

CANDIDATE CONSERVATION AGREEMENT WITH ASSURANCES
for the Robust Redhorse, *Moxostoma robustum*, Ocmulgee River, Georgia

Agreement Number 1448-40181-01-K-005

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I. INTRODUCTION

This Candidate Conservation Agreement with Assurances (Agreement) for the robust redhorse, *Moxostoma robustum*, has been developed as a collaborative effort between the private sector, and State and Federal resource agencies in order to expedite the reintroduction of the robust redhorse into the Ocmulgee River. The conservation actions specified in the Agreement will be implemented in accordance with the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 *et seq.*) (ESA), the U.S. Fish and Wildlife Service's Final Policy for Candidate Conservation Agreements with Assurances (64 Federal Register 32726-32736) (Final Policy), and 50 C.F.R. §§ 13 and 17. The goals and objectives of this Agreement will be accomplished through implementation of the conservation actions set forth in this Agreement. Successful implementation of this Agreement will expand the limited range of the robust redhorse, which is currently believed to be the most imminent threat to the species.

This Agreement, effective and binding on the date of the last signature below, is between Georgia Power Company (Georgia Power), the U.S. Fish and Wildlife Service (Service), and the Georgia Department of Natural Resources, Wildlife Resources Division (GADNR). Georgia Power, the Service, and the GADNR are collectively the "Parties" to this Agreement.

Property Owner: Georgia Power designates the following individual as the contact for this Agreement:

Michael C. Nichols
Environmental Laboratory Manager
5131 Maner Road
Smyrna, GA 30080

Cooperator: David Waller, Director
Georgia Department of Natural Resources
Wildlife Resources Division
2070 U.S. Hwy 278, S.E.
Social Circle, GA 30279

The GADNR designates the following individual as the contact for this Agreement:

Jimmy Evans, Senior Fisheries Biologist
Fisheries Section
1014 Martin Luther King Blvd.
Fort Valley, Georgia 31030

Service: The Service designates the following individual as the Agreement Administrator:

Sandy Tucker, Field Supervisor
U.S. Fish and Wildlife Service
257 South Milledge Avenue
Athens, Georgia 30605

This Agreement covers the following property:

That portion of the Ocmulgee River, Georgia, lying between river miles 230.9 and 250.2, bounded on the downstream end by a low head dam at Juliette, Georgia, and on the upstream end by Lloyd Shoals Dam, a Georgia Power hydroelectric facility.

II. AUTHORITY and PURPOSE

Sections 2, 7, and 10 of the ESA authorize the Service to enter into this Agreement. Section 2 of the ESA states that encouraging interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs is essential to safeguarding the Nation's heritage in fish, wildlife and plants. Section 7 of the ESA requires the Service to review the programs it administers and utilize those programs to further the purposes of the ESA. By entering into this Agreement, the Service is utilizing its Candidate Conservation Programs to further the conservation of the Nation's fish and wildlife. Section 10(a)(1)(A) of the ESA and its implementing regulations authorize the issuance of "enhancement of survival" permits (Permit) for proposed and candidate species and those species which may become candidates in the future.

The purpose of this Agreement is to implement conservation measures for the robust redhorse (*Moxostoma robustum*) through the reintroduction, monitoring, and research described in the Conservation Actions section of this Agreement. In particular, the proposed reintroduction is expected to expand the range of the robust redhorse.

The use of a Candidate Conservation Agreement with Assurances is appropriate even though the robust redhorse is not listed as a formal candidate species by the Service. In providing for Candidate Conservation Agreements with Assurances, the Service did not intend to exclude species that are not officially listed as candidate species, but are nevertheless at risk if populations decline (see the Final Policy, page 32732). Instead, the Service recognizes that taking steps before a species enters a serious decline is often the most effective way to conserve that species, thereby possibly precluding the need to list the species under the ESA.

All Parties to this Agreement recognize that they have specific statutory responsibilities that cannot be delegated, particularly with respect to the management and conservation of natural resources, and the management, development and allocation of water resources. Nothing in this Agreement is intended to abrogate any of the Parties' respective responsibilities. This Agreement is subject to and is intended to be consistent with all applicable Federal and State laws.

III. EXPECTED BENEFITS

This Agreement is expected to benefit the robust redhorse by initiating research on juvenile and young adult migration and by establishing a refugial population in the Project Site. In addition, the Conservation Actions described in this Agreement are eventually expected to result in a self-sustaining robust redhorse population within the Project Site. The Parties used the best scientific data available regarding the life history, biology, and known habitat requirements of the robust redhorse in selecting the Project Site and establishing Conservation Actions to benefit the robust redhorse.

The Parties believe the following objectives are reasonable and that they will help to eliminate or significantly reduce threats to the robust redhorse contributing to the long-term conservation of the species. The benefits of the specific conservation measures described in this Agreement, when combined with those benefits that would be achieved if it is assumed that the conservation measures were also implemented on other necessary properties, are expected to help preclude or remove any need to list the robust redhorse. These objectives are specific to this Agreement:

Objective 1 - Establish a refugial population of robust redhorse in the Project Site.

Through this objective, the Parties will attempt to establish sufficient numbers of robust redhorse within the Project Site to ensure long-term survival of a refugial population through propagation, population augmentation, and monitoring. By doing so, the parties expect to reduce potential threats to the species in the event of the catastrophic loss of any of the known native populations and provide the foundation necessary for a self-sustaining population within the Project Site.

Objective 2 - Increase understanding of habitat requirements and life history of robust redhorse.

Through this objective, the Parties will, through scientific study and surveys, identify habitats utilized by juvenile robust redhorse, potential migratory movements of juvenile robust redhorse, and spawning and other important habitats.

These objectives will be accomplished through implementation of the specific conservation measures set for the Agreement. However, in accordance with the principles of adaptive management, which are discussed herein, the status of this Agreement will be evaluated to assess the Agreement's success.

IV. ADDITIONAL BENEFITS

The primary focus of this Agreement is the creation and maintenance of a new robust redhorse population within the Project Site. The knowledge acquired through implementation of this Agreement can be used to help establish other refugial and self-sustaining populations of robust redhorse in other portions of its range. In doing so, this Agreement can serve as an example to others wishing to participate in robust redhorse conservation and recovery, effectively facilitating additional recovery efforts throughout the species' historic range. This Agreement could also serve as a model for similar conservation efforts for other imperiled species.

V. PARTIES

1. Georgia Department of Natural Resources
Wildlife Resources Division
2070 U.S. Hwy 278, S.E.
Social Circle, GA 30279

The GADNR works to sustain, enhance, protect, and conserve Georgia's natural, historic, and cultural resources for present and future generations. The GADNR is a cooperator to this Agreement. In its role as a cooperator, the GADNR does not require the ESA regulatory assurances typically provided under the Final Policy for Candidate Conservation Agreements with Assurances and will not receive those assurances under this Agreement. GADNR's participation will provide the close coordination with the State that is required by the Final Policy and will ensure that the Agreement is consistent with applicable State laws and regulations. The GADNR has provided funding, personnel, and other in-kind services to further the conservation of the robust redhorse.

2. Georgia Power Company
Environmental Affairs
241 Ralph McGill Blvd N.E.
Atlanta, GA 30308-3374

Georgia Power Company, a public electric utility, has already provided approximately \$1,000,000 in research funding as well as personnel and other services to support robust redhorse conservation. Georgia Power is the owner and operator of Lloyd Shoals Dam, which regulates river flows within the Project Site.

3. U. S. Fish and Wildlife Service
Ecological Services Program
1875 Century Boulevard
Atlanta, Georgia 30345

The Service works to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. The Service is committed to expanded partnerships, which offer innovative opportunities to enhance fish and wildlife resources. The Service has provided funding, personnel, and other in-kind services to further the conservation of the robust redhorse.

VI. DEFINITIONS

The following definitions apply to this Agreement:

Enhancement of Survival Permit (Permit) - The permit issued by the Service to Georgia Power, effective on the date the robust redhorse is listed as endangered or threatened under the ESA, or in some other manner becomes subject to the ESA, allowing Georgia Power to engage in the incidental taking (as defined in 50 C.F.R. § 17.3, as it may be hereinafter amended) of robust redhorse, pursuant to 16 U.S.C. § 1539(a)(1)(A).

License - The license (No. 2336-009) issued by the Federal Energy Regulatory Commission (FERC) to Georgia Power authorizing Georgia Power to operate the Lloyd Shoals Dam (see Order Issuing New License, 62 FERC ¶ 62,201 (1993)). The License term is for 30 years and will expire January 1, 2023.

Lloyd Shoals Dam - Located in Georgia at river mile 250.2 on the Ocmulgee River in Butts and Jasper Counties, this hydroelectric facility, FERC Project No. 2336-009, is owned and operated by Georgia Power pursuant to Order Issuing New License, 62 FERC ¶ 62,201 (1993).

Project Site - The Ocmulgee River between river miles 230.9 and 250.2, bounded on the downstream end by a low head dam at Juliette, Georgia (FERC Project 7019), and on the upstream end by Lloyd Shoals Dam (FERC Project 2336-009).

Refugial Population - An introduced population of adult robust redhorse from which brood stock can be obtained for future propagation. The purpose of establishing refugial populations is to reduce the risk of losing the species because of the species' limited, known range and possible catastrophic events. A refugial population may or may not be a self-sustaining population.

Robust Redhorse Conservation Strategy - A document that describes the status and distribution of the robust redhorse, discusses problems facing the species, and describes conservation actions necessary to improve the species' status across the historic range. This strategy was developed by a 12-member stakeholder partnership, the Robust Redhorse Conservation Committee (RRCC), to guide research on the biology and status of the species and the establishment of reproducing populations within its historic range. The strategy was adopted by the RRCC on May 1, 2000.

Self-sustaining Population - A population of robust redhorse exhibiting successful recruitment to the adult population. Successful recruitment means reproduction and growth over a period of years to maintain robust redhorse genetic diversity and population numbers for a specific reach of river. It is currently believed that robust redhorse are sexually mature after six years. Genetic diversity refers to the ability of the population gene pool to respond to long term changes in the environment and reduce the frequency of expression of deleterious traits.

VII. BACKGROUND

The “Robust Redhorse Conservation Strategy” dated May 1, 2000, is included as Appendix I of the Agreement and contains detailed information on the robust redhorse and ongoing conservation activities. The Conservation Strategy, as it may be amended in the future, is hereby incorporated into this Agreement by reference.

1. Species Description

The robust redhorse is a large, heavy-bodied sucker that attains total lengths greater than 700 mm and weights up to 8 kg. This species has large molariform pharyngeal teeth specialized for crushing hard-bodied prey, such as mussels, and is the only sucker species within its range with this character. The robust redhorse is bronze on the back and sides becoming pale or white ventrally. Juveniles will have intense red in the caudal fin, which becomes less distinctive in adults. Adult males develop large tubercles on the snout and head during the spawning season.

2. Life History

The robust redhorse spawns during April, May, and June when water temperatures reach 21 to 23 degrees Celsius. Spawning is typical of *Moxostoma* and involves spawning triads with two males fertilizing the eggs of a single female which are deposited in gravel bars. The life span of the robust redhorse is not currently known, but the oldest specimen collected to date was 27 years old (Jenkins, unpublished data). The robust redhorse is apparently a long-lived fish. It may take five to six years for stocked individuals to reach sexual maturity and begin spawning.

Studies of the species' diet are limited to field observations made during surveys and broodfish collection efforts. The few Oconee River specimens examined suggest that adult fish feed primarily on bivalves, including the Asian clam, *Corbicula* sp., an invasive species. Feeding habits and preferences of juvenile robust redhorse are poorly understood.

3. Habitat

The robust redhorse inhabits southeastern Piedmont Plateau and upper Coastal Plain sections of large South Atlantic slope rivers. Piedmont reaches are characterized by rock shoals, outcrops, and pools, particularly along the Fall Line. The upper Coastal Plain reaches typically have sandy banks and beds interspersed with a few shoals and occasional gravel bars. The upper Coastal Plain reaches also have extensive networks of swamps, oxbows, and floodplains. Woody debris and fallen trees seem to provide preferred habitat for adult robust redhorse in the Oconee River, and clean gravel bars are necessary for spawning and development of larval fish.

4. Distribution

The historic range of the robust redhorse includes Atlantic Slope drainages from the Pee Dee River in North Carolina to the Altamaha River in Georgia. The largest known population occurs in the Oconee River between Dublin, Georgia, and Big Black Creek and is estimated to consist of 600 adult fish (Jennings *et al.*, 2000). With the recent discovery of native populations in the Pee Dee River, North and South Carolina, the lower

Ocmulgee River, Georgia, and the Savannah River, South Carolina and Georgia, there are four known native populations. Preliminary data on the three recently discovered populations do not allow reliable population estimates at the time of this Agreement.

The GADNR, with the assistance of the RRCC, has reintroduced robust redhorse, which were obtained from propagation efforts using adults from the Oconee River population, into the Broad and Ogeechee rivers, Georgia, from 1996 to 2000. Subsequent sampling of these rivers has confirmed that the initial stocking was successful and adults were recaptured on the Broad River in 2001. The recaptured fish represent a significant development in that the stocked fish are surviving and maturing.

VIII. PROBLEMS FACING THE SPECIES

The success of any conservation or recovery effort depends on reducing or eliminating threats to the continued existence of the species. The Service uses five criteria defined in section 4(a)(1) of the ESA to evaluate threats to species, and these criteria are briefly addressed below as they relate to current threats to the robust redhorse. In addition, the “Robust Redhorse Conservation Strategy” (see Appendix I) contains additional information concerning the threats to the species.

The limited range of the species and the historical loss of suitable habitat are the primary factors affecting the decline of the robust redhorse. The construction of dams in the 1950's and 1960's reduced available spawning habitat and altered natural stream flows. Historic land use practices, including intensive agriculture and deforestation, also played a major role in the degradation of riverine habitats through erosion and sedimentation. There is currently no evidence to support overutilization, exploitation, or disease as contributing factors to the decline of the species. The flathead catfish, a predatory species introduced to the lower Ocmulgee River and High Falls Lake, has been identified as a potential threat to the robust redhorse, but has not become established in the Project Site.

There are currently no identified inadequacies in existing regulatory mechanisms. The robust redhorse is protected by the State of Georgia as an endangered species and is a species of management concern for the Service. Existing State and Federal laws serve to protect robust redhorse and its habitat including the Lacey Act, the Federal Water Pollution Control Act (Clean Water Act), the Fish and Wildlife Coordination Act, the National Environmental Policy Act, the Federal Power Act, and the Rivers and Harbors Act. Erosion and sedimentation regulations are in place and best management practices can help protect existing habitat. No other natural or manmade threats to the robust redhorse have been identified.

In summary, the limited geographic range of the robust redhorse and the presumed low numbers of wild individuals are considered to be the most serious threats facing the species. These threats are compounded by gaps in our understanding of life history requirements for the robust redhorse, particularly the habitat requirements of juveniles. This Agreement will create the third reintroduced population and allow the collection of additional information to fill these gaps in our understanding of this species.

IX. DESCRIPTION OF THE PROJECT SITE

1. Project Site

The Project Site includes approximately 19 miles of stream channel in the Ocmulgee River, between Lloyd Shoals Dam and a low head dam at Juliette, Georgia, between river miles 250.2 and 230.9. The Project Site is within the Altamaha River drainage and is approximately 120 river miles from the Ocmulgee River's confluence with the Oconee River. The watershed above Lloyd Shoals Dam encompasses approximately 1,492 square miles and is largely urban. Lloyd Shoals Dam, which impounds Jackson Lake, provides peaking power to meet electrical power demands. Several tributaries enter the Project Site, however, they provide limited habitat value for robust redhorse and are not part of the Project Site.

2. Water Quality and Quantity

Although there are known water quality problems upstream of the Project Site, the Parties believe these problems do not represent significant threats to the establishment of a robust redhorse population within the Project Site. The lake impounded by Lloyd Shoals Dam, Jackson Lake, may improve water quality within the Project Site by trapping sediment washed downstream from the developed portion of the watershed. In addition, a weir immediately downstream of Lloyd Shoal Dam greatly improves dissolved oxygen concentrations in the Ocmulgee River (Hendricks 1997), such that the waters of the Ocmulgee River between Lloyd Shoals Dam and the Towaliga River at river mile 233.1 meet the water quality criteria established by the State of Georgia for fishing. The water quality improvements in this portion of the Ocmulgee River have increased the diversity of the existing riverine fish community, and helped expand the distribution of important sport fish species (J. Evans, GADNR, personal communication).

Fishery and in-stream flow studies were conducted within the Project Site during the late 1980's and early 1990's as part of the Federal Energy Regulatory Commission (FERC) relicensing of the Lloyd Shoals Dam. These studies indicated that a 400 cubic feet per second (cfs) minimum flow would enhance aquatic resources downstream of Lloyd Shoals Dam. The GADNR and the Service recommended, and FERC approved, minimum flow releases of 400 cfs, or inflow, from the Lloyd Shoals Dam. The minimum flow releases were adopted to support fish population and aquatic community attributes suggesting a good to excellent fishery resource (FERC 1993).

The historic effects of erosion and sedimentation in the Project Site are not perceived as significant threats to the robust redhorse or its habitat in the Project Site. The threats to robust redhorse habitat from sedimentation have been reduced in recent years by extensive reforestation in the watershed. In addition, water quality has been improved through the construction of the aeration weir and increased minimum flows below Lloyd Shoals Dam.

Therefore, the Parties believe reintroduction of robust redhorse within the Project Site will not be adversely affected by water quality problems.

3. Fishery

The habitat in the Project Site consists of typical Piedmont riverine characteristics, such as gravel bars, shoals and sandy runs. The Ocmulgee River currently supports a healthy and diverse fish community that includes at least two species of riverine sucker, silver redhorse, *Moxostoma anisurum*, and "brassy jumprock", *Scartomyzon sp. cf. lachneri*. These species share habitats with the robust redhorse at other sites.

4. Watershed

The U. S. Forest Service's Oconee National Forest controls a significant portion of the watershed draining directly into the Project Site, and this area is well vegetated. Although water quality within the Project Site is relatively good, several tributaries of the Project Site (e.g., Herds Creek, Lee Creek, and Wise Creek) have been designated as partially supporting their designated uses. Erosion and sedimentation have impacted small stream habitats in these tributaries as indicated by fish surveys conducted by the GADNR, and GADNR is evaluating water quality impacts in these creeks. These tributaries are not expected to have a significant influence on the success of the Agreement. Work by the GADNR and other entities in these drainages is of interest to this Agreement but outside of its scope.

5. Withdrawals

The Flovilla, Jackson, and Jenkinsburg Water and Sewer Authority is permitted to withdraw 3.5 million gallons per day (mgd) below Lloyd Shoals Dam (Georgia Power 1991). These withdrawals are not thought to have significant impacts on the Project Site, because they are not located where they may affect riverine suckers, including the robust redhorse.

In summary, the Project Site was chosen because it is a large Piedmont and upper Coastal Plain river physiographically similar to other river reaches where robust redhorse have been located. The Project Site also has acceptable water quality and quantity, suitable gravel bars for spawning, plentiful food supply, low densities of non-native predators, and is known to support a diverse and healthy fish community.

X. CONSERVATION ACTIONS

In order to accomplish the objectives of this Agreement, the Parties agree to undertake the conservation actions described below. These actions are in addition to activities described in the Robust Redhorse Conservation Strategy, including research on habitat and life history requirements, recruitment, population genetics, development of culture techniques, and surveys for additional native populations. The Conservation Actions described below are consistent with

the Parties' goal of establishing a new robust redhorse population within its historic range. The anticipated new population of robust redhorse will increase the number of wild individuals, provide information on the life history and biology of the species, and serve as a refugial population should one or more of the known wild populations be lost due to a catastrophic event. The following conservation actions are specific to the Project Site, and the responsible Party is identified for each action. Where responsibility for a specific action has not been designated or assigned, the Parties agree to implement such measures through additional agreement, as appropriate, or through modification of this Agreement.

1. Stock the Project Site

The GADNR will stock the Project Site with approximately 4,000 hatchery-reared robust redhorse fingerlings each year for five years. Once this Agreement becomes effective, the first stocking will occur during the following fall or spring season when water temperatures permit. The long-term goal of this action is to establish a refugial population from Oconee River parental stock that consists of a minimum of five year-classes. The Parties recognize, however, that variations from this goal may occur due to unforeseen circumstances and natural events and that these actions may require adaptive management changes, such as extending the stocking duration. For instance, monitoring and research may later indicate that stocked robust redhorse permanently leave the Project Site or that the Project Site is unsuitable for establishing a refugial or reproducing population.

GADNR is responsible for producing, tagging, and stocking the fish for this project. For the purposes of this Agreement, the hatcheries that will provide robust redhorse fingerlings will be determined each spring by the GADNR in coordination with the other Parties as each hatchery prioritizes pond space for rearing other fish species.

The Service will continue to provide a fish culturist and other in-kind services such as transporting eggs to hatcheries, as needed, to assist in the Oconee River spawning activities. The Service, in association with its on-going work on the robust redhorse, has developed protocols that will be used in the production of fingerlings from eggs collected from Oconee River robust redhorse. Production of fingerlings typically consists of broodfish collection and spawning, incubation, and hatching of eggs; rearing of larval fish to fingerling size; collection and tagging of juvenile fish for stocking; and transport and release of fish in the Project Site. The number of fingerlings needed for this action represents 10% of typical annual production from the Oconee River.

2. Study the movement of introduced juvenile robust redhorse

Georgia Power will fund two surveys, one in year 1 and one in year 3, on the movement of introduced juvenile robust redhorse. Radio transmitters will be attached to a subset of the stocked fish and their movements monitored. Georgia Power will provide funding not to exceed \$75,000 per survey (see Table 1). The research will be conducted by the USGS Research Unit at the University of Georgia. If the USGS Research Unit is unable to continue this work, Georgia Power will select another qualified contractor with approval

of the Parties; such approval shall not be unreasonably withheld. The results of surveys will be provided to the other Parties in accordance with Section XI, Monitoring and Reporting.

3. Monitor abundance and distribution of introduced robust redhorse

Georgia Power will conduct or fund six surveys in order to monitor abundance and distribution of juvenile and adult robust redhorse within Project Site. These surveys will be conducted in alternate years, under clear, low-water conditions, and until an adult population of at least five year-classes is established, or until the monitoring or research indicate that the stocked robust redhorse largely moved out of the Project Site or that the Project Site is determined unsuitable for establishing a refugial population. Georgia Power will provide funding not to exceed \$20,000 per survey for the Agreement duration to fund these actions (Table 1). The results of surveys will be provided to the other Parties in accordance with Section XI, Monitoring and Reporting.

4. Estimate population size

Following the establishment of an adult refugial population in the Project Site, Georgia Power will fund three surveys to measure population size utilizing the mark-recapture methods used to estimate the population size of the Oconee River robust redhorse population. The population estimate will be conducted by the USGS Research Unit at the University of Georgia. If the USGS Research Unit is unable to continue this work, Georgia Power will select another qualified contractor with approval of the Parties; such approval shall not be unreasonably withheld. Georgia Power will provide funding necessary to complete these surveys, not to exceed \$50,000 per survey (see Table 1). The results of surveys will be provided to the other Parties in accordance with Section XI, Monitoring and Reporting.

XI. MONITORING AND REPORTING

The Parties will use the following guidelines in evaluating and adjusting the Conservation Actions as described in the Adaptive Management section. Overlap in the timetable is due to uncertainties with forecasting possible success. Georgia Power will prepare an annual Progress Report that will identify progress in implementing Conservation Actions. The report will be provided to the Service and the GADNR by December 31 of each year. Following the distribution of the annual Progress Report, the Parties will discuss the results and coordinate the next year's activities under this Agreement.

1. Establishment of a juvenile refugial population - Years 2 through 6

To fulfill Conservation Action 2, Georgia Power will identify the location and presence of reintroduced juvenile robust redhorse through the telemetry studies identified above. In addition, Georgia Power will conduct or fund electrofishing sampling efforts, that will include a minimum of two to four days in alternate years as described in Conservation

Action 3, to identify the habitat and locations used by juvenile or young adult robust redhorse. Success will consist of capture of individuals from three year-classes by year 6. Migration downstream will be evaluated through the telemetry studies, and appropriate changes to conservation actions may be proposed under the adaptive management provisions by the Parties to this Agreement.

2. Establishment of an adult refugial population - Years 6 through 11.

After year 6, Georgia Power, with the assistance of the GADNR and the Service, will identify the location and presence of adult robust redhorse in the Project Site as described in Conservation Action 3. Sampling will include a minimum of two to four days conducted with water temperatures ranging from 20° Celsius to 25° Celsius. Success will consist of the collection of 3 or more adults of each sex from at least three year-classes. The determined this success rate after considering that robust redhorse adults are difficult to collect with conventional electrofishing gear, even under ideal river conditions. The Project Site is considerably more difficult to sample than the Oconee River, with some sections inaccessible to electrofishing boats, and the ability to collect 3 adults of each sex within two to four days is comparable to catch rates in other rivers where populations of adult robust redhorse exist.

3. Establishment of a self sustaining population - Years 10 through 15.

Georgia Power will identify the location and presence of spawning adults as described in Conservation Action 3. Sampling will include a minimum of two to four days conducted in the spring with water temperatures ranging from 20 ° Celsius to 25° Celsius. Success will consist of collection of non-tagged juveniles and/or adults, which would indicate naturally-reproduced individuals (i.e., successful reproduction). Additionally, population estimates will be made using mark-recapture methods as indicated in Conservation Action 4. The carrying capacity and target population number for the Project Site are unknown at this time.

XII. FUNDING CONSERVATION ACTIONS

Funding, both in the form of monetary and in-kind services, for the Conservation Actions will be provided by Georgia Power, as set forth in the Conservation Actions section and summarized in Table 1. Additional resources may be applied to this project from other sources, but these are outside the scope of this Agreement. The Service has provided technical assistance in the Agreement and permit application development and in providing in-kind services described herein. The GADNR will also provide in-kind services as described herein.

Implementation of this Agreement is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any funds from the U.S. Treasury. The Parties acknowledge that the Service will not be required under this Agreement to expend any

federal agency's appropriated funds unless and until an authorized agency official affirmatively acts to commit such expenditures as evidenced in writing.

XIII. ADAPTIVE MANAGEMENT

The Parties agree that adaptive management provisions are necessary to ensure that the Parties can take advantage of changing conditions or new information affecting the conservation of the robust redhorse and the ultimate success of this Agreement. Adaptive management provisions are especially necessary when, as here, certain biological information is being developed, specifically information on the habitat occupied by juvenile robust redhorse.

Georgia Power will evaluate annually the effectiveness of the Conservation Actions in a report to the GADNR and the Service as described in Section XI, Monitoring and Reporting, and recommend any necessary changes. The Parties may initiate requests to modify the Conservation Actions as provided for in the Duration section of this Agreement. Requests to modify this Agreement will be initiated through written notification to all Parties and will remain within the scope of this Agreement. Specific areas where adaptive management may occur include adjustments to stocking rates, survey frequency, sampling techniques, duration of stocking, and monitoring period. Appendix II contains some potential examples of circumstances where adaptive management may be appropriate.

XIV. NOTIFICATIONS

In the event that any of the Parties detect conditions that may adversely affect robust redhorse in the Project Site, such conditions will be reported to Georgia Power, the GADNR, and the Service. Such conditions may include, but are not limited to, evidence of fish kills, spills or releases of material that may affect that reach of the Ocmulgee River covered by the Agreement, increase in flathead catfish density, or significantly increased sedimentation within the Project Site.

Georgia Power agrees to provide the Service with an opportunity to rescue robust redhorse individuals before any authorized take occurs as described in the Enhancement of Survival Permit. Such notification that authorized take will occur must be provided to the Service at least 30 days in advance of implementing the action and will include a description of the action to be taken and measures to reduce the authorized take. Rescue actions undertaken by the Service shall not unreasonably interfere with the implementation of Conservation Actions under this Agreement.

By signature of this Agreement, Georgia Power agrees to notify the Service if ownership of the covered property is to be transferred to another owner and to provide such notice 30 days in advance of the transfer. If Georgia Power transfers ownership of the enrolled property, the Service will regard the new property owner as having the same rights and obligations as Georgia Power if the new property owner agrees to become a Party to the Agreement. Actions taken by the new participating property owner that result in the take of the robust redhorse would be

authorized if the new property owner maintains the terms and conditions of the Agreement. If the new property owner does not become a Party to the Agreement, the new owner would neither incur responsibilities under the Agreement nor receive the ESA regulatory assurances that accompany the Agreement and Permit.

After any notification of change in ownership, the Service will contact the new or prospective owner to explain the existing Agreement and to determine whether the new property owner would like to continue the original Agreement or enter a new Agreement. When a new property owner continues an existing Agreement, the Service will honor the terms and conditions of the existing Agreement.

XV. LANDOWNER ASSURANCES

Through this Agreement, the Service provides Georgia Power assurances that if the robust redhorse is listed under the ESA and the Agreement has been implemented in good faith by Georgia Power, the Service will not require additional conservation measures nor impose additional land, water, or resource use restrictions beyond those Georgia Power voluntarily committed to under the terms of the original Agreement. Georgia Power requested and is hereby granted the following additional assurance that is specific to its needs:

The Service will not impose or require Georgia Power to alter its operation of Lloyd Shoals Dam for the benefit of the robust redhorse for the duration of this Agreement, including alteration of the flow regime specified in the FERC license.

These assurances will be authorized through issuance of an enhancement of survival permit under section 10(a)(1)(A) of the ESA, which will authorize incidental take of robust redhorse consistent with the terms of the Agreement. The Permit is incorporated as Appendix III of this Agreement and will become effective on the date that the robust redhorse is listed as threatened or endangered or in some other manner becomes subject to the ESA in the future. At that date, Georgia Power will be authorized take of robust redhorse in conjunction with implementation of the Conservation Actions specified in the Agreement. The take is expected to be in the form of mortality, harm, and harassment associated with reintroducing, surveying, and monitoring released individuals and their offspring. The Service has determined that this level of take will not jeopardize the species' continued existence.

The Permit will not be revoked for any reason except those set forth in 50 CFR 13.28(a)(1-4) or unless continuation of the permitted activity would be inconsistent with the criterion set forth in 50 CFR 17.22(d)(2)(iii) and the inconsistency has not been remedied in a timely fashion.

The assurances provided apply only to the robust redhorse inasmuch as the Agreement is being properly implemented. The assurances provided shall in no way limit the Service's retention of its obligations and authorities for consultation under section 7(a)(2) of the Endangered Species Act relative to future FERC relicensing activities at Lloyd Shoals Dam or other Federal actions that

may occur within the Project Site that may affect the robust redhorse or other listed, proposed, or candidate species.

The Parties agree and understand that entering into this Agreement does not preclude or otherwise remove the Service's authority to list the robust redhorse as a threatened or endangered species under the ESA should the Service determine that listing the robust redhorse is necessary pursuant to section 4 of the ESA.

XVI. UNFORESEEN CIRCUMSTANCES

1. Changed circumstance provided for in this Agreement.

If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and were provided for in the Agreement, Georgia Power will implement the measures specified in the Agreement.

2. Changed circumstances not provided for in the Agreement.

If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in the Agreement, the Service will not require any conservation and mitigation measures in addition to those provided for in the Agreement without the consent of Georgia Power, provided the Agreement is being properly implemented.

3. Unforeseen circumstances.

(A) In negotiating unforeseen circumstances, the Service will not require the commitment of additional land, water, or financial compensation, or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed upon for the robust redhorse (*Moxostoma robustum*) without consent of Georgia Power.

(B) If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the Service may require additional measures of Georgia Power where the Agreement is being properly implemented, but only if such measures are limited to modifications within the Project Site, if any, or to the Agreement's Conservation Actions for the robust redhorse, and maintain the original terms of the Agreement to the maximum extent possible. Additional conservation and mitigation measures will not involve the commitment of additional land, water, or financial compensation, or additional restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the Agreement without the consent of Georgia Power.

(C) The Service will have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available. These findings must be

clearly documented and based upon reliable technical information regarding the status and habitat requirements of the robust redhorse. The Service will consider, but not be limited to, the following factors:

- (a) Size of the current range of the robust redhorse;
- (b) Percentage of range adversely affected by the Agreement;
- (c) Percentage of range covered by the Agreement;
- (d) Ecological significance of that portion of the range affected by the Agreement;
- (e) Level of knowledge about the affected species and the degree of specificity of the species' conservation program under the Agreement; and
- (f) Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

XVII. DURATION

The term of this Agreement will be for a period of 22 years consistent with the term of the existing FERC license for the Lloyd Shoals Dam (FERC No. 2336) which will expire in 2023. The Parties believe that this is the minimum time necessary to establish a reproducing adult population of robust redhorse containing multiple year classes and for stability in the population numbers to be achieved and assessed by the Parties.

1. Continuation

If the goals of the Agreement are met or if the Parties agree that sufficient progress is being made toward the conservation of the robust redhorse, this Agreement may be continued without modification for another term to which the Parties must all agree.

2. Amendments

Amendments to this Agreement can be proposed by any Party to the Agreement and must be provided to the other Parties in writing. All Parties will have at least 60 days to evaluate proposed amendments, and all amendments must be approved in writing by each Party. Amendment of this agreement requires the consent of all Parties. The Agreement may be amended to include, or separate Memoranda of Understanding and/or Cooperative Agreements may be developed with, additional Parties as necessary to ensure implementation of specific conservation measures contained in this Agreement.

3. Termination

(A) Georgia Power may terminate this Agreement prior to the expiration date, with good cause, even if the terms and conditions of the Agreement have not been realized. However, the Permit would also be terminated at the same time. Georgia Power will submit a letter to the Parties providing 60 days notice of its desire to terminate the Agreement. Georgia Power will remain responsible for any outstanding conservation

actions identified in the Conservation Actions section of the Agreement for which it is responsible until the early termination date. Conditions required by the Permit and the assurances provided by the Permit will remain in effect until the early termination date.

(B) The GADNR may withdraw from this Agreement at any time by submitting a letter providing 60 days notice indicating its desire to withdraw from the Agreement. The GADNR will remain responsible for any outstanding conservation actions identified in the Conservation Actions section for which it is responsible until the termination date.

(C) Nothing in this Agreement shall restrain or limit any Party from taking additional conservation actions not described in this Agreement, at its own expense, to protect or conserve the robust redhorse, provided that such measures are consistent with the conservation goals of the Agreement.

XVIII. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMPLIANCE

Survey, collection, or research activities associated with implementation and maintenance of this Agreement will not constitute a significant Federal action as defined in NEPA and are given a categorical exclusion designation under 516 DM 2, Appendix 1.10.

XIX. FEDERAL AGENCY COMPLIANCE

During the performance of this Agreement, the Parties agree to abide by the terms of Executive Order 11246 on nondiscrimination and will not discriminate against any person because of race, color, religion, sex, age or national origin. No member or delegate to Congress or resident Commissioner shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.

XX. SIGNATURES

Christopher M. Hobson
Vice President, Environmental Affairs
Georgia Power Company

David Waller

Director
Georgia Department of Natural Resources,
Wildlife Resources Division

Sam Hamilton
Regional Director
U. S. Fish and Wildlife Service

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APPENDIX I

Robust Redhorse Conservation Strategy

APPENDIX II

Examples of Adaptive Management that May Be Appropriate

A. Stock the Project Site

In the event adequate numbers of fingerlings are not available due to poor harvest, the stocking duration and monitoring period may be extended. Radio-tracking and electrofishing surveys may be rescheduled in the event of such changes.

B. Study the movement of introduced juvenile robust redhorse

Depending on the success of initial radio-tracking studies, the size and number of fish may be altered to provide the most efficient means of defining habitat utilized. Changes in radio transmitters and tracking equipment may also be required. Migration by juvenile robust redhorse is a question to be addressed by this project and will be addressed in the telemetry studies that may include tracking juvenile fish downstream of Juliette, Georgia.

C. Monitor abundance and distribution of introduced robust redhorse

Monitoring may be rescheduled if stocking schedules are altered, but monitoring for juveniles and adults returning to the project site will continue until a determination is made regarding the status of the adult refugial population (i.e., whether a population has been established or not). The primary focus of monitoring is the project site, which is believed to be the most suitable habitat for spawning robust redhorse. Monitoring under this agreement may extend downstream to the city of Macon, Georgia, if necessary.

Flathead catfish and excessive sedimentation have been identified as potential threats to the establishment of a refugial population in the Project Site. Should either of these factors be determined to have a negative effect on the success of this Agreement the Parties may act cooperatively or independently to seek any remedial actions necessary. However, the invasion of the project site by flathead catfish, and the migration of sediments from offsite sources are not under the control of Georgia Power and are outside the scope of this Agreement.

APPENDIX III

Enhancement of Survival Permit

TABLE 1

Funding Conservation Actions