DRAFT

Environmental Assessment

Submerged Aquatic Plant Management of Banks Lake Banks Lake NWR Lakeland, GA

Lanier County, Georgia

United States Department of the Interior
U.S. Fish and Wildlife Service
Okefenokee National Wildlife Refuge
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1.0 PURPOSE AND NEED FOR ACTION

1.1. INTRODUCTION

This Environmental Assessment is an analysis of five alternatives developed to address the management of the submerged aquatic plants of Banks Lake on Banks Lake National Wildlife Refuge, located in Lanier County, Georgia. This section includes a brief background description of the refuge mission and objectives, a summary of the legal context within which management options must be developed, a discussion of the need and purpose of aquatic plant management within Banks Lake, and a description of the planning process used to determine the appropriate management strategies. Lastly, the identification of issues and concerns expressed by the public, refuge staff, and other agencies with regard to future management and use of Banks Lake is summarized and major impact topics are identified and defined.

1.1.1. Banks Lake National Wildlife Refuge

Banks Lake National Wildlife Refuge (3,559 acres) is located in Lanier County near Lakeland, GA. The refuge contains a variety of habitat types including 1,459 acres of cypress swamp, 1,000 acres of marsh and 900 acres of open water. Scattered through these habitat types are hardwood swamp, pine forest and other upland areas. The refuge was established for the protection and conservation of a unique environment as well as migratory and resident wildlife.

On April 16, 1980, the U.S. Fish and Wildlife Service entered into a lease agreement with The Nature Conservancy to manage 3,559 acres of the Banks Lake/Grand Bay Wetlands complex, located in Lanier and Lowndes Counties in southeastern Georgia. The original intent of the lease was to establish a National Wildlife Refuge. Changes in the emphasis of the land acquisition program resulted in a lack of funds necessary to acquire the land. The area remained in a state of limbo during 1982 and 1983 with the Service maintaining a caretaker position over Banks Lake. In 1984, funds were added to the FY 1985 budget for the purchase at a value of $356,000. The refuge designation was authorized under the Fish and Wildlife Act of 1956 and funded through provisions of the Land and Water Conservation Fund Act of 1955 with strong local support from the Lakeland community and the congressional delegation. The area became Banks Lake National Wildlife Refuge (Banks Lake NWR) on February 22, 1985.

The U.S. Fish and Wildlife Service is the primary federal agency responsible for the conservation, protection, and enhancement of the Nation’s fish and wildlife populations and their habitats. Although the USFWS shares some conservation responsibilities with other federal, state, tribal, local, and private entities, it has specific trustee obligations for migratory birds, threatened and endangered species, anadromous fish, and certain marine mammals. In addition, the USFWS administers a national network of lands and waters for the management and protection of these resources.

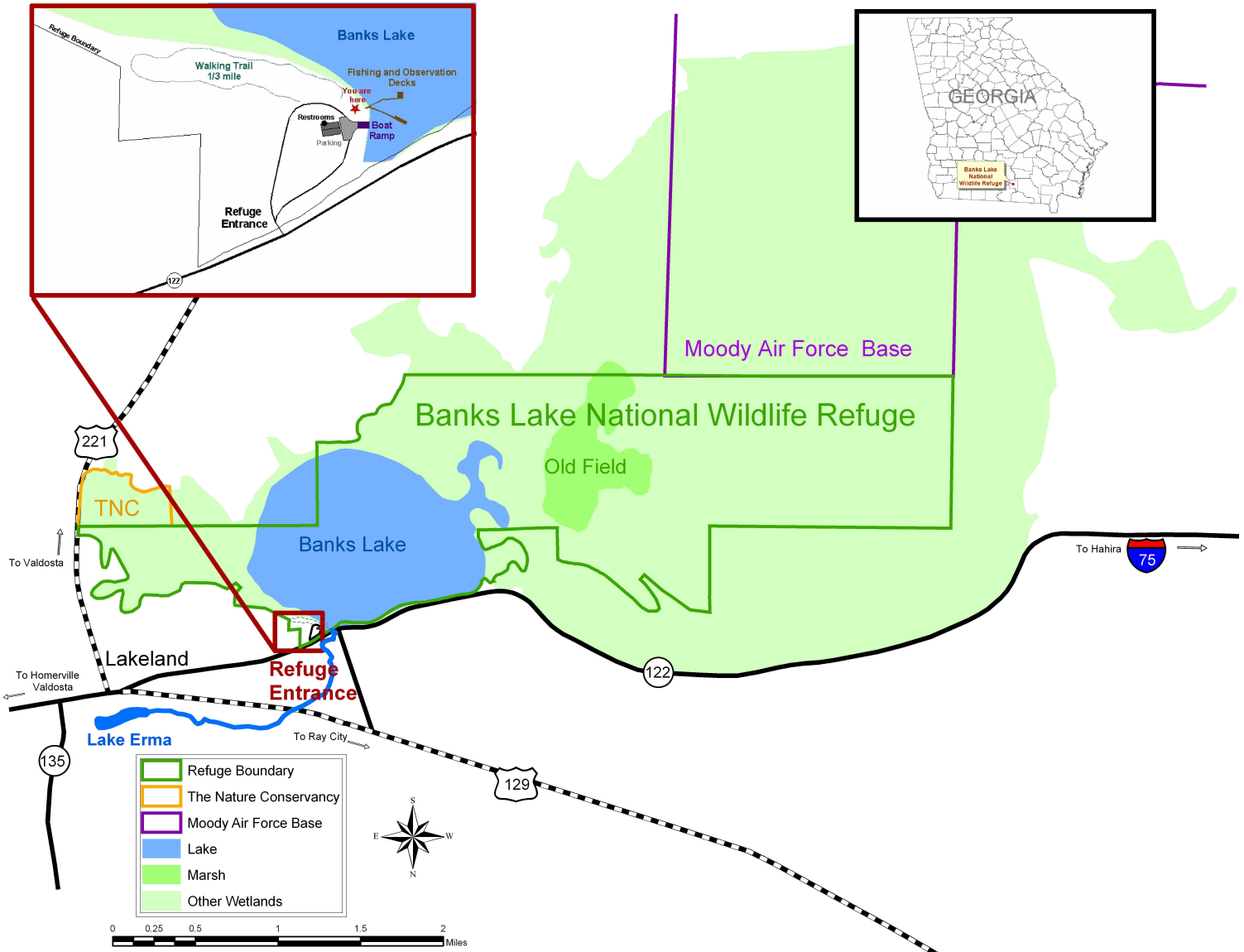

Figure 1. Location of Banks Lake National Wildlife Refuge.

As part of its mission, the USFWS manages more than 540 national wildlife refuges covering a total of more than 95 million acres. These areas comprise the National Wildlife Refuge System, the world's largest collection of lands and waters specifically managed for fish and wildlife. The System supports over 800 bird species, 220 mammal species, 250 reptile and amphibian species, 1,000 fish species, and countless species of invertebrates and plants.

The mission of the Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997 is:

> *...to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.*

The following goals for Banks Lake NWR have been developed by the USFWS and are intended to address the National Wildlife Refuge System Improvement Act of 1997 and FWS/BASS cooperative agreement.

GOAL 1: Increase quality (trophy) fishing opportunities at Banks Lake National Wildlife Refuge.

Objective 1.1: Improve public facilities to promote increased visitation.
Objective 1.2: Promote private sector participation.

GOAL 2: Enhance aquatic habitat at Banks Lake National Wildlife Refuge.

Objective 2.1: Improve water level manipulation in relation to fish, wading birds, and vegetation.
Objective 2.2: Work towards improving water quality problems associated with septic tanks and/or stormwater.
Objective 2.3: Control invasive plant expansion.

GOAL 3: Increase the quality of the fishery.

Objective 3.1: Monitor the fish assemblage.
Objective 3.2: Conduct water level drawdowns as needed to manage vegetation.
Objective 3.3: Conduct angler need assessments.
Objective 3.4: Maintain law enforcement to control wildlife violations.

1.1.2 Legal Context

The management of the aquatic vegetation at Banks Lake NWR must be accomplished within various legal and regulatory guidelines. Foremost among these legal guidelines is the National Wildlife Refuge Improvement Act and the establishing purposes of the refuge which provide an overall framework for the way in which Banks Lake NWR must be managed.

1.2 NEED FOR ACTION

It is known that moderate amounts (< 30%) of aquatic vegetation cover provides structure and food resources for fishes; and, excessive amounts (>40%) of aquatic vegetation cover can change prey assemblages, reduce growth rates, alter foraging behavior, shift population size-structure, and reduce relative condition of fish (Savino and Stein 1982; Bonvechio and Bonvechio 2006). Currently, 75% of Banks Lake is covered with aquatic vegetation. The submerged vegetation is primarily fanwort (*Cabomba* sp.) with some bladderwort (*Utricularia* sp). Emergent vegetation includes lemon bacopa (*Bacopa caroliniana*), dollar bonnet (*Brasenia schreberi*), fragrant water lily (*Nymphaea odorata*), banana-lily (*Nymphoides aquatica*), and spatterdock (*Nuphar luteum*). Water hyacinth (Eichhornia crassipes) is also present in floating mats.

Previous drawdowns were accomplished in 1987, 1994, and 2001 (Table 1). These drawdowns resulted in improved fish habitat, improved fish size structure and relative condition, and increased fishing opportunities for 2-3 years (Table 2).

Table 1. Previous drawdowns.

Start of Drawdown		**Lowest Water Level**	
Date	**Water Level**	**Date**	**Water Level**
November 2, 1987	189.00 ft msl	December 4, 1987	181.74 ft msl
October 18, 1994	190.66 ft msl	January 11, 1995	183.70 ft msl
October 1, 2001	191.40 ft msl	December 2, 2001	Level unknown (100 acres remained)

As of December 2006, the relative condition of largemouth bass collected from Banks Lake was below average. An electrofishing survey is conducted each year that water levels permit. Upon examining the data for Banks Lake, Herrington et al. (2005) found that the bluegill population appeared stunted and was characterized by low relative weights and proportional stock densities, while the largemouth bass population had low weights and medium to high proportional stock densities throughout the sample period. These conditions are characteristic of systems with

excessive vegetation. Comparing two transects that were most representative of one hour of pedal time, Georgia DNR found the following:

FWS fish collection data for 2005 versus 2006 at sites 4 and 5:

a) decrease in largemouth bass at site 5
b) decrease in bluegill, black crappie, and warmouth (4 and 5)
c) no flier or redfin pickerel collected in 2006 (sites 4 and 5).
d) Florida gar collected at both sites in 2006 – none in 2005
e) the percent of sportfish collected in 2006 at both sites made up 38-47% of the total catch (non-sportfish dominated collection)
f) the percent of sportfish collected in 2005 at both sites made up 53-72% of the total catch.

Table 2. Electrofishing summary for Banks Lake. (CPUE=Catch per Unit Effort)

Species	June 1992	Oct 1994	Nov 1995	Nov 1996	Dec 1997	Nov 1999	Aug-Sept 2001	Nov 2001	Feb 2002	Apr 2002	Dec 2005	Dec 2006
Chain Pickerel	3.14	2.43	6.5	7.71	7.67	11.14	8.57	Drawdown New Water control Structure	421,000 bluegill fingerlings released	30,000 largemouth bass fingerlings released	10.15	4.57
Bluegill	28.14	57.0	170.25	57.57	18.33	38.43	12.0				41.23	14.57
Largemouth Bass	15.29	30.71	35.25	18.71	15.33	15.0	13.57				16.0	11.86
Lake Chubsucker	8.43	9.29	50.5	0.43	3.67	51.14	8.86				32.0	10.29
Gar	7.29	3.86	10.75	5.57	1.0	7.86	2.86				13.85	1.14
Warmouth	2.43	2.0	9.75	4.86	4.67	7.71	2.57				19.38	3.14
Golden Shiner	6.14	65.86	1.5	0.71	1.17	5.14	2.86				6.77	0.14
Black Crappie	0	0	21.75	0.57	1.83	1.57	0				38.15	2.57
Bowfin	0.71	2.14	27	3.29	1.83	4.71	0.43				32.92	5.71

1.3 PURPOSE OF ACTION

The purpose of this action is to determine the most appropriate technique for managing the aquatic vegetation to enhance conditions for the fisheries and birds at Banks Lake.

The environmental assessment is needed in order to determine and evaluate a range of reasonable management alternatives. The environmental assessment predicts and evaluates the biological, physical, and socioeconomic effects of implementing each alternative. From this range of alternatives, the USFWS's proposed management action is then identified.

The Service's purposes for taking action at this time include:

- To ensure that the action reflects the objectives of the refuge, the provisions of the National Wildlife Refuge Improvement Act, and all other legeal and policy requirements pertaining to Banks Lake NWR, and
- Involve and inform the public determining the most appropriate management action to be taken.

1.4 PROJECT PLANNING

1.4.1 Introduction

Planning for this project was carried out in compliance with the provisions of the National Environmental Policy Act (NEPA), Public Law 91-190, 42 U.S. Code Section 4321. NEPA requires the preparation of environmental documents to aid in the decision-making process and to assist in informing and involving the public. An environmental assessment (EA) is prepared to evaluate alternatives and environmental consequences in order to determine if the environmental impacts are significant enough to warrant preparation of an Environmental Impact Statement or if the impacts are not significant enough for such a document and the action can be implemented without further documentation.

Following the release of the draft environmental assessment, the Service will conduct a public meeting to gather comments on the impacts of implementing the proposed action and make a determination whether or not an Environmental Impact Statement should be prepared or the proposed action should be implemented without additional documentation.

1.4.2 Public Involvement Process

In developing the EA, the Service held a public scoping meeting in Lakeland, GA, on June 26, 2007.

After the draft EA is released, there will be a 30-day public comment period and a public meeting to gather comments on the proposed action. In association with this, public outreach has been initiated to address questions and concerns and will continue through the monitoring and action phases.

1.5 SCOPING THE ISSUES

1.5.1 Introduction

The issues, concerns and general comments of the public along with technical issues were identified by refuge staff internally and through the public scoping meeting described above. All issues and concerns raised during scoping were reviewed and used to develop alternatives to address the need and purpose described above.

1.5.2 Issues and Concerns Identified

The following issues and concerns identified during internal and public scoping are addressed in this Environmental Assessment:

- What is the minimum water level to prevent fish kills and accomplish goals?
- Does the lake have to be drawdown as much as in the past to be effective?
- Consider impacts to Lake Erma and downstream residences.
- What is the length of time necessary to accomplish drawdown?
- Is the cold weather necessary for desired vegetation kill?
- If freezing temperatures do not occur, can chemical spraying of the vegetation occur?
- What are the trigger points to indicate need for a drawdown?
- What are the recreation opportunities during drawdowns?
- Are there any concerns with the water hyacinth and the drawdown?

The following issues and concerns identified during internal and public scoping have been addressed through the planning process but are not addressed specifically in this document:

- Create a list of contacts that are affected by the drawdown.
- Develop an outreach plan.
- Develop water control structure protection and other protocols to prevent manipulation by the public.
- Coordinate with members of Grand Bay/Banks Lake Council so they can prepare to accomplish habitat management activities during the drawdown.
- Prepare for additional boundary marking.
- Prepare for potential fire hazards.
- Modify structure if needed.
- Maintain wood duck boxes during drawdown if feasible.
- Monitor vegetation before and after.
- Determine if water level monitoring is adequate using staff gage readings once a day. Is a staff gage necessary in Lake Erma?
- Determine the need for water quality monitoring.
- Prepare to write a summary report of the drawdown.

2.0 ALTERNATIVES

2.1. INTRODUCTION

This section describes five alternatives developed after assessing the purpose and need for action and the issues and concerns raised by the public.

The alternatives are:

Alternative A. No Action (No manipulation)

Alternative B. Lower the water level and allow the currently submerged vegetation to become stressed and then raise the water to normal levels. (Drawdown or Water Manipulation)

Alternative C. Use herbicides to kill the aquatic plants (Chemical)

Alternative D. Mechanically Remove Vegetation (Mechanical)

Alternative E. Introduce Grass Carp to reduce aquatic plants (Biological)

2.2. Alternative A. No Action (No manipulation)

Under this alternative, the water level at full pool would be maintained to the best ability of the refuge staff considering weather conditions. Aquatic vegetation would not be managed. Access and mobility by boat would continue to be difficult reducing the opportunities for public fishing.

2.3. Alternative B. Lower the water level and allow the currently submerged vegetation to become stressed and then raise the water to normal levels. (Drawdown or Water Manipulation)

Water levels within Banks Lake would be lowered beginning in mid-October and would continue to be lowered until approximately 30% of the lake remains covered with water to maintain the fisheries. The lake level at this point would be approximately 183 ft amsl. It is estimated that the lowest level would be reached by mid-November to early December depending on the weather. It is hoped that temperatures would be sufficiently cold (freezing) for 2-3 weeks during December and January to kill the exposed aquatic vegetation or stress it before the gate within the water control structure is closed to capture the rainfall and bring up the water level in February. A gradual drawdown is necessary, where no more than 56 cubic feet/second (cfs) of water is released. This will prevent downstream flooding. At full pool with a nine foot head, a discharge of 56 cfs will occur with the water control gate opened approximately seven inches.

2.4. Alternative C. Use herbicides to kill the aquatic plants. (Chemical)

A herbicide, such as Aquathol K, Hydrothol 191, Reward, or Sonar, would be placed in the water in an attempt to kill the aquatic vegetation. Several treatments may be required.

2.5. Alternative D. Mechanically Remove Vegetation (Mechanical)

Specialized equipment would be brought in to rake and/or seine the vegetation and dispose of it off site.

2.6. Alternative E. Introduce grass carp to reduce the aquatic vegetation. (Biological)

This alternative requires the introduction of the exotic grass carp that attacks nuisance aquatic plants.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 INTRODUCTION

Banks Lake is the northern most Carolina Bay of the Grand Bay-Banks Lake Ecosystem. It consists of approximately 900 acres of open water. Average water depth is five feet. A water control structure is located near the refuge entrance where overflow waters drain into a tributary of the Alaphaha River. Water is acidic and has low total alkalinity and hardness. Largemouth bass and bluegill are the predominant fish species sought. Over 20,000 anglers visit the refuge each year. Several bass fishing tournaments are also held annually. The ecosystem also provides important habitat for a wide diversity of wildlife including great egrets, cormorants, anhingas, pied-billed grebes, white ibis, great blue herons, wood ducks, over wintering sandhill cranes and wood storks.

3.2 OVERVIEW OF THE GRAND BAY – BANKS LAKE ECOSYSTEM

3.2.1 Geographic Description

Banks Lake National Wildlife Refuge comprises a portion of the second-largest freshwater wetland system in Georgia known as Grand Bay-Banks Lake area (McGee and Black. 2003). It lies at the westernmost edge of the South Atlantic Coastal Plain ecoregion within the Suwannee River Basin. It is also within the Tifton Upland district of the East Gulf Coastal Plain Section of Georgia.
The refuge is within Lanier County, one mile west of Lakeland, Georgia, on Highway #122 and encompasses 3,559 acres. It protects one of three largest Carolina Bays within the ecosystem.

3.2.2 Topography and Geology

Banks Lake is a classic Carolina Bay with a sandy rim and an oval shape that is oriented from northwest to southeast. Because of the dam on the northwest side, the sandy rim has been inundated and a ring of pond cypress has become established. The south lobe of Banks Lake is known as Old Field Bay and thought to be one large sink.

Elevation in the area is approximately 61m asl. The dominant landforms of the area include Carolina Bays, limesinks, creek swamps, open water shallow lakes, ponds, flatwoods, and an elevated hammock.

3.2.3 Soils

Banks Lake is situated on the Lakeland Series (USDA SCS 1973) that consists of excessively drained soils over thick beds of sand. The lake bed is lined with clayey sand. On top of this lays silty sand and a high humus layer. The submerged deposits are of Pleistocene age.

The soils in the area are low in fertility and organic matter and strongly acidic. The permeability is considered rapid.

3.2.4 Climate

Summers within Lanier County are hot and humid. Temperatures may exceed 90^{o} frequently and dip to 70^{o} at night. Winters are mild. Temperatures may drop to freezing or below on about 30 days in an average winter. These cold spells are generally short in duration between more mild weather. The freeze-free growing season is normally between mid-March to mid-November.

Average rainfall for the area is 48 inches. The wettest month is July while the driest month is generally November.

3.2.5 Human Population

Valdosta and Lakeland are the largest cities in the area with populations of 43,724 and 2,730 (2000 census). It is estimated that over the next 10 years, agricultural and silvicultural practices will decline by 26% and urban areas will increase by over 110%.

There are numerous homes and vacation cabins along the northern edge of the lake. These residents have built docks that extend out into Banks Lake.

3.3 RESOURCES OF THE STUDY AREA

3.3.1. Hydrology

Originally in the landscape were the five natural bays as listed below and numerous smaller bays and lime sink depressions:

Milltown Bay
Banks Lake
Old Field Bay
Moody Bay
Grand Bay

As settlers moved into the area, water levels within all the above bays were managed. In 1825, a dam was built on the northeastern edge of Banks Lake to create a mill pond. The dam was raised in 1848 to elevate the water level in the pond. Sixty percent of the water in Banks Lake is runoff from Grand Bay Creek. It also receives runoff from Milltown Bay, Gator Run, Lee Pond, and Berryhill Pond. Today, one water control structure is located near the refuge entrance where overflow waters drain into a tributary of the Alapaha River, passing through Lake Irma.

As early as 1921, the lake was drained causing the dam at Lake Irma to fail. The dam at Banks Lake was rebuilt in 1926. According to local residents, since the water control structure was installed around 1940, the lake has been drained on a regular basis every eight to ten years to improve fishing. The dewatering would begin in early November and be completed in six weeks, after which rough fish would be removed using seines. From their accounts, the fishing would be greatly improved the spring following the drawdown. In 1941, Moody Bay was divided by Air Force crash trails into Moody Bay and Rat Bay. Other bays were created by impounding portions of the system.

3.3.2. Water Quality

Although the waters of Banks Lake are considered low in fertility and productivity, they appear to be adequate to sustain a warm water sport fish. Total alkalinity (50mg/l) and hardness (12 mg/l) are at the lower range as compared to more productive lakes at 125-400 mg/l.

3.3.3 Vegetation

The refuge contains 3,559 acres of open water, marshes, hardwood swamps, flatwoods, hammocks, and creek swamps. The majority of wetland consists of pond cypress and swamp shrub around open water with an average depth of five feet. Approximately 13% of the lake is classified as a deep cypress pond, while 59% is shallow cypress pond and shrub swamp (Banks Lake Sport Fishing Plan, 1980). The Wetland Classification of the area is as follows: system – lacustrine; subsystems – limnetic, littoral; Classes – unconsolidated bottom, aquatic bed,

emergent wetland. Pond cypress and bald cypress-black gum are the dominant tree species along the margins of the Carolina Bays. Water lily, water shield, fanwort, and floating heart are found in open water areas.

3.3.4 Fire and Forestry

The Grand Bay/Banks Lake region is in the highest frequency band of the southern U.S.. Lightning caused the majority of the fires every 1-3 years. Within the area, the upland longleaf pine habitat and the creeks created fire corridors (Frost and Langley 2006). Grand Bay is considered the most fire-exposed of the wetlands. Being shallow, it experienced the highest fire frequency. Banks Lake had some protection from Grand Bay Creek when fires moved north through the area.

3.3.5 Fisheries

The fisheries within Banks Lake are electrofished by Georgia Department of Natural Resources and USFWS Panama City Fisheries Assistance Office every other year depending on water levels. The catch per unit effort for these surveys are summarized in Table 2 and discussed in Section 1.2. Need for Action.

3.3.6 Wildlife

Observation of wading birds and sandhill cranes are common in the Grand Bay-Banks Lake area. They utilize shallow wetlands of the area along with the agricultural fields. The wood duck is a common species in the area. The refuge and GA DNR provides wood duck boxes for these birds. The bachman's sparrow (Aimophila aestivalis), gopher tortoise (Gopherus polyphemus), and round-tailed muskrat (Neofiber alleni) are found in the Grand Bay – Banks Lake area as well and are globally rare.

3.3.7 Threatened and Endangered Species

Wood storks, Florida sandhill cranes, and bald eagles have been observed on the refuge. Wood storks use the shallow pools associated with Old Field Bay for foraging. The Florida sandhill crane was introduced to the area by Georgia DNR. They forage in Old Field Bay. Bald eagles have nested on Banks Lake and thus, obtain fish from the lake.

3.3.8. Archeological/Historical Resources

Activity around the lake's dam has been documented as follows (TAI 1994). The site of Joshua Lee's mill was located on the existing dam in 1825. The mill burned in 1848 and was quickly rebuilt with a sawmill added by William Lastinger. Around 1926, E.D. Rivers acquired the land and built a lodge on the site known as Banks Lake Tavern. This lodge burned in 1935. The Civilian Conservation Corps (CCC) then established a camp on the site until 1939. In 1937, Rivers built a house nearby. Following this, Highway 122 was re-routed to its current path in 1940.

3.3.9 Public Use and Recreation

The only public access to the refuge is at the entrance on Highway #122 west of Lakeland. Access to the refuge is primarily by boat and fishing is the most popular activity. Over 20,000 anglers visit the refuge each year. Several bass fishing tournaments are also held annually. Largemouth bass and bluegill are the predominant fish species sought. Other common fish species include chain pickerel, lake chubsucker, gar, warmouth, crappie, and bowfin.

Facilities at Banks Lake NWR include a concession operation with restrooms, canoe and kayak rentals, boat ramp, short walking trail, boardwalk and platform, and accessible fishing dock.

3.3.10 Local Economy

Currently, agriculture (west side), forestry (east side) and an urban center (south side) characterize land use of the area (TNC, 2003). Moody AFB, Grand Bay WMA, and Banks Lake NWR comprise about 6,100 ha of publicly owned land. It is estimated that over the next 10 years, agricultural and silvicultural practices will decline by 26% and urban areas will increase by over 110%.

A concession is currently operating at the refuge's entrance providing rental canoes/kayaks, bait and tackle, and snacks. Numerous other bait and tackle vendors in Lakeland supply fishermen with supplies.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This section addresses the environmental consequences that can reasonably be expected to result from implementation of each of the alternatives.

4.2 ALTERNATIVE A: NO ACTION

Under this alternative, the Service would take no action to manage submerged aquatic vegetation within the boundaries of Banks Lake. This would include the submerged fanwort.

The result will be increasing amounts of submerged and emergent vegetation within the lake bed. Dissolved oxygen will be decreased and less available for the fisheries. At extreme low levels of dissolved oxygen during summer months, the fisheries could experience a die-off. Light penetration will be reduced causing less productivity and less food for the fisheries and other wildlife. Movement of fish and other wildlife is also limiting with increased vegetation. It has been shown that increased vegetation results in stunted growth, low weight and low proportional stock densities (Herrington et al, 2005). It is desirable to have less than 30% aquatic vegetation cover to benefit the fisheries.

In addition to having lower productivity of food resources, wading birds would have less success in capturing prey items with thicker growths of vegetation.

Public access would be significantly impacted due to increased vegetation limiting movement throughout the lake. A thick bed of submerged vegetation also makes it difficult to fish. As word spread on the condition of the lake and the difficulty of travel and fishing, visitation will be reduced. This would lead to fewer sales of fishing tackle in the local area and the possible closing of the concession at Banks Lake NWR.

4.3 ALTERNATIVE B: Lower the water level and allow the currently submerged vegetation to become stressed and then raise the water to normal levels. (Drawdown or Water Manipulation)

It is widely considered that drawing down water levels to control aquatic vegetation is the most effective method and the most inexpensive if the mechanisms are in place to use this method (DES 2007). Not only does the water need to be lowered, freezing or desiccation is required. No machinery or chemicals are needed for this alternative. This method is standard for submergent vegetation while not as effective on water hyacinth.

Banks Lake has a water control structure that is capable of drawing down the water level and passing the excess water to Lake Irma and on towards the Alapaha River. Planning is necessary to ensure Lake Irma can handle the outflows from Banks Lake. It is also necessary to maintain adequate water for the fisheries within Banks Lake so they can re-populate the lake once the water is allowed to rise. It has been proven by past drawdowns that in a normal precipitation year, enough rainfall and runoff is obtained to fill the lake after January to reach full pool by April or May.

Due to additional water control structures and dikes within the other bays, the drawdown will not effect the water level at Moody Bay and Grand Bay unless desired. It will have an impact on Old Field Bay and Milltown Bay; however, it is believed that Old Field Bay retains water and fish to replenish Banks Lake once water levels return to normal.

Water quality during the drawdown may be characterized by lower levels of oxygen as fish become more concentrated in the remaining pools of water. This has the potential of leading to a fish kill. As water returns, more nutrients are expected within the water column from the dead plant material that will be covered with water. Under these conditions, low oxygen levels could exist if algal blooms occur during the reflooding process.

Although there can be expected a reduction in diversity and abundance of benthic invertebrates that may effect fish and wading bird populations temporarily, they will rebound rapidly with the release of nutrients within the system. Therefore, a drawdown creates a reduced density of submerged plants facilitating movement of fish, greater opportunities to catch prey by fish and birds, and improve the food resources for a number of wildlife species. Over a longer period, these improvements will increase growth rates, the relative condition of the fish, and shift population size-structure.

Along with the reduction of submerged vegetation that fowls motors and makes movement by the public difficult, the fisheries will be improved, increasing the catch rate. A more satisfying visit to the refuge will encourage return trips. The increase in visitors directly effects the concessionaire and local businesses.

A drawdown also allows other management that is water level dependent to occur. This may be an opportunity to accomplish needed prescribed burns in areas normally covered with water. The refuge does not plan to conduct any prescribed burns on refuge lands during this time; however, partners within the area may decide to take advantage of the lower water levels.

4.4 ALTERNATIVE C: Use herbicides to kill the aquatic plants (Chemical)

Herbicides are effective in controlling aquatic plants if selected based on the target plant and used at the most vulnerable time of the plants' life cycle. Herbicides are used primarily during the growing season when the chemical can be taken up through its leaves. Herbicides with endothall or fluridone are most effective on the submerged fanwort (Aquaplant 2007). Contact herbicides act quickly and kill all plants cells. Rodeo is currently being used on water hyacinth.

The killing of large amounts of vegetation within the water column may cause water quality issues as the vegetation decomposes and reduces the dissolved oxygen. The chemicals may accumulate within the tissues of fish and other wildlife and cause long-term effects.

With the use of chemicals, there is always the human health and environmental safety aspect that needs to be considered. During herbicide treatments, the water levels would remain high enough to provide access; however, there are restrictions or waiting periods before the water can be used for certain purposes (Ohio State University 2007). Aquathol K, Hydrothol 191, Reward, and Sonar all have water use restrictions and waiting periods related to irrigation uses. Aquathol K and Hydrothol 191 both have a waiting period of 3 days for fish consumption. Although a waiting period exists, this length of time would be less than the necessary time to accomplish a drawdown. This would have less impact on local tackle shops and restaurants.

The use of herbicides is generally very expensive, especially within a lake the size of Banks Lake. It is used when other methods are not possible. The USFWS is concerned with herbicide use around water bodies and thus requires a strict review of the chemical and its effects on the system.

4.5 ALTERNATIVE D: Mechanical Control

Mechanical methods include seining and/or raking aquatic vegetation. This method requires special equipment to be used and thus very expensive, especially on a lake the size of Banks Lake. It is considered not appropriate for fanwort because fanwort can re-establish from any remaining roots or stem fragments (Mackey 1996).

4.6 ALTERNATIVE E: Biological Control

This method generally involves the introduction of an exotic species or living agent such as fish, insect, or bacteria which is harmful to and attacks the nuisance aquatic plants. Grass carp are often introduced to a pond for plant control. They are an effective control of fanwort but results generally are not seen for about a year. Sterile fish are used to prevent expansion of the population. Initially, the introduction of the carp is expensive. There are indications within the literature that the negative impacts from introducing grass carp include the alteration of the pond's food web, the vegetation structure, and invertebrate populations. This could have long term consequences on the natural system and native fauna.

Generally, the introduction of exotic species would be in direct conflict of the legal context for which the refuge was established, as well as, establish policy.

4.7 SUMMARY

The preferred alternative is Alternative B. Lower the water level and allow the currently submerged vegetation to become stressed and then raise the water to normal levels. (Drawdown or Water Manipulation). The literature indicates that when this method is possible within a pond or a lake, it is the most effective and economical method to accomplish aquatic vegetation control. The amount of submerged vegetation cover (>70%) within Banks Lake indicates that control measures are needed. Past drawdowns have improved fish conditions and habitat in addition to improving public use opportunities. It is also speculated from observations of increased bird use, that the improved conditions have increased foraging opportunities for wading birds and other wildlife.

Water will be released gradually to prevent downstream flooding and considering the capability of Lake Irma to pass water through to the river. To prevent excessive lowering of the water level in Banks Lake, a minimum of six boards will remain in the water control structure which will hold the water level at approximately 183 ft amsl.

The effectiveness of a drawdown does depend on whether the plants can be stressed further by freezing and desiccation. This is dependent on weather conditions. Spraying a herbicide on the plants while they are exposed would not be effective due to the process in which plants take in the chemical. Chemicals are most effective on vigorously growing plants. Therefore, the refuge would not use chemicals at this time during the drawdown.

Public access will be allowed on the refuge as limited by water levels throughout the drawdown. Fishing will be allowed to continue as normal until November 1, 2007 – March 31, 2008 when catch and release for game fish – largemouth bass, bluegill, crappie, and warmouth – will be initiated to preserve the fisheries for recovery after the drawdown. Other fish may be taken.

5.0 CONSULTATION AND COORDINATION

5.1 INTRODUCTION

This section summarizes the consultation and coordination that occurred in the processes of identifying the issues, alternatives, and preferred alternative for this EA.

5.2 MEETINGS, CONTACTS, PRESENTATIONS

November 1, 2006 - Letter from Bert Deener, GA DNR-Fisheries Regional Supervisor, discussing current Banks Lake conditions

January 16, 2007 – Meeting with refuge staff, GA DNR, USFWS Panama City Fisheries Assistance Office, and Banks Lake concessionaires

June 26, 2007 – Public Scoping Meeting in Lakeland, GA

September 25, 2007 – Public Meeting to hear comments on Environmental Assessment

5.3 LIST OF PREPARERS

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