acres in tributaries to Hurricane Creek. The purpose of the impoundments would be to provide partial mitigation for habitat losses that would result from impounding Hurricane Creek. The construction of these 14 greentree reservoirs would enhance approximately 137 acres of existing wetlands and create 23 acres of new wetlands, primarily to attract waterfowl. Additional habitat improvement is planned for the upland portions (714 acres) of the project site. However, 35 acres of existing wetlands would be filled or flooded by the greentree reservoirs and an additional .5 acre would be filled during construction of the emergency access road. Implementation of the mitigation plan would entail the net loss or degradation of 12.5 acres of existing wetlands.

IV. CHARACTERISTICS AND FUNCTIONS OF THE PROJECT SITE

Hurricane Creek, located in the Georgia coastal plain, is part of the Satilla River drainage system. The Creek drains a 228 square mile watershed which has been developed primarily for farming and forestry. The 1000- to 2000- foot wide floodplain is well defined but not deeply incised into the constituent sands and abundant organic matter. The main channel is often braided with three or four separate channels. Where the channel is defined it has an average width of 40 to 60 feet and a depth of 2 to 3 feet. Deeper pools retain water even during no-flow conditions. Mean daily flow in Hurricane Creek is estimated at 112 cubic feet per second (cfs); however, flows range from 0 cfs during extended droughts to peak flows of 4450 cfs (1953) or greater during storm events. The creek contains a diverse fish community (25 species) and a supporting snag and drift macroinvertebrate community.

The proposed Lake Alma site encompasses approximately 1350 acres of bottomland hardwoods, e.g., forested floodplain areas including the bay swamp community in the Hurricane Creek floodplain and branch swamp communities in the drainageways to Hurricane Creek (see Map 2). The wetlands along this 7.2 mile reach of the Creek are relatively undisturbed. As such, they provide high quality, diverse habitat for fish and wildlife, a travel corridor for upland and wetland animals, food web production for on-site and downstream biological communities, nutrient and pollutant uptake and assimilation, floodwater storage, and flow moderation. Additionally, they serve as an environment for outdoor activities including fishing, hunting, and bird watching as well as other nature-oriented activities.

The major floodplain plant communities include nearly mature bay swamp and branch swamp associations. The bay swamp community is located in the main floodplain of Hurricane Creek where soils consist primarily of alluvial deposits. The community is characterized by broadleaf evergreen and deciduous hardwood species that are adapted to periodic inundation. Overstory trees include sweetbay, loblolly bay, redbay, red maple, swamp blackgum, sweetgum, water oak, cypress, ogeechee plum, and black willow (see Attachment A).

The branch swamp communities are located in the drainageways leading to the main floodplain. They are similar in composition to the bay swamps but have a greater number of deciduous trees and shrubs and more abundant understory vegetation. Understory vegetation includes sweetpepper bush, greenbriar, honey suckle, privet, saw palmetto, and wildgrape. Pitcher plant bogs are located at the edge of the floodplain at sites where seepage from adjacent uplands occurs. The bogs contain trumpet pitcher plant and hooded pitcher plant which are classified as threatened within the State of Georgia. Adjacent to the floodplain are less diverse plant associations including sandhill, upland pine, pine plantation, and cleared or abandoned fields.

The forested wetlands which would be lost to project construction are part of an intact, functioning system that has specifically adapted to the pulsed hydrologic regime of Hurricane Creek and its tributaries. A variety of contiguous habitats are created within the floodplain by natural fluctuations in water levels including forested wetlands, braided stream channel, remnant pools, hummocks, and floodplain-upland interface. This segmentation of the environment allows the bottomland hardwoods to support aquatic, semiaquatic, and terrestrial animal communities. Vertical stratification of the forest canopy, subcanopy, and ground cover also contributes to habitat diversity. Hence, the floodplain is used by fish and wildlife as a resting, breeding, rearing, and feeding area as well as a travel corridor in an area surrounded by low quality wildlife habitat such as urban, agricultural, and pine plantation areas (see Attachments B and C).

In fact, the bulk of primary (plant) and secondary (animal) production is accomplished during the seasonal inundation of the creek swamp floodplain. Further, leaf biomass produced by the trees and shrubs provides the trophic basis for the diverse fish and wildlife communities both on the project site and downstream. The mixed hardwood tree community within the proposed project site is conducive to a diversity of wildlife because the tree species have various periods of fruition resulting in staggered mast (acorns and seeds) and fruit production. This makes food available for a variety of wildlife throughout the year. As these trees mature, their habitat value and food production will increase.

Wetlands in Hurricane Creek play a role in maintaining and/or improving water quality, as well as regulating water quantity. Pollutants from agricultural, silvicultural, and urban activities in the watershed are trapped, assimilated, or transformed within the diverse substrates and microclimates provided by the wetlands. Water temperatures in the creek and remnant pools are modulated by the shading effects of the forest canopy. Wetland trees and shrubs retard floodwaters, which are temporarily stored in the floodplain. This situation tends to decrease downstream flood stages. During drier times of the year, water stored in the spongy organic substrate of the wetlands is released, contributing to stream base flows.

As noted, creek swamps such as this gum-bay-maple assemblage are among the most productive wildlife habitats in the coastal plain. Moreover, they are becoming increasingly valuable due to the rate at which these freshwater forest communities are being lost in the Southeast through agricultural/silvicultural development, drainage projects, and impoundments. By recent estimates, over 7,300 acres of wetlands, mostly freshwater types, are being destroyed each year in the State of Georgia. Hence, the impacts of the Lake Alma Project cannot be viewed in isolation.

V. ADVERSE IMPACTS OF PERMIT ISSUANCE

Constructing the main dam, clearing the floodplain, and impounding Hurricane Creek to create an artificial lake will destroy or inundate a 1350-acre section of a productive floodplain forest and blackwater creek system. This loss represents approximately 35 percent of the total wetlands in the Bacon County portion of the Hurricane Creek watershed. Virtually all of the diverse forested habitat that now exists in the 7.2 mile reach of the floodplain will be destroyed. The proposed lake will physically eliminate all of the forest stream-pool habitat and the floodplain community which has adapted to periodic flooding. Wetlands immediately downstream from the dam would be partially dewatered by the proposed structure. Succession to more upland plant communities may eventually occur. Depending on the lake discharge regime, floodplain wetlands further downstream may be similarily affected. Reduction of detrital export will reduce overall productivity and/or alter species composition of downstream animal communities.

The dam and lake will permanently block the Hurricane Creek floodplain. Since the floodplain functions as a travel corridor for wildlife, this would disrupt animal and fish movement patterns. Animals currently living on the lake site or migrating through it will either be killed or forced into adjacent lower quality, upland habitat. There they will have to compete for available food and habitat with the present upland animal communities. This competition may result in temporary disruptions of animal communities and lowered overall population levels, thereby adversely affecting indigenous wildlife.

Although 230 acres of forested wetlands in the upstream end of the proposed reservoir and in several embayments will remain after being selectively timbered (a 75% reduction in tree stems) much of the present wetland value of this area will be destroyed or degraded especially after the remaining trees die from the effects of continuous flooding (3 to 6 foot depth). These areas then will function primarily as scrub-shrub backwater areas of the lake, subject to irregular drawdowns.

The existing forested wetlands will be replaced by a shallow recreational lake with a depth ranging from 3 to 19 feet that contains standing water habitat primarily for fish and bottom dwelling organisms. During the initial few years, the lake should be relatively productive, but thereafter lower productivity may limit its value as a sports fishery, unless the lake is intensively managed which includes significant drawdowns every seven years. These intensive management requirements may be inconsistent with other proposed uses of the lake. Moreover, it is anticipated that fish species diversity would decline and species composition change since the project would transform a stream fishery into a still water lake fishery. Approximately 180 acres at the periphery of the proposed lake may develop aquatic weed growth that should provide some habitat for aquatic and semiaquatic animals, but may limit the recreational value of the lake. However, anticipated weed control programs - - rimming, chemical applications and periodic drawdowns - - will reduce the value of this shallow water habitat.

EPA Region IV believes that the destruction of 1350 acres of relatively undisturbed bottomland hardwoods will constitute significant degradation of the waters of the United States. Forested wetlands and the valuable fish and wildlife habitat they provide have been rapidly declining in the Southeast during the last four decades. On the other hand, flatwater habitat, such as lakes, reservoirs, ponds, and mining pits, has increased. The anticipated wetlands loss represents a substantial portion of the wetlands in the Hurricane Creek watershed and is regionally significant.

While the unacceptable wildlife habitat losses serves as the primary basis of this recommended 404(c) determination, EPA Region IV has other concerns about the proposed project. These include the effects of nutrient loadings from the Hurricane Creek watershed on water quality in the proposed lake, especially during warm season, low flow periods; the effects of aquatic weed growth/die-out cycles on the water quality and the recreational value of the lake; and the effects over the long-term on downstream wetlands and stream communities from changes in flood regime and detrital export.

A mitigation plan has been developed which includes: 1) the construction of 14 small greentree reservoirs (194 acres of forested impoundments) in

drainageways adjacent to and upstream from the lake site, 2) tree plantings, a water management scheme to periodically flood and drain the impoundments. These forested impoundments are designed primarily to enhance or create waterfowl habitat, although other wildlife will also benefit.

Construction of the greentree reservoirs and an access road would destroy or permanently flood 35 acres of existing forested wetlands in the drainage ways. Only 23 acres of new wetlands would be created. The greentree reservoirs would have to be managed regularly and, almost certainly, would require a rigorous beaver control program to keep them functioning. Mast producing trees will be planted in the greentree reservoirs to improve food supplies for wildlife. However, these benefits will not be realized fully until the trees reach maturity many years after planting.

The 194 acres of habitat which the greentree reservoirs would either create or enhance represent only a very small portion of the wildlife habitat which the project would destroy. According to a 1978 Habitat Evaluation Procedure (HEP) conducted by the U.S. Fish and Wildlife Service, only 13 percent of the wetland habitat units lost by lake construction would be replaced by the mitigation plan. Most of the other functions and values of the forested floodplain wetlands, e.g., leaf litter export and travel corridor, etc., would not be replaced and would be irreparably lost. Although 714 acres of upland habitat surrounding the reservoir would be enhanced as part of the mitigation proposal, the enhancement of uplands will not replace any wetland habitat or other wetland functional losses associated with lake construction. Based on current information/data, EPA believes that it is not possible to mitigate for the loss of a 7.2 mile long floodplain corridor and its attendant functions and values.

VI. PROJECT HISTORY AND PROCEDURAL BACKGROUND

On December 15, 1976, the Final EIS on Lake Alma construction was published. EPA rated the project unsatisfactory based on its significant environmental impacts on wetlands and water quality, and referred the project to the Council on Environmental Quality (CEQ). On June 10, 1977, the Chairman of CEQ in letters to the applicant, City of Alma/Bacon County, and to the Department of Housing and Urban Development (HUD) concurred with EPA's position that the project would result in serious environmental degradation. CEQ recommended to HUD that project funds should be reprogrammed to more environmentally acceptable projects.

On January 16, 1978, EPA Regional Administrator John White recommended that the Corps of Engineers deny a Section 404 permit for the lake project

based on its nonconformance with 404(b)(1) guidelines, EPA's wetland policy, Executive Order 11990, and the expected adverse water quality impacts. U.S. Fish and Wildlife Service (FWS) and Bureau of Outdoor Recreation also recommended denial of this permit.

In 1976, FWS initiated studies to determine the mitigation necessary to offset the habitat losses resulting from the project. The report concluded that 7426 acres of wooded swamp would have to be managed intensively to compensate for these losses. Since this was considered impractical, FWS prepared a mitigation plan to mitigate some of the habitat losses. Based on the applicant's acceptance of this proposed plan, the FWS withdrew its objections to permit issuance in November, 1978. On November 15, 1979, CEQ reviewed the proposed mitigation plan and found it provided inadequate compensation. It then reaffirmed its earlier determination regarding the environmental unacceptability of the Lake Alma Project.

On August 8, 1980, EPA Assistant Administator E.C. Beck requested review of the Savannah District Engineer's favorable permit decision by the Assistant Secretary of the Army under the MOA per Section 404(q). However, on October 9, 1981, EPA Administrator Ann Gorsuch in a response to a letter from Assistant Secretary of the Army William Gianelli withdrew EPA's objections to permit issuance. Accordingly, on November 10, 1981, the Corps issued Army Permit No. 074 OYN 003752 for the construction of the dam for Lake Alma. The permit stipulated the development of mitigation based on the FWS Plan.

On December 19, 1983, the Eleventh Circuit Court of Appeals determined that a Supplemental EIS would be required to evaluate the impacts of the mitigation plan prior to the Corps 404 permit action required for construction of the greentree reservoirs. The court also enjoined lake construction pending completion of the Supplemental EIS.

In January and April 1986, EPA Region IV recommended that the Corps evaluate the impacts of the entire (lake/mitigation plan) project in the Supplemental EIS. Region IV also stated its intent to consider the total project in the reviewing process. On April 4, 1986, Regional Administrator Jack E. Ravan recommended denial of the Section 404 permit for the mitigation project as part of the unacceptability of the overall project. In January and November 1987, Region IV's comment letters on the Supplemental EIS reaffirmed a position opposing the project, and stated that if the Corps decided to issue the Section 404 permit then EPA would seriously consider 404(c) action.

On March 25, 1988, Regional Administrator Greer C. Tidwell met with representatives from the State of Georgia Department of Natural Resources, the Corps, and FWS to discuss EPA's objections to the project. Regional

Administrator Tidwell also met with representatives from the City of Alma and Bacon County on May 9, 1988, to tour the project site.

After receiving the Corps May 27, 1988, letter stating the Savannah District Engineer's intent to issue a Section 404 permit for the Lake Alma mitigation [illegible] Administrator Tidwell notified the Savannah District Engineer, the City of Alma, and Bacon County, on June 8 that he would initiate Sections 404(c) proceedings covering the entire project site unless it was demonstrated to him within 15 days that no unacceptable adverse effects would be caused by the project. After considering a June 15, 1988 letter from the Savannah District Engineer, Colonel Ralph V. Locurcio, restating the Corps' position that construction of Lake Alma would serve the public interest, the Regional Administrator initiated the proposed Section 404(c) action.

On June 28, 1988, Regional Administrator Greer C. Tidwell, in his response to Savannah District Engineer Colonel Ralph V. Locurcio, restated the Region IV position that such extensive loss of bottomland hardwood wetlands and their associated functions constitutes significant degradation of the waters of the United States under 40 CFR 230.10(c). Consequently, the Region had decided to proceed with the Section 404(c) action as outlined in the June 8, 1988 letter.

On July 15, 1988, EPA Region IV published in the Federal Register (53 Fed. Reg. 26859) a Proposed 404(c) Determination to Withdraw, Deny, or Restrict the Specification or Use of Portions of Hurricane Creek Floodplain and Portions of Unnamed Tributaries of Hurricane Creek and Announcement of a Public Hearing to be held in Alma, Bacon County, Georgia on August 30, 1988.

On July 15, 1988, Region IV sent by certified mail copies of the proposed 404(c) determination and public hearing announcement to the Savannah Corps District, the City of Alma, and the Bacon County Board of Commissioners. Copies were also sent to Georgia Department of Natural Resources and other affected agencies and parties. The applicant and affected property owners acknowledged receipt of the proposed 404(c) determination/public hearing announcement. As required in 40 CFR Part 231.3(d)(1) and (2), a copy of the notice of the proposed 404(c) determination/public hearing announcement was published in the Alma Times on July 21, 1988 and in the Savannah News on July 21, 1988 newspapers. In addition, copies of notice of the proposed determination/public hearing announcement were mailed to involved federal, state and local agencies, to interested local and state-wide conservation groups, and to other interested parties.

On August 30, 1988 Region IV held a public hearing in Alma, Georgia to solicit information and viewpoints on the proposed 404(c) action. Numerous speakers, including Alma-Bacon County public officials, GA DNR, USFWS, affected property owners, environmental groups, and other interested parties, were provided a forum in which to express their views.

A complete transcript of the public hearing proceedings is contained in Attachment E. However, a short summary of the concerns voiced by the 46 speakers is provided here. Of the 46 speakers, 22 opposed the 404(c) action and favored the construction of Lake Alma. Comments from these speakers included: the overwhelming need for the lake for recreation because of the lack of a large lake in the area and the need for the lake to further economic development; the lake would be a preferrable habitat and fishery than the existing wetlands; lack of understanding why EPA could oppose something supported by Corps and GDNR; and the inconsistency of EPA actions on other projects. Speakers against the lake raised concerns which included: the importance of the existing wetlands for hunting and fishing; the significance and cumulative impacts of such large bottomland hardwood losses; the value of a shallow lake for recreation and economic development; industry was being lost or not attracted for a multitude of other reasons; the area had numerous lakes and rivers nearby with a 1000 + acre lake within the SE quadrant and coastal areas a short drive away; and that the cost of construction and on-going maintenance would actually be a financial drain on the community, as was the case at several other lakes in the region, with a resultant tax burden.

EPA Region IV received a large number of written comments in response to the Region's proposed 404(c) determination during the public comment period both before and after the public hearing. Region IV received a total of 2242 letters and 3438 signatures in petitions in support of the proposed Regional action while 155 letters and 3583 petition forms were received opposing the proposed Regional action. Because of the large number of responses received, the concerns expressed and the Region's responses have been grouped. See Attachments D2-D5 for a response to the substantive comments. (The letters and petitions have been enclosed as part of the administrative record.)

The following briefly summarizes some of the concerns expressed in the letters. Concerns of those favoring the lake included: the need for the lake for recreation and fishing; the importance of the lake for attracting industry; the difficulty in accessing the existing wetlands and their lack of use; the ample wetlands in the region; why is EPA opposing something that the majority want; and the lake will be a better habitat than the creek. Those in opposition to the construction of the lake expressed concerns which included: the importance of these wetlands and the significance of their loss; the significant cumulative losses being experienced and the support for strong EPA action to protect wetlands; first-hand fishing and hunting experiences

in the wetlands; questioned the anticipated economic benefits of the lake, and it may become a local burden; questioned flat water recreational needs since opportunities were plentiful and many nearby lakes get sparse usage; loss of industries may be due to other reasons; and that the community has been divided by this issue too long and there is the need to pursue more positive objectives.

At the request of the attorneys representing the applicant, Alma-Bacon County, Region IV granted a six day extension of the public comment period until the close of business on September 19, 1988 (53 Fed. Reg. 36636). The extension was granted to afford every opportunity for adequate comment on a project with a voluminous record.

On September 16, 1988, Georgia DNR submitted a lengthy comment letter with technical enclosures which supplemented its statement made at the public hearing. The letter restates DNR's strong support for the lake and documents their rationale for preferring this lake over the existing wetlands. Many of its arguments revolve around the greater fishery potential of the lake and the consistency of this project with other DNR programs. Attachment D2 contains the DNR letter and Region IV's responses to its comments.

On September 19, 1988, the applicant through its Attorney submitted comments regarding the proposed 404(c) action on Lake Alma. Attachment D1 contains the letter and Region IV's response. The applicant contends that EPA cannot address the original permit decision because of the Circuit Court ruling in National Wildlife Federation v. Marsh and because of EPA policy and precedent. The applicant further claims that EPA's administrative record lacks sufficient information to meet the legal standard to use 404(c) to withdraw specification for the 1981 permit and to restrict specification for construction of the lake and OTRS. The Region, however, disagrees with these contentions. EPA believes that its authority to review the permit issuance is not limited by the Circuit Court decision, that it has acted in a manner consistent with its policy in reviewing the permit and that the record provides ample evidence of unacceptable adverse impacts on wildlife habitat to warrant use of Section 404(c) in this case.

VII. RECOMMENDED DETERMINATION

Section 404(c) authorizes different limitations on discharges which EPA may reflect through its actions on disposal site specifications. Where the facts warrant it, I may recommend that any defined area be withdrawn from specifications as a disposal site pursuant to Sections 404(a) and (b). If I should determine that the discharge of certain materials will have significantly less damaging effects than others, or that limiting discharges by amount, method and/or location will reduce the likelihood of unacceptable adverse effects, I may recommend that the use of specified site merely be restricted in some manner and/or that only a portion of the area under consideration be made the "defined area" subject to prohibition on specification.

After consideration of the entire record in this case I have determined that filling and inundating the subject waters, including wetlands, will have an unacceptable adverse effect on wildlife habitat.

I am hereby recommending that action be taken by EPA under Section 404 (c) of the Clean Water Act (CWA) to withdraw specification for the Corps of Engineers issued Section 404 Permit No. 074 OKN 003752 for discharges required for construction of Lake Alma. I am further recommending that EPA restrict specification or use of these above described waters of the United States, including wetlands, as a disposal site for dredged or fill material in connection with the construction of any lake and greentree reservoirs in mitigation thereof.

Greer C. Tidwell
Regional Administrator

10/5/88
DATE

Attachment D2

Response to Georgia Department of Natural Resources' (GDNR) Comments Raised at Alma Public Hearing and the September 16, 1988 Submitted Supporting Information

The Lake's Consistency with GDNR's Programs

According to the statements submitted by GDNR, the Department strongly supports Lake Alma because it would be consistent with and would complement recently initiated programs including: 1) a land aquisition program to purchase and manage new lands for wildlife including the purchase of critical wetlands; 2) an agressive waterfowl program to provide critical wintering waterfowl habitat; 3) a statewide wood duck box program to turn around a declining population of the State's only resident species of duck; and 4) a public fishing lake program. GDNR realizes the value of critical wetlands and is concerned about the decline of this type of habitat in Georgia. The proposed Lake Alma, especially the shallower portions, would fill a critical void of quality waterfowl habitat. GDNR's role, it was emphasized, is to protect wetlands critical to wintering waterfowl and to creat new wetlands to enhance existing habitat.

EPA fails to understand GDNR's twin objectives of trying to protect wetlands in the state while endorsing the destruction of 1200 acres of forested blackwater creek wetlands to build Lake Alma. Over 7000 acres of wetlands, primarily freshwater types, are destroyed each year in the State of Georgia. The Lake Alma project would add significantly to these losses. The shallow portions of the proposed lake as well as its green tree reservoirs would provide approximately 400 acres of wood duck habitat. However the U.S. Fish and Wildlife Service in their January 25, 1978, letter opposing the lake stated that Hurricane Creek provided valuable habitat for a variety of wildlife and noted that wood ducks were plentiful. The destruction of 1200 acres of existing wood duck habitat to create 400 acres does not seem very logical.

The Service conducted a Habitat Evaluation Procedure (HEP) study in 1978 to evaluate the wildlife habitat on the project site in Hurricane Creek for 18 wildlife groups (e.g. aquatic fur bearer, terrestrial fur bearers, raptors, migratory birds, song birds, wood ducks, etc.) with and without the proposed lake. Their evaluation revealed that 7,246 acres of wooded swamp would have to be managed for wildlife to compensate for the total estimated wildlife losses incurred if the proposed lake were built. The mitigation plan proposed by the applicant to offset wildlife losses includes 200 acres of greentree reservoirs managed primarily as wood duck habitat as well as management of adjacent upland habitat. Based on the HEP study results, only 26 percent of all wildlife habitat losses would be offset by implementation of the mitigation plan while less than 13 percent of wetland habitat losses would be recouped. In light of this study, EPA fails to understand the basis for GDNR's contention that the proposed lake "will not be destructive to wildlife. It will be an enhancement." GDNR's position is more difficult to understand considering that the Department classified blackwater swamps as an endangered wetland type

in the State of Georgia according to the U.S. FWS 1984 Southeast Regional Resource Plan.

The Hurricane Creek tree community is more mature and valuable than it was in 1978 when the HEP study was done. Recent EPA habitat evaluations on the project site found that the floodplain wetlands contain a high density of usable den trees, an abundance of larger (>12" DBH) soft and hard mast producing trees, good quantities of palatable shrub and ground cover, and numerous pools. EPA believes that the Hurricane Creek wetlands contain above average wildlife habitat when compared to other floodplain wetlands throughout the southeastern states and are definately worthy of protection.

EPA is not opposed to the construction of fishing reservoirs or the enhancement of natural areas for waterfowl provided that existing aquatic resources, especially wetlands, are not destroyed. Future fishing reservoirs should be located in floodplains in which natural floodplain resources have been destroyed or degraded by agriculture or other developmental activities. Waterfowl and wading bird populations have been reduced over the years because of the continued destruction of natural wetland habitats. Recent droughts in breeding areas have exacerbated this ongoing problem. EPA believes that allowing the Hurricane Creek floodplain corridor to remain intact would be the most desirable choice for wildlife and waterfowl in southeast Georgia. Acquisition and enhancement of existing wetland areas such as the U.S. Fish and Wildlife Service has done at their 3500-acre refuge at Banks Lake 50 miles from Alma might better enhance the population of Georgia's wood ducks.

Impacts on Waters of the U.S. and Water Quality Issues

Degradation of waters of the United States in the context of the Section 404 program refers to any negative impacts to lakes, rivers, streams, or wetlands and includes the destruction of wetlands by filling and/or inundation. The destruction and/or degradation of wetlands is the major EPA concern with this project. GDNR chooses to emphasize degradation in the narrow context of lower water quality which is only a secondary concern to EPA in this issue. EPA does not contend that there will be a significant degradation of water quality in the lake, only that we are concerned with future water quality.

GDNR contention that water quality in the proposed lake will be good was apparently based in large measure on the ratio of wooded to cleared area in the watershed above the impoundment. This is a simplistic premise which requires land use stability that is unlikely to occur over the lifetime of the project. Further, while it may be true that initial water quality could be maintained due to the wooded nature of the watershed, the long-term outlook for just this reason is not as demonstrable. Current forestry practices,especially in pine silvaculture, call for clear cutting of large blocks of timber to maximze profit margins. Even with the implementation of stringent best management practices, large pulses of sediments into the tributaries of the proposed impoundment are probable when timber is harvested in the watershed.

The statement that no sources of pollution exist upsteam of the proposed lake apparently only takes into account discrete,point inputs. However, this does not consider the inputs from non-point sources which our experience suggests will be significant,especially as development proceeds around the lake. There are a number of notional proposals to deal with this situation but little in the way of implemented plans for us to assess their efficacy. It should be noted that while water quality is certainly important to EPA, this was not the basis of the veto action.

Biomass (fish) production in Hurricane Creek was noted to be 71 lbs. per acre. This fact was then used to observe that there were low nutrient levels in the stream. There are any number of reasons why fish production in the stream is low at given times of the year other than low nutrient levels. The fluctuation in water levels in the Creek from season to season immediately comes to mind;however, the importance of the floodplain habitat to spawning and foraging during the late winter and early spring should not be discounted.

The ratio of upstream land area to lake size was given as a reason why good flushing would occur during rain events. The basis for this specific observation needs to be reexamined. That is,the large percentage of forested land above the impoundment would have a tendency to meter flows into the lake rather provide pulsed inputs. Hence, there would be a degree of delay between a rain event and new flows into the lake. In some cases it is likely that little or no discernable upsteam inputs would reach the lake during dry periods of the year. We agree that a large forested watershed is more conducive to overall water inputs into an impoundment,but the potential for water quality problems in this impoundment is not as limited as DNR would suggest.

It was mentioned that weed control would be limited to spot treatment or clearing of boat trails;hence, the implication that herbicide loadings would not become a problem. If the treatment for nusiance weed were,in fact, this easy,the situation would not have reached its current magnitude in the Southeastern United States.

The statement is made that current water quality in Hurricane Creek results in natural fish kills. Further, the statement is made that after the creek is impounded water quality will improve. Without more information on the former allegation it is difficult for us to respond in a precise manner. We would observe that those fish taxa which are currently indigenous to Hurricane Creek are adapted to low oxygen tensions. If a fish kill has resulted in the creek as discussed by DNR ,there are any number of reasons why this occurred. At this point only speculations can be made as to specific causality.

Water releases from the upper strata of the proposed lake via a multi-stage riser device could benefit downstream fish species from a dissolved oxygen standpoint. However, the need for increased flows is most likely to occur during the summer months when water levels are historically low. It is debatable how these releases would affect the primary objective of the project which is recreation. It is equally debatable whether they would occur given the obvious conflict lowering the lake level would produce.

Siltation in reservoirs is often a problem. EPA raised this issue in its comments on the EIS and continues to be concerned about same. It was noted that the large percentage of forested land to cleared area above the impoundment will make large scale erosion an unlikey possibility. In our opinion, relative location of cleared and forested land is a more important issue in this case. It is our experience that crop land is more often found adjacent to the floodplain; hence, soil movement from these areas can more easily access watercourses. Bedload then moves down stream during high water episodes until it reaches a sink area such as the proposed impoundment. Additionally, how the forested land in the watershed will be managed is also important. Unless good best management practices are used during clear-cutting operations, non-point source run-off could adversely affect future water quality.

Economic benefits of the project are part of the COE public interest evaluation of the action

This is a correct statement but it does not figure prominently in EPA's Section 404(c) process. It is also true that there is not a unanimous opinion regarding the economic benefits of this project.

Proposed project is consistent with the State's goal to provide public fishing impoundments and hunting/wildlife areas

DNR's data on outdoor recreation notes that there is currently a surplus of small flat-water fishing facilities in Bacon County (1981-Public Fishing Areas Plan for Georgia); hence, we question whether there is an intense need for this lake given its associated environmental costs. Moreover,

notional consistency of this proposal with the state's fisheries' goal does not necessarily mean compliance with the stipulations of the Section 404(b)(1) guidelines. In line with those goals of providing future generations of Georgians a place to hunt and fish, we suggest that purchase of the intact/relatively unaltered floodplain of Hurricane Creek bears investigation.

EPA lacks the expertise in wildlife habitat evaluation and the ability to assess project mitigation

GDNR is in error relative to EPA expertise in habitat evaluation/project mitigation. In fact, technical staff in Region IV were among the first to participate in the current habitat evaluation process when it was being developed by the U.S.Fish and Wildlife Service. Further, regional technical staff in composite probably have more experience in assessing project mitation proposals than have any other comparable group in the South-eastern U.S. An examination of the significant NEPA documents/major Section 404 permits reviewed in the previous five years which involved modification to various components of wildlife habitat should amply attest to our ability to evaluate if functional equivalency has been achieved. Further,the U. S. Fish and Wildlife report on this project is rather straight forward in its acknowledgement that only a small fraction of the wildlife attributes lost as a result of the project will be recouped by the proposed mitigation.

Wildlife habitat lost by the proposed impoundment is not high quality

GDNR in its comments apparently has a degree of confusion in regard to EPA's position regarding the quality of the subject bottomland hardwood habitat. It has never been our contention that this is the highest quality wildlife habitat in the Southeast. However, the Region, based on recent field inspections that included an examination of usable den trees, abundance of larger soft and hard mast producing trees, abundance of palatable browse, and other factors, concluded that the Hurricane Creek wetlands contain above average wildlife habitat when compared to other floodplain wetlands in the southeastern states. As such, EPA believes that they are definitely worthy of protection. Further,the logic that just because there is higher quality habitat within 50 miles of the project site in some fashion makes the latter expendable eludes us. We note that GDNR cites 1978 data in its discussion of habitat quality. This ignores the fact that the system is now more mature and more valuable.

We find it puzzling that GDNR feels that forested wetlands should not be a critically protected habitat type in SE Georgia. We acknowledge that this habitat is more prevalent in the coastal plain than in the physiographic provinces of north Georgia,but this begs the issue. That is, does it make good sense to convert this vegetation type to flat-water? This is especially so when there is a surplus of flat-water in Bacon County whereas the same has not been demonstrated for bottomland hardwoods. Moreover, in conversations with GDNR officials we were repeatedly told that wetland sites within this region were high on its priority purchase list given the rate at which this habitat were being sacrificed for development.

Wetland/wildlife habitat will be purchased to compensate for the losses accruing from this project

Purchase of existing bottomland hardwood habitat can not offset wetland losses associated with lake construction. Pursuit of this type of mitigation program will always result in an overall net loss of wetlands.

It was implied that there is a critical need for wintering waterfowl habitat in Bacon County

No evidence was given to support this contention other than the fact that 1500 ducks were counted at Rum Creek WMA in Monroe County. It may be true that this habitat was deficient there. Whether there is a deficiency in Alma remains a moot issue. The state wood duck box program could certainly use the subject habitat in Hurricane Creek to fullfill the goal of better nesting conditions for this species. The concept of destroying bottomland habitat and then creating habitat with many of the same conditions in the planned impoundments seems unnecessarily complicated. It is also labor intensive. Our experience has noted great variability with the operation of similar facilities because of the labor involved.

The Lake Alma site is not undisturbed

It is correct that a number of perturbations have taken place within the project area. It was never EPA's position that this is pristine bottomland habitat. The level of recent disturbance is small. Most of timber removed 30 to 40 years has successfully regenerated. However, it should be noted that any additional conversion of the area to agriculture is unlikely due to recent congressional legislation. Moreover, there are programs which allow landowners to receive various subsidies if they will allow these marginal lands to return to their natural state. Timber cutting can certainly change the visual as well as the biological aspects of a bottomland hardwood tract, but even clear cutting does not change the habitat's potential to reconstitute the climax community. This is not the case when the habitat is cleared and then inundated by 19 feet of water. The relict oxidation ponds mentioned are a case in point of an area which can revert through time.

Annual water fluctuations are deleterious to fish populations

We agree with the observation that during high flows aquatic populations access the upper reaches of the floodplain during feeding and spawning activities. It is also true that as drier conditions eventuate the aquatic habitat becomes more localized and some elements of these populations are concentrated in pools or even die as smaller pools dry up. However,

the rapid life cycles of many of the invertebrates allows them to avoid any major population losses, e.g., by weathering this period in a dormant phase of their life history. Further, the mobility of many fish species in question allow them to move into the larger order streams and avoid the adverse consequences noted by GDNR. Therefore, the contention that the fishery produced is extremely small by isolating on the drought/low flow periods over-reaches the truth of the matter.

Hurricane Creek floodplain and associated upland fringe are not particularly diverse or important habitat for wildlife

The statement is made in the GDNR comments that the current bottomland habitat is more diverse than a planted pine plantation. It is also true that from a total wildlife perspective it is much more diverse that the proposed impoundment and associated wildlife areas. On the basis of niche space apportionment for both the aquatic and terrestrial component it is more diverse than equivalent volumes of the proposed lake or the adjacent upland boundary.

The proposed lake is consistent with state programs to enhance waterfowl

The destruction of habitat which is fullfilling a particular wildlife need to enhance production of another needs to be reexamined. From our perspective it would be more prudent to rehabilitate acreage which has already been greatly modified by cultural practices,e.g.,marginal cropland,than the proposed destuction of the subject bottomland habitat. Additionally, the notion that the conversion of the existing vegetation type to a flat-water habitat constitutes increasing wildlife diversity is incorrect when viewed outside the narrow context of a certain fishery.

The Lake will attract numerous new species of wildlife, especially waterfowl, and provide new habitat for others

There is a preoccupation by GDNR that flat-water of the type provided by the lake or the impoundments is in critical short supply along the major southeastern flyways of migrating North American waterfowl. Flatwater habitat is increasing in the Southeast U.S., while wetland habitat is decreasing. Therefore, the supposition that the proposed lake will provide some new and critical habitat is just not consonant with the facts. Further, it has not been demonstrated to our satisfaction that the new species mentioned by DNR,i.e.,loons, grebe, cormorant, etc. would use the proposed lake any more than the literally hundreds of ponds and lakes already in the area or that this type habitat is limited for them.

Recent field inspection by technical staff revealed that cavity habitat produced by killing the existing trees in the lake site and mentioned by GDNR as such a benefit for wood ducks is already in ample supply. In fact, it is currently accessable to the terrestrial species mentioned in

the GDNR report whereas after flooding most of it will be much less so. The notional proposition that GDNR would manage the lake to benefit the bald eagle and alligator is interesting. We are curious how the touted recreational aspects of the lake would be affected b a large contingent of mature alligators.

There is another reality regarding the lake being the enhanced home for the other species of reptiles, mammals, and amphibians mentioned. That is, the fact that the kind of recreational operation envisioned by the local sponsor within the lake environs does not lend itself to fostering wildlife populations. DNR should be well aware that a culturally simplified environment,e.g.,mowing and removal of underbrush, only benefits a limited number of species,e.g.sparrows and pigeons,which are tolerant of mans' activities.

The swamp has been adversely affected by timbering activity

Forest products are one of the benefits provided by wetlands and EPA would expect utilization of this resource to continue. A review of aerial photographs as well as site visits do not indicate any major,recent timbering activities within the subject forested wetlands. Previous selective cutting does appear to have taken place on some reaches of the creek,but regeneration of the forest stand is well advanced. Hence, we remain unconvinced that timbering activities have any permanent adverse impact on wetland functions.

EPA has never defined what it means by wetlands

EPA and the U.S. Army Corps of Engineers jointly define wetlands as follows:

> "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalance of vegetation typically adapted for life in saturated soil conditions."

There are large amounts of wetlands remaining in the SE United States

This argument completely misses the point that every wetland loss is localized and negligible when compared to some larger remaining whole. The current situation of critical wetland loss occurred in just this fashion,i.e.,one project at a time. If wetlands were not in such short supply the state would not have its vaunted acquisition program. We have reached a point where management of this limited resource requires a careful look at each project in the context of cumulative impacts. The fact that there are large blocks of wetlands in the vicinity of Bacon Co nty overlooks the fact that they could come under development pressure, e.g., forestry,and it has not been demonstrated by GDNR that these areas have excess capacity to absorb displaced wildlife or provide other wetland functions.

US FWS data show that GA has been loosing 7300 acres of wetlands per year and the trend is expected to continue. GDNR's Growth Strategy acknowledges the important value of bottomland hardwoods and the fact that they are being lost in great numbers to forestry, development and reservoir construction activities, etc.

GDNR states that the Hurricane Creek Floodplain has no function as a wildlife corridor

The basis of its argument seems to be some obscure comment regarding the absence of current species establishment in an area because the animals are already there. It appears that GDNR has chosen to construe our comment in a biogeography context. While the travelway in question does have relevance to gross(regional)species migration,its most immediate importance has to do with the life histories of the wildlife currently in the area. GDNR staff would do well to read The Fragmented Forest by Larry D. Harris (University of Chicago Press,1984). The easily readable text provides an insight into the importance and functions of travelways in the maintenance of natural biotic populations. In this particular case the continuous nature of the current floodplain provides a relatively safe travelway through which animals move throughout their daily interactions as well as their life history. Its linear configuration allows these organisms to access the dissected adjacent upland habitats and the attributes thereof. The latter areas otherwise would be unavailable to them in many cases. It should be obvious to GDNR that the flat-water lake habitat it extolls for fish production would pose a deterent to the movement of terrestrial species. Moreover, the dissection of the floodplain by the lake would retard this animal movement to certain of the remaining regional wetlands and other populations which GDNR mentioned.

Access to the Hurricane Creek Floodplain is difficult

It is true that periphery of any bottomland hardwood area will have a thick understory. For GDNR's edification this is known as the "edge effect". However, once within the margins of the floodplain the canopy of the overstory vegetation reduces light levels. Competition is so effective that subdominants, understory,and ground cover decrease considerably. This was confirmed by technical staff on numerous field inspections of the Hurricane Creek area. We acknowledge that road access to the area is limited, but our discussions (and numerous comment letters describing fishing and hunting in the area) with residents familar with Hurricane Creek do not show the same nominal use characterized by Ranger Glass' observations in the GDNR report.

The focus on road access by GDNR points out that the entire orientation of its comments are fixed on a park-type recreation experience rather than on how this proposal would affect wildlife in the area. It was never EPA's suggestion that the flat-water facility proposed by the applicant might not receive greater use than that currently experienced by the area. Instead it is EPA's position that this extra utilization would be accomplished at an unacceptable impact on wildlife and the bottomland hardwood habitat that would be required for its construction.

The size of the area of wetlands impacted is contested.

EPA noted there were various figures of wetland involvement. EPA's estimate of wetland area on the project site subject to inundation (approximately 1200 acres) is based on numbers presented by the Corps of Engineers in the Section 404 Permit Application Document (Vol. I, Page 24) and in the DSFEIS (Vol. 4, Page E-117). In the District Engineer's (DE) Referral Report, the DE states that "the lake [Alma] will actually inundate only a little over 1200 acres of wetlands." The Corps Lake Alma Field Investigation report states that there are 1157 acres of bay and branch swamp below the 135 foot contour. The figure used in the FEIS, 950 acres, is misleading in that it excludes 200 acres of forested wetlands that will be inundated by the proposed lake and will lose most of their existing floodplain wetland values. In any case, the loss of forested wetlands to lake construction will be large and, in our opinion, significant.

Apparently, GDNR believes that because the flooding in the upper reaches of the lake will be rather shallow the present vegetation will survive intact. The literature on flood tolerance of various tree species(See Flood Tolerance in Plants:A State of the Art Review,Technical Report E-79-2,Corps of Engineers 1979) notes that there is a definite hierarchy of how well this condition is tolerated. Any number of factors figure in survival, e.g., plant age, substrate composition, etc. One of the most critical factors in survival is the duration of flooding. With continuous inundation most individuals of even the most flood tolerant species will die. A recent site inspection of Frank Jackson State Park lake revealed that the overwhelming majority of the vegetation in its upper, shallow reaches died after the water rose permanently.

GDNR notes that a beaver problem is likely in the green-tree reservoirs, but implies that it will be manageable

Our experience with beaver control suggests that their activities are much easier to deal with in theory than in actual practice. These animals are relentless in their instinct to modify the hydrology of an area to meet their needs. Control measures are labor/energy intensive and for all intents and purposes are permanent. The normal operational techniques as well as these control measures must also be applied recurrently and in a very skillful manner or the timber within the impoundments will almost surely be killed. In working with the Alabama Soil Conservation Service in similar habitats to those in question,technical staff were amazed at the level of effort necessary to maintain drainage and flood control when the consequences to do otherwise were flooded cropland and immediate financial losses. In this case the need to maintain the reservoirs is arguably less compelling to the local sponsor. Unfortunately,once the perennial vegetation is killed by flooding from whatever source its benefits are effectively gone for an extended portion of the project life. It would be necessary for the local sponsor to have a completely formulated control plan rather than just a declaration of intent before we would consider that beaver activities would only be a nuisance to operation of these facilities.

Soft versus Hard Mast

The argument advanced by GDNR that because the current mast production in the Hurricane Creek watershed is predominately of the non-lasting variety, the area should be sacrificed is not well thought out. First, we are not sure that this is correct information based on our recent field observations. Regardless, soft mast is produced during the period when the young are being reared and is, therefore, significant to the perpetuation of wildlife populations. Had GDNR been able to demonstrate that a significant amount of this mast went unused, this would have been a more compelling observation. The fact that the year round food production may be less well developed does not detract from the critical period when it is. However, we agree completely with GDNR's observation that an extremely small number of wildlife species would survive year round on the lake site were the bottomland vegetation eliminated by construction of the proposed facility.