

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Grand River Dam Authority

Project No. 1494-348 – OK

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(August 14, 2009)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's regulations, 18 CFR Part 380 (Order No. 486, 52 F.R. 47879), the Office of Energy Projects has reviewed Grand River Dam Authority's proposed shoreline management plan (SMP) for the Pensacola Hydroelectric Project, located on the Grand River in Craig, Delaware, Mayes, and Ottawa Counties, Oklahoma, and has prepared an environmental assessment (EA) on the SMP.

A copy of the EA is on file with the Commission and is available for public inspection. The EA may also be viewed on the Commission's website at <http://www.ferc.gov> using the "eLibrary" link. Enter the docket number (P-1494) excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll-free at 1-866-208-3676, or for TTY, (202) 502-8659.

Any comments on the EA should be filed by September 14, 2009, and should be addressed to the Secretary, Federal Energy Regulatory Commission, 888 First Street, N.E., Room 1-A, Washington, D.C. 20426. Please reference the project name and project number (P-1494-348) on all comments. Comments may be filed electronically via the Internet in lieu of paper. The Commission strongly encourages electronic filings. See 18 CFR 385.2001(a)(1)(iii) and the instructions on the Commission's website under the "eFiling" link. For further information, contact Brian Romanek at (202) 502-6175.

Kimberly D. Bose,
Secretary.

ENVIRONMENTAL ASSESSMENT

Application for Amendment of License

SHORELINE MANAGEMENT PLAN

PENSACOLA HYDROELECTRIC PROJECT
FERC No. 1494-348
Oklahoma



Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
888 First Street, N.E.
Washington, DC 20426

August 2009

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ACRONYMS

ABB	American burying beetle
BOD	biological oxygen demand
°C	degrees Celsius
Commission or FERC	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
dbh	diameter at breast height
EA	environmental assessment
<i>E. coli</i>	<i>Escherichia coli</i>
FC	fecal coliform
FWS	U.S. Fish and Wildlife Service
GIS	Geographic Information System
Grand Lake	Grand Lake O' the Cherokees
GRDA	Grand River Dam Authority
hp	horsepower
kg/year	kilograms/year
kW	kilowatt
MW	megawatt
mg/l	milligrams/liter
NGVD	National Geodetic Vertical Datum
NRCS	National Resource Conservation Service
Oklahoma DWC	Oklahoma Department of Wildlife Conservation
Oklahoma TRD	Oklahoma Tourism and Recreation Department
PD	Pensacola Datum
Section 7	Endangered Species Act
SHPO	State Historic Preservation Officer
SMC	shoreline management classification
SMP	shoreline management plan
SWG	stakeholder working group
USGS	U.S. Geological Survey

ENVIRONMENTAL ASSESSMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
Washington, DC

Pensacola Hydroelectric Project
FERC No. 1494-348

I. APPLICATION

Application Type: Shoreline Management Plan

Date Filed: July 21, 2008, and supplemented on December 22, 2008,
January 23, 2009, February 23, 2009, and March 23, 2009

Applicant's Name: Grand River Dam Authority

Water Body: Grand River

County and State: Craig, Delaware, Mayes, and Ottawa counties, Oklahoma

Federal Lands: The project does not occupy any federal lands

II. BACKGROUND

The Federal Energy Regulatory Commission (Commission or FERC) issued a license for the 89.6-megawatt (MW) Pensacola Hydroelectric Project (FERC No. 1494) to the Grand River Dam Authority (GRDA or licensee) on April 24, 1992.¹ The project is located on the Grand River in Craig, Delaware, Mayes, and Ottawa counties, Oklahoma (figure 1). The project consists of: (a) a reinforced-concrete dam consisting of a 4,284-foot-long multiple arch section, an 861-foot-long spillway containing 21 Taintor gates, a 451-foot-long non-overflow gravity section, and two non-overflow abutments, comprising an overall length of 5,950 feet and maximum height of 147 feet; (b) an 886-foot-long reinforced-concrete gravity-type spillway section containing 21 Taintor gates and located about 1 mile east of the main dam; (c) a reservoir, known as Grand Lake O' the Cherokees (Grand Lake), with a surface area of 46,500 acres and a storage capacity of 1,680,000 acre-feet at a normal maximum water surface elevation of

¹ The Pensacola Project was originally licensed in 1939 and relicensed in 1992. 59 FERC ¶ 62,073 (1992), Order Issuing New License (Major Project), April 24, 1992.

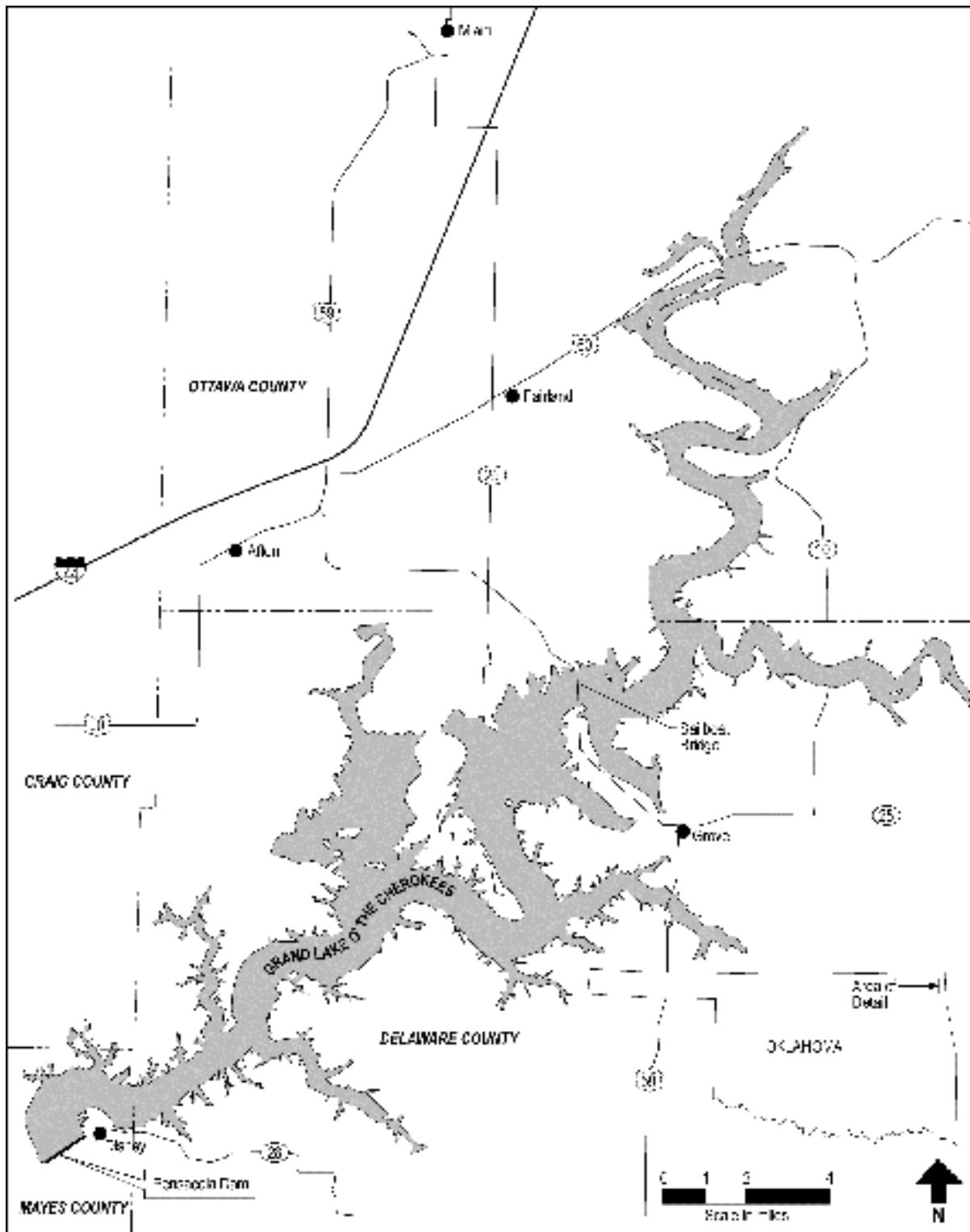


Figure 1. Location map of the Pensacola Hydroelectric Project. (Source: GRDA, 2008, as modified by staff)

744 feet National Geodetic Vertical Datum (NGVD);² (d) six 15-foot-diameter and one 3-foot-diameter steel penstocks supplying flow to six turbine-generators of 14.4-MW capacity each and one turbine-generator of 500-kW capacity, located in a powerhouse immediately below the dam; (e) a tailrace about 300 feet wide and a spillway channel about 850 feet wide, both about 1.5 miles long; and (f) appurtenant facilities.

The 46,500-acre Grand Lake has 522 miles³ of shoreline and extends 66 miles upstream of the Pensacola Hydroelectric Project dam. The project boundary is at the 750-foot Pensacola Datum (PD) contour line; thus, the Commission regulates only a strip of land (of varying horizontal distance, depending on the steepness of the terrain) around the reservoir's perimeter (figure 2).⁴ GRDA estimates the general horizontal distance between the reservoir shoreline and the project boundary is 6 feet; however, this width varies around the reservoir. Most of the land surrounding Grand Lake is privately-owned, and many areas along the shoreline have been developed with private homes, docks, condominiums, municipal and state parks, and commercial resorts and marinas.

By letter dated December 22, 2008, GRDA informed the Commission that because on-water habitable structures⁵ on Grand Lake have become a focus of concern for

² The reservoir's normal maximum water surface elevation is locally recognized as 745 feet Pensacola Datum (PD). PD is 1.07 feet higher than NGVD, which is a national standard for measuring elevations above sea level. Reservoir levels discussed in this EA will be in PD values unless otherwise stated.

³ The project license states there are 1,300 miles of shoreline around the Pensacola Project and, traditionally, GRDA has referenced 1,300 miles of shoreline for Grand Lake. However, for consistency in management and tracking of matters related to the SMP, GRDA has turned to a new GIS system, which has produced more accurate data concerning the amount of shoreline actually in the project boundary. In personal communications between B. Romanek of FERC and C. Davis, Assistant General Counsel, GRDA on February 23, 2009, GRDA provided FERC staff with the more accurate data derived from the GIS system, and the amount of shoreline calculated within the project boundary has been determined to be 522 miles.

⁴ The U.S. Army Corps of Engineers (Corps) manages flowage easement lands around Grand Lake from 750 feet PD up to the elevation of 760 feet PD in the upper reaches of the reservoir. *See* the Corps' comment letter, filed September 17, 2008.

⁵ GRDA defines an on-water habitable structure as living quarters constructed in conjunction with new or existing docks, piers and floats. These structures generally resemble cabins or homes, placed on floating structures such as covered or enclosed docks, over boathouses and other similar structures where the building is or may be occupied by people overnight or for extended periods of time. Generally, these structures may contain water supply and or waste disposal facilities such as sinks, showers, toilets, kitchens, food preparation areas and more.

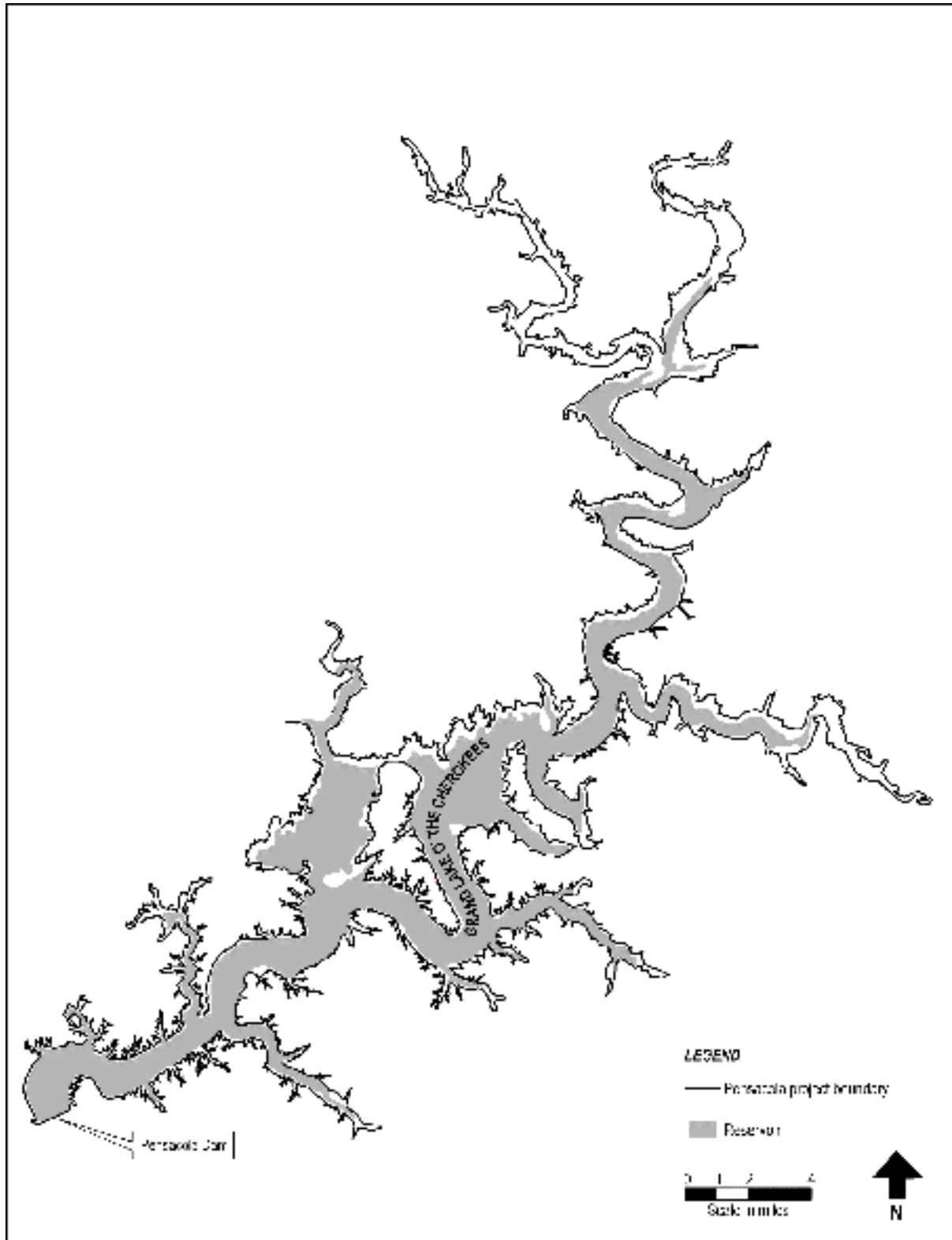


Figure 2. Pensacola Hydroelectric Project boundary map. (Source: GRDA, 2008, as modified by staff)

shoreline residents, it contracted with the University of Oklahoma to conduct an environmental assessment of the habitable structures existing on the lake. The study concluded that these structures do not pose a significant environmental threat to the lake, provided specified recommendations are followed (such as all structures to receive at least secondary wastewater treatment and have automatic shut-off valves on the lines between shore and the structures).

GRDA further states that it has imposed a moratorium on the construction and/or modification of these structures. Also, GRDA is in the process of inventorying the structures for the purpose of developing environmental and aesthetic standards for the structures. In addition, GRDA states the assessment be included as a supplement to the subject Shoreline Management Plan.

Given the ongoing assessment of the structures, we have not addressed the habitable structures in this EA. When the assessment and standards are developed, they will be addressed separately.

III. PURPOSE AND NEED FOR ACTION

On July 21, 2008, GRDA filed with the Commission a proposed shoreline management plan (SMP) for the Pensacola Hydroelectric Project stating that increasing development and competing uses for resources around the reservoir point to the need for a clearly defined, comprehensive, and consistent management strategy for the project's shoreline.

Currently, GRDA manages shoreline resources and development activities at the project through certain license conditions including:

- required reservoir surface elevation fluctuations (Article 401, as amended);⁶
- gray bat protection measures (Article 405);
- upgrade of the Duck Creek boat launch facilities (Article 408);
- consultation with the State Historic Preservation Officer (SHPO) for land-clearing or ground-disturbing activities within the project boundary (Article 409);
- the Standard Land Use Article (Article 410); and Commission-approved plans filed pursuant to license requirements (use of 1,630 acres as a wildlife management area [Article 406], long-term recreation management plan [Article 407], and fish and waterfowl habitat management plan [Article 411]).

⁶ See Order Amending License, issued December 3, 1996 (77 FERC ¶61,251).

The Commission must determine whether and under what conditions to approve the proposed SMP. The purpose, in part, of this EA is to assist in making this determination and to develop a basis any recommendations that may be developed.

It is important to note that the proposed SMP does not contain any specific development proposal. The SMP and this EA address how future development proposals will be processed. Because there is no ground- or water-disturbing activity proposed, addressing any site-specific proposal would be speculative. However, anticipation of such future proposals is addressed in a comprehensive manner and procedurally.

IV. PROPOSED ACTION AND ALTERNATIVES

The licensee is requesting that FERC amend its license for the Pensacola Hydroelectric Project by approving its proposed SMP and making it a requirement of its license.

A. Proposed SMP

GRDA states the proposed SMP is intended to maintain stewardship for the environmental and socioeconomic resources entrusted to it by providing a comprehensive plan for Grand Lake that considers GRDA's enabling legislation, the FERC license, historical and current public use data, and the need to accommodate future growth and changing use patterns. The proposed SMP is intended to enhance existing practices and help protect and enhance the reservoir's natural resources.

The licensee's proposed SMP includes:

- an inventory of the existing resources and land uses within the project boundary;
- a summary of the recreation management plan for the project, with estimates for future recreational use;
- SMP classifications and allowable use categories;
- adaptive management strategies to allow supplemental monitoring and management in response to extraordinary situations where existing SMP provisions do not provide adequate guidance or protection;
- a new shoreline use evaluation process;
- a shoreline structure permitting and inspection program;
- an enforcement plan for shoreline structures; and
- an amendment process.

Two key components of the proposed SMP include its shoreline management classifications and allowable use categories.

1. Shoreline Management Classifications

GRDA developed six shoreline management classifications (SMCs) for the Pensacola Hydroelectric Project and identified areas of the shoreline to which these classifications would apply (table 1). These shoreline management classifications are generally described below and shown in figures 3 and 4.

Table 1. Shoreline Classification Categories. (Source: GRDA. Personal communication between B. Romanek, FERC, and C. Davis, GRDA, February 20, 2009.)

Shoreline Management Classification Area	Miles of Shoreline	Percent of Shoreline
Project Operations	2	1
Municipal/Public Use	8	1
Stewardship	150	29
Wildlife Management	15	3
Responsible Growth	319	61
Responsible Growth-Wetlands	28	5
Total	522	100

Project Operations: This SMC is assigned to current and potential future project operation and related functions. This category includes all project lands used for hydroelectric generation, dams, spillways, switchyards, transmission facilities, right-of-way areas, security lands, and other operational areas. These specific shoreline uses require a degree of separation from other activities to ensure public safety or to assure the security of the project infrastructure.

Municipal/Public Use: This SMC is assigned to lands that serve a public purpose or governmental function such as state parks, public beaches, municipal water intake/outflow, transmission/utility line crossing, roads, bridges, and gas/oil pipelines. Typically, public agencies, governmental bodies, or utility providers manage these areas.

GRDA proposes to not permit new uses, outside the scope of the existing management objective of the managing entity at these locations. GRDA would not permit private residential or commercial uses at these locations unless they were consistent with the management policies of the area and the operating body requests the new use.

Stewardship: This SMC is assigned to lands which contain important or sensitive resources that require special attention, consideration, and protection in order that their significant environmental, cultural, or aesthetic contributions not be threatened, diminished, or lost. Stewardship areas include certain resources protected by state and/or federal law, natural or cultural features considered important to the area or natural environment, and areas maintained for habitat, water quality protection and general aesthetics. These areas may include palustrine wetlands and sensitive aquatic or terrestrial habitat. All currently undeveloped islands owned by GRDA are also included in this SMC.

Wildlife Management: This SMC is assigned to lands managed exclusively for the preservation and enhancement of aquatic and terrestrial habitat. Areas within this designation include all Wildlife Management areas identified in the project license as well as lands acquired for the purpose of being developed as additional Wildlife Management areas. These areas are generally characterized as larger tracts of land, removed from pressures of competing uses, where the benefits of habitat protection can be best realized. The Wildlife Management SMC affords the highest degree of protection under this SMP.

Responsible Growth: This SMC is assigned to lands managed exclusively to accommodate reasonable demands for public and private uses that are conducive to the protection and enhancement of Grand Lake's environmental, recreational, and socioeconomic resources. Designation of project land as a Responsible Growth area would not imply approval of a particular use, or exempt an applicant from permitting requirements.

Responsible Growth areas contain existing residential and/or commercial uses and areas of limited or no development not otherwise classified in this SMP. These areas comprise about 319 shoreline miles or about 61 percent of the total shoreline. Generally, Responsible Growth areas do not contain sensitive or important resources that require the degree of protection afforded by the Stewardship or Wildlife Management SMCs. Some Responsible Growth areas (see Responsible Growth-Wetlands Inventory areas on figures 3 and 4) contain palustrine wetlands not included in the Stewardship SMC due to diminished resource management potential. These areas comprise about 28 shoreline miles or about 5 percent of the total shoreline. GRDA has sought to provide mitigation through the Stewardship and Wildlife Management SMCs for uses in these areas and in the Responsible Growth SMC generally. New uses in areas containing wetlands may be subject to greater scrutiny and may require specific protection, mitigation, and/or environmental enhancements.

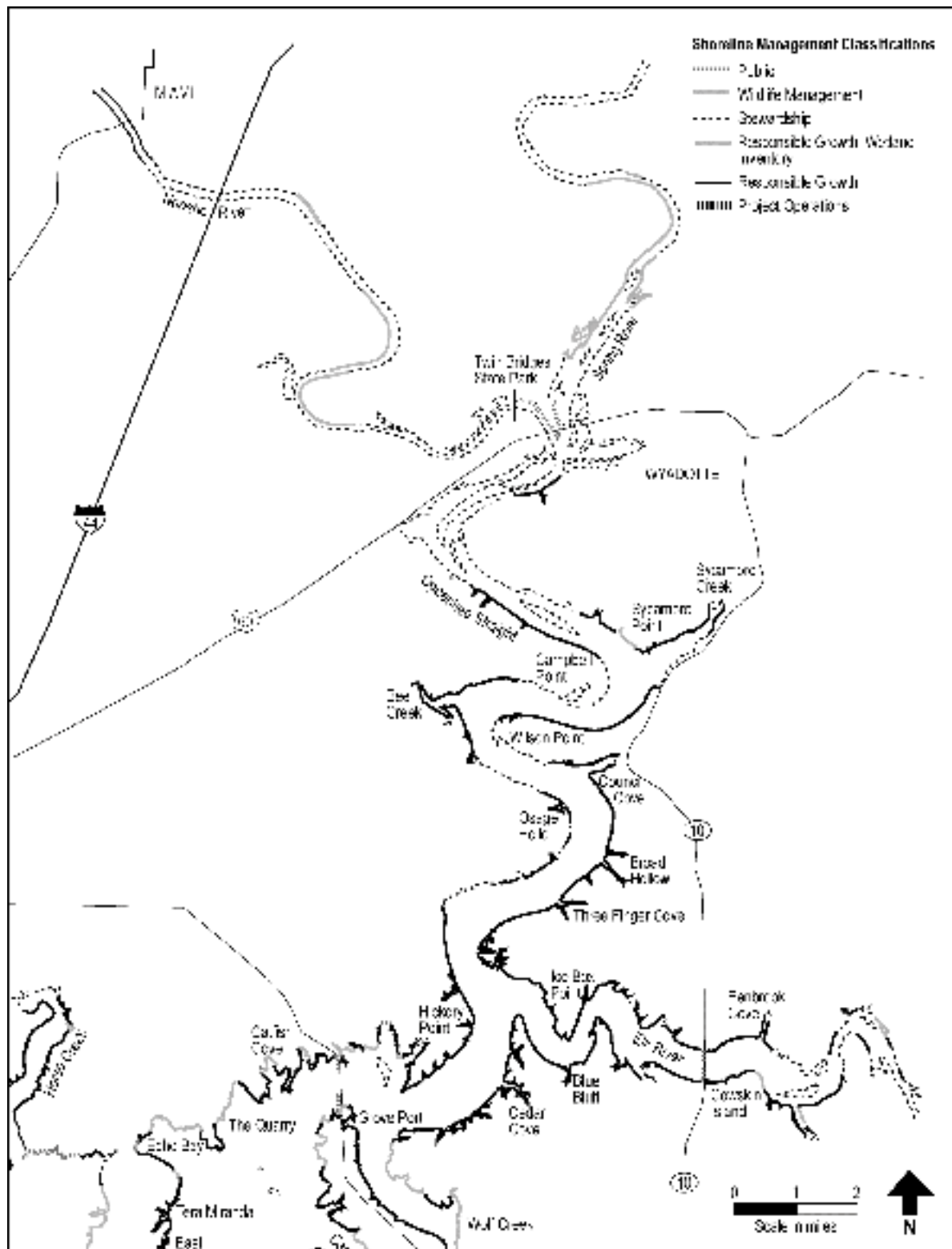


Figure 3. Shoreline management classifications (page 1 of 2). (Source: GRDA, 2008, as modified by staff)

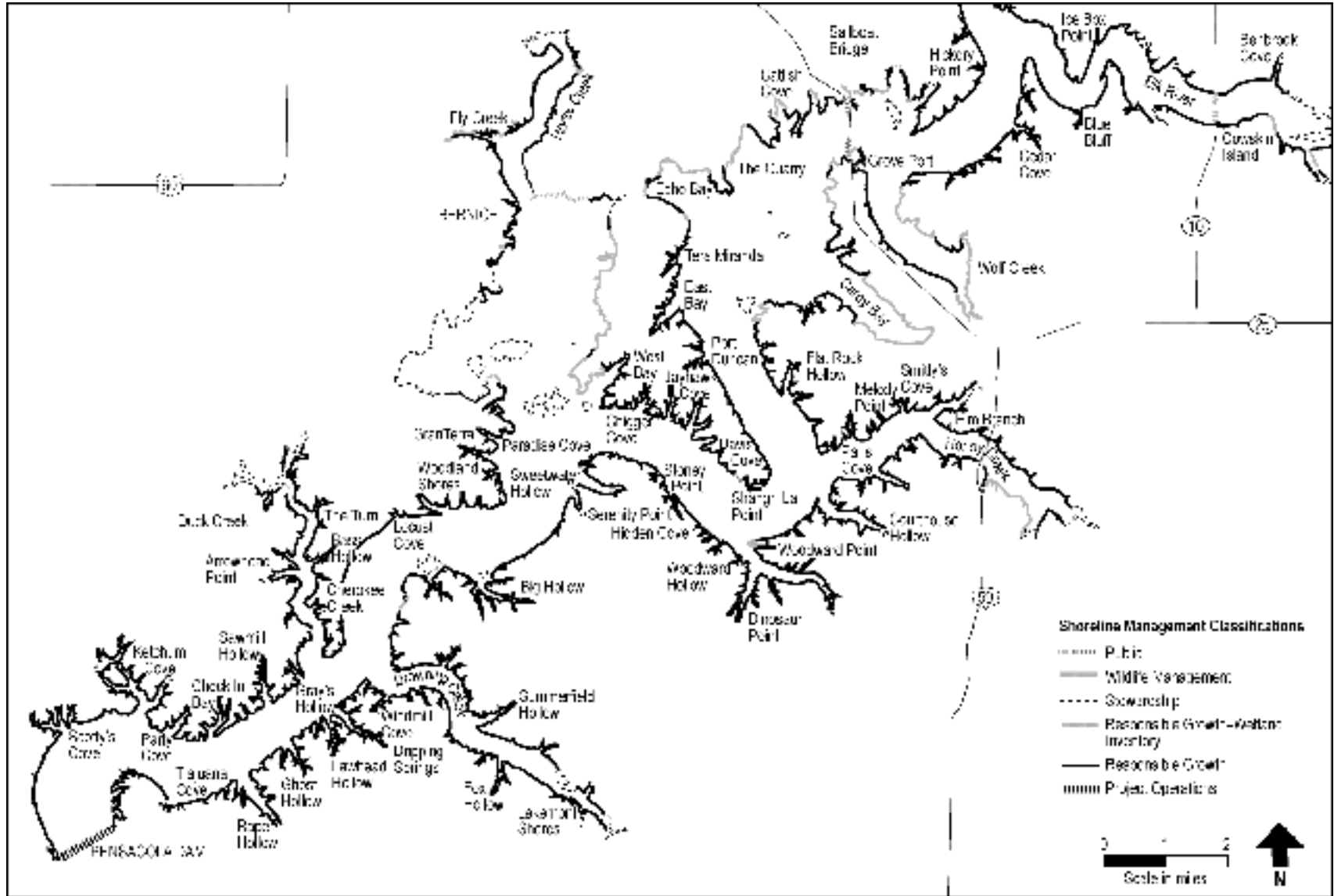


Figure 4. Shoreline management classifications (page 2 of 2). (Source: GRDA, 2008, as modified by staff)

2. Allowable Use Categories

GRDA developed three Allowable Use Categories to define common use types and identify additional considerations for determining site-specific appropriateness. These allowable use categories are generally described below.

The existing and potential Commercial Uses within the project boundary include:

- full service marinas
- commercial docks >10 slips
- commercial docks \leq 10 slips
- courtesy docks
- boat ramps
- marine railways and trams
- breakwaters
- shoreline stabilization
- dredging
- commercial water withdrawal (e.g. golf courses)
- vegetation management
- agricultural uses

The existing and potential Residential Uses within the project boundary include:

- private docks
- community docks
- multi-boat slips \leq 10
- multi-boat slips >10
- boat ramps
- marine railways and trams
- breakwaters
- shoreline stabilization
- vegetation management
- dredging
- residential water withdrawal

The existing and potential Municipal/Public Uses within the project boundary include:

- public/municipal water withdrawal/discharge;
- water treatment systems;
- parks;
- boat Ramps;
- docks; and
- wildlife management areas

GRDA would continue to permit uses associated with private residential or residential associations' uses. However, certain cove areas, shoreline locations with shallow water, areas considered congested or which support important or sensitive resources may be inappropriate for new uses related to residential development. For new developments, GRDA would place particular emphasis on consolidating uses to minimize shoreline effects for both single and multi-family shoreline uses.

In general, Municipal/Public Uses are site-specific uses that occur distinct from other uses. GRDA developed definitions and identified specific areas within or adjacent to the project boundary where known municipal/public uses occur. GRDA acknowledges that a degree of separation from other uses may be necessary for the safe operation and/or delivery of services associated with these types of uses. Any proposed municipal or public use area proposed outside an existing designated area must be able to demonstrate that the use is in the public interest.

3. Adaptive Management

GRDA proposes an adaptive management strategy to allow supplemental monitoring and management in response to extraordinary situations where existing SMP provisions do not provide adequate guidance or protection. GRDA would identify areas of concern with the assistance of the public. If communities believe their particular cove or shoreline warrants monitoring, GRDA would consider such proposals. The onus to petition GRDA would be on local citizenry. Prior to implementing any additional monitoring, GRDA would hold a public hearing, at which a majority of local residents must support the inclusion of that particular location. The objectives of these discussions would be to identify the specific concerns of adjacent property owners and develop site-specific parameters GRDA could employ to monitor and analyze the area of concern. At the conclusion of particular monitoring efforts, GRDA would meet again with residents, discuss its findings, and develop appropriate new management strategies. GRDA stresses that inclusion in the monitoring program may not result in immediate modification of

management strategies, nor does it guarantee implementation of new management policies at the conclusion of the monitoring.

4. Evaluation Process for New Shoreline Uses

By using GRDA's SMC area maps, adjacent property owners and private developers would identify their property in relation to the project boundary and determine which SMC occurs within the project adjacent to their property and the corresponding allowable uses. GRDA would review each application for a new use under the guidelines laid out in the SMP and its most current permitting program at the time of the application. GRDA would also assist the applicant at this time by identifying additional local, state, regional, and federal permits that may be required for the proposed new use. GRDA would encourage any applicant for a proposed new use to contact GRDA staff, at a minimum, at least 6 months prior to submitting any application to allow for a timely review.

GRDA proposes specific guidelines (which cover planning, review, and construction) through which adjacent property owners could apply for new use permits on project lands. GRDA would review permit applications for new uses on a case-by-case basis under these guidelines and its most current permitting program at the time of the application. General GRDA guidelines include: (1) reviewing and confirming proposed project location, SMCs, and allowable use designations stated in the application; (2) a site visit by GRDA staff; (3) timely input on resource, design, and permit requirements, and site-specific issues; (4) an approximate timetable for application review, based on the scope of a proposal and regulatory requirements; (5) notifying the applicant of the FERC review process (if required) and an approximate timeline for such; (6) an opportunity for public meetings/forums, as necessary; and (7) a GRDA site visit during construction.

5. Permitting and Inspection Program

Article 410 of the project license contains the Standard Land Use Article that allows the licensee to establish a program for issuing permits and granting conveyances of project lands for specified types of use and occupancy of project lands and waters, without prior Commission approval. Such uses may include, but are not limited to, the installation of private boat docks, pedestrian pathways, and wooden walkways and stairs. The licensee only may grant permission for such uses and occupancies, provided the use or occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project.

For any activity or use not covered under Article 410, GRDA proposes that applicants submit a written application to GRDA with drawings providing the location, layout, design, and dimensions of proposed facilities and site improvements, and descriptions of materials and types of construction. All uses must conform to GRDA's

general requirements and minimum design standards. Separate GRDA permitting standards and protocols detail specific information that relates to these permitting requirements. A current copy of GRDA's permitting procedures and standards are available on GRDA's website (www.grda.com). The permitting-procedures-and-standards documents provide information on requirements for docks and piers, bank stabilization measures, vegetation management, dredging, facility construction, and maintenance. They also establish the criteria used in evaluating proposed new uses for both commercial and residential development activities and facility construction standards for each activity.

GRDA proposes to evaluate new uses and modifications to existing uses based on:

- characteristics, zoning, intensity, and prevailing permitted uses within a half-mile radius of the proposed activities, (including SMC and allowable use determinations);
- shoreline topography and geometry;
- safety, navigation, and flood control requirements;
- environmental effects;
- potential economic development and tourism benefits;
- recreational use effects;
- any other criteria which may affect the proposed project;
- the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed facility or activity;
- the extent and permanence of the beneficial and/or detrimental effects which the proposed facility or activity is likely to have on the uses which the area is suited; and
- existing jurisdictional regulations.

GRDA proposes that agency consultation would be initiated by project proponents or GRDA as appropriate. Governmental regulations may require contact with the appropriate federal, state, county, or local governments. This will be achieved on a case-by-case bases as development proposals

Commercial Permit Application Standards

Section 7.2 of the SMP defines commercial uses that fall under the commercial permitting process. As detailed in GRDA's Commercial Project Permitting Process, commercial projects are:

- construction or modification of facilities designed to accommodate more than ten watercraft at a time;
- construction or modification of facilities intended to serve non-residential enterprises operated directly or indirectly for profit or gain, including courtesy docks; and
- dredging operations requiring removal of fill materials exceeding 2,000 cubic yards.⁷

Residential Permit Application Standards

GRDA proposes to emphasize consolidating shoreline uses and encourage the development of multi-owner facilities to reduce shoreline congestion. GRDA reviews some residential shoreline facilities (those with ten or more slips) as an allowable residential use only if they are developed specifically without intent for commercial uses or monetary gain. Any proposed facility with ten or more slips, requires FERC review and approval.

The vegetation management plan⁸ proposed by GRDA does not allow vegetation management activities on GRDA land, including the clearing or pruning of trees or shrubs, or trimming or mowing of natural undergrowth, without first obtaining a permit from the GRDA Office of Ecosystems Management. Each permit would require adjacent landowners to develop a site-specific vegetation management plan. GRDA would evaluate these proposed plans based on the following criteria:

- current permitted uses in the surrounding area;
- aesthetic and biological effects of pruning or removal on the vegetation;
- potential for replacement with more desirable vegetation;
- potential effects on the aesthetic quality of the surrounding area, with consideration given to the views from the land and from the water;
- potential environmental effects on soils, shoreline/slope stability, water quality, and wildlife habitat;

⁷ See Order Modifying and Approving Dredging Management Plan, issued November 17, 1995 (73 FERC ¶ 62, 111).

⁸ The vegetation management plan was filed on January 23, 2009, as attachment E in GRDA's response to Commission staff's additional information request.

- special consideration for unique varieties, vegetation of great age, rare vegetation, or vegetation of horticultural or historical significance; and
- special consideration for native vegetation in undeveloped landscapes.

Within Stewardship SMC areas, GRDA generally would not permit vegetation removal and any removal of wetland vegetation. Within the Wildlife Management SMC, vegetation management only would occur when necessary for the purpose of preserving and enhancing habitat. Any such activity that is allowed would be conducted under the supervision of the Office of Ecosystems Management. Organic debris removal in Wildlife Management areas would be allowable only with the express permission of the Office of Ecosystems Management.

In addition to the vegetation management plan, GRDA has several outreach programs related to vegetation management. These include media-related activities including appearances by GRDA personnel on local radio shows and at community events such as boat shows. Additionally, GRDA annually distributes Lake Rules and Lake Guides that include information on vegetation management policies.

Use of herbicides and pesticides on project lands expressly would be prohibited except by a state-licensed applicator with prior approval of the Office of Ecosystems Management.

Use of Heavy Machinery

GRDA would permit the use of machinery with a maximum power output not greater than 30 horsepower (hp) without prior approval for allowed management practices, provided the use does not result in the unauthorized movement of soil, rocks, or existing live vegetation. The use of machinery with a maximum power output greater than 30 hp may be allowed with prior approval from GRDA.

General Permits for Natural Disasters and Other Emergencies

In the event a natural disaster or other emergency situation causes significant vegetation damage or debris accumulation within the project boundary, to the extent that site-specific permitting is impractical or would result in undue delay, the General Manager of GRDA may issue a general vegetation management permit governing all management activities within an affected area in lieu of requiring site specific permits. A general permit would clearly identify the scope of allowed activities, the areas in which the permit is applicable, and the period of time for which the permit is valid.

Placement of Buoys

Adjacent property owners may request GRDA place a “no wake” buoy in front of or adjacent to their property. No wake buoys designate a 150-foot corridor off the shoreline within which boats and other watercraft must travel at idle speed. Individuals applying for a buoy permit must: (1) agree to abide by the Rules and Regulations governing the Use of Shore lands and Waters of GRDA, which are incorporated and made part of the agreement; and (2) understand that a buoy placement issued upon the application may be revoked at any time by GRDA. Any buoy not maintained in its proper location would be subject to removal by GRDA, without the applicant’s consent.

GRDA requires applicants petitioning for a no-wake buoy provide information and documentation showing the proximity of a proposed buoy to any existing buoy. If applicants feel that a buoy is warranted adjacent to their property due to boat and/or dock damage, GRDA requires proof of ongoing or existing damage, through the presentation of photo documentation of damage and/or boat traffic that is operating in a hazardous manner within the 150-foot corridor, and/or repair bills for reputed damage.

Encroachments, Permit Violations, Permit Waivers, and Grandfathering

Certain structures built on project property prior to June 1, 2005, would be allowed to remain at GRDA’s discretion. Structures must be consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. Owners of such structures may obtain a license from GRDA to encroach for a maximum of 30 years, subject to FERC approval.

GRDA states in its proposed SMP that it reserves the right to inspect any permitted or unpermitted use of project lands and waters during and after construction or implementation. If inspection of particular uses reveal inconsistencies or violations of established management policies and/or permitting standards, facility owners/users would be notified of such violation, and advised by GRDA regarding suggested means to correct it, and actions to be taken by GRDA should the violation persist.

GRDA has included procedures in the proposed SMP for written application and hearings to allow the GRDA Board of Directors to grant a waiver or exception of, or modify the requirements imposed on private and/or commercial permit applicants by GRDA.

GRDA proposes that all existing uses that were properly permitted and met current GRDA standards at the time of permitting, but which would no longer be compatible with this SMP, may remain in place, as long as they comply with the size, location, and type requirements set forth in GRDA’s requirements in effect at the time the structure was built. Grandfathered uses would not be transferable to other locations. Uses for

which GRDA has not issued a permit would not be eligible for grandfathering. All existing and new uses must comply with all current regulations pertaining to maintenance, safety, and environmental protection.

6. Enforcement Plan

GRDA proposes to continue its current policy of removing or causing to be removed, at the owners expense, a dock, wharf, boat house, breakwater, buoy or any other private or commercial structure from GRDA lands, or cancelling any license or permit if, after notice and opportunity to be heard in accordance with its enabling legislation.

- The structure is not constructed with generally-accepted building materials and pursuant to generally-accepted construction practices, or installed in accordance with the plans and specifications approved by GRDA.
- Such works are not kept in good state of repair and in a good, safe and substantial condition.
- Such works are not inspected by a licensed electrical contractor, as detailed in GRDA's permitting standards.
- Failure of payment of any fee when due.
- The owner fails to repair or remove these uses after being notified by GRDA to repair or remove the same.

GRDA intends to review the land use classification mapping, SMP, and associated permitting programs every 6 years. GRDA would provide the Commission with an evaluation of the SMP no later than the 6-year anniversary following approval of the SMP and every 6 years thereafter. GRDA identified several conditions that would initiate a review of the SMP in less than 6 years, including major commercial additions or new commercial uses, large parcel land sales/major changes in land ownership, and changes within the SMCs. In the event that one or more of these conditions occurs, or cumulative effects of activities within the project appear to affect the effectiveness of the SMP, GRDA would begin internal review of the existing plan. If GRDA determined that major changes to the land use classification mapping (through definition and assignment of a new SMC, or reassignment of an existing SMC) are necessary, it would petition the Commission to amend the SMP. Upon determination of a need to amend the SMP, GRDA would notice its intent publicly, and provide a forum for public comment on the proposed revisions.

7. Amendment Process

GRDA would institute permit and non-project use tracking by using existing GIS capabilities. GRDA would enter new permit applications into the GIS database so it can

track development and use patterns, and have easy access to data related to permitted activities. GRDA would use this database as a tool for assessing permit applications, as well as for assessing the need for future changes in permitting or land use classifications. GRDA would update project and resource databases as needed to ensure they are reflective of field conditions. As long as resource and use criteria as established by this SMP do not change, GRDA would not seek additional review by FERC.

To maintain the continued relevance of the SMP, GRDA intends to review the land use classification mapping, the SMP, and the associated permitting programs every 6 years. At least 6 months prior to preparing a report on the SMP review, GRDA would provide public notice of the process and request comment from the public. Changes in the tracking of SMP activities or other minor changes, such as new developments within existing subdivisions adjacent to Grand Lake, or changes in recreational uses and access would be noted as unlikely to warrant amendments to the SMP. Major changes in land use patterns or new uses of the project may require further evaluation for new management strategies or may even require amendment of the SMP. GRDA would provide FERC a report on the evaluation of the SMP no later than the 6-year anniversary following approval of the SMP and every 6 years thereafter.

GRDA has established the following proposed criteria that may indicate the need to address amendment of the plan.

- Major Commercial Additions or New Commercial Uses: GRDA would continue to monitor growth and development patterns around the lake and compile data that may be useful in the event an SMP amendment becomes necessary during the review period. While the northern and eastern shorelines of the lake currently do not present the level of heavy development found in the southern region, or support major commercial uses, GRDA recognizes the potential for growth and changes in overall development patterns and expectation. These areas may warrant special attention in the future.
- Large Parcel Land Sales/Major Changes in Land Ownership: In the event that major parcels of previously undeveloped land change ownership, with an identifiable purchaser and new intent for use, GRDA may review both the SMC designation, as well as the allowable uses within the area to determine if amendments to the SMP are warranted.
- Changes within the SMCs: GRDA based the current SMCs on existing environmental, social, and aesthetic resources. Some of these classifications are dynamic by nature. It is possible that during the review period, new concerns such as wetland habitat may change, thereby necessitating the re-evaluation and possible amendment of SMC and the associated allowable uses.

In the event that one or more of the above conditions occurs, or cumulative effects of activities within the project appear to affect the effectiveness of the SMP, GRDA

would begin internal review of the existing plan. If GRDA determines that major changes to the land use classification mapping (through definition and assignment of a new SMC, or reassignment of an existing SMC) are necessary, it would petition FERC to amend the SMP.

Upon determination of the necessity to amend the SMP, GRDA would publicly notice its intent, and provide a public forum for public comment, either through public meetings or through GRDA Board of Directors meeting discussions (which are open to the public). Because a revision or modification of the SMP requires FERC approval, any proposed amendment would follow FERC procedures.

B. Proposed SMP With Staff-Recommended Modifications

After evaluating the proposed SMP, and comments from resource agencies and other interested parties, we consider a number of changes to the plan to be necessary or appropriate. Specifically, the following modifications are recommended in the *Environmental Analysis* section.

- Prohibit dredging activities in Wildlife Management areas.
- Develop, in consultation with FWS, USGS, and Oklahoma DWC, a provision for standardizing sediment sampling, sediment analysis for heavy metals and other constituents as determined to be necessary, and the use of the analysis results in the dredging application and permitting process at Grand Lake, to protect water quality.
- Develop provisions for water quality monitoring in coves where “heavy boating” use occurs. The provisions would identify what constitutes heavy boating use in coves, the timing for initiating monitoring and the water quality parameters to be monitored, and the frequency and duration of monitoring. The provisions should be developed in consultation with FWS and Oklahoma DWC.
- Develop provisions for water quality monitoring in coves where “heavy boating” use occurs. The provisions would identify what constitutes heavy boating use in coves, the timing for initiating monitoring and the water quality parameters to be monitored, and the frequency and duration of monitoring. The provisions should be developed in consultation with FWS and Oklahoma DWC.
- Require site-specific planning and analysis prior to new activities or vegetation management within all areas FWS or Oklahoma DWC have identified as sensitive. This would specifically include evaluations of and

mitigation for effects on wetlands or other habitat for threatened, endangered, or sensitive species.

- Develop, in consultation with FWS and Oklahoma DWC, provisions for quantifying the effects of permitted vegetation removal in all SMC areas and mitigating these effects through the enhancement or protection of riparian vegetation in other areas.
- Within Responsible Growth-Wetlands Inventory, Stewardship, and Wildlife Management areas, and in all areas FWS or Oklahoma DWC have identified as sensitive, maintain a 35-foot-wide riparian-forest buffer similar to the areas' naturally occurring vegetation. In areas where GRDA does not have jurisdiction over a full 35-foot buffer, maintain the maximum buffer within its jurisdiction and, as a component of the public education program, encourage adjacent landowners to maintain riparian forest characteristics in the remaining buffer width.
- Classify as Stewardship those areas in Wolf Creek, Carey Bay, and Monkey Island that contain wetland resources similar to those found in Drowning Creek, Duck Creek, and Horse Creek.
- In consultation with FWS and Oklahoma DWC, develop provisions, to be included in the SMP, for: (1) identifying existing wetlands potentially affected by proposed shoreline activities and evaluating their functions and values; (2) assessing the probable effects of proposed activities on wetlands; and (3) addressing adverse effects on wetlands, from permitted activities, through appropriate mitigation. To account for the mitigation of any wetlands impacts, GRDA should be required to annually file with the Commission, at the same time it files its annual fish and waterfowl management report, a wetland mitigation report providing detailed descriptions of: (1) the status of any planned, ongoing, and completed mitigation measures; and (2) documentation of any consultation on wetland mitigation with FWS and Oklahoma DWC.
- In consultation with FWS and Oklahoma DWC, develop provisions, to be included in the SMP, for: (1) identifying existing wildlife habitats potentially affected by proposed shoreline activities and evaluating their functions and values; (2) assessing the probable effects of proposed activities on wildlife habitats; (3) addressing adverse effects on wildlife habitats, from permitted activities, through appropriate mitigation. To account for the mitigation of any wetlands impacts, GRDA should be required to annually file with the Commission, at the same time it files its annual fish and waterfowl management report, a wildlife mitigation report providing detailed descriptions of: (1) the status of any planned, ongoing,

and completed mitigation measures; and (2) documentation of any consultation on wildlife mitigation with FWS and Oklahoma DWC.

- Develop, in consultation with FWS and Oklahoma DWC, provisions for: (1) identifying wildlife habitats potentially affected by proposed shoreline activities and evaluating their functions and values; (2) assessing the probable effects of proposed activities on wildlife habitats; (3) addressing adverse effects on wildlife habitats, from permitted activities, through appropriate mitigation; and (5) providing an annual wildlife mitigation report.
- Implement GRDA's proposed annual surveys for bald eagle nesting activity and include appropriate consideration of this information during implementation of the SMP, and adherence to FWS's national bald eagle management guidelines.
- Revise the SMP to include information regarding measures to coordinate the SMP and recreation management plan, and associated management and monitoring measures, including provisions for monitoring boating-use density at the project, and coordinating future updates of the recreation management plan and SMP.
- Revise the SMP to include sub-classifications and/or reclassification of the shoreline areas designated as Responsible Growth, to differentiate between more limited development (i.e., residential) and more intense development (i.e., multi-purpose/commercial), and to identify existing public recreational access areas and future proposed public recreational access areas at the project.
- File a monitoring report with any proposed changes to the SMP, every 6 years, for Commission approval, after consultation with FWS, Oklahoma DWC, and interested stakeholders, beginning 6 years from the issuance of any order approving the SMP.
- File, for Commission approval, any proposed change to the approved shoreline management classifications.

C. No-action Alternative

Under the no-action alternative, the licensee's proposed SMP would not be approved and the licensee would continue to manage the reservoir's shoreline under its existing license conditions and Commission-approved plans.

V. CONSULTATION AND PUBLIC NOTICE

This section discusses the comments received during: (1) GRDA's consultation process on the proposed SMP; and (2) the Commission's public notice period for the proposed SMP.

A. Pre-Filing Consultation

GRDA developed the SMP after consulting with FWS, the Corps, Bureau of Indian Affairs, Oklahoma DWC, Oklahoma Conservation Commission, Oklahoma State Historic Preservation Officer (SHPO), Oklahoma Archeology Survey, Oklahoma Tourism and Recreation Department (Oklahoma TRD), Oklahoma Department of Environmental Quality, Office of State Fire Marshal, Mayes County Flood Plain Manager, Oklahoma Corporation Commission, Oklahoma Water Resources Board, Ottawa County Commission, Delaware County Department of Environmental Quality and Floodplain Administrator, Indian tribes, local governments, and non-governmental organizations. In addition, GRDA conducted local, public-outreach sessions.

A stakeholder working group (SWG) - an advisory committee comprised of 26 interested individuals, representatives of non-governmental organizations, informal citizen groups, commercial interests, and state and federal agencies -- was developed. The SWG provided advice and opinions regarding key components of the SMP, including the designation of land use classifications for shoreline property, definitions of allowable uses within these areas, and suggestions for permitting policies. The SWG was comprised of three committees with distinct tasks and objectives. These SMP working committees were Land Use Classification, Allowable Use Determination, and Permitting Policy Development.

During the pre-filing consultation proceeding, Mr. John D. Rothman,⁹ in a memorandum to the GRDA Board of Directors dated April 26, 2007, stated that the most common criticism of the proposed SMP classifications was made by owners of land proposed to be classified as "sensitive." Mr. Rothman further stated that underlying these criticisms was the obvious and logical apprehension that land values would decrease if shoreline was designated as "sensitive." This issue also was raised by the Concerned Citizens of Grove (a group of 129 total signatures on a petition) for the specific areas of Carey Bay and Wolf Creek. In addition, the Paris Cove Homeowner's Association suggested a limit on development in the cove and a classification that limits development. Generally, other issues brought up in the pre-filing consultation process included impacts on water quality from the chicken industry and other commercial pollution sources, the

⁹ Mr. John D. Rothman, mediator and attorney, was hired by GRDA to conduct the pre-filing public meetings and to prepare an independent report summarizing the public's opinions.

use of larger boats and their related high wakes causing turbidity and damage to existing docks, and the number of unsightly and presumably out of compliance docks and their aesthetic and environmental offensiveness.

Mr. Karl Blade, a shoreline resident, commented that the proposed SMP lacks designated residential areas, as opposed to the proposed mixed commercial and residential land use classification. He further stated that allowing business use next to residences on a case-by-case basis, to be decided by the GRDA board or some other GRDA-appointed authority without strict, well-understood rules, is an invitation to capricious and arbitrary results.

Seven members of the SWG, including Mark Osborn, Jack Lenhart, Doss Briggs, Mike Brady, Joseph McCormick, and Joe Chouteau, made the following 11 recommendations after viewing GRDA's final SMP.

- 1) Utilize the SMCs as developed by the working committees in the SMP process. Add the classification of "Responsible Growth" for those areas already known to be in need of special monitoring including mitigation, if new development is approved. The working committees strongly support the use of "Limited Use/Residential" and "Multi-purpose/Commercial" SMCs. Some members of the working committees also support the use of a "Fully Developed" SMC. These classifications were joined into one SMC, "Responsible Growth," when overwhelmingly negative comments were made at a public meeting stating these classifications were unnecessarily restrictive.
- 2) Expand newspaper advertisement for all official GRDA notices to include the Tulsa and Oklahoma City major newspapers. Send specific notice to all resource agencies and applicable wildlife and fishing non-governmental organizations.
- 3) Limit commercial development to a reasonable-percentage increase compared to current levels, realizing that these developments take up a disproportionate amount of recreational water space, which would then no longer be available to other stakeholders.
- 4) Authorize and direct the resource agencies to provide a proper survey and update of environmentally sensitive project resources at a fee to be negotiated between the parties.
- 5) Repeat the carrying capacity study conducted for the project recreation management plan, with proper input from the resource agencies, and provide the opportunity for the SMP working committees to review the results. The commenters state that the carrying capacity study did not

use a methodology that allowed comparison of data to the earlier 1996 study, the study methodology had not been approved by any resource agency, the calculation of the usable acres for pleasure boating is incorrect and led to an underestimate of current use, and the study was started too late in the recreation season to support any meaningful statistical analysis.

- 6) Provide existing commercial dock permits, residential dock permits, dredging/excavation permits and vegetation management permits to the SMP working committees for review and reconciliation of the terms and policies of the permits to the terms and policies of the SMP.
- 7) Submit the vegetation management plan to the resource agencies (FWS, Oklahoma DWC, the Corps, and Oklahoma Water Resources Board) for comment and revision, including SMC-specific criteria.
- 8) Clearly define goals and methods of measurement that are easy to understand and easy to oversee. Include clear enforcement language for policy violations and a clearly stated appeal process. The commenters state that this recommendation is made because the adaptive management approach advocated in the proposed SMP provides no consistent land management policies.
- 9) Identify sampling intervals, methods, and agencies responsible for each type of testing through consultation with the resource agencies. Do not allow applicants to provide their own testing when required for permits. The commenters state that this recommendation is made because the SMP does not deal aggressively with serious water-quality and heavy-metal concerns.
- 10) Incorporate the use of density model criteria for each land use classification and use these criteria in the permitting process as a fair and non-capricious method for qualifying new permit applications.
- 11) Replace areas designated by the resource agencies as “sensitive” and subsequently removed by GRDA staff back into the “Stewardship” SMC until new surveys and maps can be drawn incorporating the recommended updated information from the resource agencies.

Mr. Rudolph Herrmann, also a member of the SWG, submitted comments identical to some of those listed above, and the following additional recommendations:

- 1) Apply adaptive management strategies, realizing that there is room for much fine-tuning. Mr. Herrmann states that the adaptive management

strategy is inherently flexible, and as described in the proposed SMP, is not predictable to reservoir users.

- 2) Implement those land use classifications developed by the SMP working committees on a temporary basis, with the understanding that the next 6 years can be devoted to working out the details in a manner that is consistent, predictable, open, and fair to all.
- 3) Develop clear strategies and action plans to deal with the serious water quality problems on Grand Lake.

The City of Grove filed comments with GRDA stating that the City Council passed a resolution requesting that GRDA classify the shoreline areas abutting the city's corporate limits as "Responsible Growth" within GRDA's shoreline management plan.

FWS and Oklahoma DWC also filed comments with GRDA. These agencies made the following recommendations.

- 1) Include a limited/residential classification in the SMC. In the proposed limited/residential area, new commercial uses would be prohibited generally while residential uses would be allowed.
- 2) Create a unique classification for wildlife management areas. The proposed classification for wildlife management areas would afford greater protection than the current Stewardship SMC, and no development would be allowed without adequate mitigation and the consent of Oklahoma DWC.
- 3) Allow development in wetlands located in areas that are already used and focus preservation efforts on the north end of the reservoir instead of following the piecemeal protection of all wetlands. Additionally, the agencies suggested that protection should be focused on fish and wildlife habitat.
- 4) Use density model calculations to determine appropriateness of new uses. Under a density modeling system, the amount of obstruction a use causes is the dispositive factor in whether it would be allowed or prohibited.
- 5) Consolidate Stewardship areas to provide for more meaningful habitat protection and the creation of off-site habitat to serve as mitigation.
- 6) Conduct more extensive surveys to determine fish and wildlife habitat values for shoreline lands and waters. The agencies also recommended that the existing recreation management plan and carrying capacity

study be revised and expanded. They further recommended that submission of the SMP be delayed 1 year to allow time for additional studies.

- 7) Advertise notice of hearings in the media markets in which the hearing is to take place.
- 8) Contract with the U.S. Geological Survey (USGS) to conduct a comprehensive, lake-wide assessment for heavy metals as opposed to testing specific areas to be dredged.

GRDA agreed with some of the recommendations listed above and adequately incorporated them into the final SMP filed with the Commission. Recommendations that GRDA did not agree with, that deal with specific resource issues, are discussed in the following *Environmental Analysis* section. Other issues raised were found to be either outside the scope of the proposed SMP, and have been eliminated from further consideration, or deal with administrative and procedural matters that will be addressed in the Commission's order on the SMP.

B. Public Notice of Application

On August 8, 2008, the Commission issued a public notice of the application for the proposed SMP. This notice set a 30-day period during which interventions, comments, and protests could be filed, ending on September 7, 2008. Table 2 shows the entities who filed comments and/or motions.

Table 2. Entities who filed comments and/or motions pursuant to the Commission's public notice.

Entity	Filing Date	Comment and/or Motion
Rudolf J. Herrmann	August 26, 2008	Comments
Mr. Mike Brady/SMP Working Committee	September 3, 2008	Intervention
Mark Osborn, Jack Lenhart, Doss Briggs, Mike Brady, Joseph McCormick, and Joe Chouteau, members of the SWG	September 4, 2008	Intervention
Cheryl Lenhart	September 4, 2008	Intervention
Oklahoma DWC	September 8, 2008	Comments

Entity	Filing Date	Comment and/or Motion
Monkey Island Association	September 8, 2008	Comments
Tulsa District, U.S. Army Corps of Engineers	September 17, 2008	Comments
Grand Lakers United Enterprise	September 18, 2008	Comments
U.S. Department of the Interior, Office of the Secretary	September 19, 2008	No Comments
GRDA	September 19, 2008	Answer to Motions to Intervene and Reply Comments
FWS	October 7, 2008	Comments
Virginia Lawrence	October 15, 2008	Comments

Rudolph Herrmann, Mark Osborn, Jack Lenhart, Doss Briggs, Mike Brady, Joseph McCormick, and Joe Chouteau, generally reiterate their recommendations filed with the licensee during the pre-filing consultation. Their specific comments are detailed above in the above *Pre-filing Consultation* section. In addition, Mike Brady filed a motion to intervene requesting that the Commission reject the final SMP until deficiencies are corrected with measurable and meaningful oversight by FERC. The filing reiterates comments and concerns included in the other comments addressed in this EA.

Cheryl Lenhart states that the proposed SMP does not provide necessary changes favored by the SWG and she points out that an earlier draft SMP contained a “Residential Only” classification and the final SMP contains no such classification. Ms. Lenhart states the final SMP favors commercial over public use. Ms. Lenhart also comments that there is a need for definitive guidelines and that the adaptive management strategy is not clear and can be manipulated. She states that GRDA continually has allowed encroachments to the detriment of other public uses such as water skiing, family boating, or leisurely fishing.

Oklahoma DWC states that it supports the comments and recommendations filed by FWS. Oklahoma DWC states that it is concerned with the loss or potential loss of fish and wildlife habitat, and that the proposed SMP should include measures to reduce the ability of adjacent landowners to impact fish and wildlife habitat and/or include objective quantifiable, baseline information and a process for mitigating negative effects on habitat. Oklahoma DWC reiterates that the resource and recreation data is insufficient and requests that plans be developed to collect the appropriate data during the first 6 years of implementing the proposed SMP.

The Corps states in its comments that it manages flood flowage easements between elevations 750 and 757 feet PD at the dam, and 750 and 760 feet PD at the reservoir's upper reaches. In addition, it has some regulatory authority below the 750-foot elevation contour. The Corps states it would need to approve any structures placed within these elevations or below the 750-foot contour.

Virginia Lawrence comments that the public meetings held by GRDA were not effective. Issues were not summarized or discussed in an organized fashion and time set aside for the public to express concerns was inadequate. Ms. Lawrence has concerns that the proposed SMP may not allow for the protection of existing homeowners from commercial development that affects the appearance and safety of the reservoir. Ms. Lawrence further states that since the final SMP does not contain a Residential Only classification, existing home owners still would be vulnerable and it may be necessary for FERC to provide heavy oversight over the long-term.

FWS states that most of the recommendations from the SWG and that many of its own recommendations have not been incorporated and some FWS recommendations were expanded beyond the original intent. FWS states that generally, many of the proposed changes reduce protection of shoreline habitat without any provisions for quantifying impacts or mitigating for current and future impacts. FWS continues by stating that while impacts would continue within Responsible Growth areas, no specific management actions are described for improving fish and wildlife habitat elsewhere to mitigate for those impacts. Without some method of quantifying the impacts and providing appropriate mitigation, the proposed SMP would result in a net loss of fish and wildlife habitat. Impacts would continue to occur within Responsible Growth areas, but no specific management actions are described for the Wildlife Management areas that would enhance or restore fish and wildlife habitat to mitigate for those impacts. FWS is concerned that at least 60 percent of the shoreline has been classified as Responsible Growth and there is no proposed system to mitigate for these development-related impacts.

FWS supports the idea of taking additional time to gather more accurate and updated information on fish and wildlife resources to make informed shoreline management decisions and produce a better SMP. FWS states that the carrying capacity study was inadequately designed, contained insufficient sampling effort, and should not be used as a basis for any assumptions or decisions in the SMP. FWS makes the same assertions about the approved recreation management plan. It strongly recommends an independent review by a person or group with expertise in scientific design and statistics and that GRDA conduct a new carrying capacity study and develop a new recreation management plan.

In addition, FWS recommends surveys within Stewardship areas to determine fish and wildlife habitat values for project lands and shorelines. The proposed surveys would allow GRDA and the resource agencies to base shoreline classification decisions (such as

offsite mitigation and assist in making zoning decisions that reduce fragmentation on shoreline habitat) on actual data and values. FWS suggests that small isolated wetland areas that are surrounded by development probably have limited value and could be reclassified to allow some impacts (with appropriate permits from the Corps and possibly other agencies). These effects on isolated wetlands would be permitted only if they included appropriate mitigation and would allow management of wildlife and wetlands in larger tracts that were not so impacted by surrounding development pressures. However, many of the proposed areas classified as Responsible Growth-Wetlands Inventory have taken the FWS recommendations beyond what was intended. Some of the proposed areas are relatively large, and it would be difficult to mitigate for areas such as the Responsible Growth-Wetlands Inventory areas near Wolf Creek, Carey, Bay, and Monkey Island. These appear to be shallow areas that are flooded frequently and poorly suited for development. It is not clear to FWS why these areas have been zoned as Responsible Growth-Wetlands Inventory. FWS recommends that these larger blocks of wetlands be protected as Stewardship areas. FWS also recommends that the SMP include a process that addresses cumulative effects on shoreline habitat and provides adequate mitigation for effects on any wetlands. FWS further recommends a reduction in the fragmentation of wildlife habitat along shorelines and focus on managing larger contiguous tracts. FWS recommends eliminating language related to the millet-seeding program in the Aquatic Species section (SMP Section 5.5). For clarification, FWS states the license requirements in the fish and waterfowl management plan include millet seeding, but funding for aquatic vegetation plantings is in addition to, and not a replacement for, the millet seeding.

FWS states it is unclear as to how the Wildlife Management locations were chosen and recommends the SMP include a description of the management strategy for the 1,630 acres designated as Wildlife Management areas. FWS supports allowing public hunting on Wildlife Management areas and other GRDA lands, but such use would be difficult to manage without clearly marked boundaries to reduce trespass conflicts with adjacent private property. It states there appears to be potential for safety concerns with the proposed zoning of Responsible Growth adjacent to Wildlife Management areas that are open to hunting.

FWS states that federally-listed species information concerning the American burying beetle (ABB) is not correct in the SMP. FWS recommends conducting surveys for the ABB to establish baseline information and avoid potential shoreline development-related violations of the Endangered Species Act. FWS further states the ABB should be included in re-initiation of formal consultation for all listed species in the Pensacola Hydroelectric Project area. A new consultation is required primarily due to changes in information related to federally-listed bats and failure to comply with the existing biological opinion. In addition, the ABB was not addressed in the existing biological opinion (prepared in 1992 for the relicensing of the Pensacola Hydroelectric Project) because the range of the ABB was not known at that time to include this area of

Oklahoma. Alternatively, take of ABBs could be addressed through a programmatic section 7 consultation that would be far more efficient than individual consultations for each proposed project involving soil disturbance.

FWS states the language in the SMP related to the Neosho madtom and bald eagle should be improved to be more accurate. FWS states the Neosho madtom and its habitat are adversely affected by the reservoir and flood control operations, and effects on this species also need to be included in the new section 7 consultation. In addition, FWS states the bald eagle (*Haliaeetus leucocephalus*) was recently removed from the federal threatened and endangered species list, effective August 8, 2007. However, bald eagles are afforded additional safeguards under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. FWS recommends all construction activities be conducted in accordance with FWS National Bald Eagle Management Guidelines. FWS further recommends monitoring the reproductive success of any eagles attempting to nest near Grand Lake because there is potential for contamination (primarily metals) of fish or other prey to affect the reproductive success of nesting bald eagles.

FWS recommends a limited/residential classification be included in the SMCs. FWS's concern is that the Responsible Growth SMC is a combination of residential and commercial development and would not protect shoreline from either type of use. The Responsible Growth SMC would allow a wide variety of uses and would not provide any reasonable method of predicting or planning for future development. This SMC does not appear to provide any additional protection or assurances relative to the existing status of having no classifications or SMP.

FWS states that permits for projects that impact fish and wildlife resources on public water and lands should require mitigation; however, none of the existing fees for permits goes toward mitigation for habitat impacts or loss of public access. To help mitigate for the impacts, FWS recommends requiring contributions to a mitigation fund for effects on public lands and waters managed by GRDA. This should apply to both residential and commercial operations and be scaled appropriately with the level of impact.

FWS states the vegetation management plan should include buffers to help protect wetlands and other sensitive sites in any SMC. Buffers should be at least equivalent to Natural Resource Conservation Service standards and should be included in the vegetation management plan.

FWS recommends that GRDA contract with USGS to conduct a comprehensive, lake-wide assessment for heavy metals as opposed to testing specific areas to be dredged. GRDA's proposed language puts the responsibility for testing on the applicants and FWS states: (1) there are few, if any, area consultants that have the appropriate equipment to collect the cores for testing (in most cases it would require boat mounted equipment); (2) quality control for collection and handling of samples is imperative; (3) it would be

difficult or expensive to verify that the samples actually came from the proposed dredge site (there is potential for erroneous samples to be submitted); and (4) each permit application would have to wait for results from the lab before GRDA could process it.

FWS supports the proposed language for grazing, but is concerned that it would be difficult to enforce because GRDA does not know where its property lines are, and there are no fences to control or keep livestock on adjacent private property from grazing on GRDA property.

Monkey Island Association and Grand Lakers United Enterprise support GRDA's proposed SMP, stating that the SMP process included much study and stakeholder involvement, and that the SMP, as proposed, would promote economic development within the region.

The above comments, and GRDA's responses, are considered in the following *Environmental Analysis* section.

By letter dated December 3, 2008, Commission staff initiated tribal consultation pursuant to CFR 36, Part 800.4. The letter notified the tribes that the SMP was being reviewed and an EA would be prepared on the plan. No tribal comments were received in response to the letter.

VI. ENVIRONMENTAL ANALYSIS

A. General Setting

The Pensacola Hydroelectric Project is located about 78 miles northeast of Tulsa on the Grand (Neosho) River in Craig, Delaware, Mayes, and Ottawa counties, Oklahoma. In addition to hydropower generation, project lands and waters are used for flood control, water supply, recreation, and environmental resource protection (FERC, 1992).

Most land surrounding Grand Lake is privately owned and many areas along its shorelines have become highly developed with commercial resorts, private homes and condominiums, municipal and state parks, marinas, and private docks. The licensee manages the reservoir's shorelines via a permitting system and operates a lake patrol to monitor and inspect permitted shoreline uses and enforce its boating regulations (FERC, 1992).

Reservoir water levels fluctuate according to a rule curve established by Article 401, as amended, of the project's license. License Article 401, as amended, requires water levels be maintained between elevations 741 and 744 feet PD, in accordance with seasonal target levels.

B. Scope of the Analysis

1. Geographic Scope

The geographic scope of this environmental analysis is focused on all project lands and waters in the immediate area of the reservoir's shorelines. As appropriate, discussions of cumulative environmental effects are incorporated into the resource analyses in this document.

2. Temporal Scope

The temporal scope of this environmental analysis focuses on the period from now until the current project license expires in April 2022. The environmental effects of shoreline management after this license term would be analyzed during any subsequent relicensing process.¹⁰

C. Environmental Analysis and Recommendations

1. Geology and Soils

a. Affected Environment

The project is bordered on the east by the Ozark Plateau and on the west by the Prairie Plains. Bedrock in the project vicinity includes limestone, chert, sandstone, and shale. The project dam is constructed on chert.

The southern and eastern portions of the project vicinity (the lower portion of the reservoir) contain deep ravines and narrow valleys separated by broad, gently rolling uplands. The shorelines of the lower portions of the reservoir are mostly limestone bluffs and steep rocky beaches (FERC, 1992).

The northern and western portions of the project are in the Prairie Plains, which are typified by gently rolling plains with occasional hills and ridges. The shorelines in these portions of the reservoir generally have gentler slopes. Wetlands are confined to inlets and coves along the numerous small tributaries that enter the reservoir, and are more abundant along the upper, shallower reaches of the reservoir. Extensive cave systems occur in some of the limestone formations along the reservoir (FERC, 1992).

¹⁰ Any project relicensing process would require the prospective licensee to prepare a license application based on extensive environmental study and public involvement. The project's SMP, and the need for an updated plan, would be evaluated at that time.

The shores of Grand Lake are primarily stony, silty-loam soils on 5- to 20- percent slopes. This soil composition also occupies timbered upland ridges in cherty limestone areas. The soil surface layer is dark grayish brown in the upper 2 inches and pale brown in the lower horizon. The subsoil, which is brown, stony, silty, and clay loam, is about 60 percent chert by volume (GRDA, 2002).¹¹

b. Environmental Effects and Recommendations

Shoreline erosion may be possible as a result of GRDA-permitted activities on or adjacent to the shoreline. Such activities may include all of the items listed above within the proposed action's allowable use categories.

Article 410 of the project license allows GRDA to establish a program for issuing permits and granting conveyances of project property for specified types of use and occupancy of project lands and waters, without prior Commission approval. Such uses may include, but are not limited to, the installation of private boat docks, pedestrian pathways, and shoreline stabilization structures. The licensee only may grant permission for such uses and occupancies, provided the use or occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. All uses that exceed the provisions of Article 410 require formal Commission approval in addition to GRDA permits.

All of the GRDA-permitted uses may require ground disturbance. Therefore, there is the potential for short- or long-term erosion if appropriate measures are not taken to control or mitigate ground-disturbing activities and to monitor the shoreline to ensure that any erosion of project lands that occurs in the future, as a result of the permitted uses, is addressed.

In addition, substantial shoreline erosion has occurred in certain areas of Grand Lake as a result of fluctuating water levels and natural weather conditions. Wake-generated waves from powerboats and personal watercraft also have contributed to this erosion. GRDA imposed boat-traffic restrictions on the Duck Creek area of Grand Lake, in 2002, in an effort to reduce the potential for erosion associated with boat traffic (GRDA, 2002). Those restrictions include traffic lanes, no-wake zones, speed limits, and other limitations. The SMP includes provisions for the placement of "no wake" buoys to protect the shoreline from boat wakes.

¹¹ This information was provided specifically for the Duck Creek Cove area in response to an information request from the Commission regarding expansion of the Arrowhead Marina, and the information was extrapolated by GRDA to pertain to the rest of Grand Lake. Soil survey maps available from the Natural Resources Conservation Service support the extrapolation (NRCS, 2008).

As part of its permitting process, GRDA evaluates project designs and specifications as well as potential environmental effects and mitigation. Accordingly, GRDA is expected to ensure that permitted uses prevent erosion from developing, or include mitigation measures to address any erosion that may occur. The SMP includes by reference GRDA's permitting process and regulations, which are published on its website.

The SMP includes provisions for the stabilization of erosion sites and other means for reducing the potential for erosion, such as the placement of "no wake" buoys in front of or adjacent to properties on the shoreline of the reservoir. GRDA may issue permits allowing adjacent residential owners to stabilize eroding shorelines on project lands, including bio-stabilization or engineered solutions such as gabions or retaining walls.

Provisions of the SMP would allow construction that would have the potential to create adverse short- and long-term effects on the shoreline through shoreline erosion. However, implementation of and adherence to GRDA's established permitting regulations, and the provisions of the SMP, would enable GRDA to control and monitor activities that may result in shoreline erosion of project lands, and ensure that any erosion that does occur is addressed and only minor effects are realized.

2. Water Resources

a. Affected Environment

The Grand Lake Watershed comprises more than 10,000 square miles across Oklahoma, Missouri, Kansas, and Arkansas. The project reservoir, Grand Lake, is the third largest lake in Oklahoma with a surface area of approximately 46,500 acres and a storage capacity of 1,680,000 acre-feet at the normal maximum water surface elevation of 745 feet PD (GRDA, 2008a). Principal tributaries of Grand River are the Neosho, Spring, Cottonwood, and Elk Rivers and Labette, Big Cabin, Spavinaw, and Lightning Creeks (GRDA, 2008a).

The designated beneficial uses for Grand Lake include public and private water supply, fish and wildlife propagation as a warm water aquatic community, Class I irrigation, and primary body contact recreation (GRDA, 2008b). Oklahoma state standards require that, to protect the warm water aquatic community designation, dissolved oxygen (DO) concentrations must be maintained at or above 6.0 milligrams per liter (mg/l) at 25 degrees Celsius (°C) from April 1 to June 15 (for early life stages); at or above 5.0 mg/l at 32°C from June 16 to October 15 (summer conditions); and at or above 5.0 mg/l at 18°C from October 16 to March 31 (winter conditions) (GRDA, 2008b).

GRDA has prescribed lake-wide sanitation rules to protect public health and water quality. In general, these rules prohibit: (1) the discharge, deposit, or dumping of bottles,

cans, garbage, rubbish, refuse, debris, wreckage, bilge water containing oil or grease, or materials used in the process of cleaning the outer surfaces of vessels, or any other material of any kind be thrown into Grand Lake or dumped on shore; (2) the disposal of sewage in the waters or on shore; and (3) the operation of a vessel equipped with a marine toilet that is not a total retention system in accordance with federal regulations regarding marine toilets. GRDA's lake patrol is responsible for monitoring user compliance with these requirements and any violations are subject to GRDA enforcement.

GRDA operates the project using the reservoir elevation rule curve pursuant to license Article 401, as amended by the Commission in 1996.¹² License Article 401, as amended, requires reservoir levels to be maintained between elevations of 741 and 744 feet PD, in accordance with seasonal target levels.

Point sources of pollution entering Grand Lake include nutrient input from residential development surrounding the reservoir, discharges from the 22 wastewater treatment facilities located in Oklahoma's portion of the watershed, plus portions of the watershed in Arkansas, Kansas, and Missouri, and heavy metal contamination from acid mine drainage originating in the Neosho and Spring River watersheds. Non-point source pollution into Grand Lake originates from agricultural activities in the basin, recreational activities around Grand Lake, and possible trace metal contamination coming from local surface mining activities (GRDA, 2008a).

Certain portions of the Grand Lake watershed are listed as impaired on the state 303(d) lists for Oklahoma, Missouri, Kansas, and Arkansas for a number of distinct water quality criteria, including metals, fecal coliform (FC), pH, and low DO. Grand Lake has been recently listed on Oklahoma's 303(d) list for organic enrichment/low DO and color (GRDA, 2008a).

Water Temperature and Dissolved Oxygen

In general, surface water temperatures in Grand Lake range from between 4 and 28 °C annually (GRDA, 2008a). The reservoir typically begins to exhibit thermal stratification in May, with anoxic conditions forming in the hypolimnion several weeks later. The anoxic conditions in the hypolimnion are exacerbated by high levels of phosphorus in the reservoir, resulting in increased algae growth in the reservoir. Across Grand Lake, the extent of stratification varies. Downstream portions of the reservoir exhibit stronger stratification (in terms of stratification period and extent of anoxia in the hypolimnion) than the upper sections of the reservoir. This stronger stratification in the lower section of Grand Lake likely is due to increased water depth (GRDA, 2008a). At

¹² See Order Amending License, issued December 3, 1996 (77 FERC ¶61,251).

the normal pond elevation of 745.1 feet PD, the mean depth of the reservoir is about 36 feet while the maximum depth is 164 feet (FERC, 2007).

Sampling conducted between 2003 and 2004, found that stratification was strongest during the summer, with approximately 38 percent of the water column having DO concentrations below 2.0 mg/l in the lower portion of the reservoir. During fall and winter sampling, Grand Lake was mixed and DO concentrations were found to be above 4.0 mg/L throughout the water column. During the spring, Grand Lake showed weak stratification, with only 6 to 10 percent of the water column having DO concentrations of less than 2.0 mg/l (GRDA, 2008a).

Phosphorus

Grand Lake has been shown to have excessive amounts of phosphorus. Phosphorus enters the system from several locations, with 72 percent coming from non-point sources and 28 percent coming from point sources (GRDA, 2008a). Approximately 9,000 homes found within ¼ mile from the shoreline contribute an estimated range of phosphorus between 1,396 to 4,656 kilograms/year (kg/year) to Grand Lake. Concentrated development around Grand Lake has exacerbated phosphorus inputs. Upstream in the watershed, wastewater treatment plants and agricultural activities, including poultry farming, release additional phosphorus and other nutrients in the system (GRDA, 2008a).

Sedimentation and Heavy Metal Contamination

Water quality in Grand Lake is affected by suspended sediment that enters the lake primarily via storm runoff from agricultural areas lacking ground cover, construction sites without proper sediment control measures, and road runoff, as well as other sources. Grand Lake and many of its tributaries are listed as impaired on the 303(d) lists of Oklahoma, Missouri, and Kansas due, in part, to sedimentation and heavy metals (i.e., lead, zinc, and cadmium). These heavy metals are likely to be the result of runoff and leachate from mine tailings associated with the Tar Creek Superfund site.¹³ Sediments in the upstream portion of the reservoir have been particularly identified as containing concentrations of heavy metals (GRDA, 2008a). Lake bottom sediments, including those containing heavy metal, can be re-suspended by human activity such as dredging and other work that disturbs the lake bottom.

¹³ The first U.S. Environmental Protection Agency Record of Decision (ROD) for the Tar Creek Superfund Site was signed on June 6, 1984, under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. The ROD was subsequently amended by the Superfund Amendments and Reauthorization Act of 1986.

Bacteria

In a study conducted during the recreational season of May through September 2004, five locations in Grand Lake were sampled for *Escherichia coli* (*E. coli*), FC, and *Enterococcus*. The results were within state standards for primary body contact recreation with regards to *E. coli* and FC. Three out of ten samples analyzed for *Enterococci* resulted in values greater than the limit of 61/100 (milliliter) mL for discrete samples for primary body contact recreation. However, the limit for the monthly geometric mean of the samples, 33/100 mL, was not exceeded (GRDA, 2008a).

b. Environmental Effects and Recommendations

Shoreline Facilities

GRDA states that construction of private and commercial boat docks by adjacent landowners is allowed within the project boundary under the existing permit program. Approximately 4,611 private and 355 commercial boat docks have been permitted, primarily on the lower section of Grand Lake below Sailboat Bridge (GRDA, 2008a).

Construction of boat docks and other shoreline facilities would result in short-term turbidity of water near the construction site, primarily due to sediment disturbance and the discharge of sediment-laden runoff into Grand Lake. Long-term effects may result from increased runoff at developed sites. Subsequently, increased recreational use of the reservoir could negatively affect water quality through the potential for increased petroleum product leakage and overboard discharges of waste from boats and other watercraft.

According to the proposed SMP, boat dock construction would be limited primarily to those areas classified as Responsible Growth, Responsible Growth-Wetlands Inventory, and Municipal/Public Use. Together, these SMCs total about 354 miles of shoreline, or about 68 percent of the project shoreline. Construction of these and other shoreline facilities would not be permitted in areas classified as Stewardship or Wildlife Management, (about 166 miles or 32 percent of shoreline). Project Operations areas contain project-related features and, by nature, are separate from areas accessible to the public for safety purposes. Therefore, we do not expect boat dock construction in these areas.

As described earlier in this EA, the Standard Land Use Article (Article 410 of the project license) allows GRDA to establish a program for issuing permits and granting conveyances for certain uses of project lands and waters. Facilities to be constructed, such as boat docks, would continue to be subject to GRDA's permitting programs, and, depending on the type of facility proposed, may ultimately require Commission approval. The proposed SMP does not supersede or change this requirement. We find GRDA's

existing permitting system adequate to minimize any potential short-term effects on water quality resulting from the construction of boat docks and other shoreline facilities.

Regarding potential long-term effects to water quality (i.e., increased runoff and potential for increased petroleum leakage and waste from boats and other watercraft the docks go operational), GRDA's Rules and Regulations pertaining to Grand Lake (found at www.grda.com) include restrictions that minimize negative effects on water quality that might be associated with increased recreational use of the reservoir (see *Affected Environment* section, above).

In section 6.6 of the SMP, GRDA proposes to monitor water quality in coves of Grand Lake where boating use is heavy in efforts to identify any water quality problems that result from recreational boating. No details were provided in the SMP on what would trigger water quality monitoring in these coves (i.e., what constitutes "heavy use"), nor did the SMP identify what specific water quality parameters would be monitored by GRDA and at what frequency. Development of this type of monitoring, in consultation with the appropriate resource agencies could greatly assist in the identification and control of water quality issues that originate in the lake's busiest coves. Therefore, to further water quality protection efforts we recommend GRDA develop, for inclusion in the SMP, provisions for water quality monitoring in coves where "heavy boating" use occurs. The provisions would identify what constitutes heavy boating use in coves, the timing for initiating monitoring and the water quality parameters to be monitored, and the frequency and duration of monitoring. The provisions would be developed in consultation with FWS and Oklahoma DWC.

Dredging

Dredging and other excavation activities in Grand Lake may cause localized turbidity and suspension of sediments containing heavy metals, such as lead, zinc, and cadmium. GRDA's dredging management plan, approved November 17, 1995,¹⁴ and amended March 31, 2004,¹⁵ allows GRDA to issue permits for non-project dredging activities involving up to 2,000 cubic yards of material. Removal of more than 2,000 cubic yards requires prior Commission approval. The approved plan includes measures to ensure compliance with state, local, and federal permits; addresses presence of wetlands, historic properties, fish spawning areas, and compliance with the Endangered Species Act; and indicates that the licensee shall retain stop-work authority in order to prevent hazardous or environmentally damaging activities, and shall file annual dredging reports with the Commission. The dredging plan does not, however, specifically address heavy metals. In a January 16, 2007 letter to the licensee, the Commission summarized issues and correspondence regarding testing for heavy metals prior to dredging, and noted

¹⁴ Order Modifying and Approving Dredging Plan (73 FERC ¶ 62, 111).

¹⁵ Order Amending Dredging Management Plan (106 FERC ¶ 62, 244).

that it expected testing for heavy metal contamination in areas of proposed dredging activities to be addressed in the SMP.¹⁶ The letter noted that the licensee had already decided to require dredging applicants to perform metal assessments as part of dredging proposals.

FWS and others have recommended in this proceeding that GRDA deal more aggressively with heavy-metal contamination in Grand Lake. In comments filed on September 24, 2008, FWS states that GRDA's current dredging policy places the responsibility of testing on applicants. FWS identifies several problems with this approach, including the potential for erroneous sampling and delays associated with individual applicant testing. FWS also notes there are a limited number of consultants in the area that perform this type of analysis.

Alternatively, FWS recommends GRDA comprehensively sample all appropriate areas of the reservoir that are likely to be dredged. In this manner, GRDA and Commission staff would not be delayed waiting for individual sampling and analysis. In response, GRDA states that the most effective testing plan is to test the sites where dredging is planned as opposed to spending significant time and resources on the type of sampling recommended by FWS.

Sediment contamination, and its disturbance from dredging, needs to be addressed in the SMP. The comprehensive sediment sampling recommended by FWS would provide a substantial amount of information regarding the concentration and distribution of sediment contamination at Grand Lake. However, it is not currently clear that a lake-wide sediment testing protocol could be designed that would yield information useful in assessing risks associated with dredging and other work at specific locations on a water body the size of Grand Lake. At the same time, relying on individual dredging applicants to test and report on sediment contamination, in specific areas proposed for disturbance, could lead to problems with testing methodology inconsistencies and data accuracy.

We, therefore, recommend that the SMP include a provision for standardizing sediment sampling, analysis of sediment samples for heavy metals and other constituents as determined to be necessary, and applying the results to the site-specific dredging application process at Grand Lake to protect water quality. Specifically, we recommend that the licensee develop such a provision, in consultation with FWS, USGS, and Oklahoma DWC (a protocol for processing individual applications) which: (1) identifies sampling and analysis procedures; (2) defines the criteria to be used in selecting qualified testing contractors; (3) establishes thresholds for all constituents for which testing may be conducted; (4) describes a sequence and schedule to be followed in applying sediment sampling and analysis to the licensee's dredging permitting process, including actions

¹⁶ January 16, 2007 letter from John E. Estep, Division of Hydropower Administration and Compliance, to Kevin Easley, Grand River Dam Authority.

that would be taken to protect water quality if constituent thresholds are surpassed in a sample; and (5) provides a schedule for filing with the Commission, for approval, any necessary amendment proposal regarding the licensee's dredging management plan.

Under the proposed SMP, dredging activities would not be permitted in Stewardship areas or within vegetated wetlands. The plan, however, does not specify whether dredging would be allowed within Wildlife Management areas. To afford similar protection of water quality, we recommend that dredging not be permitted in areas designated as Wildlife Management. Dredging in other areas (Project Operations, Municipal/Public Use, Responsible Growth, and Responsible Growth-Wetlands Inventory SMCs) would be subject to the extensive permitting procedure described above.

In the SMP, GRDA notes that in addition to the above permitting requirements, notification of project commencement, post-dredging review by GRDA staff, and sign-off by GRDA enforcement staff after dredging is complete are all requirements of any dredging permit issued. These measures provide for additional GRDA involvement throughout any dredging activities permitted on Grand Lake and would help identify any problems that may negatively affect water quality.

Vegetation Management Plan

Shoreline vegetation serves to stabilize shorelines, prevent erosion, and filter and trap pollutants from entering Grand Lake. Thus, it plays an important role in protecting Grand Lake's water quality. Implementation of the vegetation management plan, included as part of the SMP, would permit some vegetation removal activities on GRDA lands. Depending on the extent, these activities may lead to increased shoreline erosion, and ultimately to increased run-off and turbidity into Grand Lake. The magnitude of this indirect effect on water quality is dependent on the amount of vegetation removal permitted at the project.

We discuss the effects of vegetation removal on terrestrial resources in section VI.C.4.b, *Vegetation Management Plan*, of this EA. The recommendations we make to minimize those direct effects, e.g., the maintenance of vegetation buffers of 35 feet, or the maximum distance for which GRDA has jurisdiction, in certain SMCs, and the development of provisions to quantify vegetation-removal effects (and mitigate for those effects), would minimize any indirect effects on water quality.

In conclusion, the proposed action, with staff's recommendations, to prohibit dredging in Wildlife Management areas, maintain vegetation buffers in certain SMCs, and develop vegetation-removal mitigation provisions, should sufficiently minimize unavoidable short- and long-term effects on water quality with respect to erosion at the project.

3. Fishery Resources

a. Affected Environment

Both Grand Lake and the Pensacola Project tailrace provide popular recreational fishing for anglers in the area. The primary sport fish in Grand Lake is largemouth bass and Grand Lake is considered one of the best reservoirs for bass fishing in the region (GRDA, 2008a). Other popular sport fish species found in Grand Lake include smallmouth bass, hybrid striped bass, white bass, black and white crappie, paddlefish, and panfish. The panfish in Grand Lake include warmouth, longear sunfish, bluegill, and green sunfish. A healthy forage fish population of threadfin and gizzard shad support the sport fishery (GRDA, 2008a). Other fishes found include flathead catfish, blue catfish, channel catfish, longnose gar, carp, carpsucker, smallmouth buffalo, logperch, emerald shiner, river shiner, red shiner, ghost shiner, silverband shiner, bullhead minnow, blue sucker, river redhorse, and river darter (FERC, 1992). Two fish species found in the project vicinity, the Ozark cavefish and Neosho madtom, are listed as threatened under the Endangered Species Act. These species are described more fully in section VI.C.5 of this EA.

Current fishing regulations on Grand Lake are designed to increase the total abundance and quality size of crappie and bass. Oklahoma DWC never stocked crappie in Grand Lake, but stocked 30,820 bass in 1995. The species primarily stocked in Grand Lake include striped bass and hybrids. In April 2005, 690,000 hybrid striped bass fry were released (GRDA, 2008a).

b. Environmental Effects and Recommendations

Shoreline Facilities

Shoreline development, such as the construction of docks, boat launches, marinas, boathouses, and piers can result in short-term effects on fishes and fish habitat due to direct disturbance of fish and fish habitat, disturbance of substrates, increased turbidity, and sedimentation. As sediments settle, localized shallow water fish habitat in the vicinity can be covered; negatively affecting fish reproduction and aquatic insects that serve as a food source for fish. In the long-term, development can lead to loss of vegetative cover along the shoreline, affecting shallow water fish habitat which serves as sanctuaries for young fish and habitat for aquatic insects. However, after dock construction is complete, docks may provide some beneficial cover along the shoreline for juvenile and adult fish.

The primary SMCs that would allow development along the reservoir are Responsible Growth, Responsible Growth-Wetlands Inventory, and Municipal/Public Use, totaling about 354 miles of shoreline. Construction of shoreline facilities in these

areas could cause losses of vegetative cover and shallow-water habitat beneficial to fish, and result in some fish displacement. Under GRDA's permitting procedures (see section IV.A.5, above), site-specific impacts to fisheries would be considered and assessed.

Shoreline facilities would generally not be permitted in areas classified as Stewardship or Wildlife Management, which total about 166 miles of shoreline. Project Operations areas contain project-related features and, by nature, are separate from areas accessible to the public for safety purposes. Therefore, we do not expect shoreline facility construction in these areas, and no adverse effects on fish resources would be expected.

Dredging

Dredging sediments in Grand Lake may lead to short-term turbidity and the suspension of contaminated sediments, including lead, zinc, and cadmium, leading to short-term effects on fish and fish habitat in Grand Lake.

Provisions in the licensee's approved dredging plan would continue to serve to minimize any adverse effects on fish resources in Grand Lake and dredging activities of greater than 2,000 cubic yards would continue to require Commission approval. Prohibiting dredging in Wildlife Management areas, as we recommend, would further minimize dredging effects on fish resources within these areas. In addition, our recommendation for assessing sediment contaminants during the dredging approval process should help ensure long-term health of the fish populations in Grand Lake.

Vegetation Management Plan

Certain vegetation removal activities on GRDA lands are expected with implementation of the proposed plan. Depending on the extent of removal, these activities may result in the loss of adequate cover along the shoreline for fish and other aquatic resources.

We discuss the direct effects of vegetation removal on terrestrial resources in section VI.C.4.b, *Vegetation Management Plan*, of this EA. The recommendations we make to minimize those direct effects, including the maintenance of vegetation buffers of 35 feet, or the maximum distance for which GRDA has jurisdiction, in certain SMCs, and the development of provisions to quantify the effects of vegetation removal (and mitigate, if necessary, for those effects), would minimize any adverse effects on fish resources.

Two of the proposed SMCs (Stewardship and Wildlife Management) are designed by GRDA to protect habitat for fish and other aquatic species. As outlined in the proposed SMP, about 150 miles of project shoreline are designated Stewardship areas, or 29 percent of the total shoreline. Wildlife Management areas amount to about 3 percent, or 15 miles of shoreline. Thus, a total of about 165 miles are afforded the additional

protections that these SMCs provide, including restricting development and prohibiting most vegetation clearing as outlined in the vegetation management plan. These measures should minimize short- and long-term effects on fish resources in Grand Lake.

Millet Seeding

In its comments, FWS states that the proposed SMP is inaccurate regarding GRDA's millet seeding efforts, a component of the project's fish and waterfowl habitat management program,¹⁷ and states that this program provides only a limited seasonal benefit to fish. Rather, it is intended primarily to benefit waterfowl and other wildlife that feed on the plants and seeds. FWS recommends the language that refers to the millet seeding program be removed from this section of the plan. FWS also clarifies that although it supports the aquatic vegetation plantings that are ongoing at the project (with a goal of improving shallow nursery habitat for fish), it was never intended that it replace the millet-seeding program. In response, GRDA agreed to remove this language from this section of the plan.¹⁸ We note here, however, that millet seeding at the project was originally implemented to provide additional habitat for juvenile bass, and likely is successful in this regard when millet seeding and germination is successful.

Habitat Evaluation

Oklahoma DWC, FWS, and other commenters express concern about the potential loss of fish and wildlife habitat due to development (the physical presence marinas, boat launch areas, bulkheading, and more) that could occur at the project without a method that quantifies effects and provides appropriate mitigation. They recommend surveys to determine existing fish and wildlife habitat values for project lands and shorelines. In a response filed with the Commission on January 26, 2009, GRDA proposes the development of a system to be implemented in response to proposed new uses so that mitigation would be premised on the actual effect a use has on habitat value.

As discussed below in section VI.C.4.b, *Terrestrial Resources*, the collection of detailed habitat information for the entire project area would be costly and time consuming. Further, such information is not necessary for the development of an SMP that adequately protects environmental resources, provided the SMP uses the best data

¹⁷ See Order Approving Fish and Waterfowl Habitat Management Plan under Article 411 and Deleting Article 404, issued on May 22, 2003 (103 FERC ¶ 62,102). This order provides a history of the millet seeding program and what is currently required of GRDA under Article 411 of the license.

¹⁸ Discussion in section 5.5 of the proposed SMP attempts to simplify GRDA's requirements concerning the millet-seeding program contained in article 411 of the project license. Article 411 does not, as indicated in GRDA's wording in section 5.5, go so far as to state that this millet-seeding requirement would be replaced at some future time.

available, provides a mechanism for updating classifications as new data becomes available, and requires site-specific evaluations to ensure sensitive areas are protected. We find the proposed SMP to be generally consistent with these guidelines. If the need for additional fisheries data is identified during the review of specific shoreline development proposals, it can be collected on an as-needed basis. We find this approach to habitat evaluation acceptable.

4. Terrestrial Resources

a. Affected Environment

Vegetation

Grand Lake is located in a transitional zone between the Ozark Highlands and Central Irregular Plain eco-regions of northeast Oklahoma. In the Ozark Highlands eco-region, which characterizes most of the project area, oakhickory and oak-hickory-pine are the primary forest types. Typical canopy species on dry uplands and ridgetops include black oak, white oak, blackjack oak, post oak, winged elm, and numerous hickories. Shortleaf pine also occurs in oak-hickory-pine stands. Mesic forests containing sugar maple, white oak and northern red oak are typical of north-facing slopes and ravines of more rugged, deeply dissected sites. Willows, bottomland oaks, maples, hickories, birch, American elm, and sycamore are typical on floodplains and low terraces. Most level sites in the region have been converted to haylands or pasturelands.

In the extreme northern portion of project, primarily the Neosho River arm of Grand Lake, the oak hickory forests of the Ozark Highlands give way to the tall grass prairies of the Central Irregular Plains. Typical dominants of tall grass prairie sites include big bluestem, little bluestem, switchgrass, and indiagrass. Dry upland forests, similar to the oak-hickory forests of the Ozark Highlands to the south and east, are common on the low rocky hills of the region. Riparian corridors typically are forested, with canopy dominants that include American elm, oaks, hackberry, black walnut, sycamore, and pecan. Much of this region has been converted for agriculture, with rangeland occupying steeper slopes and croplands on nearly level plains. Common crops include sorghum, alfalfa hay, wheat, and soybeans.

Wetlands

Grand Lake and the surrounding areas contain numerous wetlands. Wetlands are most abundant along the upper, shallow reaches of the reservoir. In the reservoir's lower reaches, shoreline areas consist primarily of limestone bluffs, with wetlands restricted to coves and backwaters of inundated tributaries. Acreages of the various wetland types occurring in the vicinity of the project are summarized in table 3.

Table 3. Acreages of wetlands around Grand Lake by wetland type and elevation zone. Source: GRDA, SMP Table 5.12-1.

Wetland Type	Elevation Zones (feet above sea level)			Totals
	735 – 742	742 – 755	755+	
Palustrine Forested Wetlands	1,720	5,555	4,374	11,649
Emergent Wetlands	34	145	55	234
Scrub/Shrub Wetlands	194	268	64	526
Mudflats	4,994	645	23	5,662
Ponded Water	89	70	88	247
Totals	7,031	6,683	4,604	18,318

Wildlife

Raptors, such as barred owl, red-tailed hawk, and red-shouldered hawk occur in both upland and bottomland forests. Song birds of the wooded lots include tanagers, nuthatches, warblers, and woodpeckers typical of the eastern deciduous forests. Grassland birds present in the prairie habitat include horned lark, grasshopper sparrow, meadowlark, dickcissel, and bobolink. Predatory birds in the grasslands consisted of short-eared owl, northern harrier, and rough-legged hawk. Bald eagles over-winter at Grand Lake, and benefit from the fish passed through the hydro plant. Game birds found at Grand Lake include bobwhite quail, wild turkey, mourning dove, and waterfowl.

Grand Lake is also important as an over-wintering and migratory stop for shorebirds and waterfowl; however, the over-wintering habitat is limited by the lack of submerged aquatic vegetation. Cormorants, pelicans, egrets, and herons are among the non-game birds that show up on Grand Lake annually. A diverse array of game waterfowl such as geese and dabbling, diving, perching, sea, and stiff-tailed ducks also occur on Grand Lake during migration. Mallards are the only dabbling duck that over-winter on Grand Lake. Mallards are the most abundant duck seen on the reservoir with numbers peaking in December. Canada geese and wood ducks live on the reservoir throughout the year.

Common mammals in the project area include white-tailed deer, striped skunk, raccoon, fox squirrel, Virginia opossum, eastern cottontail, armadillo, and red fox. These species inhabit the upland deciduous forest surrounding the project. The bottomland forests contain all of these species, plus muskrat and beaver. Common species associated

with the grassland/savannah are the least shrew, deer mouse, black-tailed jack rabbit, and badger. Bats are of ecological concern in the area and the endangered gray bat is particularly notable (discussed under *Threatened and Endangered Species*).

A variety of frogs, toads, salamanders, lizards, turtles, and snakes comprise the local herpetofauna. The amphibians include species such as the American toad, spadefoot toad, and tree frogs. The turtle community includes snapping turtles, mud turtles, softshell turtles, and a diversity of slider, map, and box turtles. With the exception of the box turtles, most of the turtle community is highly aquatic. Representative lizard species include the western slender glass lizard, collard lizard, Texas horned lizard, and diversity of skinks. Common snakes include species such as rat snakes, water snakes, bullsnakes, and venomous snakes such as copperheads, western cottonmouths, timber rattlesnakes, and western pygmy rattlesnakes.

Though no longer considered an endangered species, bald eagles are still protected by federal law under the Bald and Golden Eagle Protection Act. Bald eagles are found throughout North America, typically near open waterbodies such as lakes and large rivers. Most eagles consume a diet consisting primarily of fish, with lesser quantities of waterfowl, carrion, and small mammals (muskrats, squirrels, rabbits). Availability of large trees and snags for perching and open flight paths to feeding areas are important in habitat selection. Grand Lake is an important wintering area for bald eagles. Most of the wintering eagles use a large communal roost located on a small island near Twin Bridges State Park at the north end of the reservoir. Blackbirds represent a large part of the diet for eagles wintering on Grand Lake due to presence of a large blackbird roost near Twin Bridges State Park. The bald eagle can be expected to forage throughout the project area.

The approved fish and waterfowl habitat management plan for the project currently provides a plan to annually seed 1,000 acres of mudflats along Grand Lake's shoreline with Japanese millet.¹⁹ A new aquatic plant program is currently being studied to augment the millet seeding program. This new habitat enhancement strategy would use native plants planted in the littoral zone to provide forage and shelter to migrating waterfowl and aquatic species such as fish and turtles. In addition, GRDA has designated approximately 1,630 acres of project lands within the project boundary and adjacent to Grand Lake as wildlife management areas and management of these lands is covered by Article 406 of the license.

¹⁹ See Order Approving Fish and Waterfowl Habitat Management Plan Under Article 411 and Deleting Article 404, issued May 22, 2003 (103 FERC ¶ 62,102).

b. Environmental Effects and Recommendations

Shoreline Classification

The proposed SMP provides for the permitting of docks, break waters, bank stabilization mechanisms, and vegetation management, including vegetation removal. Effects of these activities on terrestrial resources include vegetation alteration, through approved management activities, and wildlife displacement and disturbance, through loss of habitat and increased human presence. The effects of implementation of provisions allowed by the proposed SMP on terrestrial resources are largely dependent on the classification of the shoreline and subsequent activities allowed to occur on project lands. A shoreline classification that places more miles of shoreline in protected classifications would have less of an effect on terrestrial resources. Therefore, overall effects of the SMP on terrestrial resources are largely dependent on the methods and information upon which the shoreline classification is based and the types of activities that would occur.

GRDA consulted with resource agencies, established a public working group, and held multiple public meetings to develop the proposed shoreline classification. GRDA based its classification on its GIS database (which included palustrine wetlands, contour and bathymetric data, and aquatic and terrestrial habitats considered significant by state and federal wildlife agencies), local knowledge of both GRDA staff and stakeholders, and site-specific verification. GRDA notes that not all shoreline areas that generally meet the SMC definitions necessarily fall into that particular classification. As an example, an area may have one or more environmental characteristics that fall into the Stewardship definition; however, existing commercial or residential use within that particular area precludes application of the Stewardship classification to that area.

In addition, GRDA states that while it developed the mapping of SMCs as comprehensively as possible; in some cases, the level of information available may not allow completely accurate identification of property boundaries or pinpoint Stewardship areas. Therefore, property owners may contact GRDA for a site-specific review and verification of that classification, should they wish to propose a use that is not allowable within the existing SMC. GRDA also proposes to conduct a lake-wide review of all SMCs every 6 years.

Several members of the SWG comment that the SMP should use the SMC of “Responsible Growth” for those areas already known to be in need of special monitoring, including mitigation, if new development is approved. Committee members also comment that GRDA should authorize and direct the resource agencies to provide a proper survey and update of environmentally sensitive project resources.

FWS and Oklahoma DWC recommend surveys to determine fish and wildlife habitat values for project lands and shorelines. The proposed surveys would allow GRDA and the resource agencies to base shoreline classification decisions on actual data

and values. Oklahoma DWC recommends that if surveys are not required prior to acceptance of the SMP, then GRDA should develop plans to collect the appropriate data during the first 6 years of the SMP. FWS and Oklahoma DWC also comment that if GRDA does not support additional surveys and resource agencies have to use existing information, then previous recommendations by resource agencies should represent the best available information for the values of fish and wildlife habitat. FWS and Oklahoma DWC further state GRDA should explain why FWS's recommendations were not incorporated and what information it used to classify these areas differently.

In response to these comments, GRDA notes that current classifications have been based on existing data. GRDA does not believe that lake-wide surveys are feasible or necessary at this time. Rather, it supports a system that gathers this information as the need arises.

Due to the size of the project, the collection of detailed fish and wildlife habitat information for the entire area would be costly and time consuming. In addition, such detailed information is not necessary for the development of an SMP that adequately protects these resources, provided the SMP incorporates the best data available; provides a mechanism for updating classifications as new data becomes available; and, when appropriate, requires site-specific evaluations to ensure sensitive areas are protected. GRDA's proposed SMP is generally consistent with these guidelines, but the SMP on its own is not sufficient to protect terrestrial resources.

Although GRDA indicates that it considered areas that resource agencies identified as important terrestrial habitat, the proposed SMP incorporates many areas that FWS identified as sensitive into the Responsible Growth SMC. It is not clear what information GRDA used to make the determination that these areas do not contain sensitive habitat. In addition, while GRDA supports additional data collection 'as the need arises,' the SMP does not provide a clear explanation as to when such data collection would be required or what types of information would be collected.

Managing biologically sensitive areas as Responsible Growth would allow a variety of activities, including certain levels of vegetation removal. Such activities have the potential to affect sensitive habitats. We agree with FWS and other commenters that, in the absence of surveys or evidence to the contrary, recommendations by resource agencies represent the best available information for the values of wildlife habitat. Within the Responsible Growth-Wetlands Inventory areas, GRDA proposes site-specific planning and analysis prior to new activities or vegetation management. Such plans may be subject to greater scrutiny and may result in a requirement for on- or off-site mitigation and/or an alternative vegetation management plan. We recommend GRDA provide similar protection to all areas FWS and Oklahoma DWC indicate are sensitive. Prior to issuing permits in these areas, the SMP specifically should require evaluations of the potential for the proposed activity to affect wetlands or other habitat for threatened, endangered, or sensitive species. Any unavoidable effects should be quantified and

appropriate mitigation measures developed and implemented. In addition, information collected during these case-by-case evaluations would be useful in the proposed 6-year, lake-wide reviews of the SMP. With this recommendation, we find that adverse effects on terrestrial resources would be minimized and offset with the beneficial effects of mitigation.

Vegetation Management Plan

Implementation of the proposed SMP would permit vegetation removal activities on GRDA lands. The degree to which these activities affect vegetation resources would depend on the types of vegetation that would be removed and the total area of removal. Potential effects of vegetation removal include increased erosion, reduced filtration of groundwater contaminants like pesticides and herbicides, changes in vegetation community structure, and loss of wildlife habitat.

To regulate effects on vegetation, GRDA developed a vegetation management plan. This plan was updated in the summer of 2008, subsequent to the initial filing of the SMP. The new vegetation management plan was filed as attachment E in GRDA's response to the additional information request made by Commission staff and filed on January 26, 2009. The vegetation management plan and activities allowed or not allowed under this plan are described above in the *Allowable Use Categories* section of this EA.

Several members of the working committees comment that GRDA should submit the vegetation management plan to the resource agencies (FWS, Oklahoma DWC, Corps, and Oklahoma Water Resources Board) for comment and revision, including shoreline classification-specific criteria.

FWS and Oklahoma DWC comment that the Responsible Growth SMC would allow adjacent property owners to commercially develop these areas, or mow and manage them as lawn. FWS and Oklahoma DWC note that the cumulative effects of this type of shoreline development would be extensive and occur without mitigation. Additionally, FWS and Oklahoma DWC comment that the vegetation management plan should include buffers to help protect wetlands and other sensitive sites in any SMC. Buffers should be at least equivalent to Natural Resource Conservation Service (NRCS) standards and should be included in the vegetation management plan.

GRDA, in its filing of January 26, 2009, indicates it agrees mitigation may be necessary for impacts within the Responsible Growth SMC. GRDA does not support the creation of vegetation buffers because around the majority of the reservoir, GRDA owns minimal shoreline and extensive buffers would extend into areas outside GRDA jurisdiction.

Over the long-term, vegetation management practices, including selective removal of small tree stems and intensive trimming or mowing of grasses and forbs, can have a

substantial effect on forest structure. Left unregulated, these practices would reduce natural regeneration of trees resulting in low density and diversity in the forest mid-story canopy. Repetitive mowing or intensive trimming of native forbs and grasses would favor the regeneration of grasses to the exclusion of many wildflowers; thereby, altering the species diversity and composition of the ground cover. Prior to the revision of the vegetation management plan, such activities were permitted without permits. Implementation of the SMP, including the updated vegetation management plan, would allow GRDA's Office of Ecosystems Management to control vegetation removal with site-specific evaluations of proposed activities. Used appropriately, such control could promote the generation of a sustainable, age-diverse, species-diverse, and structurally-diverse forest community.

However, vegetation removal could still affect vegetation resources if extensive clearing is permitted within the Responsible Growth SMC. These effects are dependent on how many permit applications are filed, how many are approved, and how much removal occurs. FWS, Oklahoma DWC, and GRDA agree that the potential effects of vegetation management within the Responsible Growth areas could warrant the need for mitigation. We recommend GRDA, in consultation with FWS and Oklahoma DWC, develop provisions, for inclusion in the SMP, for quantifying the effects of permitted vegetation removal and mitigating these effects through the enhancement or protection of riparian vegetation in other areas. With this recommendation, we find that overall effects on vegetation resources would be minimized.

FWS and Oklahoma DWC also indicate a preference for vegetation buffers around wetlands and other sensitive areas at least equivalent to NRCS standards. GRDA indicates that such buffers are not necessary because, in many locations, the width of the project lands is narrow and buffers in these areas would have little effect. NRCS indicates that riparian forest buffers of at least 35 feet, with vegetation characteristics similar to natural riparian forests in the area, are necessary to protect water quality. NRCS also indicates that buffers of additional width may be necessary to function as suitable habitat for riparian wildlife species (NRCS, 2006). Around the reservoir perimeter, the average distance to the project boundary is approximately 6 feet; however, considerable variation in this distance exists around the reservoir (personal communication between B. Romanek, FERC and C. Davis, Assistant General Counsel, GRDA, January 30, 2009). In many instances, the creation of NRCS-recommended buffers would not be possible. In these areas, GRDA maintains that there is little benefit to be gained by limiting vegetation management practices.

We do not agree with GRDA that no buffers are needed in these areas. Promoting a riparian forest buffer in these areas would be better than no buffer at all, even if it is narrow. Narrow buffers function as screens that reduce the effect of sights and sounds associated with human activity. Vegetation in these buffers provides additional soil stabilization and helps improve water quality. We recommend that in the Wildlife Management, Stewardship, and Responsible Growth-Wetlands Inventory SMCs, and in

all additional areas FWS or Oklahoma DWC indicate are sensitive, GRDA maintain vegetation buffers of 35 feet, or the maximum distance for which GRDA has jurisdiction. In addition, for areas where GRDA does not have jurisdiction over the entire 35-foot buffer, GRDA should, as a component of the public education program, encourage adjacent landowners to maintain a riparian vegetation buffer for the remainder of the 35-foot distance, following NRCS guidelines.

Wetlands

The proposed SMP provides a framework from which GRDA would permit non-project activities on project lands. Many of the permitted activities would potentially affect wetlands if they occurred in wetland areas. These activities include the construction of boat docks, walkways, and breakwaters, shoreline stabilization, and vegetation management. Inappropriately permitting these activities in wetland areas could result in loss of wetland habitat and function through vegetation removal, changes in topography, changes in existing hydrology patterns, or soil compaction.

To protect wetland resources, GRDA has included areas with extensive wetland habitat as Stewardship areas. In these areas, GRDA would only permit new uses for which the proponent of the activity can provide: (1) compelling evidence of hardship, or that considerable public interest exists for allowing the use that substantially out-weighs the interest of preservation; (2) information that shows the proposed location is the only feasible alternative; and (3) specific protection, mitigation, or enhancement measures to counter the effects of the activity. Outside of the Stewardship SMC, some palustrine wetlands exist within the Responsible Growth areas. These wetlands were not included in the Stewardship SMC due to diminished resource management potential. GRDA has classified these areas as Responsible Growth-Wetlands Inventory. In these areas, new uses may be subject to greater scrutiny and may require specific protection, mitigation, or enhancement measures. GRDA would not permit vegetation management activities in these wetland areas without prior consultation. In addition, GRDA requires wetland delineations prior to approving any dredging projects in areas identified as wetlands on National Wetlands Inventory maps.²⁰

FWS and Oklahoma DWC comment that while they did suggest that small, isolated wetland areas that are surrounded by development have limited value and could be reclassified to allow some impacts, they consider this appropriate only if the impacts were addressed with adequate mitigation. FWS and Oklahoma DWC state that many of the proposed areas classified as Responsible Growth-Wetlands Inventory are relatively large, and impacts would be difficult to mitigate in areas like Wolf Creek, Carey Bay, and Monkey Island. FWS and Oklahoma DWC recommend that these larger blocks of wetlands be protected as Stewardship areas. FWS and Oklahoma DWC also recommend

²⁰ See Order Amending Dredging Management Plan, issued March 31, 2004 (106 FERC ¶ 62,244).

that the SMP include a process that addresses cumulative effects on shoreline habitat, quantifies effects on wetlands, and provides adequate mitigation for impacts. FWS and Oklahoma DWC recommend GRDA contribute to a mitigation fund or manage a wetland mitigation bank to mitigate for effects on public lands and waters managed by GRDA.

Citizens of Grove comment that classification of Wolf Creek and Carey Bay as Responsible Growth-Wetlands Inventory would limit the potential for growth in their community and do not support this classification.

In response to these comments, GRDA indicates that the basis for classification of wetlands in the Wolf Creek, Carey Bay, and Monkey Island areas as Responsible Growth-Wetlands Inventory is due to the fragmented nature of these wetlands and the considerable pressure for growth that exists in these locations. GRDA indicates it agrees that a process for assessing existing wetland habitat values and evaluating any proposed mitigation should be developed. GRDA favors development of a system to be implemented in response to proposed new uses so that mitigation is based on the actual impact a use has on habitat value. GRDA welcomes the assistance of FWS in developing such a program. GRDA also supports the creation of a mitigation fund for effects on public lands and waters, stating such an approach would allow GRDA to pursue more meaningful mitigation projects that provide greater resource enhancement and benefit.

Implementation of the proposed SMP could affect wetlands if permitted activities result in the removal of wetland vegetation or alter existing topographic, hydrologic, and geologic conditions to the extent that they are no longer able to support wetland systems. The SMP provides considerable protection to wetlands occurring in the northern reaches of the project along the Spring and Neosho rivers. However, as FWS and Oklahoma DWC comment, other areas of the project, including Wolf Creek, Carey Bay, and Monkey Island, also appear to support extensive wetland resources.

FWS and Oklahoma DWC contend that these areas should be reclassified as Stewardship. Based on the scale of Figure 5.12-1 in the SMP, it is not possible to determine the extent to which these wetlands are fragmented. However, in this figure, the extent of wetlands at Wolf Creek, Carey Bay, and Monkey Island appear to be similar to wetlands classified as Stewardship in Drowning Creek, Duck Creek, and Horse Creek. We recommend areas in Wolf Creek, Carey Bay, and Monkey Island that contain wetland resources similar to those found in Drowning Creek, Duck Creek, and Horse Creek be classified as Stewardship, as FWS recommends. With this recommendation, we find that effects on wetlands in these areas would be minimized.

GRDA, FWS, and Oklahoma DWC are in agreement that the SMP would benefit from the addition of a plan for quantifying wetland impacts and implementing appropriate mitigation. In consultation with FWS and Oklahoma DWC, GRDA should develop provisions, to be included in the SMP, for: (1) identifying existing wetland areas potentially affected by proposed shoreline activities and evaluating their functions and

values; (2) assessing the probable effects of proposed activities on wetlands; and (3) addressing adverse effects on wetlands, from permitted activities, through appropriate mitigation. To account for the mitigation of any wetlands impacts, GRDA should be required to annually file with the Commission, at the same time it files its annual fish and waterfowl management report, a wetland mitigation report providing detailed descriptions of: (1) the status of any planned, ongoing, and completed mitigation measures; and (2) documentation of any consultation on wetland mitigation with FWS and Oklahoma DWC. Regarding the creation of a mitigation fund, the licensee could pursue such an approach, but we are not recommending that it be made a provision of the SMP. Regardless of the mitigation methods used, the licensee would be ultimately responsible for ensuring that any necessary mitigation measures are properly implemented.

Wildlife

Implementation of the proposed SMP has the potential to affect wildlife through the removal of habitat, or altering habitat to the extent that it is less suitable for wildlife. Such effects could result from vegetation management that changes the structure of existing habitat types. Additionally, the construction of docks and other access facilities would increase human presence and make areas less attractive to wildlife.

To mitigate effects on wildlife, GRDA designed the SMP classifications to protect areas with the greatest wildlife resources, like wetlands and other sensitive habitats. These areas are classified as Stewardship or Wildlife Management, where few, if any, habitat alterations would occur. In addition to the 1,630 acres of Wildlife Management lands required in license Article 406, GRDA has purchased 2,500 acres to be managed exclusively for the preservation and enhancement of terrestrial and aquatic habitat, and is actively pursuing the purchase of further areas for this purpose.²¹ These areas are generally larger tracts of land, removed from pressures of competing uses, where the benefits of habitat protection can best be realized.

Several members of the SMP working committees comment that, within Wildlife Management areas, GRDA should require specific notification to, and written comments from, resource agencies for any proposed shoreline development, including dredging, tree clearing, or dock building, prior to GRDA Board approval and later submittal to the Commission for approval.

FWS and Oklahoma DWC comment that the Responsible Growth SMC provides for only very limited protection of wildlife habitat and would essentially allow most GRDA property to be commercially developed or mowed and managed as a lawn for adjacent property owners. FWS maintains that the SMP would result in a net habitat loss,

²¹ The 1,630 acres are all located within the project boundary. The remaining lands are not. (Letter filed March 23, 2009, from GRDA to the Commission.)

and would not provide any real mitigation because impacts would continue to occur within Responsible Growth areas without specific management actions described for the Wildlife Management areas that would mitigate for those impacts. FWS and Oklahoma DWC recommend that GRDA include in the SMP a description of how it would manage the Wildlife Management areas. The agencies recommend GRDA implement a system that maintains existing habitat values at the Pensacola Project and requires an assessment of existing values and the values of proposed mitigation.

FWS states that permits for shoreline uses that affect wildlife resources on public water and lands should require mitigation; however, none of the existing fees for permits goes toward mitigation for habitat impacts or loss of public access. To help mitigate for such impacts, FWS recommends requiring contributions to a mitigation fund for effects on public lands and waters managed by GRDA.

FWS has also makes the recommendation that GRDA reduce fragmentation of wildlife habitat along shorelines and focus on managing larger contiguous tracts. FWS states the proposed SMP's shoreline classification maps indicate that this strategy has not been consistently implemented. FWS states that some very small isolated areas classified as Wildlife Management (such as the one in Elk River) still exist, but some relatively extensive areas of wetlands have been changed to the SMC Responsible Growth-Wetlands Inventory.

FWS and Oklahoma DWC also comment that bald eagles nest in or near the Pensacola Project. Existing nests are on private property, but eagles have attempted to nest at Monkey Island in the past. FWS and Oklahoma DWC recommend monitoring the reproductive success of any eagles attempting to nest near Grand Lake because there is potential for contamination (primarily metals) of fish or other prey to affect their reproductive success. FWS also recommends that all construction activities be conducted in accordance with FWS's national bald eagle management guidelines.

In response to these comments, GRDA indicates it is in the process of developing a management plan for Wildlife Management areas. GRDA would update the SMP upon completion of this plan. GRDA also proposes to monitor bald eagle nesting activity. Such monitoring would consist of two annual flyover surveys, one in January or February and one in April, to identify any new or active bald eagle nests in the project area. Information gathered from these surveys would guide implementation of the SMP. GRDA also agrees to follow FWS's national bald eagle management guidelines.

Actions resulting from implementation of the proposed SMP, including vegetation management practices in the Responsible Growth SMC, expansion of commercial docks and marinas, and construction of private docks, have the potential to affect wildlife resources. GRDA's protection and enhancement of habitats within Wildlife Management areas could mitigate these effects, provided these areas are of suitable size and appropriately managed.

In consultation with FWS and Oklahoma DWC, GRDA should develop provisions, to be included in the SMP, for: (1) identifying wildlife habitats potentially affected by proposed shoreline activities and evaluating their functions and values; (2) assessing the probable effects of proposed activities on wildlife habitats; and (3) addressing adverse effects on wildlife habitats, from permitted activities, through appropriate mitigation. To account for the mitigation of any wildlife impacts, GRDA should be required to annually file with the Commission, at the same time it files its annual fish and waterfowl management report, a wildlife mitigation report providing detailed descriptions of: (1) the status of any planned, ongoing, and completed mitigation measures; and (2) documentation of any consultation on wildlife mitigation with FWS and Oklahoma DWC. As noted in the above wetland section, the licensee could pursue the creation of a mitigation fund, but we are not recommending that this approach be made a provision of the SMP. Regardless of the mitigation methods used, the licensee would be ultimately responsible for ensuring that any necessary mitigation measures are properly implemented.

We also recommend implementation of GRDA's proposed annual surveys for bald eagle nesting activity, appropriate consideration of this information during implementation of the SMP, and adherence to FWS's national bald eagle management guidelines. With this recommendation, we find the SMP would not negatively affect the bald eagle, and would have moderate long-term beneficial effects on the bald eagle.

5. Threatened and Endangered Species

a. Affected Environment

The Ozark cavefish (*Amblyopsis rosae*) and Neosho madtom (*Noturus placidus*) are documented as occurring in the project vicinity and are listed as threatened under the Endangered Species Act, and by the state of Oklahoma. The gray bat (*Myotis grisescens*), which is state- and federally-listed as endangered, also occurs in the project vicinity. According to the Oklahoma Biological Inventory (2006), no other state-listed species are documented as occurring in the project vicinity, or within the project area. In addition, FWS indicates that the project area may contain suitable habitat for the American burying beetle (*Nicrophorus americanus*).

Ozark Cavefish

The Ozark cavefish is a sightless cave obligate that requires clean-flowing, permanently dark-cave streams, often with rubble bottom. A commensal association exists between this species and the federally-listed endangered gray bat, as there is some evidence that Ozark cavefish feed directly on gray bat guano. The Ozark cavefish is found in pools in two caves located near the project. One of these caves is located outside of the project drainage basin and, thus, is not influenced by the project. The land

above and adjacent to the other is owned and managed by The Nature Conservancy for the protection of the cave and its cave-dwelling species (i.e., Ozark cavefish and gray bat).

Neosho Madtom

The Neosho madtom is endemic to the Neosho (Grand) River system in Oklahoma, Missouri, and Kansas. It occurs in riffle areas of moderate sized, clear-flowing streams with a substratum of loosely packed gravel pebbles less than 1 inch in diameter. Neosho madtoms are known to occur at an upstream site on the Grand River that is periodically inundated by the Corps' flood pool. The Neosho madtom has also been documented in reaches of the Neosho and Spring Rivers (FWS, 2008). Because of their intolerance of impounded conditions, the Neosho madtom is not expected to occur in Grand Lake with any frequency.

Gray Bat

Gray bats inhabit limestone karst areas of the southeastern United States. This species migrates seasonally between winter (hibernating) and summer (maternity) caves. Gray bats forage almost exclusively over water along river or reservoir edges bordered by forest, and as such, maternity colonies are typically located in proximity to such features. Gray bats using the Grand Lake area are summer residents that hibernate in caves in northern Arkansas and Missouri. Two gray bat caves have been documented in the project vicinity and are utilized to varying degrees as maternity caves. As previously noted, land adjacent to and above one of these caves is owned and managed by the Nature Conservancy for the protection of the cave and its cave-dwelling species (i.e., Ozark cavefish and gray bat). The other cave is located on private property.

American Burying Beetle

American burying beetles, the largest of North America's 32 burying beetles, historically occurred in 35 states, but are currently found in only seven states, including Oklahoma. They rely on carrion for both sustenance and reproduction. Typical habitat preferences for American burying beetles are not well known, but surveyors have collected specimens in riparian deciduous forest, pasture, and coniferous forest (FWS, 1991). Carcasses suitable for the beetles are typically birds and small mammals in the 100 to 200 gram range. Increases in habitat fragmentation, the resulting decline in the abundance of small birds and mammals, and increases in carrion competitors like ravens, skunk, and raccoon are likely reasons for the decline of the American burying beetle (FWS, 1991). No confirmed sightings of American burying beetles have occurred in the project; however, suitable habitat may exist in the project area.

b. Environmental Effects and Recommendations

The provisions of this SMP, in and of themselves, have no effect on threatened and endangered species. Assessments of effects on threatened and endangered species would be performed, under GRDA's permitting procedures, at the time specific development activities are proposed.

Ozark Cavefish

The Ozark cavefish could potentially be affected if proposed activities were to result in disturbance to the subterranean streams and caves where this species lives. No development proposals are expected to disturb these areas and GRDA proposes no measures specific to this species. FWS indicates that it is in agreement with this assessment and makes no related recommendations.

Neosho Madtom

The Neosho madtom could be potentially affected if proposed activities were to result in increased sedimentation in currently inhabited areas. FWS commented that the Neosho madtom and its habitat are adversely affected by reservoir and flood control operations, and that effects on this species need to be included in new section 7 consultation. GRDA indicates that such consultation would provide the most appropriate venue for resolving issues related to this species. Commission staff will discuss with FWS the need to initiate consultation.

American Burying Beetle

Potential threats to the American burying beetle resulting from proposed activities include increasing habitat fragmentation and increasing populations of carrion competitors that commonly occur in association with human development. Soil disturbance during construction activities or vegetation management could also cause direct mortality.

FWS and Oklahoma DWC recommend that GRDA conduct surveys for the American burying beetle to establish baseline information and avoid potential shoreline development-related violations of the Endangered Species Act. FWS and Oklahoma DWC also recommend the American burying beetle be included in re-initiated formal consultation for all listed species in the Pensacola Project area.

In response to these comments, GRDA indicates that it expects new section 7 consultation to take place, which would provide the most appropriate venue for resolving issues related to this species. In the interim, GRDA proposes to conduct presence/absence surveys whenever 1.2 acres or more of suitable habitat is disturbed. Prior to these surveys, GRDA would contact FWS. Surveys would follow the methods in

the American Burying Beetle Survey Guidance for Oklahoma. GRDA personnel with proper training and certification from FWS and Oklahoma DWC would conduct the surveys. Following these surveys, if any American burying beetles are detected in the project boundary, GRDA would notify both FWS and Oklahoma DWC, and further consultation with these agencies would occur.

We find GRDA's proposed measures to be appropriate. Commission staff will contact FWS regarding the need to initiate formal consultation.

Gray Bat

The gray bat could potentially be affected if proposed activities were to disturb caves or influence foraging resources. Allowable uses under the SMP are not likely to affect these resources and staff does not find that any related measures are necessary to protect this species.

6. Recreation Resources

a. Affected Environment

Recreational Facilities and Access

Recreational access at Grand Lake is provided through public, commercial, and private facilities. In terms of public access, GRDA provides four, public, recreational-boat-ramp access areas including: Duck Creek Bridge Public Access, Seaplane Base Public Access, Monkey Island Public Boat Ramp, and Big Hollow. Oklahoma TRD provides five state parks, including: Bernice State Park, Cherokee State Park (Areas 1, 2 and 3), Disney/Little Blue State Park, Honey Creek State Park, and Twin Bridges State Park. In addition, there are approximately 14 municipal parks providing public access to Grand Lake. Collectively, these parks support about 22 public boat ramps providing access to Grand Lake in the area south of Sailboat Bridge.

Commercial businesses such as marinas provide both fee and non-fee services to the public. Private access is available from individual shorefront properties, neighborhood associations, and private clubs. Residential boat ramps generally provide reservoir access for individual households or small groups of households. The majority of the private docks are located in the southern two-thirds of the reservoir due to the availability of deeper and wider reaches of Grand Lake and the proximity to population centers.

In 1992, 120 commercial boat docks and more than 2,600 private boat docks were permitted on Grand Lake. By 1997, the number of private docks had risen to 3,500 with estimated docks (both private and commercial) totaling about 7,500 (FERC, 2007). As reported in GRDA's 2003 Recreation Management Plan monitoring report, there were

4,179 private boat slips and 2,180 commercial boat slips on the lake (GRDA, 2003). Based on a shoreline development inventory conducted in 2006, GRDA estimated there are about 4,476 private docks and 437 private boat ramps, and about 3,863 commercial slips for boats of various sizes and about 53 commercial boat ramps on Grand Lake (GRDA, 2008).

Recreational Use

Grand Lake is one of Oklahoma's more popular locations for boating and fishing recreational opportunities. In 2002, GRDA estimated that the project supported 4 million recreation days annually, and another 1.5 million recreation nights (GRDA, 2003). Boating at Grand Lake occurs year round, although the primary recreation season extends from mid- to late-May through early September. Boating-related activities include power boating; tubing; water skiing; boat rafting;²² sailing; fishing; and use of personal water craft, large yachts, and houseboats. Rafting is popular in selected areas, particularly in various coves or locations that are out of the way of boat traffic and in locations where swimming or cliff diving are popular. Grand Lake is home to several sailing clubs and sailboats typically range in size from 16 to 45 feet.

Grand Lake supports a high quality fishery for largemouth bass, hybrid striped bass, white bass, crappie, catfish, and paddlefish. Fishing is a year-round activity on Grand Lake and numerous fishing tournaments are held there each year. Between 1996 and 2004, Grand Lake supported an average of 135 tournaments annually, which involved an average of 52 boats per tournament or roughly 7,040 boats annually. GRDA states that records show that although the number of tournaments being held annually is declining, the number of boats participating each year is increasing.

GRDA, as part of updating its recreation management plan and preparation of the SMP for the project, conducted a recreational carrying-capacity study of Grand Lake to establish a baseline estimate of the types and locations of specific boating activity currently occurring on Grand Lake (GRDA, 2007). Aerial boat counts conducted in 2005 as part of this study identified locations on the reservoir where people boat, and the activities in which they participate. Flights occurred during times of the day when boating activity was highest. North of Sailboat Bridge, fishing is the primary recreational activity, particularly on weekends and holidays. The northernmost part of the reservoir averages roughly six to seven boats over 6,747 acres of surface water at any given period, while the area closer to Sailboat Bridge averages 16 to 17 boats over 6,363 acres at any given period on both weekends and holidays (GRDA, 2007).

²² Rafting involves the tying together of two or more anchored boats so that the boaters may visit with one another.

Boating activity south of Sailboat Bridge is markedly different from the upper reservoir. On typical use weekends, fishing still accounts for a substantial amount of boating activity, about half of all boating activity recorded. However, large percentages of boaters participate in pleasure boating, rafting, and using personal watercraft. Sailing, water tubing, and waterskiing accounted for only small percentages of identified boats. On holidays, boating use changes substantially to pursuits that are more active, and the increased use of pleasure boats and personal watercraft essentially suspends fishing activity. The level of boating activity increases significantly on holiday weekends, by approximately 300 to 600 percent. At the southernmost part of the reservoir, rafting activity was observed to triple (GRDA, 2007).

GRDA manages about 1,630 acres of project lands, comprised of many individual parcels ranging in size from 30 to 800 acres, as a Wildlife Management area and allows public hunting. Waterfowl hunting occurs from November through January primarily in the riverine sections of the reservoir between Twin Bridges and Sailboat Bridge and, to a lesser extent, in the mudflat areas of Horse Creek, south and west of the town of Bernice.

Recreation Management Plan

On August 14, 1998, the Commission modified and approved a recreation management plan for the project, submitted by GRDA pursuant to Article 407 of the project license.²³ As part of the approved recreation management plan's requirements, GRDA is to file with the Commission every 6 years a monitoring report documenting the current level of recreation use and shoreline development at the project. The Commission specified that the monitoring report include recreational use data and the results of surveys, traffic counts, lake patrol reports, and any other available information used to document recreation use and shoreline development at the project.

In addition, as part of this monitoring report, the Commission requires GRDA, in consultation with Oklahoma TRD, Oklahoma DWC, National Park Service, and FWS, to evaluate this information and assess the need to make changes to GRDA's current management practices for recreation use and shoreline development and include documentation of the licensee's consultation with these agencies and its findings regarding existing and future management of the project. Based on the results of these reports, the Commission may require changes to the long-term management of the project's lands and waters. The most recent report was filed with the Commission on May 8, 2009, and GRDA is required to file the next report with the Commission on or before April 1, 2015.

As stated in the SMP, GRDA's recreation management goals include provision of adequate, barrier-free, public recreational access to project lands and waters; support of

²³ See 84 FERC ¶ 62,144 (1998).

recreation patterns that reflect the established recreation environment; and management of public, private, and commercial access to and use of project lands and waters in a safe and responsible manner. GRDA manages public recreation on the reservoir, and has oversight and permitting of boating activity and dock structures. GRDA's Lake Patrol is responsible for enforcement of rules and regulations, including dock permitting and boat inspections, on the water and on GRDA-owned lands. Navigational markers on the reservoir that identify travel channels, submerged hazards, no wake zones, breakwaters, and swimming areas are maintained by GRDA, the Coast Guard Auxiliary, and private entities.

b. Environmental Effects and Recommendations

Recreation Management

FWS states that the carrying capacity study conducted for the Pensacola Project was inadequately designed, contained insufficient sampling effort, and should not be used as a basis for any assumptions or decisions in the SMP, and makes the same assertions regarding the approved recreation management plan for the project. FWS strongly recommends that GRDA conduct a new carrying capacity study and develop a new recreation management plan. Oklahoma DWC also states that the recreation data are insufficient and requests that plans be developed to collect the appropriate data during the first 6 years of implementing the proposed SMP.

GRDA proposes, as part of the SMP and recreational use monitoring process, to conduct monitoring of boating density through aerial flyovers and associated assessments. In addition, as stated in the SMP under the discussion of GRDA's recreation management plan and associated measures, GRDA proposes to monitor recreational use and management needs as they pertain to the Pensacola Project, including water quality in coves where recreational boating use is heavy; boat density by activity over time to identify changing use patterns; available facilities and public access; the location and cause of boat accidents; the number of annual fishing tournaments and the number of boats participating; the number of annual regattas and the number of boats participating; and opinions and preferences of Grand Lake boaters.

Should monitoring demonstrate a need for additional recreational access, GRDA would hold public meetings to describe the issues and solicit input from the public. GRDA would then review the potential solutions and develop a plan to implement additional recreational access. Any additional development on the part of GRDA would follow the guidelines found in GRDA's SMP for the project. In the event that GRDA determines the need for additional public access, Oklahoma DWC and GRDA Lake Patrol identified four prospective launch sites located on Drowning Creek, Bee Creek, Honey Creek, and Horse Creek.

GRDA conducted various studies related to recreational use and carrying capacity at the project during relicensing. These studies provide sufficient baseline information regarding the existing recreational use and capacity at the project. Due to development pressures and anticipated future recreational demand at the project, continued monitoring of recreational use at the project is warranted. As stated in the SMP and in the draft carrying-capacity study, GRDA is currently in the process of updating the recreation management plan for the project, and is developing future monitoring plans related to recreational use at the project.

The recreation monitoring measures required under GRDA's existing Commission-approved recreation management plan, along with GRDA's proposed monitoring efforts, would help monitor changes in recreational use at the project.

However, GRDA has not provided specific information regarding the timing (i.e., how often it would be conducted) and reporting methods for its proposed boating density monitoring efforts associated with aerial flyovers of the project, or how these measures would be incorporated into future recreation and shoreline management measures. In addition, GRDA has not provided information regarding how monitoring and management measures associated with the recreation management plan would be coordinated with the SMP for the project. Therefore, we recommend that GRDA provide, for Commission approval, further clarification regarding these monitoring efforts, information regarding plans for the recreation management plan update, and a discussion regarding measures for coordination of the SMP and recreation management plan.

GRDA's proposed boating density monitoring efforts, along with our recommended additional measures for providing information and measures to update the recreation management plan, as well as coordinating the recreation plan with the SMP, would result in long-term beneficial effects on recreational opportunities and management at the project.

Shoreline Management Classifications

GRDA's proposed SMCs include a Municipal/Public Use classification, which comprises about 8 shoreline miles or 1 percent of the total project shoreline. This SMC is identified as uses that serve a public purpose or governmental function such as state parks, public beaches, municipal water intake/outflow, transmission/utility line crossing, roads, bridges, and gas/oil pipelines. However, GRDA does not designate and provides no specific classification related to the location of existing public recreational opportunities, or of areas reserved for future public recreational access. Such classifications are either included in the Municipal/Public Use SMC, in terms of existing use, or in the Responsible Growth SMC for future public and private, recreational-access shoreline land uses. The management and use of municipal and governmental functions (i.e., municipal water intake/outflow, bridges, etc.) could vary greatly from that which

would occur at public recreational access areas. Furthermore, designation of areas of future public recreational access would help ensure that future public recreational access is provided to meet future recreational demand at the project.

Therefore, we recommend that GRDA include in the shoreline classifications areas designated as existing public recreational use and identify areas appropriate for future public recreational access at the project, and develop associated management objectives and measures for these classifications. Provision of these classifications and associated management measures would result in long-term beneficial effects on recreational opportunities at the project.

Further, in section 12 of the SMP GRDA states it would use their GIS database as a tool for assessing permit applications, as well as for assessing the need for future changes in permitting or land use classifications. GRDA would update project and resource databases as needed to ensure they are reflective of field conditions. As long as resource and use criteria as established by this SMP do not change, GRDA would not seek additional review by FERC. Any future changes to the classifications should first be approved by the Commission.

7. Cultural Resources

a. Affected Environment

The area of potential effect (APE) for this undertaking includes all lands within the project boundary around Grand Lake, the project reservoir. Review of the National Register of Historic Places (NRHP) and the Oklahoma Historical Society, State Historic Preservation Office's National Register of Historic Places in Oklahoma (SHPO Register) indicate the project dam is the only historic property within the APE for the project. Although the four counties around the project reservoir contain a number of properties that are listed on the NRHP and the SHPO Register, the Splitlog (or Cayuga Mission) Church is the only listed property in the immediate vicinity of the project. It is located near an arm of the reservoir (NPS, 2009; SHPO Register, 2009).

Prehistoric peoples, Native Americans in the historic period, and Euro-American settlers in the modern period leading up to Oklahoma's statehood have made extensive use of the Grand River Valley area as a place of both settlement and transportation. This pattern of use creates a high probability within the project area for intact cultural resources dating from prehistoric eras, as well as the periods of early European contact, the nineteenth century, and the Civil War (GRDA, 2008a).

In addition to the historical evidence for the likelihood of intact archaeological deposits, the topography of the region lends itself to the preservation of archaeological resources. While much of the land in the downstream portion of the project near the dam

rises in steep bluffs from the shoreline, the upriver portions of Grand Lake features a shallow, more riverine topography that has the potential to contain intact archaeological resources. In addition, there are a number of tributaries that feed into Grand Lake that have a high potential for intact resources (GRDA, 2008a).

GRDA states that it maintains data supplied by the SHPO and the Oklahoma Archeological Survey that identifies potential and significant cultural resource sites on a resource map that is not available for public inspection, but used by GRDA staff. GRDA further states that there are approximately 50 cultural sites known to exist within the project area (GRDA, 2008a).

b. Environmental Effects and Recommendations

In the proposed SMP, GRDA recognizes that any shoreline ground-disturbing activities may require review and comment from the SHPO and the Oklahoma Archeological Survey. Using the site-specific information provided on the resource map, GRDA staff would review all proposed new uses to identify potential effects on known or potentially sensitive archaeological and historical resources. GRDA proposes to review permit applications and supporting information to ensure that the property owner or new user provides the appropriate information. GRDA also proposes to assist landowners in determining whether the proposed action requires consultation with the SHPO or the Oklahoma Archeological Survey. GRDA, as a requirement or condition of its permits, would require any entity that is proposing ground-disturbing activities within the project boundary to undertake the appropriate level of investigation, monitoring, and any subsequent mitigation found to be required for reasonable protection of cultural or historic resources.

No ground-disturbing proposals are included in the SMP. Nevertheless, there is still the possibility that there could be undiscovered properties in the project area that could be adversely affected by future ground-disturbing activities allowed within the Responsible Growth, Responsible Growth-Wetlands Inventory, Project Operations and Municipal/Public Use SMCs. As required by Article 409 of the license, before engaging in any ground disturbance, or if unknown properties are found during construction or project operation, GRDA would take the following actions: (a) consult with the SHPO; (b) based on consultation with the SHPO, prepare a cultural resource management plan to include the proposed measures for avoiding or mitigating effects and a schedule for mitigating effects and conducting additional studies; (c) file the plan for Commission approval; and (d) take the necessary steps to protect the properties until notified by the Commission that all of these requirements have been satisfied. Given this information, we find that the implementation of Article 409 would provide for adequate protection of historic properties, as it relates to allowable uses under the proposed SMP.

8. Land Use and Aesthetic Resources

a. Affected Environment

Grand Lake has a surface area of 46,500 acres and about 522 miles of irregular shoreline, and is characterized by narrow channels and many coves. The reservoir north of Sailboat Bridge is about 24 miles long, comparatively shallow, more narrow and riverine in nature, with limited shoreline access. The main channel of Grand Lake is about 28 miles long and offers large areas of open, deep water south of Sailboat Bridge. The coves off of the main channel can be deep with vast areas of open water, or they may be shallow and irregular. The lower portion of Grand Lake, south of the bridge, has broad expanses of deep water areas and is easily accessed by public roadways, with the exception of the area known as Horse Creek, which has a large expanse of shallow open water and several small, undeveloped islands.

The shoreline of Grand Lake ranges from forested areas with a mixture of vegetative cover types to contiguous manicured lawns, residential housing, and commercial development. The lands adjacent to the northern and western shores of the project consist primarily of rolling plains with occasional hills and ridges and gently sloping shoreline. The lands adjacent to the southern and eastern shores are characterized by deep ravines and narrow valleys separated by broad, gently rolling uplands, with shorelines consisting primarily of steep rocky beaches and bluffs. The upper section of Grand Lake is primarily undeveloped with a more natural aesthetic, while the majority of the shoreline of the lower section of Grand Lake is primarily highly developed.

About 50 percent of land within the project boundary is deciduous forest lands, followed by cropland and pasture lands comprising about 35 percent of the project lands. Residential, commercial, and other development accounts for about 11 percent of total land area within the project boundary (see table 4). For those lands adjacent to the project boundary, the majority are comprised of undeveloped forestlands (53 percent) and agricultural/crop lands (31 percent).

Table 4. Land Uses within the Project Boundary. (Source: GRDA, 2008)

Land Use	Percent of Total Land Use
Deciduous Forest Land	49.1%
Cropland and Pasture	35.0%
Residential	9.3%
Streams and Canals	4.4%
Mixed Urban or Developed	0.7%
Transitional Areas	0.5%

Land Use	Percent of Total Land Use
Non-forested Wetland	0.4%
Commercial and Services	0.3%
Transportation, Commercial, and Utilities	0.2%
Other Urban or Developed	0.1%

Grand Lake is a popular location for recreation and residential development, particularly summer homes. In addition, leisure and retirement community development has expanded on Grand Lake. Development along the shoreline primarily consists of residential, light commercial and business, and limited agricultural lands. As of 2004, an estimated 4,400 private residences have been constructed within 500 feet of the shoreline of Grand Lake, and more than 50 percent of these are seasonal residences (GRDA, 2008).

Existing Shoreline Regulations and Permitting

GRDA currently manages the shoreline through a permitting system and uses GRDA law enforcement personnel to enforce regulations. Article 410 of the project license contains the Standard Land Use Article that allows GRDA to establish a program for issuing permits and granting conveyances of project property for specified types of use and occupancy of project lands and waters, without prior Commission approval. For shoreline and project land activities not addressed by Article 410, GRDA must review and approve any such actions and then submit the proposal to the Commission for review and approval prior to implementation.

For most proposed uses, GRDA requires that proponents submit a written application to GRDA with drawings providing location, design and dimensions, and a description of materials and type of construction. All uses must conform to GRDA's general requirements and minimum design standards. Separate GRDA permitting standards and protocols detail specific information that relates to these permitting requirements. The permitting-procedures-and-standards documents provide information on requirements for docks and piers, bank stabilization measures, vegetation management and dredging, as well as information on facility construction and maintenance requirements. They also establish the criteria used in evaluating proposed new uses for both commercial and residential activities, as well as facility construction standards for each activity.

b. Environmental Effects and Recommendations

Shoreline Management Classifications

FWS states concerns about GRDA's proposed Responsible Growth SMC because it does not provide any additional protection or assurances relative to the existing status

of having no classifications or SMP. In addition, FWS states concerns that this SMC does not distinguish between and would allow both residential and commercial shoreline uses and that these types of development differ significantly in their effects. FWS states that large marinas, clubs, and parking lots could have more severe effects on shoreline habitat, increase soil compaction, create more impervious surfaces, increase boating and vehicle traffic-related impacts, occupy more public waters, and may create conflicts within a residential area. Oklahoma DWC states it supports the comments and recommendations filed by FWS.

Mark Osborn, Jack Lenhart, Doss Briggs, Kevin Stubbs, Mike Brady, Joseph McCormick, and Joe Chouteau, all members of the SWG, comment that GRDA's proposed SMP allows for the continued commercial and private development of the project at the expense of the environment, fish and wildlife, aesthetic concerns and the interests of non-property owning recreational users of the reservoir. These SWG members also state concerns about the Responsible Growth SMC and its associated lack of creating distinctive management categories for both residential and commercial use. They also state strong support for the use of the "Limited Use/Residential" and "Multi-Purpose/Commercial" shoreline classifications as suggested in the *"Guidelines for Development of a Shoreline Management Plan"* published by the Commission.

Other shoreline residents, including Karl Blade, Rudolph Hermann, Virginia Lawrence, and Cheryl Lenhart state similar concerns about the lack of distinct management categories for residential and commercial uses, and comment that the adaptive management guidelines provide no suitable definitive goals and guidelines or consistent land management policies.

Monkey Island Association and Grand Lakers United Enterprise state support of GRDA's proposed SMP, stating that the SMP development process included much study and stakeholder involvement, and that the SMP as proposed would help to promote economic development within the region. The City Council of the City of Grove passed a resolution requesting that GRDA classify the shoreline areas abutting the city's corporate limits as Responsible Growth.

In terms of land use, GRDA's proposed Responsible Growth SMC raised concerns from resource agencies and stakeholders (as summarized above) regarding the lack of specific management goals and grouping of multiple-type uses into such a broad category, particularly combining residential and commercial uses. Under GRDA's proposed SMC, the Responsible Growth SMC would encompass about 319 shoreline miles or about 61 percent of the total project shoreline.

Under GRDA's proposed plan, these areas would generally allow for uses provided under GRDA's proposed Commercial and Residential Allowable Use Categories. These allowable uses are divided into two separate categories: commercial and residential uses. Allowable uses for the Commercial Allowable Use category would

include potential development such as full service marinas, commercial docks greater and less than 10 slips, courtesy docks, boat ramps, and marine railways and trams. For the Residential Allowable Use category, allowable uses would include potential development such as private and community docks, multi-boat slips greater and less than 10 slips, boat ramps, and marine railways and trams. In addition, GRDA states that certain allowable uses may not be appropriate in some Responsible Growth areas, given the location's characteristics and prevailing use patterns. Accordingly, prior to allowing new uses in these areas, GRDA would consider the characteristics of existing permitted uses and recreational uses within a half-mile radius, shoreline topography, safety and navigation, environmental effects, recreational use, and potential economic development benefits.

GRDA states in the SMP:

Commercial uses typically have more intensive use patterns than residential or municipal/public uses. Additionally, commercial facilities, particularly those with multiple docks, slips, and moorings, are generally significantly larger than residential uses. Commercial uses may have a greater potential for affecting navigation on the lake, particularly if they are located in narrower coves and inlets. Therefore, these uses are best located in areas with adequate shoreline and water depth to allow construction and operation with minimal effect on environmental resources. Thus, development of new commercial uses should focus on areas that currently support similar uses, in areas that could support future high/intensive uses, and in locations separated from distinctly residential uses.

We agree that commercial uses inherently are different than residential or municipal and public uses. In addition, placement of commercial uses, such as a large commercial marina in an area of residential development, or in more sensitive areas such as small coves, can lead to conflicts and increased safety hazards associated with use of project shorelines and waters. Given GRDA's proposed classification of Responsible Growth, such uses could occur under GRDA's proposed SMP. In addition, while GRDA states that it would consider the characteristics of existing permitted uses in the review of a proposed development located within areas designated as Responsible Growth, such measures alone would not ensure the protection of shoreline resources and would not promote responsible shoreline growth in these areas much beyond that which already exists without an SMP.

We note that the Standard Land Use Article (Article 410 of the project license) allows GRDA to establish a program for issuing permits and granting conveyances of project property for specified types of use and occupancy of project lands and waters, without prior Commission approval. GRDA may only grant permission for such uses and occupancies, provided the use or occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For any proposed use that would include dock facilities with a total capacity greater than

10 watercraft, GRDA is required to obtain Commission approval prior to granting permits for any such facilities.

The SMP would not supersede or change the Standard Land Use Article. GRDA would still be required to follow license requirements, including those under Article 410. However, the purpose of developing and implementing an SMP is to help the licensee carry out the intent of the Standard Land Use Article and other license requirements. These can include, but not be limited to: (1) help GRDA, the Commission, and the stakeholders view individual shoreline development proposals in a project-wide or even regional perspective, rather than as individual, isolated actions; (2) track trends of developmental activities; and (3) allow for consistent review and approval of the various developmental proposals.

As stated in the Commission's guidelines for shoreline management (FERC, 2001), there are three general types of shoreline use classifications: a classification oriented towards preserving natural resources and minimizing or prohibiting shoreline development, a classification that allows limited development along the shoreline, and a classification that allows more intense levels of development within the project shoreline. Development of shoreline management classification categories that include distinctions between more limited development (i.e., single-family residential) and more intense development (multi-unit residential or commercial development) would help allocate these uses in a more comprehensive and managed manner, compared to a piecemeal or case-by-case approach. Managing the project shoreline development with such distinctions would ensure that compatible uses are located within appropriate areas and limit potential adverse effects on project resources, e.g., locating commercial marinas in areas that have adequate shoreline and water depth to allow multiple docks and associated facilities in an area that is not adjacent to or in the vicinity of single family residential areas.

Therefore, we recommend that GRDA conduct further evaluations of the shoreline areas designated as Responsible Growth and develop sub-classifications and/or reclassify these shoreline areas to differentiate between more limited development (i.e., residential) and more intense development (i.e., multi-purpose/commercial). In addition, we recommend that GRDA develop associated management goals, objectives, and allowable uses for each sub-classification to define more clearly allowable uses and management goals associated with each sub-classification. The development and implementation of shoreline classifications and associated management measures that include more detailed sub-classifications, as recommended, would result in long-term beneficial effects on shoreline land use at the project by ensuring coordinated and compatible growth and shoreline management of the project shoreline areas.

Update of Shoreline Management Plan

GRDA intends to review the SMP's land-use classification mapping, the SMP, and the associated permitting programs every 6 years. GRDA would provide the Commission with a report on the evaluation of the SMP no later than the 6-year anniversary following approval of the SMP and every 6 years thereafter. GRDA identified several triggers, including major commercial additions or new commercial uses, large-parcel land sales/major changes in land ownership, and changes within the management classifications. In the event that one or more of these conditions occurs, or cumulative effects of activities within the project appear to affect the effectiveness of the SMP, GRDA would begin internal review of the existing plan. If GRDA determines that major changes to the land-use classification mapping (through definition and assignment of new SMCs or reassignment of existing SMCs) are necessary, GRDA would petition the Commission to amend the SMP. Upon determination of the necessity to amend the SMP, GRDA would notice its intent publicly, and provide a forum for public comment on the proposed revisions.

GRDA's proposed report on the status and evaluation of the SMP every 6 years would provide the Commission information regarding implementation of the SMP, and shoreline management issues or changes that are occurring at the project. We recommend the licensee file the monitoring report with any proposed changes to the SMP every 6 years, for Commission approval, after consultation with the appropriate agencies, beginning 6 years from the issuance of any order approving the SMP. The filing also should include documentation of the licensee's consultation with the agencies on the monitoring report, including responses to any agency comments and recommendations. In the event that GRDA would propose changes to the SMP, it would need to file any proposed amendments to the Commission for review and approval. The provision of SMP updates and measures to monitor the effectiveness of the SMP over time would provide beneficial long-term effects on shoreline land resources by ensuring that shoreline management measures are implemented and updated to meet future shoreline management demands at the project.

9. Socioeconomics

a. Affected Environment

Population and Employment

The socioeconomic environment for the Pensacola Project includes Craig, Delaware, Mayes and Ottawa Counties, Oklahoma. Compared to the state as a whole, all four counties tend to have lower per capita incomes and slightly higher unemployment rates, and the residents are older (GRDA, 2008a). Citing the Oklahoma Department of Commerce and U.S. Bureau of the Census, GRDA reports that Mayes and Delaware

Counties had the highest populations and were roughly equal in estimated population at 38,369 and 37,077, respectively, in 2000. In the same year, Ottawa ranked third in population among the four counties with a population of 33,194, and Craig County ranked fourth with 14,950 people.

The largest communities in each county are Grove (Delaware County), Pryor (Mayes County), Miami (Ottawa County), and Vinita (Craig County). Citing the Grove Chamber of Commerce, GRDA reports that Grove was recently rated one of the top retirement areas in the nation by Rand McNally, the Wall Street Journal, and Retirement Places. From 2000 to 2006, Grove's population grew an estimated 17 percent.

All four counties around Grand Lake likely experience some seasonal changes in population due to the influx of summer residents and tourists during the popular summer months from Memorial Day through Labor Day. Population projections through the year 2030 show an anticipated increase in the population of all four counties (GRDA, 2008a).

Land use in the Grand River basin is devoted primarily to agriculture and mining. The primary industries contributing to employment in the region are education, health and social services, and manufacturing. The recreation and tourism industry plays an important role, ranking among the top three industries in terms of employment in Ottawa County. Citing U.S. Census data, GRDA states that recreation and tourism employ approximately 4,100 people in the four counties. The community of Miami, in Ottawa County, supports Northeastern A&M College, which is reflected in the fact that the education, health, and social services industry is one of the largest employers in the county (GRDA, 2008a).

Recreation-Related Development

Construction of Grand Lake resulted in the development of a significant recreational resource in the region. Numerous marinas and state recreation sites provide water-based access and attract tourism dollars to the local economy. Local communities capitalize on this and GRDA cites the Oklahoma Department of Tourism and Recreation as estimating that Grand Lake generated in excess of \$28 million in tourism-related revenue to the area in 1987. GRDA reports that it is likely that tourism-related revenue has increased since 1987 (GRDA, 2008a).

Many seasonal businesses have been established to capitalize on the tourism industry and support the interests and needs of visitors as well as permanent and seasonal residents. These businesses include fast food establishments, gas stations, waterfront shops, marinas, and retail, and all provide employment opportunities and contribute to the economic stability of the area (GRDA, 2008a).

From the late 1970s through the early 1990s, Oklahoma's economy was severely depressed as a result of its dependency on and the decline of the domestic oil industry.

This period of time was also a relatively low- to no-growth period for the Grand Lake area. Beginning around 1992, surrounding regions began to recover economically and the Grand Lake area experienced a significant influx of investors and private property owners (FERC, 2003). The majority of the established marinas on Grand Lake at the start of this period of increased economic activity were located on Duck Creek Cove. This area of the reservoir was poised for rapid economic growth at that time, with pre-existing platted subdivisions and developments, including golf courses and other recreational amenities. Since 1980, all Duck Creek marina owners have expanded their commercial developments to provide facilities and services to meet growth in demand (FERC, 2003).

The popularity of the Duck Creek area is partially attributable to its geographic proximity to Tulsa, the largest metropolitan area in northeast Oklahoma. The cove is relatively protected from severe reservoir conditions, and is large enough to support a substantial amount of boat traffic. Lake-access roads and interstate accessibility have contributed to this area's growth. Duck Creek is considered to be the most popular residential area on the reservoir primarily because of the commercial marinas and yacht clubs at this location. It has the highest concentration of residences on Grand Lake outside of incorporated city or town boundaries (FERC, 2003).

Although detailed information specific to Grand Lake is not available, there is information available that suggests that land values in the vicinity of Grand Lake are greater than those values elsewhere. GRDA cites Darrel Kletke, Department of Agricultural Economics, Oklahoma State University, as stating that land values in Mayes, Delaware, Ottawa and Craig Counties increased 75 to 150 percent between the periods 1973-1975 and 1998-2000. In terms of dollars per acre, land values in Mayes, Delaware and Ottawa Counties consistently exceeded land values in the rest of the state during the period 1972 to 1999. During the same period, land values in Craig County generally remained equal to or slightly greater than statewide values (GRDA, 2008a).

b. Environmental Effects and Recommendations

The SMP's shoreline management classification system provides a range of development opportunities. Classifications such as Municipal/Public Use, Responsible Growth, and Responsible Growth-Wetlands Inventory allow the types of development that could accompany residential or commercial development on adjacent land (such as docks, boat ramps, and breakwaters). Development would be more restricted under other SMCs (Stewardship and Wildlife Management), but values such as open space, wildlife habitat, and aesthetic values would be protected. Both development and the protection of amenity values have the capacity to influence the socioeconomic environment both positively and negatively.

In particular, GRDA states that Responsible Growth areas are specifically intended to be managed to accommodate reasonable demands for public and private uses that are conducive to the protection and enhancement of Grand Lake's environmental, recreational, and socioeconomic resources. Together, the areas classified as Responsible Growth and Responsible Growth-Wetlands Inventory include approximately 347 miles of shoreline (66 percent of the shoreline within the project boundary), including 319 miles (61 percent) in Responsible Growth areas and 28 miles (5 percent) in Responsible Growth-Wetlands Inventory areas. Residential and commercial development could also occur in the Municipal/Public Use areas (8 miles or 1 percent of the shoreline).

Two of the SMCs, Stewardship and Wildlife Management, are designed by GRDA to protect habitat for fish and other aquatic species. Approximately 150 miles of project shoreline (29 percent) are designated Stewardship and about 15 miles of project shoreline (3 percent) are designated as Wildlife Management. Thus, a total of approximately 165 miles of some of the most sensitive shoreline are afforded the protections that these classifications provide, including restricted development and prohibited vegetation clearing, as outlined in the vegetation management plan.

In its comments filed with the Commission, the Monkey Island Association and Grand Lakers United Enterprise wrote that the proposed SMP would have a positive effect on the local economy because it would allow private docks and other amenities that would enhance the area's attractiveness to new homeowners and raise the value of homes abutting the project boundary, which, in turn, would bring new jobs and revenue to the areas. In their comments, these SMP supporters wrote that such development would increase the tax base, which would benefit the school districts as well as the township and county government units that provide needed services such as transportation, fire, and ambulance protection, as well as road maintenance.

During the pre-filing consultation process, John D. Rothman, in a memorandum to the GRDA Board of Directors, dated April 26, 2007, stated that the most common criticism of the proposed SMP classifications was made by owners of land proposed to be classified as "sensitive." Mr. Rothman further stated that underlying these criticisms was the obvious and logical apprehension that land values would decrease if the shoreline was designated as "sensitive."

Voicing another opinion, however, Mike Brady, in a letter filed with the Commission on September 3, 2008, states that the overwhelming tenor of the final draft of the SMP is designed to promote the commercial and private development of a public resource at the expense of its protection and preservation.

It is generally understood that waterfront residential property tends to appreciate in value with: (1) open and unobstructed views of the water; (2) free access to and use of the water and adjoining shoreland for recreational activities; (3) the availability of private boat docks for personal use and enjoyment; and (4) conveniently located commercial

marina facilities and other popular recreational amenities. On the other hand, proximity to commercial developments, with attendant use conflicts and aesthetic disturbances, also can have a depreciating effect on the value of residential property (FERC, 2003).

As described earlier in this EA, the Standard Land Use Article (Article 410 of the project license) allows GRDA to establish a program for issuing permits and granting conveyances for certain uses of project lands and waters. Facilities to be constructed, such as boat docks, would continue to be subject to GRDA's existing permitting program and depending on the type of facility proposed, ultimately may require Commission approval. The proposed SMP does not supersede or change this requirement. Similarly, approval of the SMP does not authorize any additional construction activities outside of what may be permitted by GRDA currently. In section VI.C.8.b, *Land Use and Aesthetic Resources*, we recommend that GRDA conduct further evaluations of the shoreline areas designated as Responsible Growth and develop sub-classifications and/or reclassify these shoreline areas to differentiate between more limited development (i.e., residential) and more intense development (i.e., multi-purpose/commercial). In addition, we recommend that GRDA develop associated management goals, objectives and allowable uses for each sub-classification to define more clearly the allowable uses and management goals associated with each sub-classification. The SMP with staff's recommended measures would be beneficial to adjacent landowners insofar as it would reduce the uncertainty with regard to how project lands could be developed in the future.

The designation of 61 percent of the project shoreline as Responsible Growth areas allows these lands to be managed exclusively to accommodate reasonable demands for public and private uses that are conducive to the protection and enhancement of Grand Lake's environmental, recreational, and socioeconomic resources. GRDA's proposed SMP would no doubt increase the appeal of those properties to buyers, which in turn would likely lead to the increased construction activity, jobs, and tax revenues anticipated by GRDA, Monkey Island Association, and Grand Lakers United Enterprise. However, no project-specific economic analysis has been prepared to conclusively demonstrate whether the increased tax revenue associated with developing more shoreline properties would more than offset the additional costs to the communities for providing services to those properties and residents. That would depend in large measure on the nature of the development, the types of residents that are attracted, the level of services provided by local governments, and the tax structure.

In summary, implementation of the SMP with staff's recommended measures would benefit adjacent landowners by reducing the uncertainty associated with how project lands could be developed in the future. Beyond that, the potential socioeconomic impact of GRDA's proposed SMP and its component shoreline classifications cannot be estimated at this time because the shoreline classifications allow for certain types of development, but do not dictate what level of development would actually take place. The actual level of development and its economic value would depend not just on the

supply of land in certain classifications at Grand Lake, but also on the demand for such development, the supply of similar opportunities elsewhere, the tax structure in various jurisdictions, and so on.

D. No-action Alternative

Under the no-action alternative, there would be no SMP to provide shoreline classifications or an integrated, comprehensive approach to management of Grand Lake's shoreline. Without the SMP, GRDA would continue to manage the lake's shoreline through its existing license conditions and Commission-approved plans filed pursuant to license requirements.

VII. CONCLUSIONS AND RECOMMENDATIONS

Dredging and Water Quality Monitoring

The proposed SMP, by reference, includes GRDA's rules and regulations for recreational activities on Grand Lake with the goal of minimizing adverse effects on Grand Lake's water quality. We find that these measures, combined with the measures included in GRDA's approved dredging plan, should, in general, minimize adverse short- and long-term effects on water quality in Grand Lake. With staff's recommendations to prohibit dredging in Wildlife Management areas and develop supplemental SMP provisions for water quality monitoring in recreational "heavy use" areas (as well as to maintain vegetation buffers and develop mitigation provisions for vegetation-removal impacts, discussed below), we find the proposed plan sufficiently minimizes unavoidable short- and long-term effects on water quality at the project.

- We recommend that dredging activities be prohibited in Wildlife Management areas.
- We recommend GRDA develop supplemental SMP provisions for water quality monitoring in coves where "heavy boating" use occurs. The provisions would identify what constitutes heavy boating use in coves, the timing for initiating monitoring and the water quality parameters to be monitored, and the frequency and duration of monitoring. The provisions would be developed in consultation with FWS and Oklahoma DWC.

Sensitive Areas

GRDA has based its shoreline classifications on its GIS database (which includes palustrine wetlands, contour and bathymetric data, and aquatic and terrestrial habitats considered significant by state and federal wildlife agencies), local knowledge of both GRDA staff and stakeholders, and site-specific verification. FWS and Oklahoma DWC

recommend GRDA conduct surveys to determine fish and wildlife habitat values for project lands and shorelines and base shoreline classifications on the results of such surveys. In the absence of such surveys, FWS and Oklahoma DWC suggest that recommendations by resource agencies should represent the best available information for the values of fish and wildlife habitat. GRDA does not believe that lake-wide surveys are feasible or necessary at this time. Rather, GRDA supports a system that gathers this information as the need arises. We agree with GRDA that lake-wide surveys are not necessary at this time. We also concur with FWS and Oklahoma DWC that in the absence of surveys, information on sensitive areas provided by resource agencies represents the best available information for the values of fish and wildlife habitat.

In areas with fragmented wetlands, the Responsible Growth-Wetlands Inventory SMC provides additional protection for wetland values by requiring site-specific planning and analysis prior to new activities or vegetation management. Such plans may be subject to greater scrutiny and may result in a requirement for on- or off-site mitigation and/or an alternative vegetation management plan. However, some areas that FWS and Oklahoma DWC classify as sensitive are provided no additional protection beyond the general Responsible Growth SMC. GRDA provides no rationale for classifying areas FWS and Oklahoma DWC indicate are sensitive as Responsible Growth areas.

- We recommend GRDA implement protection mechanisms similar to those identified in the Responsible Growth-Wetlands Inventory SMC for all areas FWS or Oklahoma DWC identified as sensitive. Such protection measures would include site-specific planning and analysis prior to new activities or vegetation management. This analysis specifically would require evaluations of the potential for the proposed activity to affect wetlands or other habitat for threatened, endangered, or sensitive species. Any unavoidable effects would be quantified and appropriate mitigation measures developed and implemented. Such plans would be subject to greater scrutiny and could result in a requirement for on- or off-site mitigation and/or an alternative vegetation management plan. These provisions would ensure sensitive habitat areas are not impacted. Information collected during these site-specific reviews could then be used during the lake-wide review process occurring every 6 years.

Vegetation Management and Riparian Buffers

GRDA's vegetation management plan requires site-specific evaluations and approved permits prior to any vegetation management activities on project lands. However, within Responsible Growth areas, and to a lesser extent within Responsible Growth-Wetlands Inventory and Stewardship areas, some vegetation management activities are likely to occur. GRDA, FWS, and Oklahoma DWC are in agreement that these management activities could warrant the need for mitigation. In addition, FWS and Oklahoma DWC recommend GRDA maintain vegetation buffers, at least equivalent to NRCS standards, around sensitive resource areas. GRDA opposes such buffers stating

that in many cases it would not have jurisdiction over enough land to require large buffers, and narrow buffers would provide limited benefit. To mitigate for impacts in these areas, GRDA has instituted stronger protection in Stewardship and Wildlife Management areas. We disagree with GRDA that the limited benefits of narrow vegetation buffers do not justify their presence in sensitive areas. Rather, we find that any buffer is better than no buffer requirement at all in these areas.

- We recommend that in consultation with FWS and Oklahoma DWC, GRDA develop supplemental SMP provisions for quantifying the effects of permitted vegetation removal and mitigating these effects through the protection and enhancement of riparian vegetation in other areas.
- We recommend that within Responsible Growth-Wetlands Inventory, Stewardship, and Wildlife Management areas, and in areas FWS or Oklahoma DWC identified as sensitive, the vegetation management plan for the project stipulate that a 35-foot-wide riparian-forest buffer similar to the areas' naturally occurring vegetation be maintained. In areas where GRDA does not have jurisdiction over a full 35-foot buffer, it should maintain the maximum buffer within its jurisdiction and, as a component of the public education program, encourage adjacent landowners to maintain riparian forest characteristics in the remaining buffer width.

Wetlands

GRDA, FWS, and Oklahoma DWC are in agreement that potential effects on wetlands could warrant the need for mitigation and that a mitigation plan should be developed. During the development of the proposed SMP, FWS indicated that small isolated wetland areas that are surrounded by development have limited value and could be reclassified to allow some impacts, provided such impacts were mitigated. GRDA classified wetland complexes in Wolf Creek, Carey Bay, and Monkey Island as Responsible Growth-Wetlands Inventory due to the fragmented nature of these wetlands and the considerable pressure for growth that exists in these locations. FWS does not agree that such classification is appropriate in these locations because these wetlands are large and impacts would be difficult to mitigate. FWS and Oklahoma DWC recommend these wetlands be classified as Stewardship. We agree that wetland resources would benefit from the development of impact mitigation provisions. Based on limited information provided in the SMP, we conclude that wetland values in the Wolf Creek, Carey Bay, and Monkey Island areas are similar to wetland areas classified as Stewardship in Drowning Creek, Duck Creek, and Horse Creek. We find that the wetland resources in Wolf Creek, Carey Bay, and Monkey Island should be provided similar protection, despite additional development pressures.

- We recommend that the larger blocks of wetlands in the Wolf Creek, Carey Bay, and Monkey Island areas be protected as Stewardship areas, as recommended by FWS.
- We recommend that GRDA, in consultation with FWS and Oklahoma DWC, develop provisions, to be included in the SMP, for: (1) identifying existing wetlands potentially affected by proposed shoreline activities and evaluating their functions and values; (2) assessing the probable effects of proposed activities on wetlands; and (3) addressing adverse effects on wetlands, from permitted activities, through appropriate mitigation. To account for the mitigation of any wetlands impacts, GRDA should be required to annually file with the Commission, at the same time it files its annual fish and waterfowl management report, a wetland mitigation report providing detailed descriptions of: (1) the status of any planned, ongoing, and completed mitigation measures; and (2) documentation of any consultation on wetland mitigation with FWS and Oklahoma DWC.

Wildlife

To mitigate adverse effects on wildlife, GRDA has designed the SMP classifications to protect areas with the greatest wildlife resources, like wetlands and other sensitive habitats. These areas are classified as Stewardship or Wildlife Management, where few, if any, habitat alterations would occur. In addition to the 1,630 acres of Wildlife Management area required in license Article 406, GRDA has purchased 2,500 acres and is actively pursuing the purchase of additional areas that it would manage exclusively for the preservation and enhancement of terrestrial and aquatic habitat. FWS and Oklahoma DWC comment that the Responsible Growth SMC proposes only very limited protection for fish and wildlife habitat. The cumulative effects of this type of shoreline development are extensive and are occurring without mitigation. Therefore, FWS maintains that the SMP would result in a net habitat loss and does not provide any real mitigation because impacts would continue to occur within Responsible Growth areas without any specific management actions described for the Wildlife Management SMC that would mitigate for those impacts. FWS and Oklahoma DWC recommend that GRDA include a description of how it would manage the Wildlife Management areas in the SMP.

FWS and Oklahoma DWC also comment that bald eagles nest in or near the Pensacola Project. FWS and Oklahoma DWC recommend monitoring the reproductive success of any eagles attempting to nest near Grand Lake because there is potential for contamination (primarily metals) of fish or other prey to affect their reproductive success. FWS also recommends that all construction activities be conducted in accordance with FWS's National Bald Eagle Management Guidelines. GRDA also proposes to monitor bald eagle nesting activity. Such monitoring would consist of two annual flyover

surveys, one in January or February and one in April, to identify any new or active bald eagle nests in the project area. Information gathered from these surveys would guide implementation of the SMP. GRDA also agrees to follow the National Bald Eagle Management Guidelines.

Actions resulting from implementation of the proposed SMP, including vegetation management practices in the Responsible Growth SMC, expansion of commercial docks and marinas, and construction of private docks, have the potential to affect wildlife resources. GRDA's protection and enhancement of habitats within Wildlife Management areas could mitigate these effects, provided these areas are of suitable size and appropriately managed. We also conclude that GRDA's proposed measures to monitor bald eagle nesting success and adhere to the National Bald Eagle Management Guidelines would benefit the bald eagle.

- We recommend that GRDA, in consultation with FWS and Oklahoma DWC, develop provisions, to be included in the SMP, for: (1) identifying existing wildlife habitats potentially affected by proposed shoreline activities and evaluating their functions and values; (2) assessing the probable effects of proposed activities on wildlife habitats; and (3) addressing adverse effects on wildlife habitats, from permitted activities, through appropriate mitigation. To account for the mitigation of any wildlife impacts, GRDA should be required to annually file with the Commission, at the same time it files its annual fish and waterfowl management report, a wildlife mitigation report providing detailed descriptions of: (1) the status of any planned, ongoing, and completed mitigation measures; and (2) documentation of any consultation on wildlife mitigation with the FWS and Oklahoma DWC.
- We recommend implementation of GRDA's proposed annual surveys for bald eagle nesting activity, appropriate consideration of this information during implementation of the SMP, and adherence to the National Bald Eagle Management Guidelines.

Recreation Management

FWS recommends that GRDA conduct a new carrying capacity study and develop a new recreation management plan for the project. Oklahoma DWC also states that the recreation data is insufficient and requests that plans be developed to collect the appropriate data during the first 6 years of implementing the proposed SMP. We conclude that GRDA's studies conducted as part of the recreation management plan update and preparation of the SMP provide sufficient baseline information regarding the existing recreational use and capacity at the project. However, we also conclude that GRDA has not provided sufficient information regarding its proposed monitoring efforts associated with aerial flyovers of the project. In addition, GRDA has not provided

information regarding how monitoring and management measures associated with the recreation management plan would be coordinated with the SMP for the project.

- We recommend that GRDA supplement the SMP to include information regarding measures to coordinate the SMP and recreation management plan and associated management and monitoring measures, including provisions for monitoring boating use density at the project, and provisions for coordinating future updates of the recreation management plan and SMP.

Shoreline Classifications

FWS, Oklahoma DWC, and several individuals state concerns about GRDA's proposed Responsible Growth SMC because it does not provide any additional protection or assurances relative to the existing status of having no classifications or SMP. In addition, these entities state concerns that this SMC does not distinguish between and would allow both residential and commercial shoreline uses and that these types of development differ significantly in the type of impacts that could occur. We conclude that development of SMCs that include distinctions between more limited development (i.e., single-family residential) and more intense development (multi-unit residential or commercial development) would help allocate these uses in a more comprehensive and managed manner, compared to GRDA's proposed management classification of Responsible Growth. We conclude that managing project shoreline development with such distinctions would help to ensure that compatible uses are located within appropriate areas and limit potential adverse effects on project resources.

- We recommend that GRDA revise the SMP, in consultation with FWS, Oklahoma ODWC and interested stakeholders, to develop sub-classifications and/or reclassify the shoreline areas designated as Responsible Growth to differentiate between more limited development (i.e., residential) and more intense development (i.e., multi-purpose/commercial) and to identify existing public recreational access areas and future proposed public recreational access areas at the project. In addition, we recommend that GRDA develop associated management goals, objectives, and allowable uses for each sub-classification to more clearly define allowable uses and management goals associated with each sub-classification.
- We recommend that GRDA file, for Commission approval, any proposed change to the approved shoreline management classifications. These classifications are integral to the SMP and should not be changed without further review.

Shoreline Management Plan Updates

GRDA's proposed report on the status and evaluation of the SMP every 6 years would provide the Commission information regarding the implementation of the SMP and shoreline management issues or changes that are occurring at the project. In the event that GRDA were to propose changes to the SMP, it would need to file any proposed amendments to the Commission for review and approval.

- We recommend GRDA file an SMP monitoring report and any proposed changes every 6 years, for Commission approval, after consultation with FWS, Oklahoma DWC, and interested stakeholders, beginning 6 years from the issuance of any order approving the SMP. The filing also should include documentation of the licensee's consultation with the agencies on the monitoring report, including responses to any agency comments and recommendations.

VIII. FINDING OF NO SIGNIFICANT IMPACT

Based on information, analysis, and evaluations contained in this EA, we find that implementation of the proposed SMP, with staff recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment.

IX. LITERATURE CITED

- FERC (Federal Energy Regulatory Commission). 2007. Final Environmental Assessment, Application for Non-Project Use of Project Lands and Waters. Pensacola Project, FERC No. 1494-300 (121 FERC ¶61,052). October 18, 2007.
- FERC. 2001. Guidance for Shoreline Management Planning at Hydropower Projects, April 2001.
- FERC. 2003. Final Environmental Assessment, Application for Non-Project Use of Project Lands and Waters. Pensacola Project. FERC No. 1494-232 (105 FERC ¶61,100). October 23, 2003.
- FERC. 1992. Order Issuing New License and Environmental Assessment. Pensacola Project. FERC No. 1494-002 (59 FERC ¶ 62,073). April 24, 1992.
- FWS (U.S. Fish and Wildlife Service). 2008. Review of Notice of Availability of Shoreline Management Plan; Pensacola Hydroelectric Project, FERC No. 1494-348; Craig, Delaware, Mayes, and Ottawa Counties, Oklahoma. Letter from Regional Environmental Officer to Secretary, FERC. Filed October 7, 2008.

- FWS. 1991. American Burying Beetle (*Nicrophorus americanus*) Recovery Plan. Newton Corner, Massachusetts. 80 pp.[0]
- GRDA (Grand River Dam Authority). 2009. GRDA Response to Additional Information Request. Filed on January 26, 2009.
- GRDA. 2008a. Application for approval of the Pensacola Project, Shoreline Management Plan (FERC No. 1494-348). Filed on July 21, 2008.
- GRDA. 2008b. Environmental Assessment of Habitable Structures on Grand Lake, dated October 1, 2008. Filed on December 23, 2008.
- GRDA. 2007. Recreational Boating Carrying Capacity Analysis based Upon the Visitor Experience and Resource Protection Framework, Draft, May 2007, prepared by Kleinschmidt Associates.
- GRDA. 2003. Report on Recreation management Plan and Shoreline Management Plan, Pensacola Project (FERC No. 1494), submitted to the Commission on July 2, 2003.
- GRDA. 2002. Additional information on the application for non-project use of project lands and waters, Pensacola Hydroelectric Project (FERC No. 1494-232). Grand River Dam Authority, Vinita, Oklahoma. March 29, 2002.
- NPS (National Park Service). 2009. National Register of Historic Places, National Register Information System. Accessed January 28, 2009, at <http://www.nr.nps.gov>.
- NRCS (U.S. Department of Agriculture, Natural Resources Conservation Service). 2008. Web Soil Survey web page. [Websoilsurvey.nrcs.usda.gov/appl/WebSoilSurvey](http://websoilsurvey.nrcs.usda.gov/appl/WebSoilSurvey), accessed on January 2, 2009. Natural Resources Conservation Service.
- NRCS. 2006. Natural Resource Conservation Service Conservation Practice Standard Riparian Forest Buffer. Available online at <ftp://ftp-fc.sc.egov.usda.gov/NHQ/practice-standards/standards/391.pdf>. Accessed 1/28/2009.
- SHPO Register (Oklahoma Historical Society, Oklahoma State Historic Preservation Office). 2009. National Register of Historic Places in Oklahoma database. Accessed January 28, 2009, at <http://www.ocgi.okstate.edu/shpo/>

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Document Content(s)

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