ENVIRONMENTAL ASSESSEMENT
AND FINDING OF NO SIGNIFICANT IMPACT

MODIFICATION OF REGULATION AND OPERATION
OF
GREEN RIVER LAKE, KENTUCKY

INTRODUCTION

This Environmental Assessment (EA) has been prepared to address the proposed modifications in the operation of the Corps of Engineers Green River Lake project in Adair, Taylor and Casey counties, Kentucky. The National Environmental Policy Act (NEPA) mandates environmental review of all proposed activities on Federal lands which could potentially cause significant impacts to the human environment. The proposed modifications are being carried out under the authority of Section 216 of the 1970 Flood Control Act (Public Law 91-611).

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to restore natural hydrologic variability in flow and temperature in the Green River downstream of Green River Lake while continuing to meet the authorized project purposes, e.g., flood control. The Green River, from the tailwater of the lake to the eastern boundary of Mammoth Cave National Park, is known as one of the most biodiverse stretches of river in the United States.

The U.S. Department of Agriculture, Natural Resources Conservation Service, the Kentucky Department for Natural Resources and Environmental Protection, Division of Conservation, and The Nature Conservancy have joined into a public-private partnership to offer the conservation reserve enhancement program (CREP) to landowners to protect this stretch of river and preserve it for future generations. The goal of this partnership and the Louisville District is to implement strategies throughout the watershed to protect and restore the ecosystem functions and rare plants, animals, and communities that are indigenous to this aquatic area. This goal cannot be achieved without the modification of the current water regulation schedule for Green River Lake.

The Commonwealth of Kentucky Department of Fish and Wildlife Resources has requested review of pool levels and operational plans for all four Louisville District lakes in the Green River basin to benefit fish and wildlife resources and extend recreational opportunities. This proposed action at Green River Lake is the first to be considered.

The proposed operational changes are needed to assist the recovery of numerous state and federally protected plants and animals, especially aquatic species, downstream of the dam and to increase recreational opportunities in the fall for boating and sport fishing.

PROPOSED ACTION AND ALTERNATIVES

No Action

A basic alternative to any proposed plan is the no action alternative. This alternative continues the present operational plan as it exists for Green River Lake. Important components of the current operational plan are as follows:

Lake Water Elevations

Winter Pool 664
Summer Pool 675

Non-Crop Season Release Rates

Maximum 7200 cfs
Minimum 300 cfs

Spring Filling Schedule

15 March – 15 April (or until 675 attained)
Minimum release 50 cfs

Fall Drawdown or Release Schedule

15 September – 15 October 10% (1 foot)
16 October – 30 November 90% (10 feet)

Alternatives

Multiple alternatives were considered to meet the purpose and need for the proposed action. Four were evaluated in detail as these represented the best opportunities to improve downstream flows and temperature while having no adverse effect on flood control, water supply, or any other use of Green River Lake.

All the alternatives considered as operational modifications evaluated four important factors; (1) capability to increase the non-crop season maximum and minimum release rates without adverse impacts, (2) capability to delay the significant Fall drawdown until lake destratification and reduce the 15 September – 30 October drawdown to 0.5 foot without adverse impact, (3) capability to raise winter pool to elevation 668 without significant adverse flood control impact and, (4) capability to modify the filing schedule without significant impacts on recreation.

The four alternatives considered in detail are as follows:

Modification 1

Lake Water Elevations

Winter Pool 664
Summer Pool 675

Non-Crop Season Release Rates

Maximum 8200 cfs
Minimum 300/1000 cfs

Spring Filling Schedule

15 March – 15 April (10 feet)
16 April – 15 May (1 foot)
Minimum release 100 cfs

Fall Drawdown or Release Schedule

15 September – 31 October 5% (0.5 foot)
1 November – 30 November 95% (10.5 feet)

Modification 2

Same as Modification 1 except:

Spring Filling Schedule

15 March – 15 April (9 feet)
16 April – 15 May (2 feet)

Modification 3

Lake Water Elevations

Winter Pool 668
Summer Pool 675

Non-Crop Season Release Rates

Maximum 8200 cfs
Minimum 300/1000 cfs

Spring Filling Schedule

15 March – 15 April (6 feet)
16 April – 15 May (1 foot)
Minimum release 100 cfs

Fall Drawdown or Release Schedule

15 September – 31 October 10% (0.5 foot)
1 November – 30 November 90% (6.5 feet)

Proposed Action

Same as Modification 3 except:

Spring Filling Schedule

15 March – 15 April (5 feet)
16 April – 15 May (2 feet)
Minimum release 100 cfs

AFFECTED ENVIRONMENT

General Description/Land Use

Green River Lake is operated for the purposes of flood control, low flow augmentation, recreation and fish and wildlife enhancement, and serves as a source of water supply. The lake was authorized by the Flood Control Act of 28 June 1938, and was completed in February 1969. Green River Lake is located in south central Kentucky, about eight miles south of Campbellsville. The dam site is at mile 305.7 on Green River. The lake controls 682 square miles of the upper Green River watershed.

The lake has a minimum pool elevation of 653 feet msl, which forms a 5,070-acre lake 18 miles in length and a water quality pool elevation of 664 which forms a 6,650-acre lake 21 miles in length. Summer pool at 675 msl forms 8,210-acre lake 25 miles in length. Water supply storage has a volume of 64,500 acre-feet between elevations 653 and 664 and is equal to 1.77 inches of runoff. Total storage volume of the lake is 723,200 acre-feet at the flood control pool elevation of 713 feet msl. At this elevation, the lake covers 19,100 acres and extends 37 miles.

The pool is held, as near as possible, at elevation 664 from late fall through the winter months to provide additional storage capacity for floodwaters. From mid-April through mid-September, the pool is maintained at elevation 675, conditions permitting.

A total of 32,356 acres of land was acquired in fee for Green River Lake. Flowage easements were taken on an additional 1,587 acres. Approximately 2,430 acres are

included in seven sites selected for public access. Five of the sites have been developed and are currently open to public use.

Climate/Air Quality

The climate of the project area is of the humid, subtropical type. The mean annual temperature is about 57 degrees Fahrenheit which varies from a mean of 37 degrees Fahrenheit in January to a mean of 76 degrees Fahrenheit in July, producing a growing season of approximately 180 days. Precipitation in the project area is fairly evenly distributed throughout the year, with smaller amounts occurring in late summer and fall. The average annual rainfall is approximately 51 inches.

Cultural Resources

Though numerous prehistoric sites have been reported in many portions of the Green River Valley, likely the best known prehistoric manifestations are the Shell Mound Archaic sites found further downstream. Historic settlement of the area was likely underway as early as the late 1700's. Two predominate categories of cultural resources are likely to be encountered within the environs of the study area. Prehistoric camp sites – likely seasonal in nature – will be found scattered across the landscape adjacent to local streams. Following initial Euro-American occupation, numerous small farmsteads were established in the area – albeit typically on elevationally higher landforms – and this portion of the Green River Valley is yet largely undeveloped and retains much of its rural character.

Environmental Justice

Approximately 5 miles upstream from Green River Lake is the small town of Pellyton is an Amish/Mennonite community. The Pellyton community (population approximately 180) is northeast of Neatsville bridge on highway 210.

Recreation

The public use areas around the lake contribute a major portion of the camping, picnicking, water access, swimming and other day use opportunities in the Green River Lake area. There are three marinas located throughout the lake area that offer a full range of services.

Physiography, Geology and Soils

The Green River Lake project lies within the Mississippian Plateau Province, an area underlain by Mississippian age limestones and shales. The underlying geology in the lake area consists of clayey siltstone, medium to dark-gray shale, and light to bluish-gray siliceous limestone. The topography is moderately to highly dissected rolling uplands. The relief is more severe in the areas north and east of the lake, and the slopes are gentler in the areas adjacent to the south and west. Maximum relief in the project area is about

400 feet. The walls of the river valley form a relatively steep bluff on the side of the river and generally alternate with more gentle slopes on the opposite side.

The spillway cut (713 msl) is an outstanding geologic resource within the project area which offers a unique opportunity to witness the weathering of fractures in siltstone and limestone formations. Immediate access to the spillway is not available to the public, but visual inspection is provided from the overlook within the interpretive area.

Soils within the project area are divided into three major categories based on the material from which they were developed. Some soils in the uplands and along valley walls were developed from residuum, a weathered form of the bedrock. Other soils in the uplands were developed from loess. Soils in the bottomlands along stream valleys were developed in alluvium.

Of the major soil classifications which occur in the Upper Green River Basin, four encompass most of the project lying in the Mississippian Plateau Physiographic Region. They are the Gilpin-Caneyville-Dekalb, Pembroke-Crider-Cumberland, Baxter-Bedford, and Garmon-Talbott-Baxter soil associations.

Farmland: Prime or Unique

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and which is available for these uses. Prime farmland can be cropland, pastureland, range land, forest land, or other open vegetated lands, but cannot be urban built-up land or water.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation. It also has favorable temperature and growing season, acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

Unique farmland is land other than prime farmland used for the production of specific high value food and other fiber crops. Unique farmlands can economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods.

The U.S. Department of Agriculture, Soil Conservation Service has not classified any unique farmland within the Green River Lake area. There is a considerable amount of classified prime farmland scattered throughout all the counties in the Green River Lake project area, however, a very insignificant amount is adjacent to the lake itself. Downstream agriculture (as far as Mammoth Cave National Park) is dominated by pasture, hayfields, and forests.

Threatened or Endangered Species

The possible presence of threatened, endangered, or declining plant or wildlife species is an important consideration in the planning of any resource development. The United States Fish and Wildlife Endangered and Threatened Species List include the following species whose range includes the project area: bald eagle, Indiana bat, and gray bat. While the eagle occurs only as a migrant, the bats are residents of the area at least part of the year.

A well known, unique biological characteristic of the Green River Basin is the presence of a large and diverse mussel population, considered by some to be one of the most diverse of any stream in the country. Downstream of the dam from the Green-Taylor County line to the upstream boundary of Mammoth Cave National Park, there has been reported 39 species of freshwater mussels, six of which are endangered.

Impoundment of Green River Lake has reduced the mussel populations, which formally existed in that section of the river, but probably not eliminated all mussel species. Those capable of adapting to a lake environment may still persist to some degree.

Waste: Hazardous or Solid

Wastes at Green River Lake consist of domestic and sanitary wastes associated with a wide variety of recreational opportunities including boating, camping, picnicking, swimming, hiking and sightseeing and operational wastes associated with Green River and Emerald Isle Marines. Domestic and sanitary wastes do not meet the definitions of hazardous waste and are therefore deemed solid wastes. Josco Construction disposes of these wastes through a contract with the Corps. Wastewater at the various recreation sites and facilities is disposed of by a septic system or a lift station.

Operational wastes generated from the marinas are disposed of by contract with Josco Construction. Disposal of hydraulic fluids and waste generated from the operation of the dam is also disposed of by Josco Construction.

Water Quality: Drinking and Ground

There are approximately 8,288 miles of streams and rivers in the upper Green River basin. Only 714.3 miles (9%) have been assessed to determine whether they meet water quality standards for swimming and fishing. Many of the streams in the upper watershed are relatively pristine but others have been negatively impacted by agriculture and development. The limited monitoring data available in the upper Green River basin indicates that streams have documented impairments due to agriculture (98.3 miles of stream impaired), industrial and municipal wastewater discharges (61.5 miles), urban runoff and development (17.9 miles), and other unknown sources (394.7 miles).

Wetlands

A naturally occurring process due to the impoundment of the Green River Lake is the development of several wetland areas at the headwaters of the Green River Lake. Also, there are numerous other small wetlands (less than one acre), mostly ephemeral wetlands downstream of the lake.

Wild and Scenic Rivers

A large segment of the upper Green River has been designated a state Wild River in recognition of its outstanding natural qualities and pristine setting. The designated stream segment is the highest quality, least-impacted stream in the basin. It consists of 26 stream miles of the Green River (Hart and Edmonson counties) and has a corridor area of 6,500 acres. This is part of a larger 157-mile segment, from Green River Lake Dam to Lock & Dam #4, that winds through Taylor, Green, Hart, Edmonson, Warren, and Butler counties. This stream segment is managed by the Division of Water to protect its natural features and undeveloped character. In addition, Mammoth Cave National Park, managed by the National Park Service, also protects much of the Wild River segment of the Green River in Edmonson County, as well as portions in Hart County.

Wildlife and Vegetation

In general, the diversity of habitat in the Green River project area provides for a relatively large variety of wildlife species. Approximately 28,770 acres of project lands and water are licensed to the Kentucky Department of Fish and Wildlife Resources for wildlife management.

The Green River area provides many habitats, ranging from karst topography to bottomland woods, which allow for a large diversity of reptiles and amphibians. A total of 76 species have their geographic range and habitat requirements met within the project area. These 76 species include 21 species of salamanders, 13 species of frogs and toads, 7 species of lizards, 12 species of turtles, and 23 species of snakes.

A diversity of habitat in the project area ranging from upland forests to grasslands and marshes supports many varieties of birds. The project provides the opportunity to observe 230 bird species. These include 51 permanent residents, 25 winter residents, 65 summer residents and 89 migratory species. Although 33 of these species are considered game birds, dove and quail, supported by fairly good populations, are the most widely hunted.

The Green River Watershed is on the eastern most edge of the Mississippi Flyway. A small population of wood ducks commonly nest in the area; however, most of the waterfowl species are associated with fair sized wintering and migrating flocks. Waterfowl hunting is limited, with mallards comprising the majority of the take.

Forty-nine mammal species have their geographic ranges and habitat requirements met within the project area. The list includes five game species such as the cottontail rabbit, fox and gray squirrels, woodchuck, and whitetail deer. Also included are a number of furbearers and aquatic furbearers; however, their habitat is limited because of the steep banks surrounding the lake.

The fishery resource is typical of most large Kentucky impoundments, though some others are more productive. Much of the lake suffers from lack of suitable cover for fish. Banks sides are sheer bedrock which drop rapidly to the bottom. The fishes most sought by lake anglers include bass, catfish, crappie, and panfish.

There is one state park on Green River Lake operated by the Commonwealth of Kentucky. The park has a state wildlife management area associated with it that is administered by The Kentucky Department of Fish and Wildlife Resources.

The vegetation in the Green River basin can be broadly classified into four, general categories according to site. The four types are: bottomland, slopes, upland, and open lands. A listing of species associated with each type are shown below.

A. Bottom Land. This broad type includes streambank thickets, flood plain forests, and marshes. Species include:

Salix nigra	Black willow
Acer negundo	Box elder
Acer saccharinum	Silver maple
Platanus occidentialis	Sycamore
Liquidamber stvraciflua	Sweetgum
Betulnigra	River birch
Juglans nigra	Black walnut
Gleditsia tricanthos	Honey locust

B. Slopes. This type consists of species which favor sites of lower slopes. Species include:

Fagus grandiflora	Beech
Liriodendron tulipifera	Yellow poplar
Quercus alba	White oak
Acer saccharum	Sugar maple
Quercus rubra	Red Oak
Carya spp.	Hickories
Fraxinus Americana	White ash
Quercus velutina	Black oak
Nyssa sylvatica	Black gum
Acer rubrum	Red maple
Tilia Americana	Basswood

Aescular spp.	Buckeyes
Celtis occidentalis	Hackberry
Magnolia acuminata	Cucumbertree
Platanus occidentalis	Sycamore
Prunus serotina	Cherry

C. Upland. This type is found on the ridges, upper north slopes, and middle land upper south slopes. Species include:

Quercus prinus	Chestnut oak
Fagus grandiflora	Beech
Acer saccharum	Sugar maple
Liriodendron tulipifera	Yellow popular
Acer rubrum	Red maple
Fraxinus americana	White ash
Nyssa sylvatica	Black gum

D. Open Lands. These lands, which consists of areas which have virtually no tree growth, are either old pasture, cropland, or residence sites. The land is generally vegetated with various weed species. In some areas, the eastern Red Cedar (*Juniperus virginiana*) has become fairly well established.

ENVIRONMENTAL IMPACTS

General Description/Land Use

Just as with the current operation, the initiation of maximum release following a flood event is based on guidance intended to reduce the potential for releasing stored floodwaters during periods when this release would be inappropriate. The maximum release, though higher, would be initiated and/or reduced according to the existing guidance. Therefore, a higher maximum release during the non-crop season has no significant impact on downstream crest reductions. The proposed change in minimum release from 300 to 1000 cfs, could result in minor differences in downstream reductions if the higher rate was initiated at the onset of the flood control operation. But, since the proposed modified release schedule provides for a minimum flood control release of 300 cfs during periods when the allowable release station and the first flood control station (Munfordville) dictate, the maximum benefit afforded by the project has been achieved prior to the increase in minimum release. Therefore, no loss of flood control benefit is attributed to the increase.

Pasture, hayfields and forests dominate downstream land use. The only potential adverse effect would be during crop season. Since crop season release rates will remain the same, there is no difference in crests experienced during the crop season.

Climate/Air Quality

The only air quality impact associated with the reregulation of Green River Lake would be a positive, very localized impact. Odors, primarily hydrogen sulfide, would be reduced or eliminated at the tailwater of the dam during Fall releases as these will not occur until after destratification. .

Cultural Resources

The reregulation of Green River Lake will have no adverse impact to cultural resources. Although there is a change to the current operation, it reasonably approaches the current level.

Environmental Justice

Pellyton is located approximately 5 miles upstream from the project area and, therefore, will not be affected by the reregulation of Green River Lake. No loss of flood protection or water supply anywhere in the basin will result from the proposed action.

Recreation

The proposed modified filling schedule (possibly beyond a dependable source of inflow) shows some potential for adverse impact on attainment of summer pool level. The current operation defines the filling curve as mid-March through mid April. In reality, no adverse impacts are associated with non-attainment of summer pool until Memorial Day. Though the current plan provides for slightly higher ideal summer pool utilization, the proposed plan reasonably approaches the current level. Additionally, the proposed plan produces over a 40 percent increase in ideal recreation levels in October from the current level.

Physiography, Geology and Soils

The plan only slightly modifies pool levels, release and fill dates within the Green River Lake project area, therefore, no adverse impacts associated with the physiography, geology or soils are expected. Likewise, downstream effects to physiography, geology, and soils are minimal even if identifiable.

Farmland: Prime & Unique

Prime farmland does exist in the Green River Lake area. However, there is none adjacent to the lake itself. No downstream lands will be affected as maximum releases are during non-crop season. Therefore, no adverse impacts to prime farmland are expected.

Most all low-lying property has been removed from crop production other than hay. Maximum releases will occur during non-crop seasons and are not expected to impact agricultural uses on the land.

Threatened & Endangered Species

No adverse impacts to threatened or endangered species are expected from this action. In fact, by restoring the more natural hydrologic variability in flow and temperature of the Green River downstream of the lake, the ecosystem functions along with rare plants, animals, and communities that are indigenous to the area are expected to recover.

Waste: Hazardous or Solid

No hazardous or solid wastes will be generated by this proposal. No sites will be impacted by the changes in lake reregulation.

Water Quality: Drinking and Ground

The proposed plan would defer the primary Fall drawdown until the lake has destratified. This would result in a significant benefit in the quality of release waters. Preliminary analysis indicates that a delayed filling and higher winter pool provides an improvement in overall lake water quality, but little advancement in the capability of the project to meet downstream Spring temperature objectives. The reservoir tends to respond much slower to increasing temperatures in the Spring than does the uncontrolled runoff area downstream. Often there is inadequate warm water in the project to meet May and June outflow temperature objectives. The current plan has a limited multilevel release capability and precludes meeting a downstream temperature objective about 45 percent of the time in May and 34 percent in June. The proposed multilevel release capability could improve the situation. The increase to 1000 cfs would permit multilevel control of about 80 percent of the May-June releases. The thermodynamics of the reservoir pool would still limit the capability to dependably meet Spring release temperature targets.

The proposed plan also provides a more dependable source of water supply as the quantity available at winter pool is increased.

Wetlands

The modification changes the filling and release schedules of the Green River Lake, along with an increase in winter pool elevation. These changes will have no adverse impact to surrounding wetlands, either on project lands or downstream of the lake.

Wild & Scenic Rivers

The changes in lake regulation will more closely mimic pre-impoundment conditions. This will restore natural flow and temperature conditions within that portion designated by the Commonwealth of Kentucky as a wild and scenic river.

Wildlife & Vegetation

The intention of the proposed plan is to restore the natural hydrologic variability in flow and temperature in the Green River Bioreserve Area. The restoration of a more natural hydrologic variability in flow and temperature of the Green River will restore ecosystem functions and rare plants, animals, and communities that are dependent on the same.

COMPLIANCE WITH OTHER ENVIRONMENTAL REQUIREMENTS

National Environmental Policy Act (NEPA). It has been determined that a Finding of No Significant Impact (FONSI) will satisfy the requirements of NEPA.

National Pollutant Discharge Elimination System (NPDES) A NPDES permit (storm water) will not be required for this action.

Farmland Protection Policy Act (FPPA)

This act directs Federal agencies to identify and take into account the adverse effects of their programs on the preservation of farmland. The most significant change to the proposed release rates will be during the non-crop season. Therefore, the proposed plan will have no significant effect on farmlands.

Floodplain Management (E.O. 11988)

Although the proposed plan is within a floodplain, no adverse impacts to the floodplain or flood stages will result from the proposed action.

PUBLIC INVOLVEMENT AND COORDINATION

Appendix A contains a list of all Federal, state, and local agencies, public officials, local libraries, and interested individuals that were advised of the project by public notice, and solicited for comments and concerns.

DETERMINATION AND CONCLUSION

I have reviewed and evaluated, in light of the overall public interest, the documents and factors concerning this EA and proposed reregulation of Green River Lake as well as the stated views of other interested agencies and the concerned public. In doing so, I have considered the possible consequences of the proposed project in accordance with regulations published in 33 CFR Parts 230 (Corps of Engineers Regulations) and 40 CFR 1500-1508 (Council for Environmental Quality Regulations). The following paragraphs provide my conclusion and how the action complies with the above-cited regulations.

I believe that the proposed project is environmentally sustainable. I believe that this reregulation will not result in any significant impact to the environment. I believe that this proposed action does not constitute a major federal action that would result in any

irretrievable or irreversible losses to aquatic or terrestrial resources. Additionally, it would not significantly affect the quality of the human environment. This constitutes a Finding Of No Significant Impact (FONSI). As a consequence, I find that an Environmental Impact Statement is not required by the provision of Section 102 of the National Environmental Policy Act Public Law 91-190, or 42 USC 4332, or by the applicable implementing Corps of Engineers regulations and guidance. This FONSI was prepared in accordance with 33 CFR 230 and 40 CFR 1500-1508.

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Date

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