

DRAFT LAND PROTECTION PLAN AND ENVIRONMENTAL
ASSESSMENT FOR

**GREEN RIVER
NATIONAL WILDLIFE REFUGE AND CONSERVATION
PARTNERSHIP AREA**

Henderson County, Kentucky



Southeast Region



Green River National Wildlife Refuge

Draft Land Protection Plan and Environmental Assessment



U.S. Department of the Interior
Fish and Wildlife Service
Southeast Region

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DRAFT LAND PROTECTION PLAN

I. INTRODUCTION AND PURPOSE

The U.S. Fish and Wildlife Service (Service) proposes to restore and manage a valuable wetland complex for the benefit of migratory birds and threatened and endangered species in Henderson County, Kentucky, through the establishment of Green River National Wildlife Refuge (NWR). The land being proposed for protection includes a diverse system of bottomland hardwood forests, wetlands, uplands, and agricultural lands. The area has been considered ecologically important since 1958, when the Service first identified this area as an acquisition priority for waterfowl conservation. In 1978, the Service again recognized the area as important to waterfowl in the "Bottomland Hardwood Preservation Program" document (USFWS 1978). In addition, the New Madrid Wetlands project document of the North American Waterfowl Management Plan (NAWMP) identified the area as a high priority site for waterfowl in 1989 (NAWMP 1086). The site of interest is adjacent to and will augment three separate state agency ownerships: Kentucky Division of Forestry (Green River State Forest), Kentucky Department of Parks (John James Audubon State Park) and Kentucky Department of Fish and Wildlife Resources (KDFWR) (subunits of the Sloughs Wildlife Management Area (WMA)) (Figure 1). There are multiple NWRs and other protected lands surrounding the site of interest as well (Figure 2).

This Draft Land Protection Plan and Environmental Assessment (Draft LPP/EA) identifies the proposed establishment of Green River NWR, as outlined in the Service's Proposed Action (Alternative B). The purposes of this Draft LPP/EA are to:

- Announce the Service's intent to establish the proposed refuge;
- Inform landowners about the Service's long-standing policy of only acquiring land from willing sellers (it is the Service's policy to work with willing sellers to acquire fee-title or less-than-fee-title interest in property);
- Provide landowners and the public with an outline of Service policies, priorities, and protection methods for property in the project area; and
- Assist landowners in determining whether their properties are located within the proposed project.

This Draft LPP/EA presents the methods the Service, conservation partners, and interested landowners could use to accomplish wildlife and habitat goals and objectives for the proposed refuge.

A Conservation Partnership Area (CPA) is a specified area in which the Service would have the authority to acquire property from willing landowners for a proposed refuge, but is limited to an acquisition cap smaller than the CPA itself. The CPA acreage was determined based on several factors and experience from other projects. A larger project area (CPA) is required in order for the overall acreage objective to be achievable. All lands will not be for sale in a defined area. Lands with residences, complex infrastructure, etc. or lands that result in undue complexity will not be purchased. The larger CPA gives the Service the ability to meet the project's target acreage of 24,000 acres. It also provides an enhanced ability to diversify habitats, increase habitat connectivity, diversify and support public uses at a higher level, and provide a critical buffer for refuge wildlife resources during major flood events. Once approved, the CPA is an authorized area in which lands may be acquired by the Service from willing-sellers. Once the project target of 24,000 acres is achieved, land

acquisition efforts will end and the CPA will no longer be in effect. Any future refuge expansion beyond the 24,000 acres, including donations, would require additional Service approval in accordance to the Service's expansion policies (341 FW 1-3).

The Service would be limited to acquiring property within the CPA, but would have the ability to adjust specific parcel acquisition to respond to changing landowner interest, conditions, and opportunities. In the approximate 53,000-acre CPA, the Service would seek to acquire approximately 24,000 acres in fee-title interest or less-than-fee-title interest (conservation easements and/or leases) for the proposed Green River NWR (Figure 3).

The CPA boundary identified along with the associated LPP/EA are draft documents until all public comments have been received, evaluated and incorporated. If specific comments are received regarding the CPA boundary, changes will be incorporated as appropriate.

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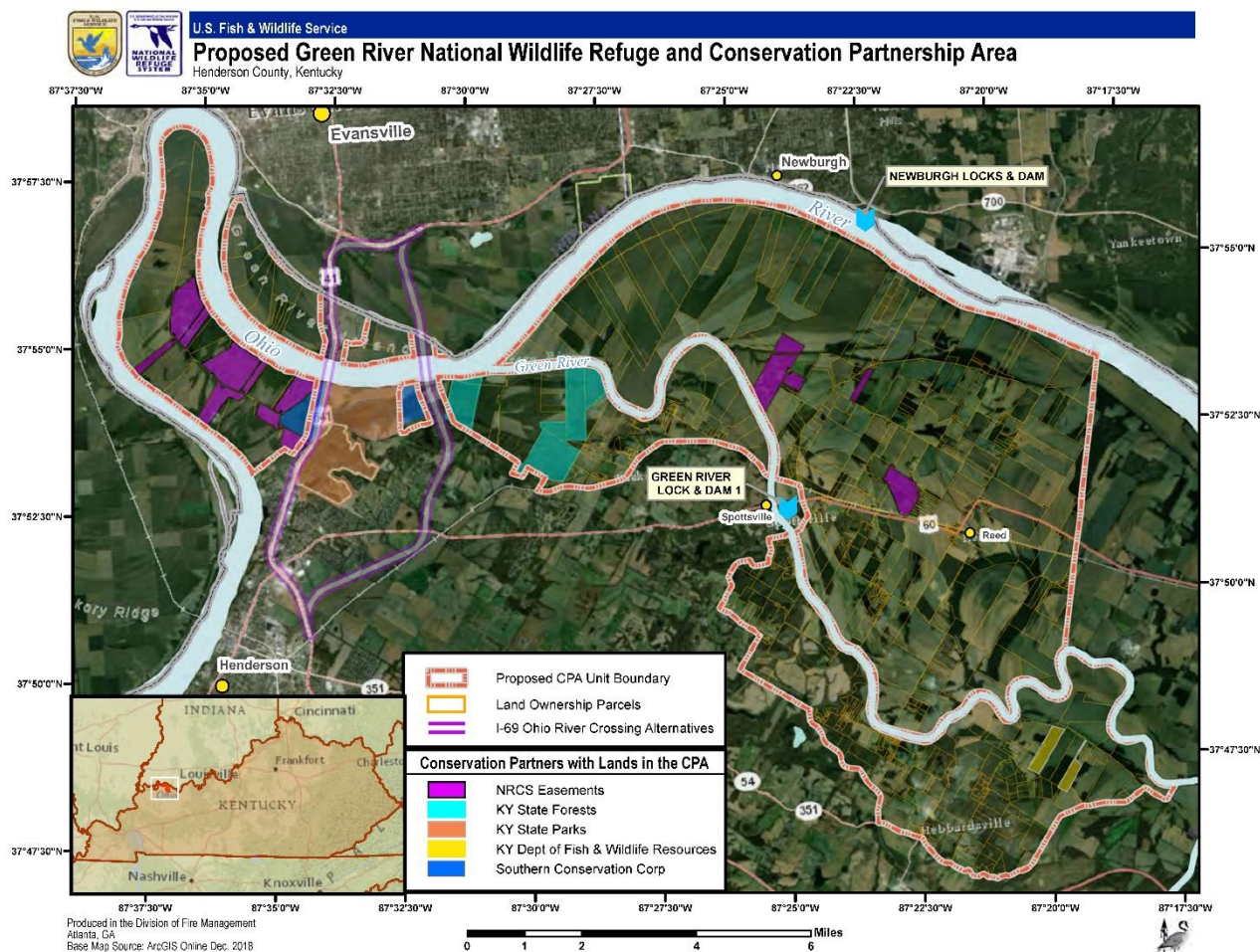


Figure 2. Location of the Proposed Green River NWR and Protected Lands near Henderson County, Kentucky.

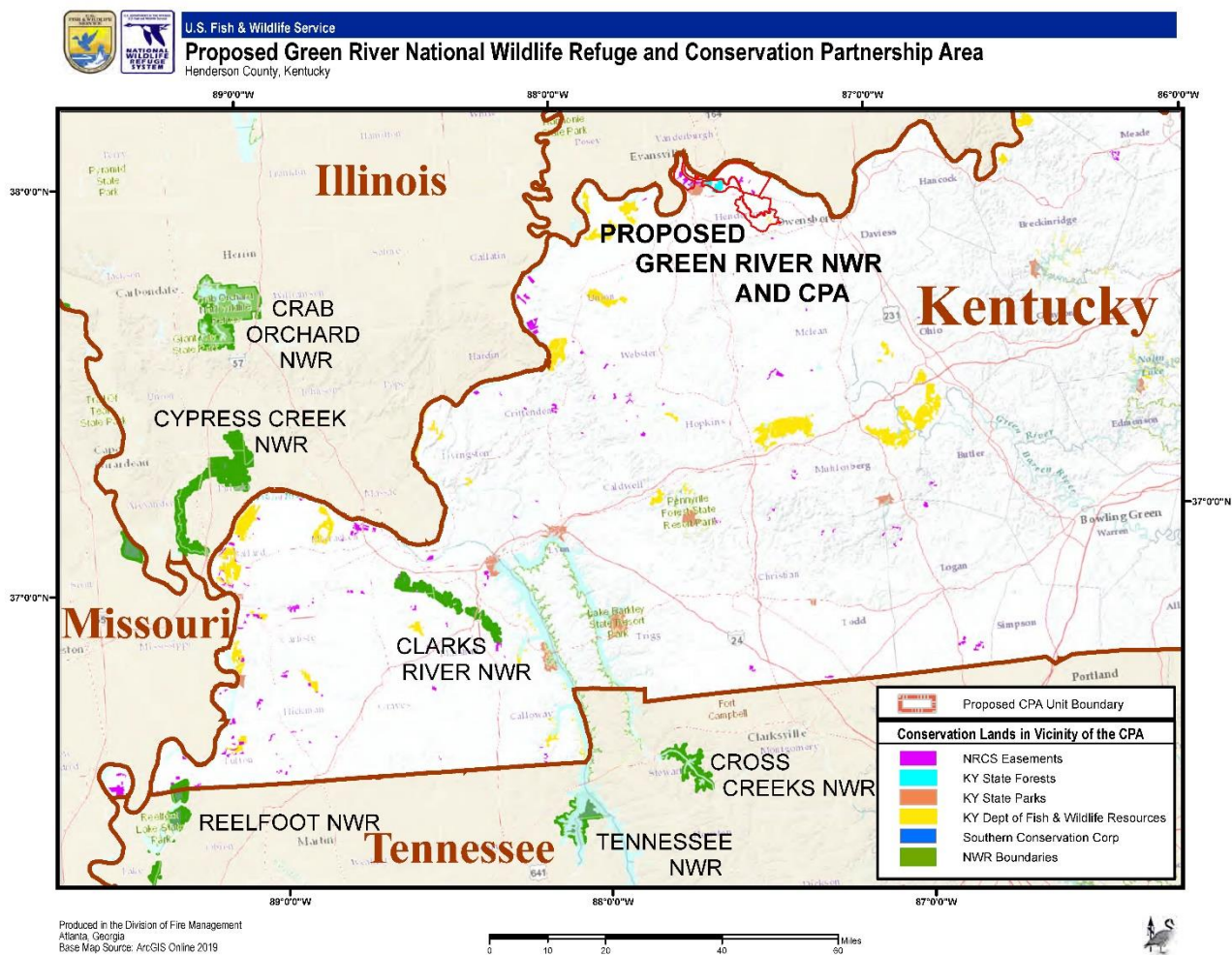
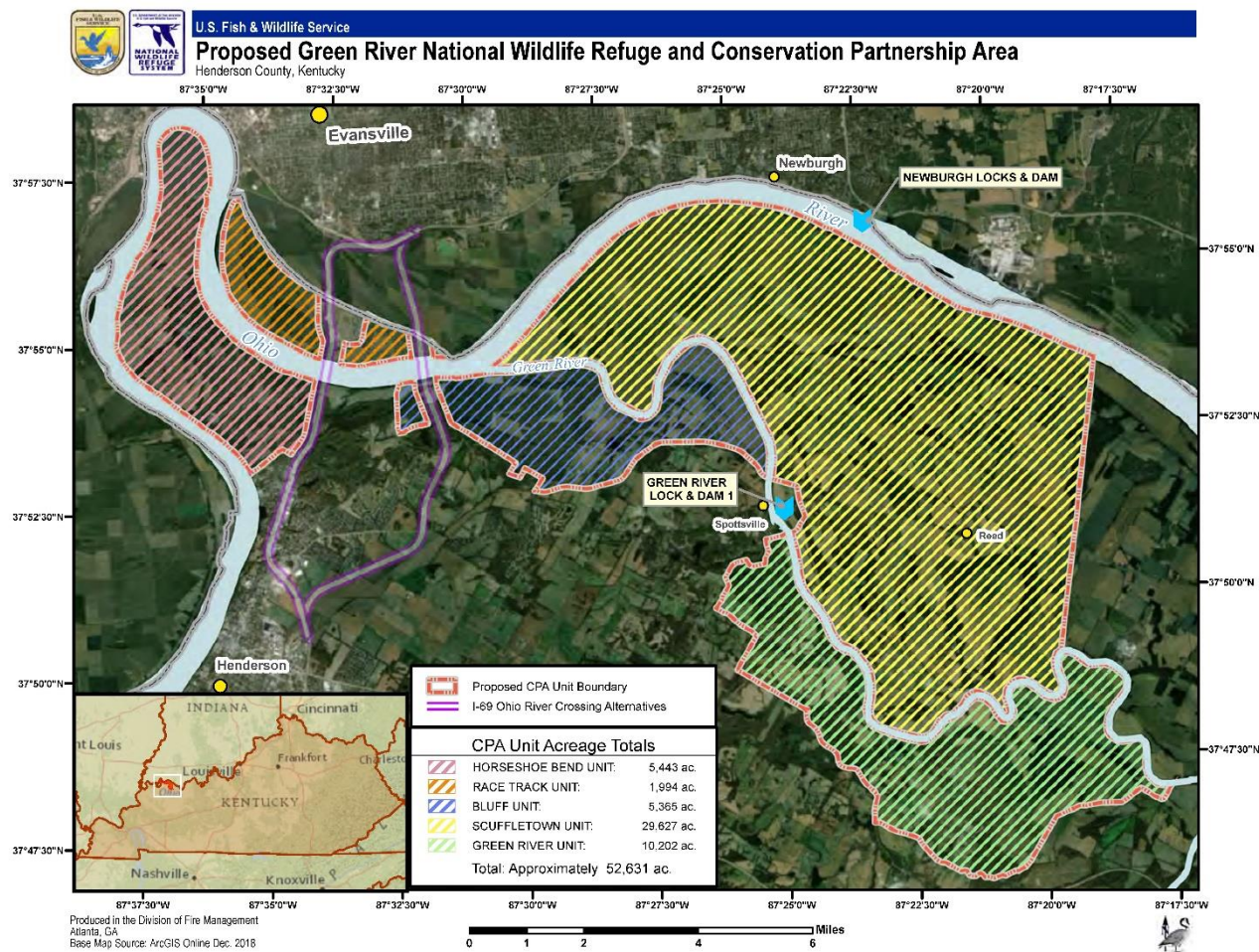


Figure 3. Proposed Conservation Partnership Area and Green River National Wildlife Refuge Units, Henderson, Kentucky.



One of the objectives of establishing a refuge is to contribute to a more connected and functional conservation landscape that will provide effective habitat connections between existing and future conservation areas. Identification of land parcels in this Draft LPP/EA does not preclude the acquisition of those parcels by other agencies, organizations, or individuals in their efforts to develop connections between existing or future conservation areas. This proposal also does not affect ownership or management of current conservation lands in the surrounding area.

The scope of this Draft LPP/EA is limited to the proposed acquisition of lands, in fee-title and less-than-fee-title, within the CPA. The Draft LPP/EA is not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. A conceptual management plan and interim compatibility determinations would guide management and public use on newly established refuge lands and conservation easements until a comprehensive conservation plan (CCP) and compatibility determinations are developed (Appendix B). Other uses will be considered and must be determined appropriate and compatible to the purposes of the refuge before being allowed.

PROJECT DESCRIPTION

The Service proposes to establish a CPA of approximately 53,000 acres to protect and manage approximately 24,000 acres along the Green and Ohio rivers (Figure 3). The proposed 24,000-acre Green River NWR would consist of five units with the majority of the lands lying on the south side of the Ohio River in Henderson County, Kentucky. The Scuffletown Unit (29,627 acres) and the Horseshoe Bend Unit (5,443 acres) lie along the south bank of the Ohio River and are separated by U.S. Highway 41. The Race Track Unit (1,994 acres) is located both east and west of Highway 41 and along the north bank of the Ohio River. The Bluff Unit (5,365 acres) is bordered by the John J. Audubon State Park on the west, the Green River on the north and east and a CSX railway on the south. The Green River Unit (10,202 acres) lies south and east of Spottsville, Kentucky and is bordered by the Green River on the north and east. The Service is working in cooperation with the Indiana Department of Transportation (INDOT), the Kentucky Transportation Cabinet (KYTC), and with Federal Highway Administration (FHWA) for the proposed I-69 Ohio River Crossing (ORX). As part of the coordination, the Service agreed to exclude two 2000-foot wide right-of-ways (ROWs) from the proposed Green River NWR CPA although the final I-69 ORX ROW will likely be less than 800' wide upon completion (See Figure 3).

REFUGE PURPOSE(S)

Refuge lands can be acquired under various legislative and administrative authorities for specified purposes. Establishment of the proposed Green River NWR could be authorized by the Migratory Bird Treaty Act of 1918, National Wildlife Refuge System Improvement Act, Endangered Species Act, Emergency Wetlands Resources Act, and/or Fish and Wildlife Act. The purposes of a refuge are derived from legislative authorities that established the refuge and would contribute to the mission and goals of the National Wildlife Refuge System (Refuge System) by:

- Establishing a second national wildlife refuge in Kentucky to support conservation of fish, wildlife, and plants;
- Protecting and managing wetlands and bottomland forest habitats to support waterfowl, migratory birds, and threatened and endangered species;
- Providing high-quality hunting and sport fishing opportunities;
- Providing opportunities for public use and environmental education and interpretation;

- Collaborating with partners to protect and enhance biodiversity and water quality and quantity within the Ohio River and Green River watersheds, benefiting both humans and wildlife; and
- Ensuring healthy wildlife populations for the benefit of Kentuckians and all Americans.

Four overarching goals were developed for the proposed Green River NWR, as follows:

Goal 1. Protect, Restore, and Manage Habitats for Fish and Wildlife. The proposed Green River NWR would restore, manage, and conserve bottomland hardwoods, adjacent upland habitats, and plant and animal species associated with these communities. The proposed refuge would contribute to the habitat goals presented in the North American Waterfowl Management Plan (NAWMP), various threatened and endangered recovery plans, and Kentucky's State Wildlife Action Plan.

Goal 2. Provide Landscape-Level Conservation. The proposed Green River NWR would contribute to a more connected and functional conservation landscape targeted by the Southeast Adaptation Conservation Strategy (SECAS) partners by reducing habitat fragmentation and protecting and restoring a network of rare and declining wetland types and their surrounding landscapes. The proposed refuge would also protect and enhance water quality and quantity in localized portions of the Ohio River and Green River watersheds, benefiting both humans and wildlife.

Goal 3. Connect People with Nature. Visitors would have access to the proposed Green River NWR in order to enjoy and take advantage of opportunities for compatible hunting, fishing, wildlife observation, photography, and environmental education and interpretation.

Goal 4. Promote Conservation Partnerships. The proposed Green River NWR would increase opportunities for collaboration and partnerships in science, education, and research with conservation organizations, private landowners, government agencies, and others. These collaborative efforts will help inform land management decisions on the proposed refuge and encourage continued responsible stewardship of the refuge and its natural resources.

Additional Goal detail is provided in the draft Conceptual Management Plan for the proposed Green River NWR (Appendix A).

II. RESOURCES

RESOURCES TO BE PROTECTED

This section describes the environment that would be affected by the implementation of the No Action Alternative or the Proposed Alternative. It is organized under the following four major topics: physical resources (i.e., topography, soils, climate, and air and water quality), biological resources (i.e., habitats and fish and wildlife species), cultural resources, and socioeconomic conditions.

The CPA lies in the Interior River Lowland Ecoregion. For the purposes of this Draft EA, we limited the affected environment to the portion of the Ecoregion that contains Henderson County, Kentucky. This CPA is the area within which we analyzed the potential environmental consequences of the No Action Alternative and Proposed Alternative, further detailed in Chapter IV of this Draft EA. The CPA occupies approximately 53,000 acres in western Kentucky. Figure 1 and 2 (above) shows this area relative to other major landmarks.

The proposed Green River NWR area is part of the [Southeast Conservation Adaptation Strategy](#) (SECAS). SECAS developed the Southeast Blueprint which stitches together smaller sub-regional plans into an integrated map of conservation priorities across the region. The Blueprint is helping coordinate the efforts of federal, state, non-profit, and private organizations by identifying opportunities for shared conservation action. Almost 50% of the proposed Green River NWR CPA is prioritized in Version 3.0 of the [Southeast Blueprint](#). About 18% of the CPA is rated as high priority, and approximately 28% is rated as medium priority (Figure 4) for protection.

PHYSICAL ENVIRONMENT

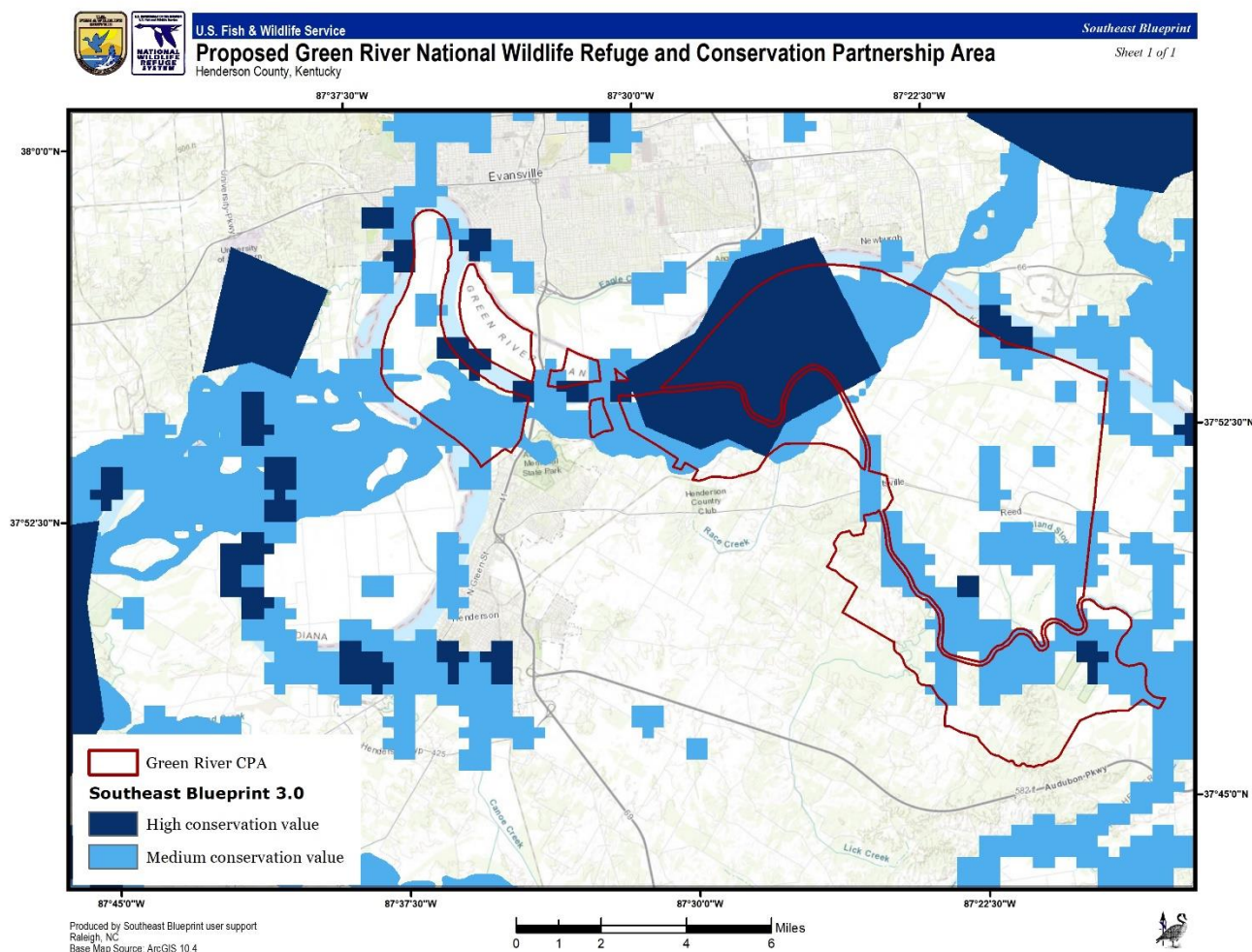
TOPOGRAPHY AND GEOLOGY

Henderson County is located in the southern region of Kentucky bordered to the north by the Ohio River. The county is a rolling to hilly area, well dissected by normal stream erosion (McGrain and Currens, 1978). Elevations range from 331 to 588 feet. Major drainage basins are Canoe Creek, Green River, and the Ohio River. The Ohio River's broad floodplain along the river has elevations of 350 to 370 feet with sloughs, marshes, and flood scours. The normal pool level of the Ohio River, 331 feet, is the lowest elevation in the county. South of the floodplain the terrain is rolling. The highest elevations are found in the bluffs adjacent to the floodplain. The highest elevation in the county, 588 feet, is in Wolf Hills, northeast of the city of Henderson. This point is more than 200 feet above the adjacent floodplain. In the interior part of the county, ridgetop elevations are generally between 450 and 500 feet.

Alluvial deposits from rivers and streams occur throughout the Ohio River and Green River floodplains as well as within the valleys of most moderate to large streams within the project study area. In Kentucky, alluvium up to 135 feet thick covers the Lisman Formation and encompasses most of the City of Henderson as well as the stream valleys formed by Canoe Creek, Wilson Creek, Elam Ditch, North Fork, and Race Creek. The rolling hill areas of Posey, Vanderburgh, Warrick, and Henderson counties are covered with loess (windblown) deposits of silt, fine sand, and clay. In Henderson County, this layer is between 30 and 50 feet thick (Johnson, 1973).

About 87% of the Green River NWR area is comprised of underrepresented geophysical settings. Geophysical settings (a key component of [The Nature Conservancy's Resilient Lands Analysis](#)) are distinct combinations of soil type, elevation, and landforms that support different ecological

Figure 4. The Southeast Conservation Adaptation Strategy Blueprint 3.0 recognizing lands within the proposed Green River NWR CPA as conservation priorities across the region.



communities and species). These specific settings were identified by the Open Space Institute as disproportionately underrepresented in current protected lands. By targeting an area predominantly composed of these underrepresented settings, the proposed Green River NWR helps fill this conservation gap and further contributes to the climate resilience of the area (Figure 5).

Henderson County, Kentucky ranks number sixth and twenty-ninth in statewide oil and gas production, respectively. Fifty-eight oil wells are currently active in Henderson County. Over half of these are in the CPA. In addition, one coal mineshaft and two underground mines exist in the CPA. All three are currently inactive.

The Service does allow the extraction or development of minerals on National Wildlife Refuge System lands if there is a valid existing right to engage in such activities (612 FW 1). Oil and gas production on lands acquired by the Service where mineral interests have been severed from the estate will be

managed as a pre-existing operation. As the surface owner, the Service would manage these operations through development of an operational plan, compliance with NEPA, and the issuance of an operations/production Special Use Permit (SUP). Operations/Production Special SUP's are issued for up to 5 years, however a 2-5 year permit is most common. Permits issued for a period of more than 5 years must be approved by the regional office. Operations will continue in the same manner prior to Service ownership except with potentially greater oversight to ensure operations are environmentally compliant and do not detract from the purposes for which the refuge was established. Environmental concerns and operation actions will be coordinated through a process developed, agreed upon, and signed by all involved parties. Processes including SUPs related to oil and gas activities can be found in subpart C of 50 CFR part 29 (81 FR 79948) which governs the exercise of non-Federal oil and gas rights within refuges outside of Alaska).

Leasing of Federal oil and gas is only allowed if there is drainage of Federal oil and gas by adjacent development. The Bureau of Land Management (BLM) conducts the leasing in this situation, but it can only occur with the approval of the Secretary of the Interior, and with the Service's concurrence as to the time, place, and nature of those operations (see 43 CFR 3101.5-1) and (612 FW 1).

SOILS

There are seven soil associations in Henderson County, Kentucky: Huntington-Egam-Newark; Giant-Melvin; Uniontown-Dekoven-Henshaw; Loring-Grenada; Memphis-Wakeland; Loring-Zanesville-Wellston; and Markland-Sharkey-Newark (NRCS 1967). These soils range in drainage and texture. Drainage class refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Texture is defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter.

In general, the bottomland areas associated with the Ohio River and Green River in Henderson County, Kentucky, are typified by deep, level to nearly level, moderately well drained to poorly drained soils formed in alluvium (Figure 6). These soils are typically fine grained ranging from fine sandy loams to silty clay loams (Figure 7). These soil types previously supported native mixed hardwoods; however, the majority of the land has been cleared and converted to agricultural use with the exception of some of the poorly drained areas where sloughs are prevalent.

The upland areas selected within the CPA are predominantly deep, well drained, nearly level to strongly sloping soils formed primarily in loess with the underlying material consist typically of sandstone and shale (Figure 6). These medium textured soils typically have a silt loam surface layer (Figure 7). The loess covering the broad ridge tops, flats, and gently rolling hills is as much as 50 feet thick.

Drainage in Henderson County, Kentucky area is mostly toward the north and west. The Green River and other tributaries of the Ohio River carry runoff from about 80 percent of the county. The rest of the county drains directly into the Ohio River through small streams and ditches. The Green River flows along the eastern edge of the county and then cuts across the northeastern corner (NRCS 1967).

Two fault systems (Wabash Valley and Rough Creek) can affect Henderson County, KY. In addition to these two fault systems, the New Madrid Seismic Zone has caused earthquakes in the area within the last 200 years (Peterson 2014). During an earthquake, the alluvial soils within the floodplain of the Ohio River Valley could possibly liquefy. In the transition zone between the steeper-sloped uplands and the floodplain, a potential for landslides exist during earthquakes.

CLIMATE

Kentucky's central location in the eastern half of the United States, yet some distance from ocean bodies of water, results in a climate that is characterized by moderately large variations in temperature and abundant precipitation. Summers vary from warm to hot and humid, while winters are cool with occasional episodes of very cold Arctic air. Average daily high temperatures for July range from 86°F in the east to 90°F in the west, while average daily high temperatures for January range from 38°F in the north to 44°F in the south. Temperatures fall below 0°F for about three days per year in the north and one day in the south. Kentucky's elevation ranges from 400 feet above sea level along the Mississippi River in the west to more than 4,100 feet at the peak of Black Mountain in the southeast, although most of the state is below 1,000 feet above sea level. Average annual precipitation ranges from about 42 inches in the north to around 52 inches in the southern portion of the state. The wettest year on record is 2011 with 64 inches of precipitation while the driest year was 1930 with 29 inches. (NOAA, 2014)

Figure 5. The Nature Conservancy's Resilient Lands Analysis of underrepresented geophysical settings in the proposed Green River NWR CPA.

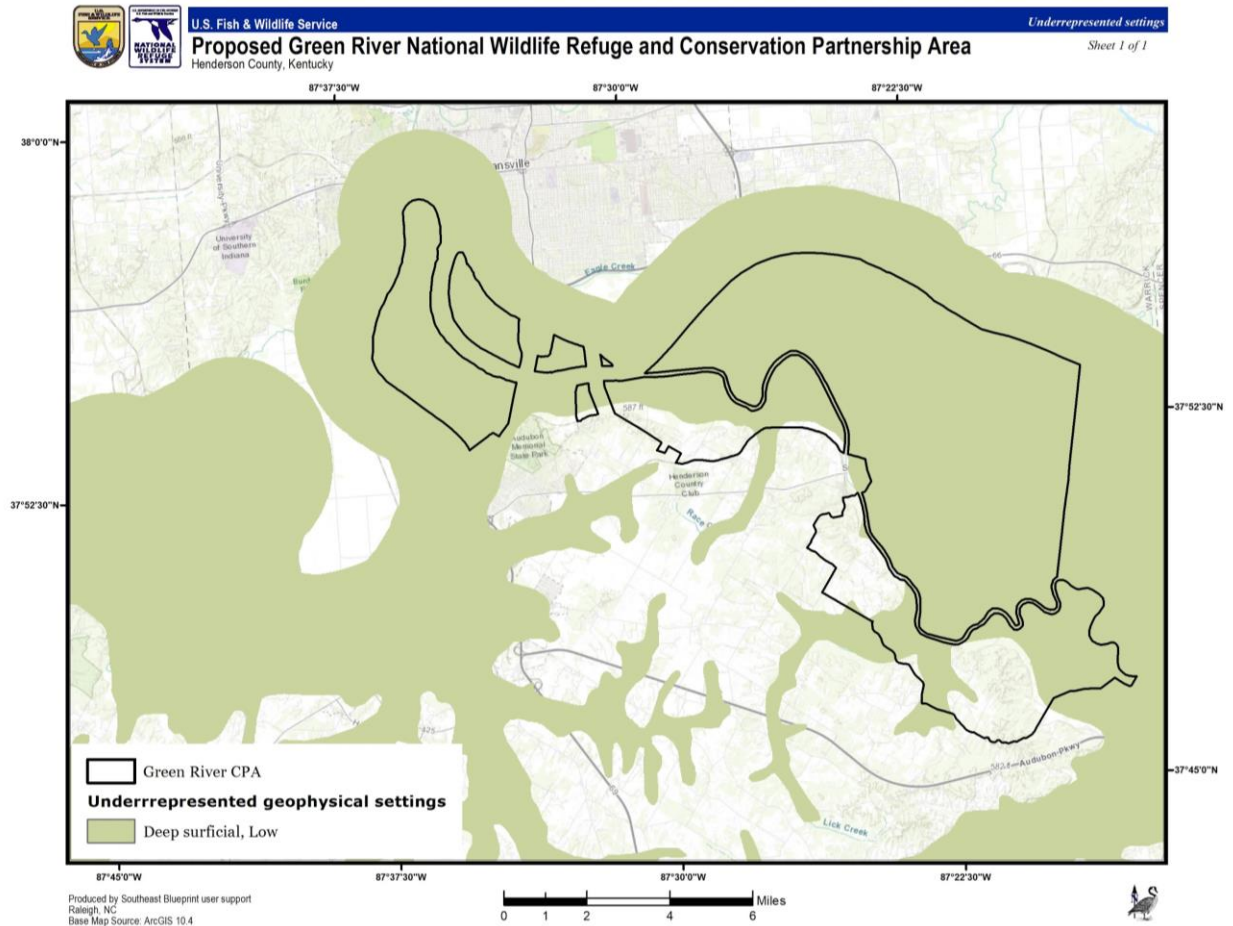


Figure 6. Drainage Classes of Soils in the proposed Green River National Wildlife Refuge Conservation Partnership Area.

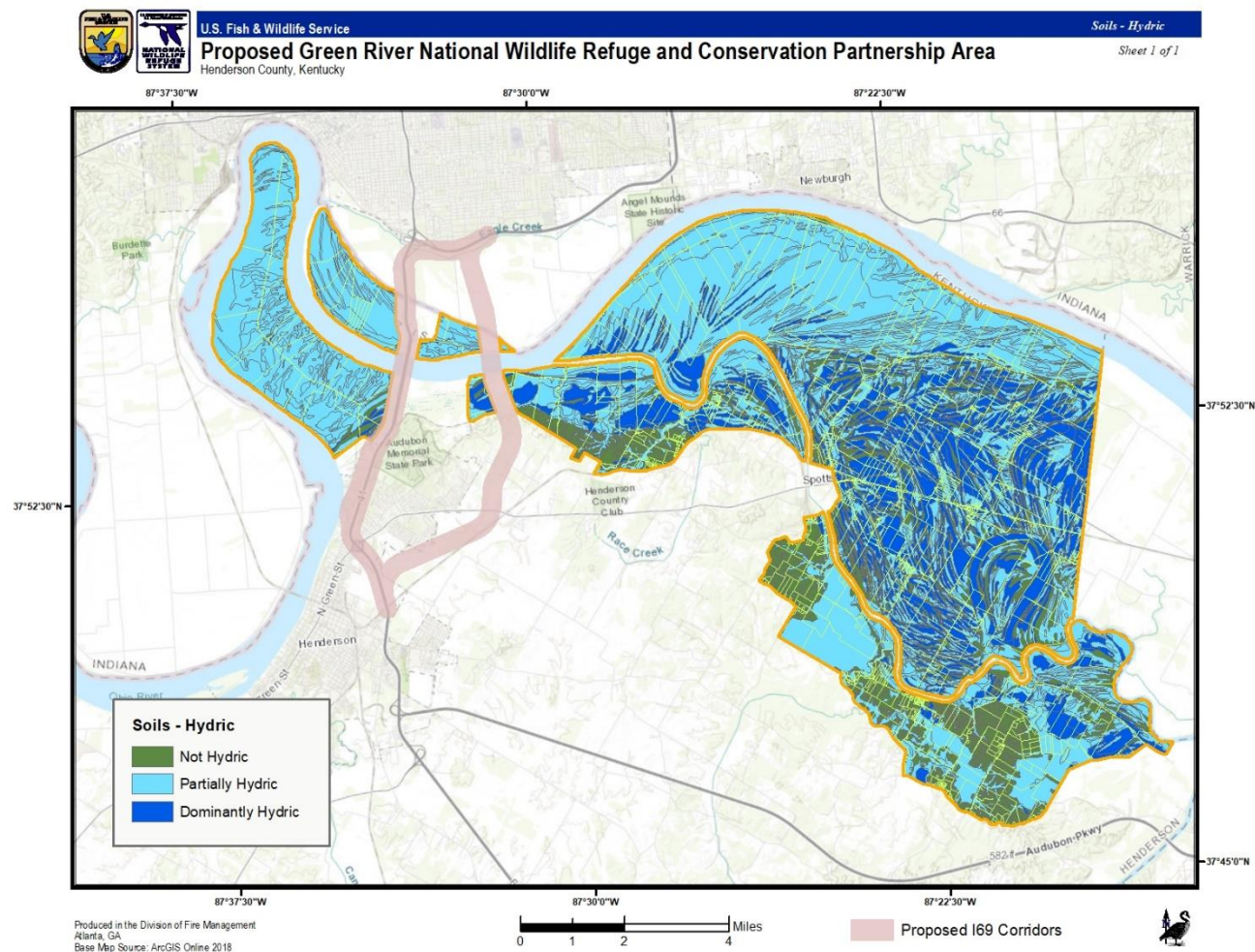
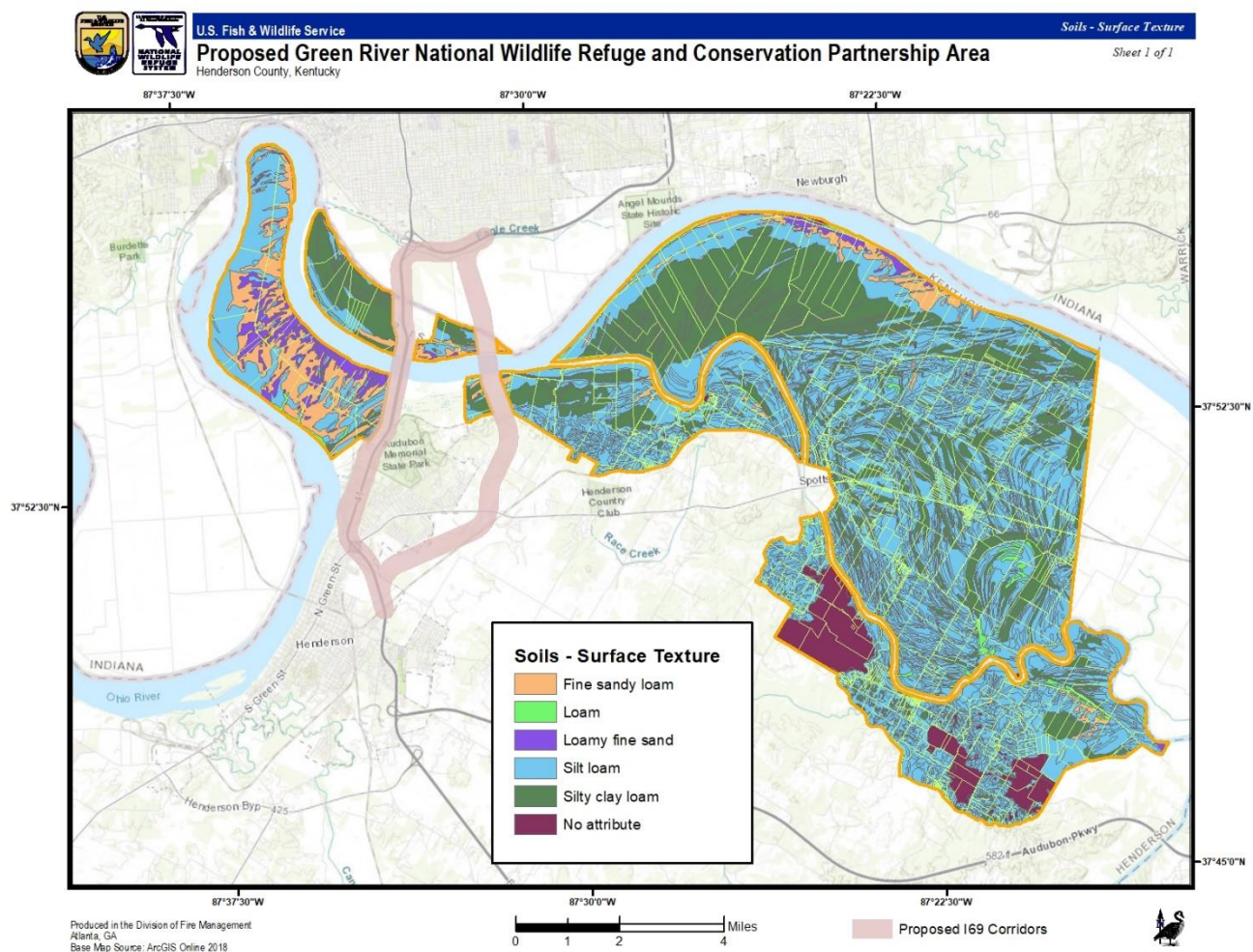


Figure 7. Texture Classes of Soils in the proposed Green River National Wildlife Refuge Conservation Partnership Area.



CLIMATE CHANGE

This proposal would contribute to the climate adaptation goals and objectives laid out in the Service's Strategic Plan for Responding to Accelerated Climate Change, "Rising to the Urgent Challenge" (USFWS 2009).

Despite the increasing robustness of global climate change models, most have yet to be stepped down to the regional or local scales necessary for a meaningful evaluation of impacts to specific landscapes or habitat types (Boyles 2009, USFWS 2008a). Across the southeastern United States, prevailing global climate models uniformly project increased maximum and average annual temperatures, but are less consistent in their projections relating to precipitation patterns (Karl et al. 2009). The US Environmental Protection Agency (2016) reported that:

"Although the average temperature did not change much during the 20th century, most of the commonwealth has warmed in the last 20 years. Average annual rainfall is increasing, and a rising percentage of that rain is falling on the four wettest days of the year. In the coming decades, the changing climate is likely to reduce crop yields and threaten some aquatic ecosystems. Floods may be more frequent, and droughts may be longer, which would increase the difficulty of meeting the competing demands for water in the Ohio, Tennessee, and Cumberland rivers."

The Green River site's current climate resilience for biodiversity is not exceptionally high, but the area around the proposed Green River NWR has significant potential to raise its resilience scores through restoration to improve connectivity (Figure 8). About 8 percent of the Green River CPA scores above average as a climate-resilient biodiversity hotspot based on [The Nature Conservancy's Resilient Lands analysis](#). This analysis identifies mostly natural, high-diversity areas that support high levels of biodiversity today, and are likely to continue to support biodiversity in the face of climate change. Another 42 percent of the Green River NWR area scores average on climate resilience, while the remaining 42 percent scores below average. Focusing land acquisition on areas with above average resilience would improve the climate resilience of the refuge.

Though the overall climate resilience of the Green River NWR area is not exceptionally high, the refuge scores more highly on landscape diversity (again, a product of [The Nature Conservancy's Resilient Lands analysis](#)) (Figure 9). About 25 percent of the Green River area scores above average on landscape diversity, while 40 percent scores average and 27 percent scores below average. Overall resilience is a product of both a site's landscape diversity and its local connectedness to other natural areas. This suggests that the area's resilience is being negatively

Figure 8. The Nature Conservancy's Overall Climate Resilient Lands Analysis in the proposed Green River National Wildlife Refuge Conservation Partnership Area.

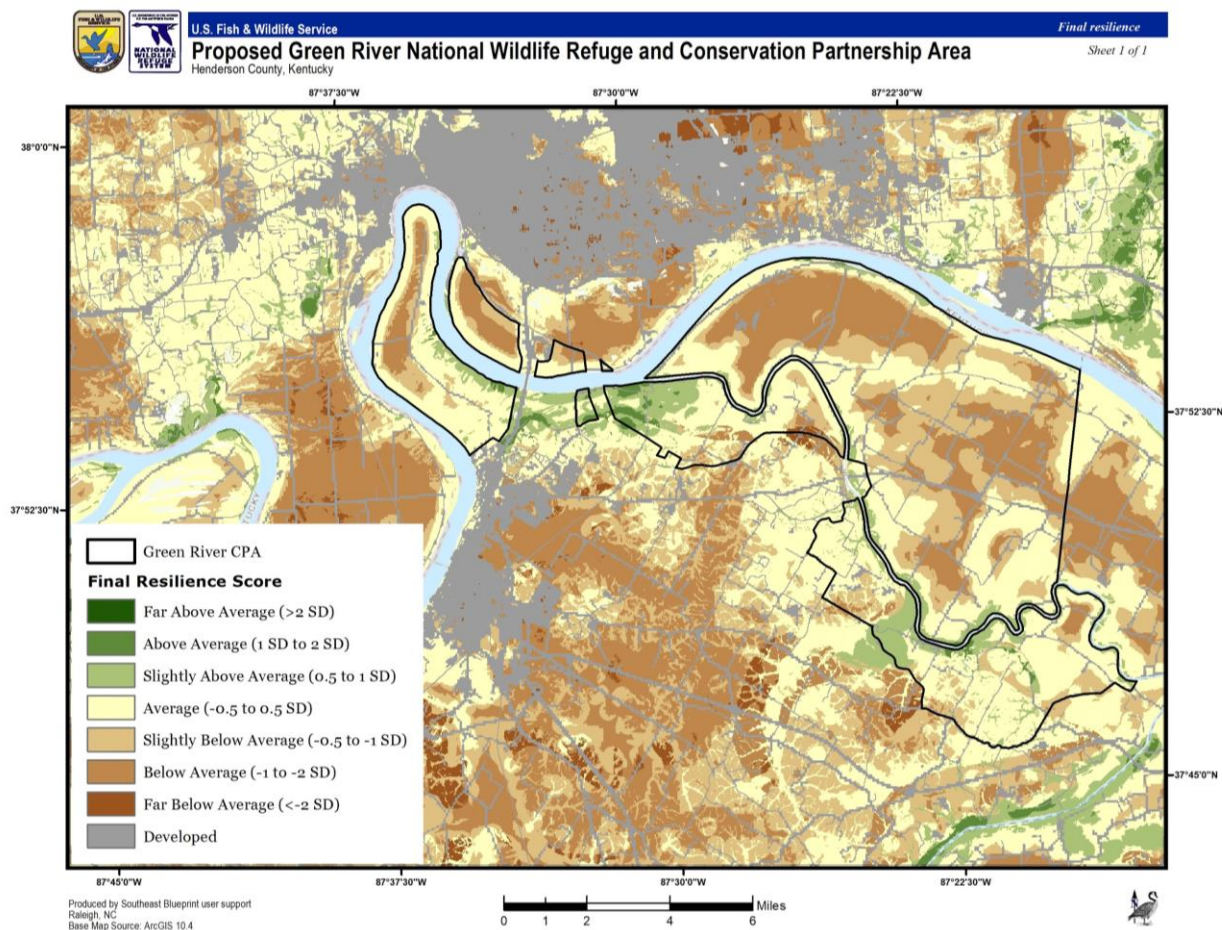
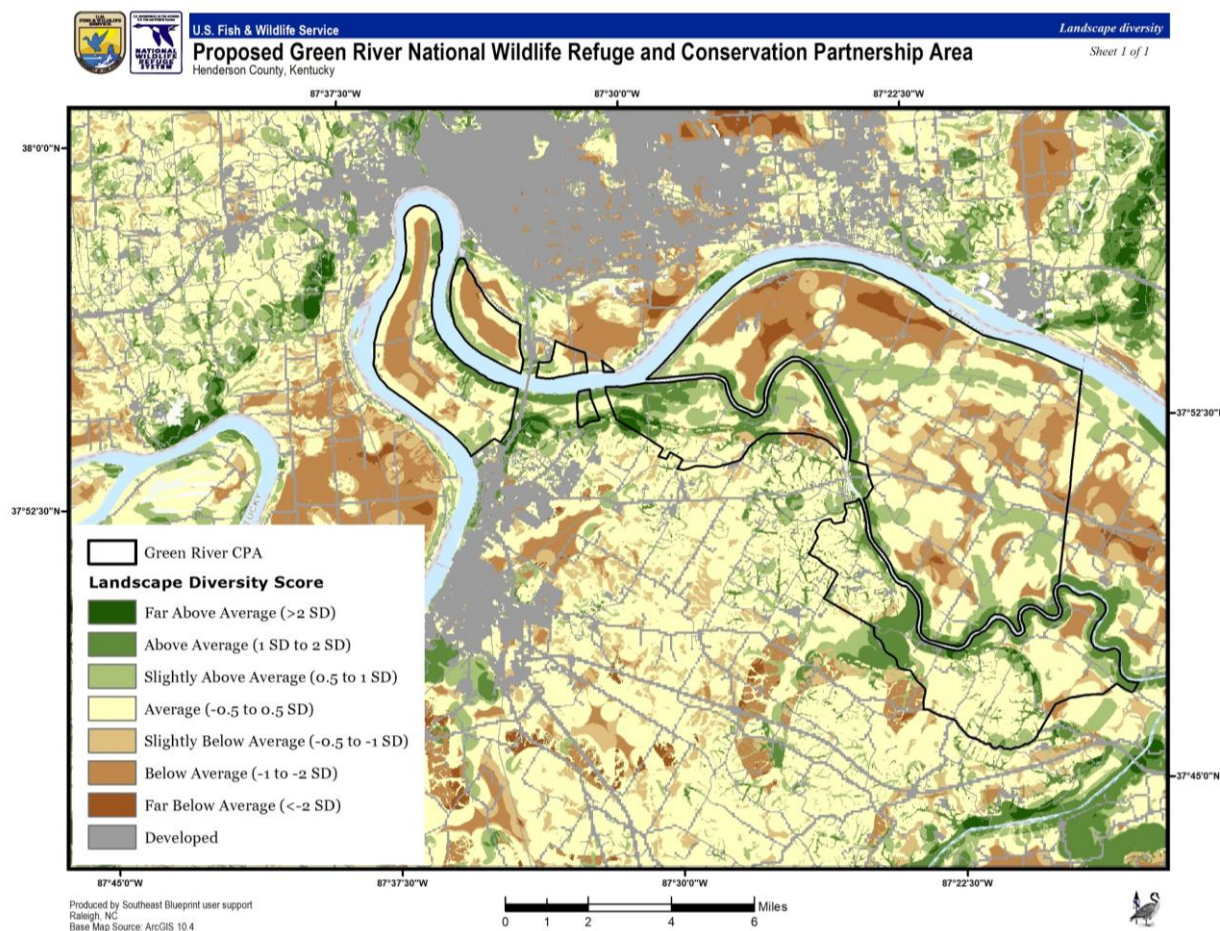


Figure 9. The Nature Conservancy's Landscape Diversity Analysis in the proposed Green River National Wildlife Refuge Conservation Partnership Area.



impacted by fragmentation, but much of it has the fundamental geophysical characteristics necessary to support high levels of biodiversity. While a site's baseline landscape diversity is fixed, connectedness can be influenced by management. Management and restoration of the proposed Green River CPA through the refuge would increase the climate resilience of the area by improving connectedness.

AIR QUALITY

The Clean Air Act of 1970 (as amended in 1990 and 1997), required the U.S. Environmental Protection Agency (EPA) to implement air quality standards to protect public health and welfare. National Ambient Air Quality Standards (NAAQS) were established based on protecting health (primary standards) and preventing environmental and property damage (secondary standards) (EPA 2011). Criteria air pollutants in Kentucky include carbon monoxide (CO), lead, nitrogen dioxide (NO₂), ozone (O₃), particulate pollution (PM: PM_{2.5} and PM₁₀ ug/m³), and sulfur dioxide (SO₂). Primary sources of air pollutants are emissions from vehicles, power plants, and industrial activities. These pollutants are monitored by a network of monitoring stations throughout each state and

analyzed in order to better understand general air quality trends and to locate exceedances. In Kentucky, emissions of sulfur dioxide (SO₂) continue a steep and steady decline. Since 1995, SO₂ emissions have been reduced more than 87 percent. Similarly, emissions of nitrogen oxides (NO_x) have declined significantly in recent years. Since the year 2000, NO_x emissions from Kentucky power plants have decreased more than 76 percent in 2016. The reduction of NO_x reduces the formation of harmful ground-level ozone that aggravates respiratory conditions such as asthma and bronchitis.

HYDROLOGY AND WATER QUANTITY

Hydrology

The Ohio River drains 203,910 square miles in all or portions of 14 states (Pennsylvania to Mississippi). The river traverses some 981 miles in a generally southwesterly direction from its beginning at the confluence of the Monongahela and Allegheny Rivers in Pittsburgh, Pennsylvania to the mouth near Cairo, Illinois where it flows into the Mississippi River. A series of 20 locks and dams constructed and operated by the U.S. Army Corps of Engineers are used to control the river elevations and maintain navigability of the entire 981-mile length. In addition to the series of locks and dams, dredging of the channel is also performed by the USACE to facilitate navigation.

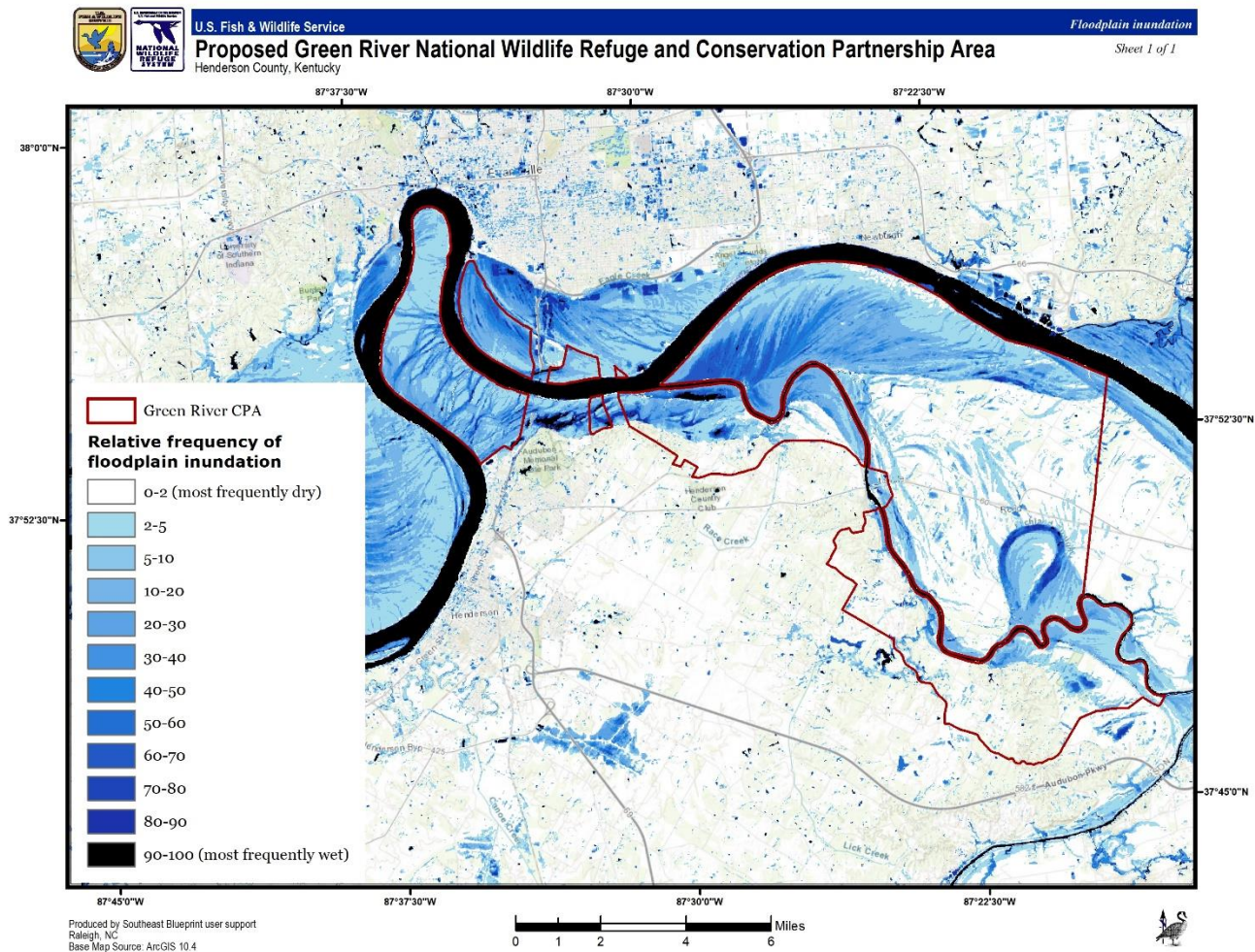
The Green River is a major tributary that flows into the Ohio River in the project study area at Ohio River Mile (RM) 784. The Green River drains a large portion of central Kentucky with a drainage area of 9,230 square miles extending into northern Tennessee. The Green River level is also controlled by a series of locks and dams. Lock and Dam Number 1 is within the project study area located just south of the US 60 crossing near Spottsville at Green RM 9.1. The primary area of study for this project is downstream of this dam where the pool level is controlled by the Ohio River. The pool elevation of the Green River in this location is also 342 feet above mean sea level.

According to a draft floodplain inundation analysis for the Southeast, the proposed Green River NWR CPA is located on an area of significant floodplain quantity and diversity for the Ohio River (<https://gcpolcc.databasin.org/datasets/0d0c5fb9d42f45d3a0a23872eda23543>) (Figure 10). Upstream on the Green River itself, due to a large amount of overbank flooding and cultivated croplands, the refuge is likely to experience nutrient loading impacts. Upstream management strategies may help mitigate this and improve the health of the Green River area's ecosystems.

WATER QUALITY

The Clean Water Act (CWA) of 1972 (as amended) authorizes the EPA, in partnership with the states, to regulate discharges of pollutants into the waters of the United States and set quality standards for surface waters. Since its implementation almost 40 years ago, the CWA has significantly improved water quality in the United States, primarily as a result of controlling municipal and industrial point-source pollution (Andreen 2004). Point source pollution includes specific discharges from a factory or sewage treatment plant. Non-point source pollution (NPSP) comes from many sources and typically makes its way into water bodies via surface runoff. It includes a range of materials, including fertilizers, oil, bacteria, road salt, sediment, and pesticides (EPA 2011). NPSP is currently the largest cause of water quality degradation in the United States.

Figure 10. The Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative Databasin analysis of floodplain inundation frequency in the proposed Green River NWR CPA.



Management of water resources has traditionally focused on two main components, surface water and groundwater. Nearly all surface-water features interact with groundwater. Surface-water bodies gain water and solutes from groundwater systems, and surface water is a source of groundwater recharge and can cause changes in groundwater quality (USGS 1998).

The Ohio River is formed by the confluence of the Allegheny and Monongahela rivers in Pittsburgh, Pennsylvania. From this point, the historic river flows 981 miles through hundreds of riverside communities toward its confluence with the Mississippi River near Cairo, Illinois. Six hundred and fifty-five miles of the river form Kentucky's northern border. According to a 2009 report from the Environment America Research & Policy Center, the Ohio River ranks number one in the country for toxic discharge pollution. While water quality continues to improve on the Ohio River, threats continue from stormwater runoff, agricultural runoff, mercury deposition from coal-fired plants,

industrial wastewater discharges, and millions of gallons of untreated sewage that flow into the river each year from sewer overflows.

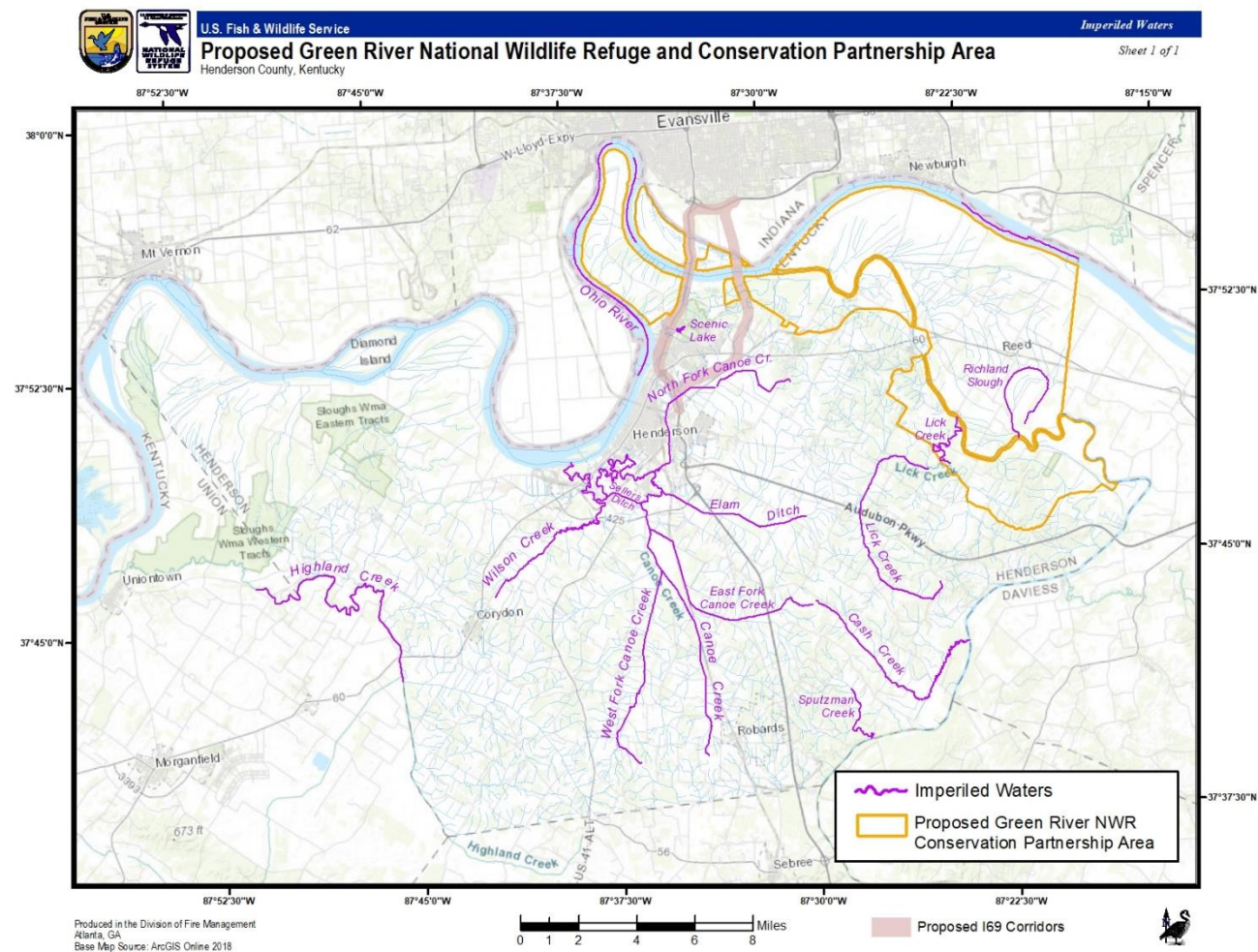
The Kentucky Waterways Alliance considers Green River the fourth most biologically diverse river system in the United States (<https://kwalliance.org/>). The Upper Green River Watershed is rated by the Nature Conservancy and the Natural Heritage Program as the fourth-most important watershed in the United States and the most important watershed in Kentucky to protect for fish and mussel species. It is the most biologically diverse river in the entire Ohio River ecosystem and hosts 71 mussel species and more than 150 fish species. In addition, there are 43 endemic species found in the Green River that are found nowhere else in the world. This watershed contains Mammoth Cave National Park, Kentucky's largest spring, Lost River Cave, Hidden River Cave, Cub Run Cave, and the only segments of the Green River deemed Wild River (26 miles) and Exceptional Waters (66 miles). The Ohio River could have a significant effect on the water quality within the Green River (Figure 11).

The primary threats to surface water quality in the area include siltation and nutrient loading from agricultural runoff, petroleum products and heavy metals from urban runoff, nutrients, Biochemical Oxygen Demand (BOD) and bacteria from municipal wastewater, and brine from oil and gas extraction. The large volume of agricultural land in the area generate significant portions of the total runoff discharge to surface waters providing an opportunity for erosion and fertilizer runoff to affect surface waters in the absence of conservation tillage, filter strips, and grassed waterways. The large urban areas of Evansville, Indiana and Henderson, Kentucky include high percentages of impervious surfaces such as roofs, parking lots, and roadways that increase the runoff rate and incorporate automobile contaminants such as oil, grease, and heavy metals as well as industrial pollutants in the runoff discharging to surface waters. Additionally, municipal sewage discharges from these large cities generate discharges to surface waters from both treated effluent discharges and untreated discharges from combined sewer overflows, which contain both nutrient loading and pathogenic organisms. Oil fields in the western portion of the area, both south and north of the Ohio River, present the opportunity for brine contamination from mineral extraction.

BIOLOGICAL ENVIRONMENT

The Interior River Lowland Ecoregion (Ecoregion) encompasses 93,200 square kilometers (km²) across southern and western Illinois, southwest Indiana, east-central Missouri, and fractions of northwest Kentucky and southeast Iowa. The ecoregion includes the confluence areas of the Mississippi, Missouri, Ohio, Illinois, and Wabash Rivers, and their tributaries. When water levels are above flood stage, large numbers of migratory waterfowl and wading birds can be observed using the bottoms located along the confluence of the Ohio and Green Rivers. An Indiana bat (federally endangered) maternity colony has been located within the project site and summer habitat conditions on some tracts appear suitable for this species. A diverse freshwater mussel assemblage typically occurs in this portion of the Ohio River, and includes the federally endangered fat pocketbook mussel, fanshell mussel, catspaw mussel, pink mucket, ring pink mussel, and sheepnose mussel.

Figure 11. Imperiled Waters listed by the Kentucky Division of Water (DOW), Department for Environmental Protection (DEP), which were found to partially support or not support one or more of its designated uses due to either a pollution or a pollutant (e.g. impaired waters) located in the in the proposed Green River National Wildlife Refuge Conservation Partnership Area.



VEGETATIVE COMMUNITIES

This section provides a broad overview of the vegetative communities across the CPA. For the purposes of this proposal, vegetative communities or ecological systems that will be used are defined in the National Land Cover Dataset (NLCD). The majority of the lands in the CPA are considered to be in "open" or undeveloped land uses and most parcels are in private ownership (Fry et al. 2011). Table 5 in the Green River NWP Draft LPP summarizes the general types of land cover contained in the CPA. In general, the land is a mix of agriculture, forest, and water/wetlands (Figure 12). Agricultural lands dominate the land cover type (over 73 percent), followed by forest and water/wetlands. All other land use classes each contribute less than 5 percent of the total cover.

Historically, this area was part of a large bottomland hardwood forest which had extensive oak, hickory, and native pecan components. Some portions of the proposed project site were converted to agricultural uses during the early portions of the century; however, the majority of the area was converted into active agricultural production during the late 1960's and early 1970's. This conversion was accomplished by extensive drainage of wetlands, alteration of interior drainage systems, and clearing of the bottomland hardwood forest.

Currently, the area consists of ridge and swale farmland, river-scar oxbows, several sloughs, wet depressional areas, and a small amount of bottomland hardwoods. Cypress Slough, on the south side of the Green River in the Scuffletown Unit, is a large natural wetland. A few scattered tracts of cut-over forest remain, consisting predominantly of silver maple, cottonwood, and hackberry, however over 90% of this area is in agricultural production. Downstream of the mouth of the Green River, approximately 1,200 acres of bottomland forest remain, consisting predominantly of cypress, willow, hackberry, silver maple, ash, and buttonbush.

The most commonly grown crops in the CPA are corn and soybeans. However, agricultural production in the project area has been heavily impacted by annual flooding from both the Ohio and Green Rivers. During the late 1990's, most crops were heavily damaged due to overbank flooding during the months of May and/or June. The agricultural interests at the Scuffletown Unit have installed a levee system and three water control structures along the Green River which are designed to prevent or reduce the effect of overbank flooding. Many of the interior drainage systems presently on the land offer excellent opportunities to restore historical hydrology and quality wildlife habitats, with minor modifications.

NONNATIVE PLANTS

Nonnative invasive species are reported to be the second-most critical threat to conservation of biodiversity (Wilcove et al. 1998). While not all nonnative species are known to disrupt native ecosystems, of particular concern are those that are successful at invading and rapidly spreading through natural habitats, resulting in changes in the native vegetative community (U.S. Forest Service 2003 and 2009). The Kentucky Exotic Plant Council lists the following species as "severe threats" in Kentucky:

- Ailanthus altissima* - Tree-of-heaven
- Alliaria petiolata* - Garlic mustard
- Carduus nutans* - Musk thistle
- Celastrus orbiculata* - Oriental bittersweet
- Conium maculatum* - Poison hemlock
- Coronilla varia* - Crown vetch
- Dioscorea oppositifolia* - Chinese yam

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- Elaeagnus umbellata* - Autumn olive
- Euonymus alatus* - Winged euonymus, burningbush
- Euonymus fortunei* - Wintercreeper
- Festuca arundinacea* (*Lolium arundinaceum*) - Kentucky 31 fescue
- Lespedeza cuneata* - Sericea lespedeza
- Ligustrum sinense*, *L. vulgare* - Privet
- Lonicera japonica* - Japanese honeysuckle
- Lonicera maackii*, *L. morrowi*, *L. tatarica* - Bush honeysuckle
- Lythrum salicaria* - Purple loosestrife
- Melilotus alba* - White sweet clover
- Melilotus officinalis* - Yellow sweet clover
- Microstegium vimineum* - Japanese grass
- Miscanthus sinensis* - Chinese silver grass
- Phragmites australis* - Common reed
- Polygonum cuspidatum* - Japanese knotweed
- Pueraria lobata* - Kudzu
- Rosa multiflora* - Multiflora rose
- Sorghum halepense* - Johnson grass
- Stellaria media* – Chickweed

FISH AND WILDLIFE

General Wildlife Diversity

A variety of wildlife species use the floodplains along the Ohio and Green Rivers and are described below.

Mammals

Mammal species include many of those commonly found in the eastern United States (e.g., raccoon (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), bobcat (*Lynx rufus*), river otter (*Lontra canadensis*), beaver (*Castor canadensis*) and a variety of small mammals. Several species of bats breed and hibernate in the area.

Birds

Over 350 species of birds have been recorded in Kentucky, of these, approximately 150 species breed in the state. Green River and adjacent habitats provide important habitat for a variety of bird species. In addition to many resident and short-distance migratory species, these habitats are important to many neotropical migratory songbirds, providing breeding and wintering habitat and serving as stopover sites during migration. When flood conditions from the Ohio and Green Rivers negate the extensive drainages and alterations, significant populations of migratory waterfowl are observed on the project area. Continental waterfowl population objectives for the area can be stepped down from the North American Waterfowl Management Plan using county-level harvest data (1999-2013) following Fleming et al. (2017; Method 4D). Migratory shorebirds and wading birds also use the area during the spring migrations. In addition to many common species, the CPA supports several priority migratory birds, many of which are associated with wetland habitats according to Central Hardwoods Joint Venture. See Table 1 for a list of some of the priority bird species found in the CPA.

Table 1. Continental and Regional Priority Migratory Bird Species of the Central Hardwoods Bird Conservation Region Associated with the Proposed Green River NWR and Adjacent Habitats.

Common Name	Scientific Name	Continental Concern	Regional Concern
King Rail	<i>Rallus elegans</i>	Y	Y
Least Tern	<i>Sternula antillarum</i>	Y	Y
American Black Duck	<i>Anas rubripes</i>	Y	Y
Horned Grebe	<i>Podiceps auritus</i>	Y	Y
Swainson's Warbler	<i>Limnothlypis swainsonii</i>	Y	Y
James Bay Canada Goose	<i>Branta canadensis</i>	Y	Y
Cerulean Warbler	<i>Setophaga cerulea</i>	Y	Y
Prothonotary Warbler	<i>Protonotaria citrea</i>	Y	Y
Lesser Scaup	<i>Aythya affinis</i>		Y
Pied-billed Grebe	<i>Podilymbus podiceps</i>		Y
American Bittern	<i>Botaurus lentiginosus</i>		Y
Least Bittern	<i>Lxobrychus exilis</i>		Y
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>		Y
American Coot	<i>Fulica americana</i>		Y

<https://www.chjv.org/priority-birds-habitats/>

Amphibians and Reptiles

The area provides habitat for many generalist and opportunistic amphibian and reptile species. The Copperbelly water snake (*Nerodia erythrogaster neglecta*) can be found within the wetlands. In addition, several State species of concern are supported, including bird-voiced treefrog (*Hyla avivoca*), Northern crawfish frog (*Lithobates areolatus*), midland smooth softshell (*Apalone mutica*), western mud snake (*Farancia abacura*), and the eastern ribbon snake (*Thamnophis sauritus sauritus*).

Fish and Other Aquatic Animals

Big river species such as paddlefish (*Polyodon spathula*), lake sturgeon (*Acipenser fulvescens*), catfish spp. (*Siluriformes* spp.), carp (*Cyprinus carpio*), buffalo spp. (*Ictiobus* spp.), and gar spp. (*Lepisosteidae* spp.) use the main stems of the Ohio and Green Rivers and the overflow lands. Sloughs and secondary creeks provide seasonal reproductive and nursery habitats when water conditions permit. However, these resources are limited due to the drainage activities on the properties and the seasonal nature of these habitats. Freshwater game species such as crappie

(*Pomoxis* sp.), bluegill (*Lepomis macrochirus*), and largemouth bass (*Micropterus salmoides*) are found in the backwater areas and in creeks and river sloughs when water conditions permit. In addition to fish, the area supports a variety of mussels (*Mytilidae* spp.), crayfish (*Decapoda* spp.), and other invertebrate species. A number of these aquatic invertebrates are rare and imperiled.

THREATENED, ENDANGERED, CANDIDATE AND AT-RISK SPECIES

Federal Listed Species

The CPA and surrounding areas support 18 threatened and endangered species as listed in Table 2. The Service is conducting an intra-Service Endangered Species Act (ESA) Section 7 consultation in association with the Green River NWR Land Protection Plan. This Intra-Service ESA Section 7 Consultation contains a thorough list of species and effects of the proposed action (Appendix C). The Service is also conducting an ESA consultation in coordination with FWHA, Kentucky Division on the proposed corridor construction of I-69.

Table 2. Federally listed, endangered, threatened, and candidate species associated with Henderson County, Kentucky.

Common name	Scientific name
Endangered	
Fanshell	<i>Cyprogenia stegaria</i>
Catspaw	<i>Epioblasma obliquata obliquata</i>
Snuffbox	<i>Epioblasma triquetra</i>
Pink Mucket	<i>Lampsilis abrupta</i>
Ring Pink	<i>Obovaria retusa</i>
Sheepnose	<i>Plethobasus cyphus</i>
Fat Pocketbook	<i>Potamilus capax</i>
Spectaclecase	<i>Cumberlandia monodonta</i>
Northern riffleshell	<i>Epioblasma torulosa rangiana</i>
Orangefoot pimpleback	<i>Plethobasus cooperianus</i>
Clubshell	<i>Pleurobema clava</i>
Rough pigtoe	<i>Pleurobema plenum</i>
Indiana Bat	<i>Myotis sodalis</i>
Gray Bat	<i>Myotis grisescens</i>
Least Tern	<i>Sternula antillarum</i>
Threatened	
Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>
Northern long-eared bat	<i>Myotis septentrionalis</i>
Candidate	
N/A	

Federal At-risk Species

Listing a plant or animal as federally protected under the Endangered Species Act is proven to be successful in preventing extinction. However, providing a plant or animal this level of protection is America's last line of defense. There are tremendous opportunities for voluntary conservation actions, undertaken before a species requires listing, to preclude the need to list species and improve habitats for listed, at-risk and common species alike.

A plant or animal is considered "at-risk" when:

- It is proposed for listing as threatened or endangered under the Endangered Species Act,
- It is a candidate species for listing, or
- It has been petitioned by a third party for listing.

At-risk species in the proposed CPA are listed below (Table 3).

Table 3. Federal At-risk Species in the proposed Green River National Wildlife Refuge Conservation Partnership Area.

Common name	Scientific name
	At-Risk Species
Pyramid pigtoe	<i>Pleurobema rubrum</i>
Longsolid	<i>Fusconaia subrotunda</i>
Tri-colored bat	<i>Perimyotis subflavus</i>
Golden winged warbler (historic records)	<i>Vermivora chrysoptera</i>
Monarch	<i>Danaus plexippus plexippus</i>

State Listed Species

The proposed area supports many state listed and priority species and communities considered in Kentucky according to the Kentucky State Nature Preserves Commission (Table 4). A complete preferred habitat association is contained in Appendix D.

Table 4. State Listed and Priority Species and Communities in the proposed Green River National Wildlife Refuge and Conservation Partnership Area, Kentucky according to the Kentucky State Nature Preserves Commission.

Common Name	Scientific Name	Status Kentucky ¹
Blue scorpion- weed	<i>Phacelia ranunculacea</i>	S
Rose turtlehead	<i>Chelone obliqua var. speciosa</i>	S
River Bulrush	<i>Bolboschoenus fluviatilis</i>	E

Common Name	Scientific Name	Status Kentucky ¹
Burhead	<i>Echinodorus berteroi</i>	T
Floating Pennywort	<i>Hydrocotyle ranunculoides</i>	E
Small-flower baby-blue- eyes	<i>Nemophila aphylla</i>	T
Tennessee Leafcup	<i>Polymnia laevigata</i>	E
Large Bur-reed	<i>Sparganium eurycarpum</i>	E
Pickereel-weed	<i>Pontederia cordata</i>	T
Bottomland Hardwood Forest		S
Bottomland Marsh		T
Coastal Plain Slough		T
Longsolid	<i>Fusconaia subrotunda</i>	S
Pocketbook	<i>Lampsilis ovata</i>	E
Pyramid Pigtoe	<i>Pleurobema rubrum</i>	E
Little Spectaclecase	<i>Villosa lienosa</i>	S
A Leptophlebiid Mayfly	<i>Traverella lewisi</i>	H
Lake Chubsucker	<i>Erimyzon sucetta</i>	T
Black Buffalo	<i>Ictiobus niger</i>	S
Bird-voiced Treefrog	<i>Hyla avivoca</i>	S
Northern Crawfish Frog	<i>Rana areolata circulosa</i>	S
Eastern Hellbender	<i>Cryptobranchus alleganiensis</i>	S
Midland Smooth Softshell	<i>Apalone mutica mutica</i>	S
Western Mud Snake	<i>Farancia abacura reinwardtii</i>	S

Common Name	Scientific Name	Status Kentucky ¹
Eastern Ribbon Snake	<i>Thamnophis sauritus sauritus</i>	S
Copperbelly water snake	<i>Nerodia Erythrogaster neglecta</i>	S
Spotted Sandpiper	<i>Actitis macularius</i>	E
Upland Sandpiper	<i>Bartramia longicauda</i>	H
Great Egret	<i>Ardea alba</i>	T
Brown Creeper	<i>Certhia americana</i>	E
Sedge Wren	<i>Cistothorus platensis</i>	S
Fish Crow	<i>Corvus ossifragus</i>	S
Common Gallinule	<i>Gallinula galeata</i>	T
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T
Osprey	<i>Pandion hallaetus</i>	S
Peregrine falcon	<i>Falco peregrinus</i>	S
Short-eared owl	<i>Cistothorus platensis</i>	S
Least Bittern	<i>Ixobrychus exilis</i>	T
American Bittern	<i>Botaurus lentiginosus</i>	H
Hooded Merganser	<i>Lophodytes cucullatus</i>	T
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	T
King Rail	<i>Rallus elegans</i>	E
Virginia Rail	<i>Rallus limicola</i>	E
Yellow-crowned night heron	<i>Nyctanassa violacea</i>	T
Bank Swallow	<i>Riparia riparia</i>	S

Common Name	Scientific Name	Status Kentucky ¹
Evening Bat	<i>Nycticeius humeralis</i>	S
Masked Shrew	<i>Sorex cinereus</i>	S

¹ E – State Endangered; T – State Threatened; R – State Rare; S – Species of Special Concern; X – State Extirpated; H – Historic Record. Source: DEIS 2019 and KSNPC Dec. 2015.

EXOTIC PESTS

The spread of nonnative or exotic species represents one of the most serious threats to biodiversity nationwide, undermining the ecological integrity of native habitats and pushing rare species to the edge of extinction. Often, introduced species lack predators for control or simply out-compete native species. Once established, many exotic species are virtually impossible to eradicate. They have been implicated in the decline of nearly half the imperiled species in the United States (Defenders of Wildlife 2006).

The Commonwealth of Kentucky faces a significant threat from exotic species invasion to its natural ecosystems. According to Jones (2005), nearly 25 percent of vascular plants in Kentucky are non-indigenous. Kentucky Exotic Pest Plant Council (KY- EPPC; <http://www.se-eppc.org/ky/list.htm>) also lists 92 plant species as threats to local communities. Other exotic pests contribute to the decline of the forests include the beech bark disease (*Neonectria* spp.), butternut canker (*Sirococcus clavigignenti-juglandacearum*), dogwood anthracnose (*Discula destructiva* Redlin), gypsy moth (*Lymantria dispar*), hemlock woolly adelgid (*Adelges tsugae*), and oak wilt (*Ceratocystis fagacearum*) (The Nature Conservancy and Southern Appalachian Forest Coalition 2000). The emerald ash borer (*Argilus planipennis*) is also now found within Kentucky and can destroy forests and landscape plantings. Several exotic aquatic fish and mussel species known to be serious threats in Kentucky are the Asian carp (*Cyprinus carpio*), silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Hypophthalmichthys nobilis*), grass carp (*Ctenopharyngodon idella*), black carp (*Mylopharyngodon piceus*), common carp (*Cyprinus carpio*), zebra mussel, (*Dreissena polymorpha*), and alewife (*Alosa pseudoharengus*). The primary mammalian species threatening ecological communities in Kentucky is the feral hog (*Sus scrofa*).

SOCIOECONOMIC ENVIRONMENT

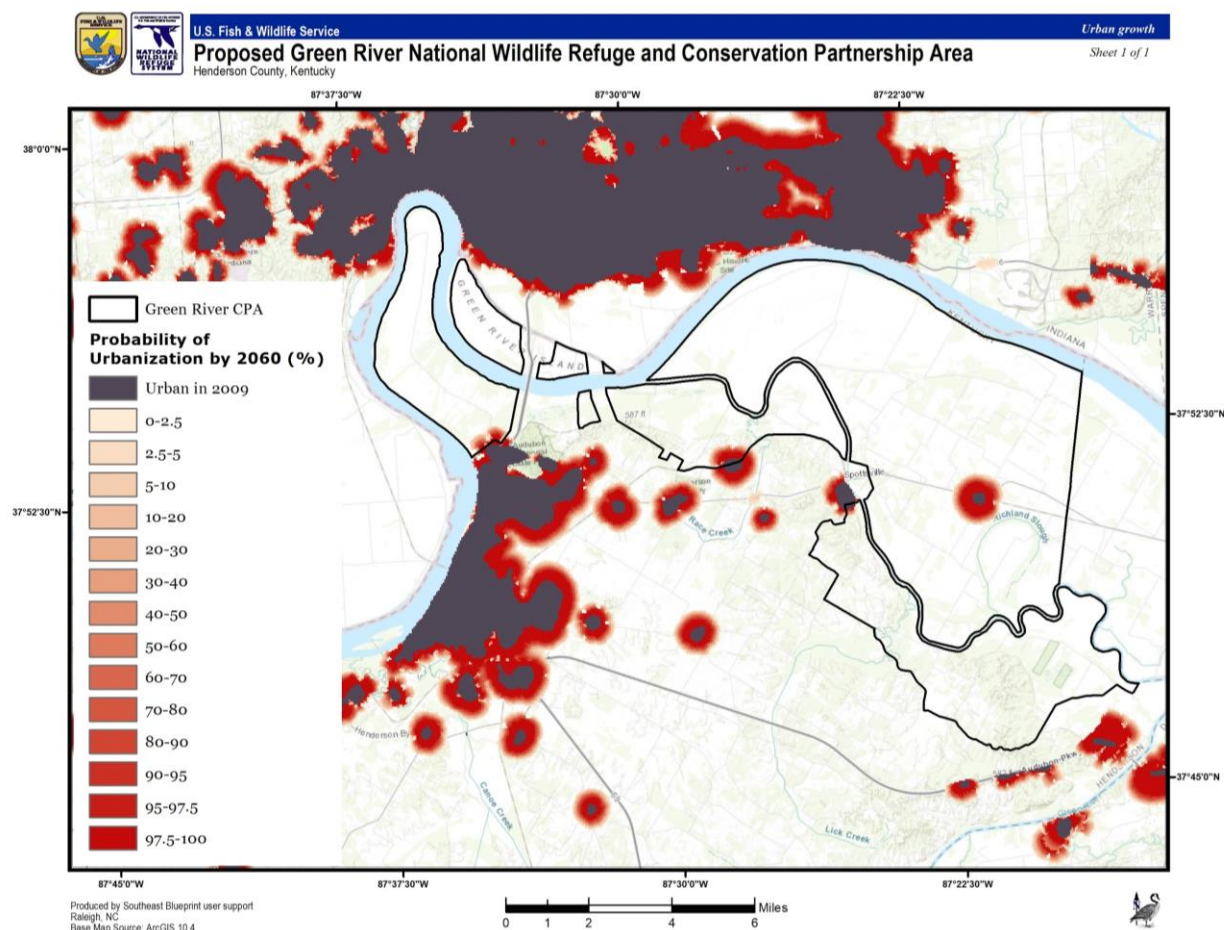
This section summarizes population, employment, income, tourism, and wildlife-dependent recreational data and trends for Henderson County, Kentucky, the area potentially affected by the proposed action and, where applicable, state and national levels.

POPULATION

Between 2015 and 2040, the population of Kentucky is projected to increase 10.4% – from 4,425,092 to 4,886,381 – a gain of 461,289 people. The population of Henderson County, KY is 87% White, 7.08% Black, and 2.62% two or more ethnicities. Only 2.58% of the people in Henderson County, KY speak a non-English language, and 99% are U.S. citizens. According to the [SLEUTH urban growth model](#), urbanization does not pose as much of a threat to the Green River area as it does to other

parts of the Southeast. Only 2% of the CPA is predicted to be urban by the year 2060 (Figure 13). However, since only a small fraction of the lands within the CPA boundary were urban in 2009 (0.181%; considered present day in this analysis), this does represent a significant increase in the urban footprint. Human population growth is one of many factors considered in determining the urban footprint.

Figure 13. Predicted probability of urbanization by 2060 in the proposed Green River NWR CPA.



EMPLOYMENT AND INCOME

Henderson County, Kentucky has a population of 46,362 people with a median age of 40.2 and a median household income of \$41,630. Between 2015 and 2016 the population of Henderson County, KY declined from 46,396 to 46,362, a 0.07% decrease and its median household income grew from \$41,036 to \$41,630, a 1.45% increase. Males in Henderson County, KY have an average income that is 1.23 times higher than the average income of females, which is \$42,907. The income inequality of Henderson County, KY (measured using the Gini index) is \$40,482 which is lower than the national average. The median property value in Henderson County, KY is \$113,500, and the homeownership rate is 61.1%. Henderson County, KY is the 22nd most populated county in Kentucky.

The economy of Henderson County, KY employs 20,932 people specializing in mining, quarrying, oil and gas extraction, utilities, and manufacturing. The largest industries in Henderson County, KY are manufacturing (3,708), healthcare and social assistance (3,179), and retail trade (2,879), and the highest paying industries are utilities (\$60,469), mining, quarrying, oil, and gas extraction (\$48,668), and finance and insurance (\$37,935) (<https://datausa.io/profile/geo/henderson-county-ky/#economy>).

TOURISM

Kentucky's tourism industry generated \$14.5 billion in economic impact during 2016, an increase of over five percent from \$13.7 billion in 2015. The industry supported nearly 193,000 jobs and generated more than \$1.5 billion in tax revenue, with \$195.1 million going directly to local communities. From 2015 to 2016, Henderson County saw a 2.6% increase in tourist spending, generating \$63,550,037 in direct tourist spending. Tourist spending in Henderson County alone has increased every year for the past six years.

WILDLIFE-DEPENDENT RECREATION

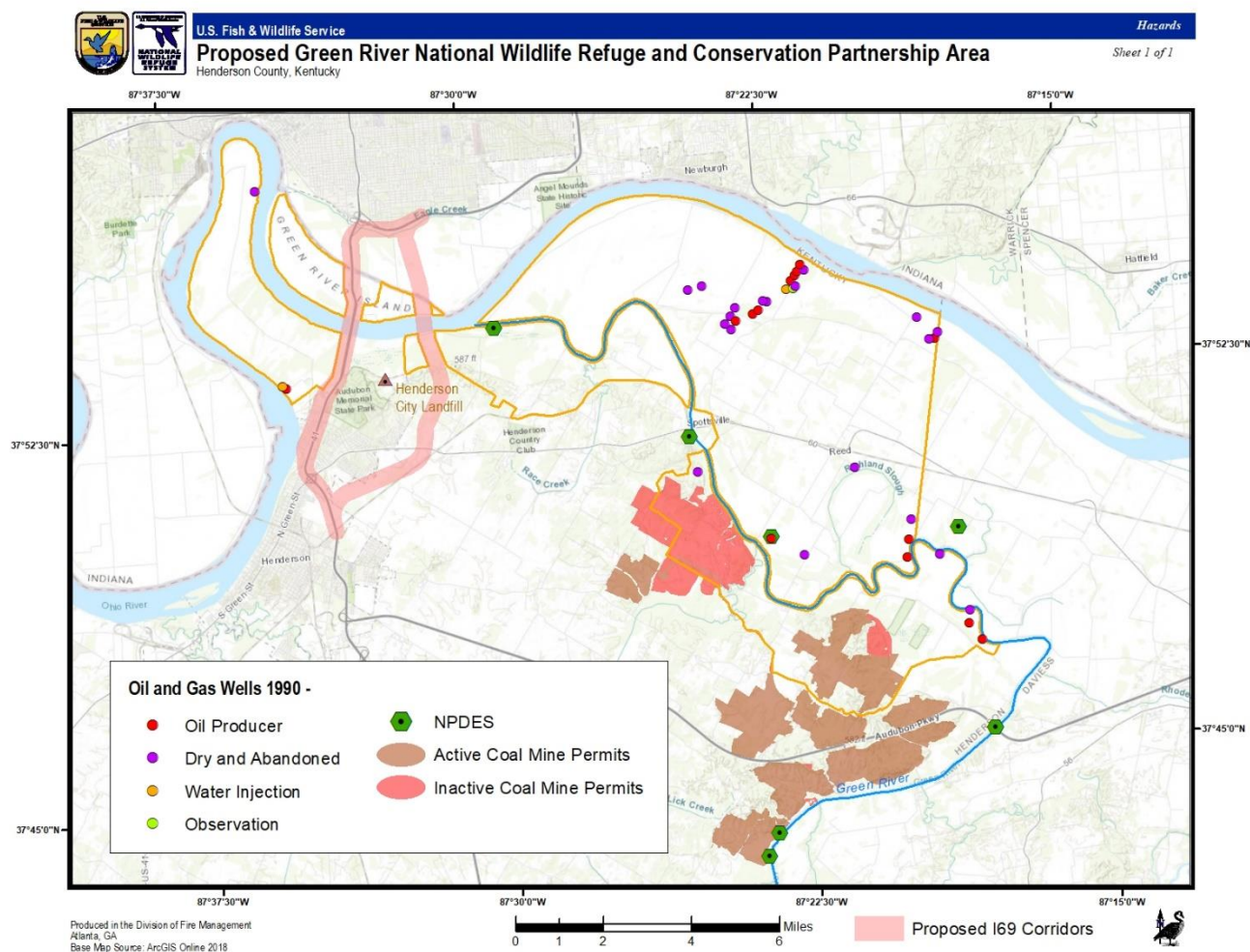
Fish and wildlife are economically important nationwide. According to the report, "Banking on Nature 2013: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation," approximately 46.5 million people visited national wildlife refuges in Fiscal Year 2011, generating almost \$2.4 billion in total economic activity and creating almost 35,000 private sector jobs, producing about \$792.7 million in employment income. Additionally, recreational spending on refuges generated nearly \$342.9 million in tax revenue at the local, county, state, and federal levels (Carver and Caudill 2013). In 2006, nearly 71 million people 16 years and older spent \$45.7 billion and generated \$122.6 billion while fishing, hunting, or observing wildlife (Leonard 2008). As land development continues and the number of places left to enjoy wildlife decreases, refuge lands may become even more important to the local community. It can benefit the community directly by providing recreational and employment opportunities for the local population and indirectly by attracting tourists from outside the area to generate additional dollars for the local economy. In 2017, Kentucky outdoor recreation generated \$12.8 billion in customer spending annually creating 120,000 direct jobs with \$3.6 billion in wages and salaries and generating \$756 million in State and local tax revenue.

MANAGEMENT STATUS

Transportation Facilities and Hazards

Transportation facilities include roadways and highways, airports, railroads, and utility lines. Utility corridors include high-voltage transmission lines. Oil and gas wells, landfills, National Pollution Discharge Elimination System (NPDES) point source pollution sites, and active and inactive coalmines within or near the proposed Green River NWR CPA are shown in Figure 14.

Figure 14. Oil and Gas Wells, National Pollutant Discharge Elimination System (SPDES) Sites, coal mines and other potential hazards within the proposed Green River NWR CPA.



Roads and Highways

Currently, two major roads traverse the proposed Green River NWR CPA. U.S. highway 41 connects Henderson, Kentucky to the Evansville metropolitan area in Indiana. U.S. highway 60 parallels the CPA on the south and crosses the CPA near Spotsville, Kentucky. The INDOT and the KYTC, in coordination with FHWA, are committed to providing a critical link between the two states by creating a new bridge and road to connect I-69 in Kentucky to I-69 in Indiana. A Draft Environmental Impact Statement (DEIS) has been completed (FHWA 2018) that assesses the environmental impacts of three road corridor alternatives for I-69 ORX. The Service is working in cooperation with INDOT, KYTC, and FHWA to ensure that the Service's planning efforts for the proposed Green River NWR CPA do not interfere with the I-69 ORX project. As part of this coordination, the Service agreed to exclude two 2000-foot wide ROW corridors from the proposed Green River NWR CPA. This will

allow adequate room for the final I-69 ORX ROW, which will likely be less than 800-feet wide (See Figure 3).

The Service is a willing cooperator with the INDOT, KYTC, and FHWA to assist them in (1) avoiding important natural resources where feasible; (2) minimizing any remaining, unavoidable impacts; and (3) mitigating for those resources that are destroyed or negatively impacted. This system of ensuring that federally-funded projects do not significantly impact natural resources is required of INDOT, KYTC, and FHWA by the National Environmental Policy Act and Section 404 (B)(1) of the Clean Water Act whether or not a National Wildlife Refuge or Wildlife Management Area is affected by the project. Furthermore, to facilitate the FWHA's compliance with the requirements of Section 4(f) of the Department of Transportation Act, which establishes a national policy that encourages preservation of publicly owned wildlife and waterfowl refuges, the Service would avoid purchasing lands within the final construction alignment. Once the final I-69 ORX alternative is selected and construction of the I-69 ORX is completed, the Service would then consider administratively incorporating unused portions of the reserved corridors into the Green River NWR CPA.

Airports

There are no large airports within the CPA; however, Evansville Regional Airport is located north of Henderson, KY.

Railroad Lines

There are no passenger rail service provided in the Evansville/Henderson Metropolitan Area. CSX, as well as the Norfolk Southern rail line, the Indiana Southwestern rail line, and the Indiana Southern rail line provide freight rail service.

Utility Corridors

Several high-voltage lines connect power plants in Henderson and Macon Counties to cities and towns throughout the CPA.

CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 14 of the Archaeological Resources Protection Act require the Service to evaluate the effects of any of its actions on cultural resources (e.g. historic, architectural and archaeological) that are listed or eligible for listing in the National Register of Historic Places (NRHP). In accordance with these regulations, the Service has coordinated the review of this proposal with the Kentucky State Historic Preservation Office.

The body of federal historic preservation laws has grown dramatically since the enactment of the Antiquities Act of 1906. Several themes recur in these laws, their promulgating regulations, and more recent executive orders. They include: (1) Each agency is to systematically inventory the historic properties on its holdings and to scientifically assess each property's eligibility for the NRHP; (2) federal agencies are to consider the impacts to cultural resources during the agencies' management activities and seek to avoid or mitigate adverse impacts; (3) the protection of cultural resources from looting and vandalism are to be accomplished through a mix of informed management, law enforcement efforts, and public education; and (4) the increasing role of consultation with groups, such as Native American tribes, in addressing how a project or management activity may impact specific archaeological sites and landscapes deemed important to those groups. The Service, like

other federal agencies, is legally mandated to inventory, assess, and protect cultural resources located on those lands that the agency owns, manages, or controls. The Service's cultural resource policy is delineated in 614 FW 1-5 and 126 FW 1-3. In the Service's Southeast Region, the cultural resource review and compliance process is initiated by contacting the Regional Archaeologist (RA). The RA would determine whether the proposed undertaking has the potential to impact cultural resources, identify the "area of potential effect," determine the appropriate level of scientific investigation necessary to ensure legal compliance, and initiate consultation with the pertinent State Historic Preservation Office and federally recognized tribes. The Service believes that the proposed acquisition of lands would have no adverse effect on any known or yet-to-be identified NRHP-eligible cultural resources. However, in the future, if the Service plans or permits any actions that might affect eligible cultural resources, it would carry out appropriate site identifications, evaluations, and protection measures as specified in the regulations and in Service directives and manuals.

AGRICULTURAL HERITAGE

In the 1700s and 1800s, settlers cleared forests and grasslands for farming. As Kentucky became a state, agriculture played an integral part. During the very early 1800s, farmers were driving their livestock through Louisville on undeveloped streets. Farming livestock was appealing because of the ease with which they could provide forage, and then sell the animals for profit, which led to the foundation of Bourbon Stockyards (recognized as the oldest livestock yard in America). During the same time, Bluegrass Stockyards was founded to market tobacco from the productive farmland of the Bluegrass Region. Today, agriculture contributes over \$3 billion in cash receipts to the economy of Kentucky annually.

Normal human expansion in our nation will continue to eliminate wildlife habitats that have previously been relied upon for successful wildlife restoration. Therefore, our professional wildlife managers will need to work more diligently than ever to ensure that those remaining important places have the best available food resources and other important conditions to ensure they can persist. Throughout the expansion of the National Wildlife Refuge System (NWRS), many refuges were acquired for the purposes of specifically benefiting and enhancing waterfowl and other migratory bird species. Further, in recognition of the need to provide adequate forage for waterfowl and migratory birds many refuges currently, and historically, will need to maintain active farming practices that produce a variety of crops to support birds and other species (USFWS 2018). Active farming practices are guided by the Service's Integrated Pest Management Policy (569 FW 1), 601 FW 3 Biological Integrity, Diversity, and Environmental Health; 620 FW 2 Cooperative Agriculture Use; 603 FW 1 Appropriate Use; and/or 603 FW 2 Compatibility.

ARCHAEOLOGICAL RESOURCES

Historical archaeological sites are known to exist within Henderson County, Kentucky. The Ohio and Green River floodplains and their associated uplands, are expected to be rich with precontact area habitation archaeological sites. A literature review of *The Archaeology of Kentucky: An Update* from 2008 revealed several major archaeological surveys have been conducted in Henderson County, Kentucky. Due to these investigations, Henderson County has the second highest number of archaeological sites in the State. The Kentucky Office of State Archaeology files record 865 sites in Henderson County. Background research indicates that 105 archaeological sites are recorded within 2.0 km of the project study area. Eighty of these archaeological sites are prehistoric, 17 are historic, and 8 are of mixed prehistoric and historic sites. Numerous late Archaic shell middens are located along the Green River in Henderson County. Within the deep midden deposits, floodplain Woodland sites have been identified along the Ohio River. One survey also identified sites including Early

Woodland components, Middle Woodland components, and Late Woodland components. Several petroglyphs were also documented. Surveys also revealed several petroglyphs and numerous Caborn-Welborn sites. In addition, 27 sites are listed in the National Register of Historic Places for Henderson County, Kentucky, of these, three are Green River shell middens sites. The remainder of historic places listed are buildings.

Based on the results of the archaeological site file review, there is a higher potential for prehistoric archaeological sites of all periods in upland contexts, fewer sites are found in river bottom settings. However, sites dating to the Late Prehistoric are more likely to be found in river bottom settings on floodplains, terraces, or along the margins of sloughs because soils in the upland context are either eroded, or derived from loess, the potential for buried archaeological sites in this area is low. Therefore, prehistoric archaeological sites are most likely to occur insurface or near-surface contexts. There is a higher potential for buried archaeological deposits in river bottom settings, subject to periodic flooding from the Ohio and Green rivers. In addition, the potential for buried archaeological sites increases near transitional landforms between river bottom and upland contexts.

THREATS

HABITAT LOSS THROUGH LAND CONVERSION

Historically, this area was part of a large bottomland hardwood forest which had extensive oak, hickory, and native pecan components. Some portions of the proposed project site were converted to agricultural uses during the early portions of the 20th century; however, the majority of the area was converted into active agricultural production during the late 1960s and early 1970s. This conversion was accomplished by extensive drainage of wetlands, alteration of interior drainage systems, and clearing of the bottomland hardwood forest. Currently, the area consists of ridge and swale farmland, river-scar oxbows, sloughs, wet depressional areas, and a small amount of bottomland hardwoods. A few scattered tracts of cut-over forest remain, consisting predominantly of silver maple, cottonwood, and hackberry; however, over 70% of this area is in agricultural production. Most of this habitat loss is the result of decades of land use changes and conversion undertaken in support of agricultural, industrial, commercial, or residential development.

NONNATIVE PLANTS

Nonnative plants are known to occur across Western Kentucky, accounting for 15-20 percent of the documented flora. While not all nonnative species are known to disrupt native ecosystems, some species are successful at invading and rapidly spreading through natural habitats, resulting in changes to the native vegetative community, and are of particular concern. A list of some of the more problematic nonnative plants that invade habitats can be found above.

CLIMATE CHANGE

Overall, the effects of climate change are expected to have a negative effect on the proposed refuge, by reducing crop yields, threatening some aquatic ecosystems, flooding more frequently, and longer droughts. This would likely increase the difficulty of meeting the competing demands for water in the Ohio River.

RELATIONSHIP OF PROJECT TO LANDSCAPE CONSERVATION GOALS AND OBJECTIVES

The proposed Green River NWR would contribute to a more connected and ecologically functional landscape by reducing habitat fragmentation and protecting and restoring a network of wetland types and associated habitats. The proposed refuge would also protect and enhance water quality and quantity benefiting both humans and wildlife.

The Service would work with public and private partners to restore and maintain habitat connectivity throughout the CPA by working to reduce habitat fragmentation by connecting and buffering lands that are already protected. Many sites are hydrologically connected and these connections support important movement corridors for wildlife among small blocks of remaining habitat. Populations of plants and animals are becoming increasingly isolated as blocks of undeveloped lands with suitable conditions to support a diverse plant and animal communities no longer function as a contiguous body. These disjunct habitat conditions are most commonly attributed to man-made barriers including highways, sprawling residential and commercial development, and/or other land uses that create barren landscapes or vast openings that are devoid of annual vegetation. These large spans of open landscape can exclude the movement or transfer of flora and fauna.

The proposed refuge would work to connect disjunct habitats and wildlife populations by establishing/protecting corridors necessary to facilitate movement of wildlife and gene flow between populations. Connections to nearby streams and forests would help maintain/create healthy populations and would also allow species to migrate and adapt to changes in habitats such as those that might result from climate change. Further, proposed habitat restoration would buffer existing streams to improve water quality and water availability for the associated flora and fauna and local human populations. These efforts would allow for a more intact and functional landscape.

Proposed management would complement the management of adjacent and nearby conserved lands, both public and private, thus enhancing the Service's wildlife management contribution to the region and helping to create a more functional conservation landscape.

The proposed refuge would contribute to many landscape conservation goals and objectives, as well as partner efforts, including the Appalachian LCC (USFWS 2011); conservation and mitigation banks; and international, national, and regional conservation plans and initiatives. Several of these are listed below.

International:

- North American Bird Conservation Initiative (2016)
- North American Waterfowl Management Plan (1986, 2012)
- North American Waterbird Conservation Plan (2002)
- Partners in Flight (PIF) North American Landbird Bird Conservation Plan (Rich et al. 2004)

National:

- US Shorebird Conservation Plan (2001)
- Wetlands Reserve Program (WRP) of the Natural Resources Conservation Service (NRCS 2011)
- Partners for Fish and Wildlife (USFWS 2007)
- Forest Stewardship Program (USDA Forest Service 2011)
- Strategic Plan for Responding to Accelerating Climate Change (USFWS 2009)

- Forest Stewardship Program (USFS 2011)

Regional:

- Southeast Conservation Adaptation Strategy (SECAS 2017)
- Southeast Blueprint (Databasin 2018)
- Appalachian NatureScape design (2018)
- The Nature Conservancy's Resilient Lands analysis (2016)
- SLEUTH urban growth model
- Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative (LCC) (2015) (<https://gcpolcc.databasin.org/datasets/0d0c5fb9d42f45d3a0a23872eda23543>)
- The Appalachian LCC Energy Forecast Model
- Threatened and Endangered Species Recovery Plans (USFWS 2012)

State:

- Kentucky Comprehensive Wildlife Conservation Strategy (KCWCS 2013)
- Bottomland Hardwood Preservation Program (USFWS 1978)
- New Madrid Wetlands project (North American Waterfowl Management Plan (NAWMP) 1989).
- Interior Low Plateaus (ILP) Bird Conservation Plan (physiographic area #14) (2017)
- Corps of Engineers, Louisville District, Interim Feasibility Report: Ohio River Ecosystem Restoration Projects (USACE 2006)

PARTNERSHIP EFFORTS/RELATED RESOURCES

State and federal agencies are among the partners in this landscape, including the Kentucky Department of Fish and Wildlife Resources (KDFWR), United States Department of Agriculture (USDA), United States Forest Service (FS), USDA Natural Resources Conservation Service (NRCS), United States Department of Agriculture Farm Services Agency (FSA), The United States Army Corps of Engineers (ACOE), and Kentucky Department of Forestry. The Service is working in cooperation with INDOT, KYTC, and FHWA to ensure that the Service's planning efforts for the proposed Green River NWR CPA do not interfere with the I-69 ORX project. The proposed Green River NWR would also provide local and regional benefits to wildlife and people by working in concert with existing conservation areas and partners, including landowners and community residents, John James Audubon State Park, The Nature Conservancy, Kentucky State Parks, Southern Conservation Corp., Ducks Unlimited, National Wild Turkey Federation, University of Kentucky Cooperative Extension Office, and others (See Figure 1). Restoration and management activities would assist in accomplishing the goal of providing landscape-level conservation by contributing to ecological resilience across the landscape. Taken together, these efforts have aided the protection of state and federal listed threatened and endangered species, forests, farmlands, and recreational areas that contribute to the long-term ecological health, economy, and way of life of the region.

Given the dramatic changes sweeping the southeastern United States - such as urbanization, competition for water resources, extreme weather events, sea-level rise, and climate change,

conservation partners are working together to design and achieve a connected network of lands and waters that supports thriving fish and wildlife populations and improved quality of life for people across the southeastern United States and the Caribbean. SECAS is a combined federal, state, nonprofit and private organizations coordinating their conservation actions and investments to focus on common goals, including the area in the proposed Green River NWR CPA. The Service's proposed refuge provides an overarching level of protection which complements and enhances the partnership efforts in the area.

III. LAND PROTECTION STRATEGY

ACTION AND OBJECTIVES

AUTHORITIES FOR ESTABLISHING THE REFUGE

Based on the refuge purposes, a refuge could be established under the following statutory authorities:

1. National Wildlife Refuge System Administration Act; (16 U.S.C. 668dd(b))
2. Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712).
3. Endangered Species Act of 1973 (16 U.S.C. 1534)
4. Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3921-3923); and/or
5. Fish and Wildlife Act of 1956 (16 U.S.C. 742a)

CONSERVATION PARTNERSHIP AREA

A CPA approach was used to provide a more flexible tool for acquiring or otherwise protecting land. The CPA includes lands with conservation value, within which the Service would work with other conservation partners and willing landowners to protect resources. For this project, the CPA boundary was delimited by floodplain and wetland habitats along the Ohio and Green Rivers as well as adjacent upland hardwoods and grasslands. Including additional uplands adjacent to flood-prone areas provide safe habitat to wildlife during flood events and provide elevated nesting locations for turtles and other species. The proposed CPA also contains a large amount of marginal cropland that is regularly flooded. If such areas are acquired by the Service, restoration of floodplain forests and forested wetlands on these areas would reduce sedimentation in the Ohio and Green Rivers, thus improving water quality and providing additional habitat areas and habitat connectivity to native wildlife. By having such diverse habitats, the proposed CPA will increase the public's ability to participate in a variety of wildlife-dependent recreational opportunities, such as hunting, fishing, wildlife photography, and wildlife viewing.

LAND USE

Land use has similarities to land cover, but is often used to show anthropogenic uses of an area. For the purposes of this Draft LPP, the National Land Cover Dataset (NLCD) was used to portray land use. The majority of the lands in the CPA are considered to be in "open" or undeveloped land uses and most parcels are in private ownership (Fry et al. 2011). Table 5 summarizes the general types of land cover contained in the CPA. In general, the land is a mix of agriculture, forest, and water/wetlands. Agricultural lands dominate the land cover type (over 73 percent or 40,450 acres), followed by forest and water/wetlands (See Figure 4 in Draft LPP, Chapter I). All other land use classes each contributed less than 5 percent of the total cover.

LAND PROTECTION PRIORITIES

The Service's proposed action (Alternative B) would result in the establishment of Green River NWR through the protection of approximately 24,000 acres. This would be accomplished through a combination of fee-title purchases from willing sellers and less-than-fee-title purchases (e.g., conservation easements and cooperative agreements) from cooperators within the approximate 53,000-acre CPA (See Figure 3 in Draft LPP, Chapter I). Lands not acquired within the CPA will remain in private ownership and will not be affected by being a part of the CPA designation.

Table 5. Land use in the proposed Green River National Wildlife Refuge and Conservation Partnership Area.

Land Use Class	Conservation Partnership Area	
	Acres	Percent
Agricultural	40,450	73
Developed	2,934	4.4
Forest	9,065	17.2
Shrubs/Barrens	188	0.4
Water/Wetlands	2,658	5
Totals	52,637	100

Source: Multi-Resolution Land Characteristics (MRLC) National Land Cover Database (NLCD) 2011

The Service believes these are the minimum interests necessary to conserve and protect the fish and wildlife resources associated with the proposed refuge.

Much of the land included in the CPA currently has (or could have, upon restoration) important habitat value and high potential for helping support a range of species. Lands included in the CPA also have high potential for ensuring habitat connectivity between the proposed refuge and surrounding conservation lands, and in providing corridors between sites.

The proposed CPA was delineated after engaging numerous stakeholders in the area and considering a variety of conservation and public benefits. The considerations included but were not limited to key wildlife species and habitats, habitat diversity, landscape resiliency, public recreation potential, flooding frequency and duration, water quality, infrastructure development within and outside the CPA, community expansion and economics, past establishment proposals, current data and trends, working lands, potential for working partnerships, wildlife corridor opportunities, existing land conservation projects, industry, etc. The CPA strives for wildlife habitat conservation and restoration for the benefit of wildlife and people. Table 6 summarizes the parcels and units within the CPA for the proposed establishment of Green River NWR.

Table 6. CPA Units for the proposed establishment of Green River NWR

CPA Unit Name	County	Number of Parcels	Acres	Protected Acres	Percent Protected
Bluff Unit	Henderson	186	5,366	1093	2.1%
Green River Unit	Henderson	420	10,202	182	0.3%
Horseshoe Bend Unit	Henderson	22	5,443	1229	2.3%
Race Track Unit	Henderson	18	1,994	0	0%
Scuffletown Unit	Henderson	687	29,627	614	1.2%
Total		1336	52,632	3118	5.9%

LAND PROTECTION METHODS

We may use several methods of acquiring either a full or a partial interest in the parcels identified for Service land protection: (1) Purchase (e.g., complete title, or a partial interest like a conservation easement), (2) leases and cooperative agreements, and (3) donations.

PURCHASE

The preferred acquisition methods for protecting land within the CPA are fee-title acquisitions and purchase of conservation easements; however, the method ultimately used depends on the goals of the Service and the goals of the landowners.

Fee-Title Purchase

A fee-title interest is normally acquired when: (1) The area's fish and wildlife resources require permanent protection not otherwise assured, (2) land is needed for visitor use development, (3) a pending land use could adversely impact the area's resources, or (4) it is the most practical and economical way to assemble small tracts into a manageable unit.

Fee-title acquisition conveys all ownership rights to the Federal Government and provides the best assurance of permanent resource protection. A fee-title interest may be acquired by donation, exchange, transfer, or purchase (as the availability of funding allows). The Federal Government does not pay property tax. However, the Service annually reimburses counties to compensate for lost revenue, based on a formula that is the greater of: 75 cents per acre; three-fourths of one percent of the fair market value; or 25 percent of the net receipts collected from operation and management of the refuge. This is called refuge revenue sharing and use of these funds must first be approved by Congress. Also, Congress may appropriate additional funds to compensate local governments.

Easement Purchase

Easement purchase refers to the purchase of limited rights (less-than-fee-title) from an interested landowner. The landowner would retain ownership of the land, but would sell certain rights identified and agreed upon by both parties. The objectives and conditions of our proposed conservation easements would recognize lands for their importance to wildlife habitat or outdoor recreational activities, and any other qualities that recommend them for addition to the Refuge System. Land uses that are normally restricted under the terms of a conservation easement include:

- Development rights (agricultural, residential, etc.);
- Alteration of the area's natural topography (unless for restoration);
- Uses adversely affecting the area's floral and faunal communities;
- Private hunting and fishing leases;
- Alteration of the natural water regime.

COOPERATIVE AGREEMENTS

Management control on privately owned lands could be obtained by entering into cooperative agreements with the landowners.

DONATIONS

We encourage donations in fee-title or conservation easement in the approved areas. We are not aware currently of any formal opportunities to accept donations of parcels within the proposed CPA boundary.

LAND PROTECTION OPTIONS

The Service acquires lands and interests in lands, such as easements, and management rights in lands through leases or cooperative agreements, consistent with legislation or other congressional guidelines and executive orders, for the conservation of fish and wildlife and to provide wildlife-dependent public use for recreational and educational purposes. These lands include national wildlife refuges, national fish hatcheries, research stations, and other areas.

We will use the following options to implement this Land Protection Plan, if approved:

- Option 1: Management or land protection by others;
- Option 2: Less-than-fee-title acquisition by the Service;
- Option 3: Fee-title acquisition by the Service;

When land is needed to achieve fish and wildlife conservation objectives, the Service seeks to acquire the minimum interest necessary to meet those objectives, and acquire it only from willing sellers. Our proposal includes a combination of Options 1, 2, and 3 above. We believe this approach offers a cost-effective way of achieve the protection needed to accomplish refuge objectives, while also attempting to meet the needs of local landowners.

Option 1. Management or Land Protection by Others

Bottomland hardwoods have long been recognized for their biological importance, and the Service has worked since the early 1990s in conjunction with federal, state, and non-governmental partners and private landowners to develop a coordinated restoration and protection strategy for these habitats. A portion of the land within the CPA is already owned, or managed through conservation

easements, by various conservation partners. The management of these existing sites will significantly contribute to proposed refuge objectives.

In addition to private landowners, the following partners (current or future) own or provide management assistance on ecological significant properties associated with the identified project area:

- Kentucky Department of Fish and Wildlife Resources
- Henderson County
- Ducks Unlimited
- National Wild Turkey Federation
- University of Kentucky Cooperative Extension Office
- Aluminum Company of America (ALCOA)
- Henderson County Tourism
- Audubon State Park
- Henderson County NRCS
- Henderson County FSA
- Louisville District - U. S. Corps of Engineers
- Kentucky Division of Forestry
- Southern Conservation Corp.

Option 2. Less Than Fee-Title Acquisition by the Service

Under Option 2, we would protect and manage land by purchasing only a partial interest, typically in the form of a conservation easement. This option leaves the parcel in private ownership, while allowing Service control over some or all land use decisions to achieve the refuge's and landowner's land use objectives. The structure of such easements would provide permanent protection of existing wildlife habitats while also allowing habitat management or improvements and access to sensitive habitats, such as those important to endangered species or migratory birds. It would also allow for public use where appropriate. We would determine, on a case-by-case basis, and negotiate with each landowner, the extent of the rights we would be interested in buying. These rights may vary, depending on the configuration and location of the parcel, the current extent of development, the nature of wildlife activities in the immediate vicinity, the needs of the landowner, and other considerations.

In general, any less-than-fee-title acquisition by the Service would maintain the land in its current configuration with no further subdivision. Easements are a property right, and typically are perpetual. If a landowner later sells the property, the easement continues as part of the title. Properties subject to easements generally remain on the tax rolls, although the change in market value may reduce the assessment. The Service does not pay refuge revenue sharing on easement rights. Where we identify conservation easements, we could be interested primarily in purchasing development and some wildlife management rights. Easements are best when:

- Only minimal management of the resource is needed, but there is a desire to ensure the continuation of current undeveloped uses and to prevent fragmentation over the long-term and in places where the management objective is to allow vegetative succession;
- A landowner is interested in maintaining ownership of the land, does not want it to be further developed, and would like to realize the benefits of selling development rights;
- Current land use regulations limit the potential for adverse management practices;
- The protection strategy calls for the creation and maintenance of a watershed protection area that can be accommodated with passive management; or

- Only a portion of the parcel contains lands of interest to the Service.

The determination of value for purchasing a conservation easement involves an appraisal of the rights to be purchased, based on recent market conditions and structure in the area. The Land Protection Methods section further describes the conditions and structure of easements.

Option 3. Fee-Title Acquisition by the Service

Under Option 3, we would acquire parcels in fee-title from willing sellers, thereby purchasing all rights of ownership. This option provides us the most flexibility in managing priority lands and ensures the protection in perpetuity of the resources acquired.

Generally, the lands we would purchase require more than passive management (e.g., controlling invasive species, mowing or prescribed burning, planting, or managing for the six priority public uses). We propose fee-title acquisition when adequate land protection is not assured under other ownerships, active land management is required, or we determined the current landowner would be unwilling to sell a partial interest like a conservation easement.

In some cases, it may be appropriate to convert a previously acquired conservation easement to fee-title acquisition. For example, if an owner is interested in selling the remainder of interest in the land on which we have acquired an easement, we would entertain acquisition of the remaining interest if the remaining interest would further the refuge's objectives. We would evaluate such scenarios on a case-by-case basis.

SERVICE LAND ACQUISITION POLICY

Once a CPA boundary has been approved, we contact landowners within the CPA to determine if any are interested in selling. If a landowner expresses an interest and gives us permission, an appraisal would be completed on behalf of the Service by the Department of the Interior Appraisal and Valuation Services Office (AVSO) to determine its fair market value. Once an AVSO approved appraisal has been obtained by the Service, we can present an offer for the landowner's consideration.

Appraisals completed by AVSO must meet federal as well as professional appraisal standards. In all fee-title acquisition cases, the Service is required by federal law to offer 100 percent of the property's appraised market value, which is typically based on comparable sales of similar types of properties.

The proposed CPA boundaries were delineated after engaging numerous stakeholders in the area and considering a variety of conservation and public benefits. The considerations included but were not limited to key wildlife species and habitats, habitat diversity, landscape resiliency, public recreation potential, flooding frequency and duration, water quality, infrastructure development within and outside the CPA, community expansion and economics, past establishment proposals, current data and trends, working lands, potential for working partnerships, wildlife corridor opportunities, existing land conservation projects, industry, etc. Designation of a final CPA boundary would give the Service the approval to negotiate with landowners that may be interested or may become interested in selling their land in the future. With this internal approval in place, the Service can react more quickly as important lands become available. Our long-established policy is to work with willing sellers as funds become available, and we continue to operate under this policy. Lands within this proposed boundary do not become part of the refuge unless their owners willingly sell or donate them to the Service.

FUNDING

The two primary sources of funding for land acquisition are the Land and Water Conservation Fund (LWCF) and the Migratory Bird Conservation Fund (MBCF). The primary sources of income to the LWCF are fees paid by companies drilling offshore for oil and gas, and oil and gas lease revenues from federal lands. The primary sources of income to the MBCF are the sale of Migratory Bird Hunting and Conservation Stamps (also known as Duck Stamps), and import duties on arms and ammunition. The Service would seek funding from the LWCF and MBCF for fee-title and conservation easement acquisitions, if the proposed project is approved. Establishment of a second national wildlife refuge in western Kentucky would build upon and strengthen the Service's work in the region, and would better enable the Service to implement a landscape-level approach to conservation.

During planning for this refuge, the Service identified an approximately 53,000-acre CPA. Of these 53,000 acres, the Service is seeking authority to acquire fee-title or a conservation easement interest of approximately 24,000 acres. In order to estimate the cost to acquire the 24,000 acres for the proposed Green River NWR, we extrapolated a high-to-low range of values based on estimates of land values for fee-title (high) and conservation easement (low) acquisition.

Because the method of acquisition (Fee-title vs. conservation easement) would be determined on a case-by-case basis, for each landowner or within defined target areas, it is impossible to pre-determine how many acres would be acquired in fee-title and how many acres would be acquired in conservation easements. Therefore, we have provided a high range based on fee-title acquisition of all 24,000 acres, and a low range based on acquisition of conservation easements on all 24,000 acres. This range in value is affected by the following factors:

- Land types, i.e., Agriculture, Forest and Woodland, etc.
- Ownership size. Tract sizes range from less than one acre to more than 8,000 acres.
- Legal interest(s) acquired (conservation easement).
- Other factors that affect per acre land value.
- The total acreages of fee-title vs. conservation easement interest acquired

The estimated cost to acquire fee-title on all 24,000 acres is \$127,000,000. This is based on an estimated average per-acre-cost of all size tracts and the Land Use Classes shown in Table 5, above. The total estimated cost to acquire conservation easements on all 24,000 acres is \$63,500,000. This is also based on an estimated average per-acre-cost of all size tracts and the various land use classes, then discounted for acquisition of a partial interest (i.e., conservation easement interest). This results in an estimated cost to acquire the entire 24,000 acres of the proposed Green River NWR by a combination of fee-title and conservation easement of between \$63.5 M and \$127M.

It is important to note that these costs are only provided as an approximation based on currently available information. Donations, the ratio of fee-title to conservation easement purchases, and land value fluctuations over time are among the factors that would likely influence the costs associated with completion of the proposed Green River NWR.

IV.COORDINATION

COORDINATION WITH CONSERVATION PARTNERS

Building on previous efforts to establish a refuge in this area, the Service incorporated issues identified during the 2001 and 2018 public scoping periods.

As part of its outreach efforts, the Service used a variety of tools, including direct mailings to landowners, elected officials, tribes, and natural resource non-governmental organizations, as well as digital media. A project website is set up which includes information about the project. The Service and the Kentucky Department of Fish and Wildlife Resources (KDWFR) coordinated with the following partners:

- Local Tribal Members from the following Tribes:
 - Cherokee Nation of Oklahoma
 - Chickasaw Nation
 - Delaware Nation of Oklahoma
 - Eastern Band of Cherokees
 - Miami Tribe of Oklahoma
 - Osage Nation
 - Peoria Tribe of Indians of Oklahoma
 - Quapaw Tribe of Oklahoma
 - United Keetoowah Band of Cherokee Indians in Oklahoma
- Henderson County Elected Officials
- Ducks Unlimited
- National Wild Turkey Federation
- University of Kentucky Extension Office
- Aluminum Company of America (ALCOA)
- CPA Landowners
- Senator Mitch McConnell's Local, State and Washington Offices
- Henderson County Tourism Department
- Audubon State Park
- Henderson County NRCS
- Henderson County FSA
- Kentucky Division of Forestry
- Federal Highways Administration
- Kentucky Transportation Cabinet
- Indiana Department of Transportation
- State Elected Representatives for the Area
- Federal Elected Representatives for the Area
- The Nature Conservancy
- Southern Conservation Corporation

ELECTED OFFICIAL CONTACTS

Contact was made with congressional offices representing the affected areas (Kentucky 4th and 11th Congressional Districts, U.S House of Representatives 1st and 2nd Congressional Districts, and the two U.S. Senators). The offices were contacted via e-mail or telephone and we offered to personally brief their staffs, which was done for all of them. Additionally, congressional staff received copies of

the letters the Service sent to private landowners, as well as frequently asked questions we distributed about the project.

Additionally, county elected representatives from the affected areas were mailed letters describing the project and we offered to meet personally with the representatives to brief them on the proposed project.

PUBLIC OUTREACH

Other methods of outreach to private landowners, state and elected officials, tribes, other state and federal natural resource agencies, natural resource non-governmental organizations, and the general public included direct mailings, e-mails, digital media (a dedicated project website and by Facebook) were distributed.

The purpose of public scoping and outreach was to seek input from the public regarding the proposed establishment of Green River NWR and to identify the issues that needed to be addressed in the planning process. The public will also have an opportunity to comment on the draft LPP and EA for more than 30 days and the Service will host a public information meeting.

DRAFT ENVIRONMENTAL ASSESSMENT

I. PURPOSE AND NEED FOR ACTION

INTRODUCTION

The U. S. Fish and Wildlife Service (Service) proposes to protect and manage a series wetland complexes along the Ohio and Green River floodplains and their associated uplands through the proposed establishment of Green River National Wildlife Refuge (NWR) (See Figure 3 in LPP Chapter I). The land being proposed for protection includes a diverse system of wetlands and surrounding upland bluffs, including bottomland hardwoods, upland hardwoods, and swamps. This proposal represents a significant opportunity to protect a number of federal and state listed species. Protection of Green River NWR is directly aligned with the Service's national priorities of migratory bird conservation, threatened and endangered species recovery, landscape-level conservation, and connecting people with nature.

The Service proposes to acquire, protect, and manage certain land in western Kentucky through a combination of fee-title purchases from willing sellers, conservation easements, cooperative agreements, or other conservation mechanisms with interested landowners. Lands and waters that could be purchased outright (fee-title purchase) or less-than-fee-title purchase (e.g., easement) would become part of the proposed Green River NWR. The four overarching goals of the proposed refuge would be to: (1) Protect, restore, and manage habitats for fish and wildlife; (2) provide landscape-level conservation; (3) connect people with nature; and (4) promote conservation partnerships.

The mission of the National Wildlife Refuge System is:

“to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Improvement Act of 1997).”

National wildlife refuges provide important habitat for native plants and many species of mammals, birds, fish, insects, amphibians, and reptiles. They also play a vital role in conserving threatened and endangered species. Refuges offer a wide variety of wildlife-dependent recreational opportunities and many have visitor centers, wildlife trails, and environmental education programs. Nationwide, about 25 million visitors annually hunt, fish, observe, and photograph wildlife, or participate in educational and interpretive activities on refuges.

Refuge lands can be acquired under various legislative and administrative authorities for specified purposes. Establishment of the proposed Green River NWR would be authorized by the National Wildlife Refuge System Improvement Act, Endangered Species Act, Emergency Wetlands Resources Act, Fish and Wildlife Act, or Migratory Bird Treaty Act. The purposes of a refuge are derived from legislative authorities that established the refuge.

The scope of this draft environmental assessment (Draft EA) is limited to the proposed acquisition, in fee-title and in less-than-fee-title, of lands for the establishment of the Green River NWR. For the purposes of this Draft EA, Henderson County, Kentucky, within which the environmental analysis is conducted, encompasses the Interior River Valleys and Hills Ecoregion in Kentucky. This Draft EA is not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. A conceptual management plan (Appendix A) and interim compatibility determinations (Appendix B) are included to provide general outlines on how the proposed lands would be managed. The appendices are provided as general information for the public in its review of this Draft EA. If the proposed refuge is established and the needed lands or interests in lands are acquired, the Service would develop a Comprehensive Conservation Plan, a 15-year management plan, and needed “step-down” management plans (habitat management plan, public use plan, etc.). These plans would be developed and reviewed in accordance with Department of the Interior requirements of the National Environmental Policy Act.

The following is the vision for the Green River NWR, if approved:

The Green River National Wildlife Refuge will conserve floodplains of the Ohio and Green Rivers and portions of their surrounding landscapes for current and future generations. Refuge lands and waters will be managed for fish and wildlife populations with an emphasis on the management of migratory birds, imperiled federal trust species, and improve water quality and quantity within the watersheds surrounding the refuge. As part of a system of public and private conservation lands, the refuge will expand outdoor recreational and educational opportunities, helping to support local economies.

PURPOSE AND NEED

The land, water, and wildlife resources of the Ohio and Green Rivers landscape are at risk; therefore, we propose a conservation effort focused on expanding and connecting a matrix of natural lands. This Draft EA presents a proposal for protection of additional wildlife habitat in Henderson County, Kentucky, through the establishment of the Green River NWR. In 2001 and 2010, the Service submitted proposals to establish the Refuge, but these proposals were ultimately unsuccessful due to higher national priorities. Establishment of the Refuge is supported by a variety of partners, citizens, and local officials and would complement conservation, public access, and environmental education efforts ongoing in the project area. The Service believes it can play a role in further conserving the natural resources associated with the project area through establishment and management of the Green River NWR.

Our approach to the protection and conservation of the proposed Green River NWR, as outlined in this draft EA, is through the use of a Conservation Partnership Area to identify where potential refuge lands will be acquired. In this proposal, CPA outlines areas represented by wetlands along the Green and Ohio Rivers and adjacent upland habitat critical to wildlife during high water events and for infrastructure to support public recreation. The proposed CPA encompasses approximately 53,000 acres and are depicted in Figure 3 in Draft LPP, Chapter I. Within the CPA boundaries, the Service seeks to protect approximately 24,000 acres in fee-title or conservation easements.

Inside the CPA, the Service may consider negotiations for acquisition of an interest in land. The Service would work with interested landowners to establish a legal interest such as a management agreement, easement, lease, donation, or purchase. Lands are not subject to any refuge regulations or jurisdiction unless, and until, an interest is acquired. Any landowner within the CPA boundary, even though the surrounding parcels may have been purchased by the Service, retains all the rights, privileges, and responsibilities of private land ownership. This includes, but is not limited to, the right

to access, hunting, vehicle use, control of trespass; the right to sell the property to any other party; and the responsibility to pay local real estate or property taxes. It is the Service's policy to work with willing sellers to acquire fee-title or less-than-fee-title interest in property.

The purpose of the proposed refuge would be to contribute to the mission and goals of the National Wildlife Refuge System (Refuge System) by:

- Establish a second national wildlife refuge in Kentucky to support conservation of fish, wildlife, and plants;
- Protect and manage wetlands and bottomland forest habitats to support waterfowl, migratory birds, and threatened and endangered species;
- Provide high-quality hunting and sport fishing opportunities;
- Provide opportunities for public use and environmental education and interpretation;
- Collaborate with partners to protect and enhance biodiversity and water quality and quantity within the Ohio River and Green River watersheds, benefiting both humans and wildlife; and
- Ensure healthy wildlife populations for the benefit of Kentuckians and all Americans.

There is a need for increased resource protection in this part of Kentucky, as various growing threats are likely to continue to put natural resources at risk. Currently, the primary threats are habitat loss and alteration resulting from development and agriculture. Other threats include nonnative plants and possibly climate change, which are discussed further in Chapter II of this Draft EA.

BACKGROUND

The proposed Green River NWR is located along the Ohio and Green Rivers in Henderson County, Kentucky, between the cities of Evansville, Indiana and Henderson, Kentucky (See Figure 3 in draft LPP Chapter I). Owensboro, Kentucky is about 15 miles to the east. The confluence of the Green River and Ohio River is within the proposed refuge boundary and U.S. Highway 41 currently crosses the area. However, a new bridge and roadway is planned as a part of the I-69 Ohio River Crossing (ORX) Project and will be located just downstream of the confluence of the Ohio and Green Rivers (FWHA 2018) (See Figure 3 in draft LPP Chapter I). The Newburgh Lock and Dam is located adjacent to the proposed refuge and is operated by the U.S. Army Corps of Engineers (USACE). The proposed refuge would include approximately 24,000 acres from lands lying on the north and south sides of the Ohio River and approximately 20 miles upstream along the Green River. All lands identified as a part of the project area are located solely within the Commonwealth of Kentucky.

In 1958, the Service first identified this area as an acquisition priority for waterfowl. In 1978, the Service recognized this area as important to waterfowl in the "Bottomland Hardwood Preservation Program" document. The New Madrid Wetlands project document of the NAWMP identified the area as a high priority site for waterfowl in 1989. Located in the Shawnee Hills subdivision of the Interior Low Plateaus (ILP) Bird Conservation Plan (physiographic area #14), the forested wetland habitat in the ILP has been mostly replaced by agriculture and is designated as priority habitat for restoration. This site is adjacent to and will augment state-owned lands: the Green River State Forest, John James Audubon State Park and portions of KDFWR's Sloughs WMA. USACE, Louisville District, has prepared an Interim Feasibility Report: Ohio River Ecosystem Restoration Projects (Illinois, Indiana, Kentucky, Ohio, West Virginia, Pennsylvania). A key objective of the study is to restore bottomland hardwoods in identified high priority areas in partnership with federal and state agencies and private landowners/conservation groups. Each state in the study area has been tasked to identify its top priority sites for restoration. The Commonwealth of Kentucky has identified Scuffletown Bottoms;

(one of the proposed units for Green River NWR), in the original New Madrid Project Joint Venture Initiative as the number one priority site for Kentucky.

In 1999, Tom Bennett, then Director of the Kentucky Department of Fish and Wildlife Resources approached Sam Hamilton, past Southeast Regional Director, with a proposal to establish a second National Wildlife Refuge in Kentucky near Henderson County. When initially proposed in the early-2000s, the Green River NWR focused restoring and managing a valuable wetland complex for the benefit of migratory birds. The goals of the proposed refuge would be to provide: (1) habitat for migrating and wintering waterfowl; (2) habitat for non-game land birds; (3) habitat for a natural diversity of fish and wildlife; (4) nesting habitat for wood ducks and other local nesting migratory birds; and (5) opportunities for environmental education, interpretation, and wildlife-oriented recreation. Senator Mitch McConnell introduced legislation on January 25, 2002 to establish Green River National Wildlife Refuge although final authorization was never achieved.

In 2010, interest in the establishment of the Green River NWR again became a priority for long-time supporters of the project. A supplemental final environmental assessment was developed for Green River NWR. This document included the proposed acquisition of lands, the establishment of a new national wildlife refuge, and a conceptual management plan and interim compatibility determination providing general outlines on how the new refuge would be managed. However, higher national priorities lead to conservation of lands in other areas of the U.S.

In 2018, a report accompanying the Fiscal Year (FY) 2018 Consolidated Appropriations Act (Act) included a directive to establish the Green River National Wildlife Refuge (Refuge) near Henderson, Kentucky:

“Green River National Wildlife Refuge. - The agreement directs the Service to approve the establishment of the Green River National Wildlife Refuge in the Green River Bottoms area near the confluence of the Green River and Ohio River in Henderson County, Kentucky. The refuge should consist of approximately 24,000 acres - to be acquired from willing landowners. The Service should partner with other stakeholders on establishment of the refuge and look for opportunities related to environmental mitigation for interstate bridge construction projects in the area. The Service is directed to wait to establish final boundaries of the refuge until the new I-69 interstate bridge corridor is selected. Within 120 days of the date of enactment of this Act, the Service is directed to report to the Committees on its progress toward establishment of the refuge.”

The U.S. Senate report accompanying the FY 2019 Interior-Environment appropriations bill includes additional direction on Green River. The direction includes much of the text from the omnibus report but adds:

“The Committee directs the Service to forgo the development of the preliminary Land Protection Strategy and go directly to the full Land Protection Plan in order to expedite its establishment of the Green River National Wildlife Refuge...The Committee is aware that the I-69 interstate bridge corridor selection process is ongoing. While the Service should consider the bridge corridor selection process, the Committee does not support delaying the establishment of the refuge.”

In light of this new direction and conversations with Senator McConnell's office, the Service is moving forward with the land protection process and detailed planning for Green River NWR.

PROPOSED ACTION

The Service proposes to acquire, protect, and manage through fee-title purchases, leases, donations, conservation easements, and/or cooperative agreements from willing sellers approximately 24,000 acres within an approximately 53,000-acre Conservation Partnership Area (CPA). All parcels acquired would be managed by the Service as the Green River NWR. No interest will be acquired nor management conducted on lands within the CPA that are not a part of the 24,000 acre final project area. Lands not acquired within the CPA will remain in private ownership and will not be affected by being a part of the original CPA designation. Once the project target of 24,000 acres is achieved, land acquisition efforts will end and the CPA will no longer be in effect. Any future refuge expansion beyond the 24,000 acres, including donations, would require additional Service approval in accordance to the Service's expansion policies (341 FW 1-3). The Service will not seek water right ownership or usage as an independent unit to be acquired but rather as a part of the individual parcel to be acquired (403 FW 1-3). The overall goals of the proposed refuge would be to: (1) Protect, restore, and manage habitats for fish and wildlife; (2) provide landscape-level conservation; (3) connect people with nature; and (4) promote conservation partnerships, as further detailed in the Conceptual Management Plan (Appendix A).

It is anticipated that funding for this proposal would be provided primarily through the Land and Water Conservation Fund (LWCF), among others. The authority for the use of these funds for land acquisition include: Migratory Bird Conservation Act of 1929; Fish and Wildlife Act of 1956; Endangered Species Act of 1973; Emergency Wetlands Resources Act of 1986; and/or National Wildlife Refuge System Improvement Act of 1997.

COORDINATION AND CONSULTATION

During the planning process, the Service coordinated and consulted with a mix of governmental entities with interest in the region. Several federal and state agencies serve as key partners in this landscape, including the KDWFR, USACE, NRCS, and non-governmental conservation organizations. These partners were key in the development of the proposal. For a complete list of partners see the Green River NWR Draft LPP, Chapter IV. Coordination and Consultation.

PUBLIC PARTICIPATION

PUBLIC SCOPING

Public scoping can help the Service identify issues and concerns, potential alternatives, and scientific information regarding the need to increase conservation efforts aimed at protecting aquatic and riparian habitats, as well as large tracts of deciduous forest. Building on previous efforts to establish a refuge in this area, the Service incorporated issues identified during the 2001 and 2018 public scoping periods.

As part of its outreach efforts, the Service used a variety of tools, including direct mailings to landowners, elected officials, tribes, and natural resource non-governmental organizations, as well as digital media. A project website is set up which includes information about the project.

SPECIAL CONSIDERATIONS

The Service initially reviewed the designation of Wilderness in July 2018, finding that no areas met the criteria or intent of the Wilderness Act. The proposed CPA is part of a landscape that is largely rural, with agriculture, forestry, and outdoor recreation/tourism. Most tracts in the proposed acquisition boundary are impacted by human use throughout the region. The extensive network of

roadways, altered landscapes, increasing population, and development would make a wilderness experience improbable.

The proposed refuge acquisition focus area boundary has been reviewed by the Service for inclusion in the National Wilderness Preservation System according to criteria set forth in the Wilderness Act of 1964. Based on the Service's assessment, the proposed refuge was found to be unsuitable for wilderness designation since:

- No areas meet the Wilderness minimum size requirement of 5,000 contiguous roadless acres (2,023 ha);
- No areas contain any units of sufficient size for preservation as Wilderness;
- Areas under consideration have been altered by historic and ongoing human activities; and/or
- No areas include outstanding opportunities for solitude or for primitive recreation.

Therefore, no potential units of the proposed Green River NWR are suitable for designation as Wilderness at this time.

II. AFFECTED ENVIRONMENT

For a complete description of affected resources, see Chapter II. Resources Section of the Draft Land Protection Plan for the proposed Green River National Wildlife Refuge (See Figure 1 in draft LPP, Chapter I).

III. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

This chapter presents the alternatives for the proposed Green River NWR within Henderson County, Kentucky, including the Proposed Action, which the Service believes best meets the outlined purposes, vision, and goals. It is envisioned that the proposed refuge would:

- Establish a second national wildlife refuge in Kentucky to support conservation of fish, wildlife, and plants;
- Protect and manage wetlands and bottomland forest habitats to support waterfowl, migratory birds, and threatened and endangered species;
- Provide high-quality hunting and sport fishing opportunities;
- Provide opportunities for public use and environmental education and interpretation;
- Collaborate with partners to protect and enhance biodiversity and water quality and quantity within the Ohio River and Green River watersheds, benefiting both humans and wildlife; and
- Ensure healthy wildlife populations for the benefit of Kentuckians and all Americans.

Several purposes would be identified to further the vision for the refuge, such as:

"for the protection of migratory birds . . . or any part, nest, or egg of any such bird"
[Migratory Bird Treaty Act (16 U.S.C. 703)].

"conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans" 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997).

"to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants..." 16 U.S.C. 1534 (Endangered Species Act of 1973).

"the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." 16 U.S.C. 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986).

"for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude" 16 U.S.C. 742f(b)(1) *"for the development, advancement, management, conservation, and protection of fish and wildlife resources"* 16 U.S.C. 742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956).

Four overarching goals were developed for the proposed refuge and CPA. The goals are intentionally broad, descriptive statements of the desired future conditions. They provide the management direction to support the proposed refuge purposes and the proposed vision statement. Descriptions of the alternatives address the goals, and offer an explanation of how

each alternative addresses the proposed refuge's goals. These documents would provide interim management direction for the proposed refuge until a more detailed comprehensive conservation plan (CCP) could be developed. If the refuge is approved, the Service would develop a CCP within 15 years of approval. The goals established for the proposed refuge address habitat for fish and wildlife, landscape-level conservation, connecting people with nature (e.g., public use), and conservation partnerships, as listed.

Goal 1. Protect, Restore, and Manage Habitats for Fish and Wildlife. The proposed Green River NWR would restore, manage, and conserve bottomland hardwoods, adjacent upland habitats, and plant and animal species associated with these communities. The proposed refuge would contribute to the habitat goals presented in the North American Waterfowl Management Plan (NAWMP), various Threatened and Endangered recovery plans, and Kentucky's State Wildlife Action Plan.

Goal 2. Provide Landscape-Level Conservation. The proposed Green River NWR would contribute to a more connected and functional conservation landscape targeted by the Southeast Adaptation Conservation Strategy (SECAS) Partners by reducing habitat fragmentation and protecting and restoring a network of rare and declining wetland types and their surrounding landscapes. The proposed refuge would also protect and enhance water quality and quantity in localized portions of the Ohio River and Green River watersheds, benefiting both humans and wildlife.

Goal 3. Connect People with Nature. Visitors would have access to the proposed Green River NWR in order to enjoy and take advantage of opportunities for compatible hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Goal 4. Promote Conservation Partnerships. The proposed Green River NWR would increase opportunities for collaboration and partnerships in science, education, and research with conservation organizations, private landowners, government agencies, and others. These collaborative efforts will help inform land management decisions on the proposed refuge and encourage continued responsible stewardship of the refuge and its natural resources.

FORMULATING ALTERNATIVES

Under NEPA, the Service developed and evaluated a reasonable range of alternatives. The Proposed Action defines what the Service plans to do or recommend, but cannot implement without considering other reasonable, environmentally sensitive alternatives. Other reasonable alternatives to the Proposed Action that could also be viewed as fulfilling the proposed purposes of the refuge are described in this Draft EA. This offers the Service and the reviewing public an opportunity to consider a range of reasonable alternatives for the Proposed Action, thus fulfilling one of the key tenets of NEPA.

Alternatives describe complementary management approaches for achieving the missions of the Service and Refuge System, the purposes for which the refuge would be established, and its vision and goals, while responding to issues and opportunities identified during the planning process.

Based on this process to identify and evaluate alternatives, the Service selected two alternatives, including the NEPA-required No Action Alternative, to provide a baseline for comparing the action alternative. The alternatives evaluated in detail are listed.

- Alternative A. No Refuge (No Action Alternative)
- Alternative B. Proposed Establishment of the Green River National Wildlife Refuge within the Conservation Partnership Area

DESCRIPTION OF ALTERNATIVES

In addition to the No Action alternative (Alternative A), one action alternative (Alternative B) was developed. The description for each alternative also includes the possible management activities that would help meet each of the four overarching goals of the proposed Green River NWR.

To help explain the alternatives, definitions for several terms are listed in the glossary at the end of this document.

ALTERNATIVE A – NO ACTION

The No Action Alternative required by NEPA serves as a baseline to which any other alternatives are compared. In this alternative, the Service would not approve a CPA and a new refuge would not be established; there would be no comprehensive land conservation effort to protect Green River and its immediate surrounding upland habitats. Under this alternative, the Service would continue activities it has pursued over the last several years, including partnership programs to restore rare habitats, control or eradicate invasive plants, and reestablish populations of globally imperiled plants. Habitat protection and management would continue by existing organizations and government programs. Hence, a comprehensive and landscape-level effort centered on protecting and managing floodplain habitats and associated watershed buffers for the conservation of Green River is unlikely to be achieved in the foreseeable future.

The role of Alternative A in terms of its ability to meet each of the four overarching conservation goals is detailed below.

Goal 1. Protect, Restore, and Manage Habitats for Fish and Wildlife

Under this alternative, efforts to protect, restore, and enhance the floodplains of the Ohio and Green River would likely continue at current levels. The Service would continue to work with the natural resource agencies, non-profit organizations, universities, and others to leverage site-specific grants for restoration and protection and offer management guidance for federally listed species.

Goal 2. Provide Landscape-Level Conservation

Conservation lands in this landscape would continue to be managed by their respective agencies and organizations under the No Action Alternative, but a comprehensive, Service-led approach at the proposed scale to protect the confluence of the Ohio and Green Rivers would likely not occur in the foreseeable future.

Goal 3. Connect People with Nature

The Service seeks opportunities to promote appropriate and compatible wildlife-dependent recreation on national wildlife refuges. There would be no refuge-based recreational opportunities under the No Action alternative. A number of wildlife-dependent recreational

activities exists within the landscape and would continue. Hunting and fishing occur under regulations administered by state agencies. Public hunting occurs on several state-managed lands within the area. Hunting also occurs on private lands.

Fishing is recreationally important to the local population and draws visitors from afar. Areas throughout the watershed would continue to provide recreational fishing opportunities.

State agencies, as well as private organizations, provide outdoor wildlife-dependent recreation and educational opportunities. These wildlife-dependent activities would continue under the No Action Alternative.

Goal 4. Promote Conservation Partnerships

There is management occurring on sites by state staff and non-governmental organizations, depending on staff levels and funding. This would continue under the No Action Alternative.

ALTERNATIVE B – PROPOSED ACTION

Under the proposed action, a CPA of approximately 53,000 acres would be authorized, within which approximately 24,000 acres of fee-title or less than fee-title lands (such as easements) would be approved for the establishment of the Green River NWR (See Figure 3 in Draft LPP, Chapter I). The proposed 24,000-acre Green River NWR would consist of five units with the majority of the lands lying on the south side of the Ohio River in Henderson County, Kentucky (See Figure 3 in Draft LPP, Chapter I). The Scuffletown Unit (29,627 acres) and the Horseshoe Bend Unit (5,443 acres) lie along the south bank of the Ohio River and are separated by U.S. Highway 41. The Race Track Unit (1,994 acres) is located both east and west of Highway 41 and along the north bank of the Ohio River. The Bluff Unit (5,365 acres) is bordered by the John J. Audubon State Park on the west, the Green River on the north and east and a CSX railway on the south. The Green River Unit (10,202 acres) lies south and east of Spottsville, Kentucky and is bordered by the Green River on the north and east. If this proposal were to be approved, lands would be added to the Refuge System, depending on factors such as willing landowners, funding, etc. The acquisition process could take years before the majority of the 24,000 acres were to be realized. However, each tract protected would be a needed component to the overall conservation of Green River Watershed. Furthermore, the protection of the entire proposed acreage would represent a very important effort to providing long-term, landscape-level conservation of these vulnerable and rare wetlands.

The CPA acreage was determined based on several factors and experience from previous projects. A larger project area (CPA) is required in order for the overall acreage objective to be achievable. Congress directed the Service to establish a national wildlife refuge up to 24,000 acres. For this target to be plausible, a larger area must be identified from which to draw upon. All lands will not be for sale in a defined area. Lands with residences, complex infrastructure, etc. or lands that result in undue complexity will not be purchased. These lands, in particular, cannot all be identified and excluded from a CPA. All projects and areas are different but experience and area analysis provided a basis from where to begin. The Service's starting point were the lands of Henderson County, especially within the Ohio and Green River floodplains, that have been repeatedly identified by the Service, Kentucky Department of Fish and Wildlife Resources, The Nature Conservancy, and others as an area of ecological significance since the 1950's. This significance is primarily associated with migratory bird, bottomland hardwood forest and wildlife and habitat diversity. The proposed CPA contains a wider array of topographies and habitat types. The previously, the Service focused on floodplain and wetland habitats along

the Ohio River exclusively; most recently, the Service decided to consider those same lands but also included additional habitats with topographies that are less subject to re-occurring flood events. Inclusion of a non-floodplain land component provides opportunities to establish public use infrastructure not possible in flood-prone areas, increases habitat and wildlife diversity management options, and provides a needed safe haven for wildlife during major flood events. This adaptive approach has been adopted as a result of lessons learned with other Service land protection projects.

The Service is also working in cooperation with INDOT, KYTC, and FHWA for the proposed I-69 ORX. As part of the coordination, the Service agreed to exclude two 2000-foot wide ROWs from the proposed Green River NWR CPA although the final I-69 ORX ROW will likely be less than 800' wide upon completion (See Figure 3 in Draft LPP, Chapter I).

Goal 1. Protect, Restore, and Manage Habitats for Fish and Wildlife

Alternative B would substantially increase opportunities to conserve the floodplain habitats and their associated uplands. If approved, this proposal would authorize the Service to work with willing landowners to purchase, outright or as easements, lands and waters within the CPA. On fee-title interest tracts, where the Service would become the land manager, bottomland hardwoods could be restored and managed, with a focus towards land management improving overall habitat conditions, including those for federally listed species as well as state listed and rare species.

A management plan would be developed to ensure the protection and recovery of trust species and other rare species within the sites, and restoration and management needs would be addressed, with a focus on hydrology and vegetation. Types of potential restoration would include restoring hydrology by plugging ditches that drain portions of sites and controlling nonnative invasive plants to the extent possible. Long-term management may include establishment and protection of a forest around sites that would protect the rivers from pesticide drift, runoff containing nutrients, and nonnative invasive plants. Impoundments could be created on some sites to provide feeding and resting places for migrating waterfowl and wading birds.

Working with partners, the refuge would work to protect the following trust species: wintering and migrating waterfowl, forest breeding birds, threatened and endangered wildlife including Indiana, gray and northern long-eared bats, American Bald Eagle, fanshell, catspaw, snuffbox, pink mucket, ring pink, sheepsnose, fat pocketbook, rabbitsfoot mussels, etc., State species listed at risk or need in of special management concern, etc. Activities would be implemented on refuge lands to help safeguard these species. Such activities would include law enforcement, and involvement/education of stakeholders in the region. Biological surveys would be conducted in association with stakeholders to address necessary inventory and monitor for species of concern.

Goal 2. Provide Landscape-Level Conservation

Under this alternative, the refuge would contribute to regional landscape-level conservation of Green River by helping to protect the floodplains and their associated uplands along the confluence of the Ohio and Green Rivers. Water resources important to lower Green River Watershed would be further protected and enhanced under this alternative. We would also conduct public outreach and education efforts, including those aimed at reducing runoff volume and pollutants and encourage stakeholder action to restore and protect the surrounding hydrology. Restoration of the hydrology and developing impoundments will help in meeting

North American waterfowl population objectives and Partners in Flight objectives. Establishing and restoring a forested landscape would reduce runoff, restore declining forest habitat and hydrology, and aid in establishing corridors important to wildlife.

Goal 3. Connect People with Nature

Under the proposed alternative, opportunities for wildlife-dependent recreation would be increased, helping to connect people with nature, with the aim of promoting a conservation ethic and stewardship. While some of the parcels proposed for acquisition may be unsuitable for public access due to the potential for flooding, other sites would be well-suited to these activities. The Service would work cooperatively with its conservation partners to determine what areas are suitable to provide public use opportunities, including hunting, fishing, wildlife observation, photography, and interpretive and educational programs. Where needed and appropriate, we would initiate development of facilities to engage the public in these activities. More specific management plans would be developed to address all aspects of outdoor wildlife-dependent recreation identified in the interim compatibility determinations. We would develop opportunities for volunteer involvement in refuge management and outreach efforts, and would work with school districts and teachers to develop an environmental education program featuring unique species or communities on the refuge.

Goal 4. Promote Conservation Partnerships

This alternative would increase and strengthen our collaborative efforts with conservation partners. We would also work to foster better communication between the Service and neighboring landowners, and provide them with information on how to manage their lands for the benefit wildlife and future generations. The creation of the refuge would provide opportunities for the Service to help focus the efforts of other partners towards strategic habitat conservation (SHC). Using the SHC model, the establishment of Green River NWR would coordinate and link actions that various programs and partners perform at individual sites, so that their combined effects would achieve conservation of species and their habitats on a landscape-level scale. In addition, this leadership role would assist with collaboration among partners to learn from one another.

SUMMARY

Compared to the No Action Alternative, the Service believes that implementing Alternative B (Proposed Action) would provide a more focused, collaborative, comprehensive, landscape-level approach to the conservation of the Ohio and Green River confluence. This alternative would help increase the protection and restoration of floodplain habitats, benefitting numerous priority species, including those that are state and federal listed, or that are rare and at risk. Additionally, if implemented, this proposal would increase wildlife-dependent recreational opportunities in the area, helping to foster a greater appreciation for the natural resources of the region, while increasing support for the Refuge System.

IV. ENVIRONMENTAL CONSEQUENCES

This chapter analyzes and discusses the potential environmental effects on the resources outlined in Chapter II. Environmental effects include those that are direct, indirect, and cumulative. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Alternative B, if approved, is generally believed to have indirect effects since the majority of lands are not expected to be acquired/protected immediately. Cumulative impacts are effects on the environment which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects are discussed in a separate section following the analysis of Alternatives A and B.

Potential effects or impacts, either positive (beneficial) and negative (adverse), to resources resulting from the implementation of the two alternatives were identified and placed into one of the listed categories, where possible.

- None - no effects expected
- Minimal - impacts are not expected to be measurable, or are too small to cause any discernible degradation to the environment
- Minor - impacts would be measurable, but not substantial, because the impacted system is capable of absorbing the change
- Moderate - effects would be measurable, but could be reduced through appropriate mitigation
- Major - impacts would be measurable and individually or cumulatively significant; an Environmental Impact Statement would be required to analyze these impacts

For the purposes of this Draft EA, the proposed refuge CPA and adjacent lands within Henderson County, Kentucky is the total Area of Influence/Interest (AOI) where effects are analyzed. The AOI is used solely to analyze the potential effects resulting from the No Action and Proposed Action to the environment (physical, biological, socioeconomic, and cultural resources). The proposed refuge CPA would equal approximately 53,000 acres or 0.003 percent of the Henderson County, KY (which is 17 Million acres total).

EFFECTS COMMON TO BOTH ALTERNATIVES

ENVIRONMENTAL JUSTICE

Executive Order 12898 “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” (February 11, 1994), requires that federal agencies consider as part of their action, any disproportionately high and adverse human health or environmental effects to minority and low income populations. Agencies are required to ensure that these potential effects are identified and addressed. The communities surrounding the refuge are relatively homogenous; minority groups do not represent a substantial portion of the affected community. No differential impacts based on minority status would therefore be anticipated under either of the alternatives.

ALTERNATIVE A: NO ACTION ALTERNATIVE EFFECTS

Under this alternative, the Service would take no action to acquire, protect, and manage any lands and Green River NWR would not be established.

Although protection and conservation efforts by the Service's Frankfort Ecological Services Field Office and conservation partners could continue, future habitat protection under existing laws and regulations and with existing resources would likely be insufficient to prevent degradation of the area's fish and wildlife resource values. Federal executive orders involving the protection of wetlands and floodplains only apply to federal agencies. They do not apply to habitat alterations by non-federal entities, which receive no federal funds.

The primary deterrent against the loss of wetland resource values is the U.S. Army Corps of Engineers' Section 404 permit program, which is administered under the authority of the Clean Water Act. This program requires permits for most types of work in wetlands. However, few acres along the Ohio and Green River would be protected through Clean Water Act regulations. Additionally, there is no assurance that the protection offered by these regulations would be consistent with protection of the area's fish and wildlife resources. These regulatory programs are not designed to accomplish the same objectives because of the vastly different missions of the two federal agencies. Furthermore, these programs are subject to changes in the law and to varying definitions and interpretations, often to the detriment of wetlands. The Corps' regulatory authority provides for the issuance of Section 10 and/or Section 404 permits when it is not contrary to the public interest to do so, and provided other conditions are met. Fish and wildlife conservation is only one of several public interest factors that are considered in permit issuance decisions. If fish and wildlife conservation is outweighed by other factors, permits that would alter the wetlands in the proposed CPA could be issued. In addition, the Agricultural Act of 2014 establishes the Agricultural Conservation Easement Program (ACEP). The ACEP — which repeals FRPP, GRP, and WRP but does not affect the validity or terms of any FRPP, GRP, or WRP contract, agreement or easement entered into prior to the date of enactment — provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements component, NRCS helps American Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands. If lands along the confluence of the Ohio and Green Rivers were enrolled in the ACEP, some benefits to erosion and wildlife could be expected, however aspects of proactive management and public use would be excluded.

The desired fish and wildlife protection objectives, therefore, cannot be achieved at a meaningful scale or degree under this alternative. Specifically, implementation of No Action alternative could adversely affect the area's existing habitats, plants, migratory birds, and other species associated with these wetlands.

EFFECTS ON THE PHYSICAL ENVIRONMENT

This section discusses potential effects to physical resources (e.g., topography, soils, water resources, etc.) under the No Action alternative.

Topography and Geology

Beneficial

Under this alternative, positive impacts with regard to the topography and geology in the AOI are not anticipated.

Adverse

According to the University of Kentucky, over 60 million tons of coal have been mined from both underground and surface mines in Henderson County since 1820. Although an important commodity and economic asset to the region, mining may have some negative ecological effects to wildlife and water sources but would most likely continue in this area.

Soils

Beneficial

No beneficial impacts to soils in the AOI are expected under the No Action alternative.

Adverse

In unprotected areas, soils would continue to be lost and degraded, leading to erosion and sedimentation as a result of various land use practices. Natural soil-formation processes would no longer occur in areas covered by impervious surfaces (e.g., roads, parking lots, buildings). Soil compaction is also expected at sites where construction occurs. Additionally, soils would continue to be exposed to various contaminants resulting from annual application of agricultural chemicals and runoff from roads and urban areas. Soil impacts from development or unmanaged use of lands would continue and likely increase over the long term.

Climate Change

Beneficial

Under this alternative, fewer areas in the AOI are expected to remain or become carbon sinks, and positive impacts with regard to climate change are not anticipated.

Adverse

Vegetation, alive or dead, is an important carbon stock, and ecosystems in the United States contain approximately 66,600 million tons of carbon (Heath and Smith 2004). According to the U.S. Climate Change Science Program, the size of the carbon sink in U.S. forests appears to be declining, based on inventory data from 1952 to 2007 (Birdsey et al. 2007). The carbon density (the amount of carbon stored per unit of land area) is highly variable, as it is directly correlated to the amount of biomass in an ecosystem or plant community. The total carbon in an ecosystem also includes the organic component of soil, which can be substantial, depending on the vegetation cover type and other factors (Bruce et al. 1999). The total carbon stored in temperate forests (which are expected to be similar to the “deciduous forests” that comprise most of the land cover in the AOI) is about 70 tons per acre. Forests go through a cycle of growth and death, and consequently, sequester and release carbon dioxide. The timeframe and magnitude of these cycles of carbon storage and release varies with the size and type of forest, among other factors. However, when land is cleared of vegetation, carbon dioxide that was stored in plant material and soil is released relatively quickly into the atmosphere through such processes as decomposition, burning, and soil oxidation. Additionally, without vegetation, the ability of the land to sequester or store carbon is reduced to minimal levels. The exact

extent of unprotected natural lands that would eventually be converted to agricultural or urban use is unknown. However, the proposed refuge (24,000 acres) would represent a fraction of the over 9 billion tons of global carbon entering the atmosphere yearly. Impacts to climate change under this alternative are expected to be minimal.

Air Quality

Beneficial

Positive effects on air quality in the AOI are not expected under this alternative.

Adverse

Under this alternative, unprotected lands that are currently in a natural state would continue to be converted to agricultural and urban areas. Air quality declines tend to be correlated to increasing urbanization, due to higher levels of traffic, increases in air pollution from point sources, and reductions in vegetated areas (Song et al. 2008). Trees have been shown to reduce the concentration of ozone (O₃), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), and particulate matter less than 10 and 2.5 microns in diameter (PM₁₀ and PM_{2.5}), primarily through direct uptake and adhesion to stems and leaves (Escobedo et al. 2007). Some tree species naturally produce volatile organic compounds that can convert to ozone under certain atmospheric conditions, such as high temperatures and stagnant air (Chameides et al. 1988). However, because vegetated areas also remove ozone and other air pollutants from the atmosphere, there tends to be net reduction in air quality as areas become increasingly developed and forests are lost (Song et al. 2008). We expect the No Action alternative to have a minimal impact on air quality across the AOI.

Water Quality

Beneficial

Under the No Action alternative, benefits to water quality are not anticipated in the AOI.

Adverse

Under this alternative, water quality is expected to generally be adversely affected in the AOI. Land use directly affects water quality, and in undeveloped areas, the natural physical, chemical, and biological processes interact to recycle most of the materials found in storm-water runoff. However, as natural vegetated lands are converted to farms or urban use, these natural processes are disrupted. As a result of everyday human activities, materials such as leaves, animal wastes, oil, greases, heavy metals, fertilizers, pesticides, and other materials are washed off by rainfall and are carried by storm water to rivers and wetlands. These materials can create high pollutant loadings of sediment, nutrients, heavy metals, petroleum hydrocarbons, and coliform bacteria and viruses (Gill et al. 2005). Overall, water quality in the AOI is likely to continue to be adversely affected by expanding urban land use, agricultural operations, and mining. Increased management efforts by state agencies and non-governmental partners to encourage low-impact development and the use of agricultural best management practices (e.g., controlled grazing, livestock exclusion fencing, stream buffer plantings) would help reduce water quality degradation.

Hydrology and Water Quantity

Beneficial

This alternative is not expected to result in positive impacts to the hydrology and water quantity of the area.

Adverse

The flow of water and water availability on most unprotected lands in the AOI would continue to be altered as a result of the land use changes, including urbanization, agribusiness, industry, mining, etc. Urbanization often requires the construction of drainage ditches, roads, and other impervious surfaces. Impervious surfaces associated with urbanized areas reduce the area available for rainwater to percolate into the soil. This generally has two direct consequences when it rains: (1) there is less water available for recharging the local surficial aquifer, while at the same time the amount of runoff that flows into low-lying area increases; and (2) low-impact development and stormwater best management practices required or promoted by state and federal regulatory agencies and local governments (e.g.; rain gardens, stormwater bioretention ponds, green roofs, permeable pavement installation) would help mitigate some of the impacts associated with impervious surfaces. However, extreme rainfall events would likely exceed the capacity of most stormwater systems, and some runoff would be transported to area waters. At a more local level, increased storm water volumes and peak discharge rates associated with urbanization can produce drastic changes in stream channels, resulting in eroded banks and more frequent flooding that can cause damage to adjacent property, homes, and wildlife habitat. Subsurface water plays an important part in the hydrology of an area by providing streams and rivers with a steady supply of water during droughts. As more lands are urbanized, the water storage ability of an area is reduced, limiting water supplies needed for wildlife and human uses.

As with hydrology, water quantity in the AOI is expected to continue to be negatively affected under this alternative. Growing human settlements increase the demand for water. Expanding agricultural, industrial, mining, and other economic sectors are also expected to compete for limited water resources. The amount of water available for wildlife, native habitats, and wildlife-dependent recreational opportunities would likely decline, as more water would be diverted to support increasing needs elsewhere.

Overall, the negative consequences on hydrology and water quality in the AOI are expected to constitute a moderate impact under the No Action alternative.

Noise

Beneficial

The soundscape of the AOI is not expected to benefit under the No Action alternative.

Adverse

Although noise from various sources currently affects rural lands in the AOI, substantial tracts of land remain where noise levels are relatively low. Without protection, additional lands in the AOI would continue to be converted to agricultural and urban use. Noise levels associated with farm equipment, road traffic, and industrial operations would increase. There is currently no specific information about the impacts of noise on the soundscape in the AOI, but human-induced sounds and noise on wildlife and visitors should not be underestimated, especially at

local scales. Taken together, the impact of increased noise levels across the AOI within the No Action alternative is expected to constitute a minimal impact.

EFFECTS ON THE BIOLOGICAL ENVIRONMENT

This section discusses potential effects on biological resources (e.g., habitats, wildlife, and federal and state listed species) under the No Action alternative.

Habitats

Beneficial

Under the No Action alternative, benefits to this resource are not expected. Given past actions and land use trends, it is anticipated that human population growth, development, and other land use changes would continue. Within the AOI, native habitats and natural systems would continue to be converted to developed lands and other uses, resulting in continued loss of these resources and further fragmenting remaining natural lands and waters.

Adverse

Existing native habitats would likely be lost to residential and agricultural development. The water resources within the AOI would be impacted by increased stormwater runoff from the growth in impervious surfaces (e.g., roads, parking lots), leading to a deterioration of water quality. Water levels in wetlands, streams, and rivers would likely fluctuate more, thereby altering their ecology. The loss of groundwater recharge (due to increased impervious surfaces) and the rise in residential, agricultural, industrial, and mining-related water consumption would increase the frequency of drying events of these wetlands and water bodies, affecting many aquatic and semi-aquatic species. The majority of remaining forests occur on public lands. Ecologically healthy forest habitats that are not protected would become increasingly fragmented, with negative consequences to various wildlife and watersheds. An increase in forest edges would promote the invasion of exotic plants.

Without a refuge, approximately 24,000 acres of habitat could go unprotected, constituting a moderate impact.

Wildlife

Beneficial

Under the No Action alternative, there would be no benefits to native fish or wildlife populations with the possible exception of those species that can tolerate or thrive in urbanized, agricultural, or otherwise altered environments. Examples of such species include deer (*Odocoileus virginianus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), blue jay (*Cyanocitta cristata*), mockingbird (*Mimus polyglottos*), and various fish species that can live in low-quality waters.

Adverse

As native and natural habitats continue to decline in quality and spatial extent, and as habitat patches become more fragmented, the animal species that use these habitats would decline in numbers or fitness. The No Action alternative would exacerbate this decline in the area's flora

and fauna, and because some of these species are endemic or greatly restricted in their distribution, it may contribute to the future listing of species under the Endangered Species Act. Nuisance species that prefer forest edges would increase, such as the brown-headed cowbird (*Molothrus ater*), raccoon, red fox (*Vulpes vulpes*), and opossum (*Didelphis virginiana*). These species are predators on other wildlife and increases in their populations would cause further disruption of native ecosystems. Nonnative aquatic species would also likely increase. Depending on the rarity of the native species affected that are likely to occur in the CPA, this consequence is expected to be moderate.

Federal/State Listed and Priority Species

Beneficial Effects

Under the No Action alternative, there would be no benefits to at least ten federally listed (threatened or endangered) species that are known to occur on some of the CPA. Likewise, at least 39 state-listed species of concern would also not benefit under this alternative.

Adverse Effects

The Upper Green River Watershed is rated by the Nature Conservancy and the Natural Heritage Program as the fourth-most important watershed in the United States and the most important watershed in Kentucky to protect for fish and mussel species. It is the most biologically diverse river in the entire Ohio River ecosystem and hosts 71 mussel species and more than 150 fish species. In addition, there are 43 endemic species found in the Green River that are found nowhere else in the world. These unique species are not expected to benefit under this alternative.

Similarly, federal/state priority and state listed species are generally not expected to benefit under this alternative.

Nonnative Species

Beneficial

Given the Service's policy that most exotic species are undesirable, there would be no positive consequences under this alternative.

Adverse

Many exotic species often thrive in habitats that have been disturbed (Byers 2002). In addition, increased human access (new settlements, roads, etc.) increases the opportunities for exotic species to spread. The opportunity for expanded urbanization and other land uses that are expected to occur under the No Action alternative could allow for the continued proliferation of numerous exotic species, furthering the disruption of the native ecosystems. As exotic species gain a greater foothold in the AOI, they colonize and negatively alter rare habitats and the native species associated with these areas. The impacts resulting from exotic species are expected to increase under this alternative.

EFFECT ON THE SOCIOECONOMIC ENVIRONMENT

This section discusses potential effects to socioeconomic resources (e.g., local tax revenues, wildlife-dependent economics, refuges and local real estate values, ecosystem services, and land use patterns) under the No Action alternative.

Local Tax Revenues

Under this alternative (No Action), local tax revenues would not be affected since the refuge would not be established. The No Action Alternative will not have any effect on local taxes.

Economics of Wildlife-dependent Recreation

Beneficial

Economic benefits associated with wildlife-dependent recreation would not be realized under this alternative.

Adverse

Acquisition and management of new lands in the AOI that offer wildlife-dependent activities are not likely to be established in the foreseeable future. Public lands, such as refuges, can contribute to the region's economy in several ways. First, a segment of the visiting public would spend its money at area hotels and restaurants. Second, visitors would locally buy some equipment and supplies associated with public uses such as hunting, fishing, and wildlife-watching/photography. Data also shows that property values increase on lands near National Wildlife Refuges.

Wildlife-related activities are important in Kentucky. According to the outdoor industry association, 61% of residents participate in outdoor recreation each year. This recreation generates 12.8 billion in consumer spending annually, 120,000 direct jobs and 756 million in state and local tax revenue. The association also states that twice as many jobs in Kentucky are sustained from hunting and fishing than distilling as an example of the importance of certain types of outdoor recreation to Kentucky's economy. In the absence of new public lands in the area, the associated new economic and tax opportunities would not be realized.

Effect of Refuges on Nearby Property Values

Beneficial

There would be no benefits to property values resulting from this alternative.

Adverse

A new study released by the Service, "Amenity Values of Proximity to National Wildlife Refuges," shows that in urban areas across three regions of the country, owning a home near a national wildlife refuge increases home value and helps support the surrounding communities tax base (Taylor et al. 2012). According to the study, homes located within half a mile of a refuge and within eight miles of an urban center were found to have higher home values of roughly:

- Seven to nine percent in the southeast

- Four to five percent in the northeast; and
- Three to six percent in the California/Nevada regions.

Hence, under this alternative, property values would not benefit from a nearby refuge and would rise only according to regional factors.

Ecosystem Services

Beneficial

Under this alternative, there would be no benefits to local communities associated with ecosystem services, and no cost savings to local communities would result from functioning natural systems, such as those provided by a refuge.

Adverse

Under this alternative, local communities would not benefit from an array of potential “ecosystem services” (McConnell and Walls 2005).

Land Use Patterns

Beneficial

Under the No Action alternative, lands trusts, national parks, Natural Resources Conservation Service, Kentucky state agencies, and other conservation land managers would continue to protect some of the lands in the AOI. Even if the proposed refuge lands are acquired over the next several decades, lands in the AOI would be left unprotected and remain at risk from urban development, row-crop agriculture (including biofuel production), industry, mining, and other land uses generally deemed incompatible with natural resource protection efforts. Hence, in terms of conservation, which is an integral component of the Service’s mission, there would be no beneficial impacts to land use under this alternative.

Adverse

Kentucky’s populations are likely to continue to rise during the next 50 years. The replacement of open spaces (e.g., farmland, wildlife habitat, outdoor recreation areas) in the AOI by ever changing land uses would continue to have potential negative consequences to people and wildlife. Impacts would be to clean and dependable supplies of water, local food/fiber production, outdoor recreation, etc. These effects are expected to be moderate.

EFFECTS ON CULTURAL RESOURCES

This section discusses potential effects to cultural (e.g., archaeological, historical) resources under the No Action alternative.

Beneficial

No positive impacts to archeological and historic resources are expected under the No Action alternative.

Adverse

The No Action alternative could have a negative effect on the protection of historical and archaeological resources in the AOI. Without additional protection, cultural resources, whether listed or not, tend to be vulnerable to development, disturbance, take, and vandalism. Without a refuge, fewer lands would be managed by the Service and its partners, which have a clear responsibility for protection of cultural resources.

Landowners and developers have no similar legal responsibilities, unless one of their activities requires a federal permit (i.e., U.S. Army Corps of Engineers 404 Permit, or a Service Incidental Take Permit) or state permit. If permits are required, landowners or developers would have to comply with either Section 106 of the National Historic Preservation Act or state regulations regarding cultural resources prior to the issuance of any permit. In these cases, archaeological and historical investigations, if deemed necessary by the federal agency, the state agencies, and the tribes, would be limited to the project area in question. The activity could proceed provided that the landowner or developer has taken steps to avoid, minimize, or mitigate adverse impacts to historic properties identified within the specific project area. While a number of landowners within the AOI possess a strong conservation ethic and their efforts to protect and conserve important habitats on their holdings are often beneficial for cultural resource sites, other landowners may not be so principled.

However, because of population growth, increased urbanization, and changing land use patterns projected for the AOI, a number of historical properties would likely be adversely impacted under the No Action alternative. These impacts are expected to be moderate.

ALTERNATIVE B: PROPOSED ACTION

Under this alternative, the Service would authorize an approximately 53,000 acre CPA from within which approximately 24,000 acres of lands and waters could be acquired as part of Green River NWR. Proposed methods of acquisition are summarized in Section A.

EFFECTS ON THE PHYSICAL ENVIRONMENT

This section discusses potential effects to physical resources (e.g., topography, soils, water resources) under the Proposed Action.

Topography and Geology

Beneficial

Under this alternative, once acquired by the Service, the topography and geology would be protected from activities that could substantially alter the landscape. As discussed under the "Topography and Geology" section under the No Action alternative, current mining operations are changing these resources at selected sites within the AOI. If lands that contain mineral or energy resources are acquired, benefits to topography and geology are expected to be a minimal. Other lands that have been converted or altered significantly would be evaluated for restoration opportunities, and would likely include some aspects of topography restoration.

Adverse

If Green River NWR were to be established, minimal construction activities would occur that would affect these resources. Any possible new construction (e.g., facilities to support refuge operations and visitor services) is not expected to result in adverse impacts to the topography or geology over the long term and instead would incorporate and highlight natural topography and geology where appropriate.

Soils

Beneficial

Under this alternative, there would be a minor benefit to soils within the proposed refuge. This resource would largely be protected from disturbance and degradation associated with development, agriculture, mining, etc. The “Soils” section under the No Action alternative provides a more detailed discussion on how these land uses can affect soils.

Adverse

Within the proposed refuge, some soils could be disturbed due to the construction of one or more potential buildings, parking lots, and other infrastructure needed to support refuge visitors and operations. Natural soil-formation processes would no longer occur in areas covered by impervious surfaces (e.g., roads, parking lots, buildings). Soil compaction is also expected at sites where construction occurs. Best management practices would be used to minimize these impacts. Additional environmental analyses would be conducted in association with any substantial (e.g., roads, parking lots, buildings) construction projects, per Service policy. Although the exact acreage needed for any new refuge infrastructure is unknown at this point, it is believed it would be a small percentage of the total refuge area. Agricultural activities would still occur on lands acquired in support of wildlife objectives. Tillage and chemical use would occur in support of agricultural activities but in highly scrutinized manner approved at many levels to reduce negative impacts associated with erosion, runoff and soil contamination. The impacts to soils resulting from the alternative are expected to be minimal.

Climate Change

Beneficial

Under this alternative, there would be assurances that the approximately 24,000 acres of proposed refuge lands would continue to act as carbon sinks, resulting in a positive impact with regard to climate change. Habitat restoration work that would include tree and/or grass plantings would aid in providing this assurance. As further detailed in the “Climate Change” section under the No Action alternative, many natural areas have the ability to store carbon (live and dead vegetation, soil). Habitats differ in their ability to store carbon, depending on the amount of vegetation they support and other factors. Some habitats such as certain wetlands, although they store carbon, also produce methane (Bridgham et al. 2006), which is a powerful greenhouse gas (NOAA 2011). It is believed that the proposed refuge lands would provide a net reduction in greenhouse gases, even with potential anthropogenic sources (see discussion of Adverse Effects below) of these gases taken into account. Overall, this benefit would be minimal. Due to the comparatively small size of the proposed refuge, its carbon sequestration ability would likely not be measurable compared to the volume of Earth’s atmosphere.

Adverse

Under this alternative, refuge operations and facilities, public visitation, and habitat management would contribute greenhouse gases to the atmosphere.

The amount of carbon that would potentially be released through refuge operations (e.g., combustion engines, electrical equipment use) was not estimated for this Draft EA. However, the proposed refuge would aim to minimize its carbon emissions. As the Refuge System works to implement many of the strategies for achieving Service-wide carbon neutrality by 2020 (USFWS 2011: "Strategic Plan for Climate Change"), refuge energy use is expected to decline. These actions would include use of hybrid vehicles, building energy efficient facilities, video-conferencing (to reduce travel-related energy use), and green purchasing. These strategies, combined with those of other Service offices and the Federal Government in general, would likely result in a beneficial reduction in the rate of greenhouse gas emissions nationally.

Refuge visitation would be associated with a number of vehicles on the refuge. The low rate of speed necessitated would minimize emissions. In addition, the number of vehicles on the refuge at any given time would not be expected to create a significant impact to greenhouse gas emissions.

Prescribed burning could be a valuable habitat management tool within several habitats of the proposed refuge. The primary gases released during prescribed fire include CO₂, CO, and water vapor, with other gases present in trace amounts (EPA 2011). Most of these are greenhouse gases. However, it has been shown that prescribed fires can decrease the risk of wildfires, which typically release greater amounts of greenhouse gases (National Science Foundation 2010). Wildfires tend to burn entire habitats including mature trees, whereas prescribed fires are aimed at reducing groundcover and low-growing shrubs. The amount of greenhouse gases contributed to the atmosphere as a result of prescribed fires on the proposed refuge is expected to be minimal.

Air Quality

Beneficial

A positive effect on air quality is anticipated as a result of this alternative. With the establishment of the proposed refuge, sources of air pollution resulting from urbanization, industry, etc., would be halted within the 24,000 acres acquired as part of the refuge. This benefit is expected to be minor, given that the proposed refuge would cover a relatively small percentage of the total AOI.

Adverse

Under this alternative, refuge operations and facilities, public visitation, and habitat management would contribute some pollutants to the atmosphere, affecting air quality.

Some air pollutants would be released through refuge operations (e.g., combustion engines, electrical equipment use). However, the proposed refuge would aim to minimize its emissions from vehicles as well as the indirect emissions associated with electrical energy use. As the Refuge System works to implement many of the strategies for achieving Service-wide carbon neutrality by 2020 (USFWS 2011: Strategic Plan for Climate Change), refuge energy use is expected to decline. These actions would include use of hybrid vehicles, building energy efficient facilities, video-conferencing, and green purchasing. These strategies, combined with those of other Service offices and the Federal Government in general, would likely result in a

beneficial reduction air pollutants. Refuge visitation would be associated with a number of vehicles on the refuge. The low rate of speed necessitated would minimize emissions of air pollutants. In addition, the number of vehicles on the refuge at any given time would not be expected to create a significant impact to air quality.

Prescribed burning could be a valuable habitat management tool within several habitats of the proposed refuge. Prescribed burning releases several air pollutants, including CO and particulate matter. The proposed refuge would work with its partners to reduce smoke-related issues in adjacent areas resulting from prescription fires. The risk of wildfires would be minimized through a fire management program. One positive consequence of prescribed fire is the reduction in the frequency and intensity of wildfires, which tend to release larger amounts of air pollutants (National Science Foundation 2011).

Overall, the negative consequences to air quality associated with this alternative are expected to be minor.

Water Quality

Beneficial

This alternative is expected to result in benefits to water quality in the AOI. The establishment of the proposed refuge would protect 24,000 acres from future urbanization, expanded agricultural operations, growing industries, etc. These land uses are typically associated with declines in water quality, as further detailed in the “Water Quality” section under the No Action alternative. Conservation lands, such as the proposed refuge, tend to improve water quality downstream as restored or maintained vegetated areas reduce runoff and sedimentation, while also absorbing some nitrogen and phosphorus (<https://www.cwp.org/reducing-stormwater-runoff/>). Installation of agricultural and stormwater best management practices and the use of low impact development methods on refuge lands are expected to improve water quality within portions of the AOI. Sedimentation, excess nutrients, and other water pollutants are further discussed in the section on “Water Quality” under the No Action alternative. The positive impacts to water quality are expected to be moderate under the Proposed Action.

Adverse

Under this alternative, there would be some impacts to water quality resulting from new construction, refuge operations, and visitor use on the proposed refuge.

The construction of office and visitor use buildings, parking areas, trails, and other facilities and infrastructure needed for refuge operations and public use programs would cause some vegetation clearing, soil disturbance, and associated runoff. Low impact development methods and best management practices would be used to minimize these effects. Runoff from roads and parking lots would cause some oil, grease, and other materials from vehicles to leach into soils or be carried as runoff into low-lying areas. Stormwater wetlands and retention ponds, for example, would help mitigate many of the water quality impacts associated with runoff.

Prescribed fires and clearing of nonnative plants would cause some vegetation to be removed, leaving soils exposed to runoff and erosion. In general, it is expected that runoff would be buffered by vegetated areas and would likely not contaminate water bodies. If nonnative plant removal operations were to occur in riparian zones, BMPs would help ensure that impacts to water quality were kept to a minimum. Use of only EPA registered and Service approved

herbicides for controlling non-native plants or in support of refuge agriculture, forestry and maintenance could cause some of these chemicals to leach into the groundwater or make their way into surface waters. Application of pesticides on the proposed refuge will adhere to the Department of the Interior's Pesticide Use Policy (517 DM 1), the Service's Integrated Pest Management Policy (569 FW 1), and other applicable policies (e.g., 601 FW 3 Biological Integrity, Diversity, and Environmental Health; 620 FW 2 Cooperative Agriculture Use; 603 FW 1 Appropriate Use; and/or 603 FW 2 Compatibility). Adherence to these policies and the Service's Best Management Practices (BMPs) would keep any of these adverse effects to water quality at a minimum. Herbicide use would likely be much less than occurs on working farms and in developed areas.

Public use on the proposed refuge would include hunting (which, by its very nature, is off-trail), with some associated trampling of vegetation. This is expected to be a minimal impact, given that hunter densities would likely be sufficiently low to reduce the chances of foot-paths from becoming established. Erosion associated with wildlife watching would be minimized by limiting these activities to trails, and possibly, overlooks and observation towers. For anglers, some improved access (e.g., boardwalks) to fishing areas might be constructed, which would minimize erosion to shorelines.

In general, it is believed that any negative consequences to water quality resulting from the proposed refuge would be minimal.

Hydrology and Water Quantity

Beneficial

This alternative is expected to result in positive impacts to the hydrology and water quantity of the area. About 24,000 acres of proposed refuge lands would be protected from the construction of extensive drainage ditches, roads, and large areas of impervious surfaces associated with development that would otherwise alter the hydrology. See the "Hydrology and Water Quantity" section under the No Action alternative for a discussion on the impacts of various structures on water flow and quantity. The benefit to these resources is expected to be moderate under the Proposed Action. Furthermore, the refuge would restore the hydrology where needed, which would be beneficial to refuge lands and areas outside of the refuge.

Adverse

Under this alternative, there would be some impacts to hydrology and water quantity resulting from construction projects on the proposed refuge. Infrastructure such as visitor and office facilities, paved areas, and landscaped areas would alter, to some degree, the local hydrology and amount of water available to downstream areas. Specific site plans for public use building(s) and refuge offices have not yet been developed (where possible, existing structure would be evaluated to determine if they could serve refuge needs), so the amounts of impervious surfaces are unknown at this time. However, impervious surfaces, such as roads, sidewalks, and buildings, reduce the area available for rainwater to percolate into the soil. This generally has two direct consequences when it rains: there is less water available for recharging the local surficial aquifer, while at the same time the amount of runoff that flows into low-lying areas increases. Low impact development methods and best management practices would be used to minimize these effects. Stormwater wetlands, and retention ponds, rain gardens, and rooftop rainwater harvesting, for example, would help mitigate many of the water quantity impacts associated with impervious surfaces. The Kentucky Department of Environmental

Protection would be used as a reference during construction, and BMP's would be employed to minimize impacts from refuge-associated development. Although additional environmental studies would likely be conducted in association with any future construction, it is not believed that there would be significant impacts to the hydrology or water quantity resulting from the proposed refuge. Overall, the negative effects on hydrology and water quantity are believed to be minimal under this alternative.

Noise

Beneficial

The soundscape of the areas in which the refuge is proposed would benefit under this alternative. Sources of noise from industrial operations would not occur within the refuge boundary, providing minimal benefits to this resource.

Adverse

Some noise would be associated with use of vehicle and limited equipment by refuge staff and the visiting public on the refuge. Because high levels of speed would not be permitted on the refuge, associated noise levels would be kept to a minimum. However, traffic from the proposed I-69 ORX may contribute to increased noise to visitors and wildlife on the refuge. The level is expected to cause minimal adverse impacts to this area. Hunting would cause some noise disturbance, but the frequency and duration would be at levels that would keep it at minimal levels. Overall, it is expected that the proposed refuge would have a minimal impact on this resource.

EFFECTS ON THE BIOLOGICAL ENVIRONMENT

This section discusses potential effects to biological resources (e.g., habitats, wildlife, federal/state-listed species, and exotic species) under the Proposed Action.

Habitats

Beneficial

With the implementation of Alternative B, floodplain habitats and adjacent uplands and stream habitats would be afforded additional protection, and we expect moderate benefits to natural habitats. At this time, we cannot predict the relative amounts of different habitats that would eventually make up the refuge, but it would conceivably have more forested and shallow wetland ratio to what is found in the overall CPA.

Protecting the adjacent buffer areas would be critical to the long-term conservation of Green River. These vegetated areas help protect water resources that are important to the river. Forests, for instance, can absorb and slowly release water; providing a flow of water that sustains the river up-stream, even during some droughts. Conversely, vegetated lands help prevent sedimentation and limit flash floods.

Adverse

The 2012 Census of Agriculture reported a 9% decrease in farms (509 farms to 465 farms) and 10% decrease in acres farmed (195,706 acres to 175,914 acres) from 2007 to 2012,

respectively in Henderson County, Kentucky. With the proposed establishment of Green River NWR, this decline in farmed acres may continue as some refuge lands would be converted to bottomland hardwoods or impoundments for wildlife. Land in farming (Approximately 73% or 40,450 acres in CPA) could be moderately affected if 24,000 acres were removed from availability; however, lands other than agricultural are considered within the CPA, prime agricultural lands will likely not be for sale and purchasing of substantial acreage of land by the U.S. Fish and Wildlife Service will take decades to accomplish, therefore the impact will be gradual and considered minimal.

We anticipate that existing natural habitats could also be lost to urban development under the No Action alternative. This would fragment remaining natural lands and waters. However, we expect that the distribution of these impacts might change if the Proposed Action was implemented. For example, the Proposed Action would protect approximately 24,000 acres from unpredictable land use changes; however, additional development could be attracted to the periphery of protected areas. A frequent real estate selling point is the ability to own land where there are fewer neighbors and some people may desire to live adjacent to a refuge or other protected natural area. This could entice residential development around the Proposed Action on lands not already protected. In this event, the periphery of these areas could be affected by adjacent landowners (human disturbance) and wildlife connectivity could be reduced. In the interim, the price for these adjacent lots may also increase due to their anticipated desirability. That increase in cost, may make it more difficult for the Service or other conservation agencies or entities to buy additional lands or easements in those areas. In general, we expected impacts to habitats under this alternative to be minor.

Wildlife

Beneficial

There are hundreds of non-listed species including fish, mussels, amphibians, reptiles, birds, and mammals potentially present in the AOI. The Green River Basin is a center of biodiversity for endemic species, however most are found in the upper less disturbed part of the watershed. Numerous migratory birds utilize the forests and other habitats for breeding, wintering and as a stopover location during their migration, especially waterfowl. Continental waterfowl population objectives for the proposed refuge can be stepped down from the North American Waterfowl Management Plan using county-level harvest data (1999-2013) following Fleming et al. (2017; Method 4D). Using a 50-km buffer around the AOI, assigned population objectives from each county overlapped by the buffer and local eBird data (avg. abundance during 1 November – 31 April 2012–2017 (Soulliere et al. 2013), a migration curve was developed to extrapolate waterfowl population estimates over a typical fall/winter/spring period. Total use day objectives for dabbling ducks, diving ducks, and geese were then estimated following Soulliere et al. (2013). Based on these analyses, the proposed Green River NWR's target use day objectives for the proposed Green River NWR would be approximately 3,697,788 dabbling ducks, 155,328 diving ducks, and 884,357 geese. Under this alternative, the habitats protected would benefit a range of other species and potentially reduce mortality that results from habitat loss and human settlement infrastructure such as high towers, roads, etc.

Adverse

There could potentially be some minimal impacts to non-listed species resulting from the establishment of a refuge. Although pre-work surveys and best management practices would

be used, restoration projects could temporarily displace or possibly kill individuals of some species in the short term. However, mitigation efforts would reduce those effects to a minimum and over the long term, impacts would be beneficial to many wildlife species. Various wildlife-dependent public use opportunities (e.g. wildlife observation, hunting, etc.) could cause disturbance to vulnerable species (e.g. nesting birds, etc.) possibly resulting in reduced reproductive output or survival of individuals. Rare plants could get trampled or otherwise disturbed. These risks would be offset by possibly limiting access during certain times of the year to particular sites, making some sites off-limits to the public, and other mitigating measures. These measures will be described in more detail in a detailed Comprehensive Conservation Plan and Appropriateness and Compatibility Determinations, if the refuge is established.

Impacts to game species would include take by anglers and hunters, but this is already occurring in the area. Generally, hunting and fishing on sites where these activities would be permitted would be regulated according to state and refuge guidelines. In some cases and on specific sites, additional restrictions could be warranted. Overall, adverse effects on game species are expected to be minimal.

Federal/State Listed and Priority Species

Beneficial Effects

Under the Proposed Action, there would be direct and/or indirect benefits to several federally listed (endangered or threatened) species that are known to occur on some of the CPA. We believe that under this alternative, through the additional protection and conservation of floodplains and watershed buffers would benefit some species greatly and the establishment of a refuge is expected to contribute to ongoing recovery efforts. Under this alternative, these positive effects are expected to be moderate.

In addition, conservation of this area could help reduce sedimentation rates by converting agricultural lands back into bottomland hardwood forests and utilizing best management practices. Since the Upper Green River Watershed is rated by the Nature Conservancy and the Natural Heritage Program as the fourth-most important watershed in the United States and the most important watershed in Kentucky. It is the most biologically diverse river in the entire Ohio River ecosystem and hosts 71 mussel species and more than 150 fish species. In addition, there are 43 endemic species found in the Green River Basin that are found nowhere else in the world. The positive effects from this alternative could be moderate on parts of the Green River watershed.

Adverse Effects

Impacts to federally/state listed and priority species are expected to be minimal. Restoration efforts could potentially have localized, short-term consequences to some of the flora and fauna, but the long-term benefits (e.g. increasing suitable habitat, growing population size of listed species, etc.) would outweigh those impacts. Best management practices and limiting public access on highly vulnerable sites would further reduce (to minimal levels) any negative effects associated with refuge operations and visitor use. In addition, residential development patterns could shift slightly towards refuge lands if people view it as a desirable recreational area. This could fragment adjacent unprotected habitats.

Invasive Species/Diseases/Pathogens

Beneficial

In our global society, invasive species, wildlife diseases, and pathogens are an ever increasing threat to ecosystems and wildlife (<https://www.fws.gov/invasives/faq.html>). We anticipate that exotic invasive plant species would be managed under the Proposed Action, and regular assessment of wetlands and the surrounding areas included within the CPAs would be necessary to address these threats. Additionally, establishment of a refuge would provide opportunities to educate the public about these threats and to serve as an example on how to minimize their impacts. We envision that a management plan will be developed for the CPA, and this plan will include monitoring and control implementation.

Adverse

The designation of the site as part of a National Wildlife Refuge will likely mean visitation by more people at some locations. High visitation can increase the risk of spreading wildlife diseases, pathogens, and invasives. For example, *ranavirus* and *chytrid* fungi are two wildlife diseases that have devastated populations of amphibians and reptiles in certain regions. These two diseases can easily hitchhike a ride on the boots of visitors or biologists visiting these sites, as can seeds from invasive plants. Risk assessments and appropriate planning should be in place to minimize the chance of spreading invasive species, diseases, and pathogens within and between sites, which will serve to minimize and reduce impacts.

EFFECTS ON THE SOCIOECONOMIC ENVIRONMENT

This section discusses potential effects to socioeconomic resources (e.g. local tax revenues, wildlife-dependent economics, refuges and local real estate values, ecosystem services, and land use patterns) under the Proposed Action.

Local Tax Revenues

The effects, both beneficial and adverse, of Service lands on local tax revenues depends on several factors (federal government appropriations, land value trends, etc.), further described below.

The Refuge Revenue Sharing Act of June 15, 1935 (16 U.S.C. §715s) offsets the loss of local tax revenues from federal land ownership through payments to local taxing authorities. The refuge provides annual payments to taxing authorities, based on the acreage and value of refuge lands located within their jurisdiction. Money for these payments comes from the sale of oil and gas leases, timber sales, grazing fees, the sale of other Refuge System resources, and from Congressional appropriations, which are intended to make up the difference between the net receipts from the Refuge Revenue Sharing Fund and the total amount due to local taxing authorities. The actual Refuge Revenue Sharing payment does vary from year to year, because Congress may or may not appropriate sufficient funds to make full payment. The exact amount of the annual payment depends on the Congressional appropriation, which in recent years have tended to be less than the amount to fully fund the authorized level of payments.

The Refuge Revenue Sharing payments are based on one of three different formulas, whichever results in the highest payment to the local taxing authority. The payments are based on three-quarters of 1 percent of the appraised fair market value (or the purchase price of a property until the property is reappraised). The Service reappraises the value of refuge lands

every five years, and the appraisals are based on the land's highest and best use. Refuge Sharing payments typically benefit local communities in areas where wetlands and formerly farmland-assessed properties make up a larger component of the landscape. On these types of lands, full entitlements Refuge Revenue Sharing payments sometimes exceed the real estate tax; in other cases, Refuge Revenue Sharing payments may be less than the local real estate tax.

In areas that are rapidly urbanizing and land-values are rising, Refuge Revenue sharing payments may be less than local tax rates. However, it is expected that these losses may be offset by cost-savings to communities. Refuges can reduce costs to local communities because they require minimal infrastructure. Maintaining a system of open spaces, such as a refuge, is one important way to control the operating costs of local government. Land conservation is often less expensive for a local government than a suburban-style residential development. In general, refuges and other open spaces put little demand on the infrastructure of a municipality and should be considered in assessing the financial impact on the municipality. Preserving open space has the long-term benefit of avoiding future costs. Increasingly, communities and counties are finding that single-family residential tax rate tables do not cover the costs of municipal services, community infrastructure and local schools. Studies show that for every \$1.00 collected in taxes, residential development, costs between \$1.04 to \$1.67 in services. Furthermore, these costs continue into the future, generally increasing over time. Even including the initial cost of acquisition, open space is less costly to taxpayers over both the short and long term than development of the same parcel, while the major public costs to preserve natural areas are finite (East Amwell Agricultural Advisory Board 1994, Mendham Township Committee 1994, Pinelands Commission 1994, Burlington County Farmland Preservation Program 1996, Madsen et al. 2004).

Under this alternative (establishment of a new refuge), it is difficult to determine what the overall effects will be on local tax revenues. Generally, the area is experiencing population growth, but there are more localized areas where this is not the case. These trends could change over time. At this point in time, we are unable to predict (if the proposal were to be authorized) where and when refuge lands would be purchased within the CPA.

Economics of Wildlife-dependent Recreation

Beneficial

We expect the establishment of a new refuge to have some positive economic effect. Refuges can contribute to the region's economy in several ways. First, a segment of the visiting public would spend money at area hotels, restaurants, gas stations, etc. Secondly, visitors would locally buy some equipment and supplies associated with public uses such as hunting, fishing, and wildlife-watching/photography. Wildlife-related activities are important in Kentucky.

According to the report, "Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation," approximately 34.8 million people visited national wildlife refuges in Fiscal Year 2006, generating almost \$1.7 billion in total economic activity and creating almost 27,000 private sector jobs, producing about \$542.8 million in employment income. Additionally, recreational spending on refuges generated nearly \$185.3 million in tax revenue at the local, county, state, and federal levels (Carver and Caudill 2007). In 2006, nearly 71 million people 16 years and older spent \$45.7 billion and generated \$122.6 billion while fishing, hunting, or observing wildlife (Leonard 2008). As land development continues and the number of places left to enjoy wildlife decreases, refuge lands may become even more

important to the local community. It can benefit the community directly by providing recreational and employment opportunities for the local population and indirectly by attracting tourists from outside the area to generate additional dollars for the local economy. In 2017, Kentucky outdoor recreation generated \$12.8 billion in customer spending annually creating 120,000 direct jobs with \$3.6 billion in wages and salaries and generating \$756 million in State and local tax revenue. The Proposed Action would add to the Kentucky economy by generating more funds from outdoor recreational opportunities and associated revenues.

Adverse

Negative consequences could include additional congestion of area roads, for instance, resulting from an increase in refuge visitors. Heavy traffic and associated long delays could curb future visitation to the area. We expect this effect to be minimal.

Effect of Refuges on Nearby Property Values

Beneficial

A new study released by the U.S. Fish and Wildlife Service, "Amenity Values of Proximity to National Wildlife Refuges," shows that in urban areas across three regions of the country, owning a home near a national wildlife refuge increases home value and helps support the surrounding communities tax base (Taylor et al. 2012). According to the study, conducted for the U.S. Fish and Wildlife Service by economic researchers at North Carolina State University, homes located within half a mile of a refuge and within eight miles of an urban center were found to have higher home values of roughly:

- Seven to nine percent in the southeast
- Four to five percent in the northeast; and
- Three to six percent in the California/Nevada region.

Hence, under this alternative, property values could benefit from a nearby refuge.

Adverse

A rise in real estate values resulting from a nearby refuge could adversely affect some homeowners with fixed or declining incomes.

Ecosystem Services

Beneficial

Under this alternative, local communities could receive some benefits from an array of potential "ecosystem services" (McConnell and Walls 2005). Refuges and other open spaces can provide additional economic benefits, in terms of ecosystem services, which are the cost savings provided by functioning natural systems. These include all the functions performed by nature that contribute to a high quality of life and attracts/sustains employers and families. These functions that provide health and social benefits to humans, such as, recreations clean drinking water, reductions in stormwater runoff (i.e. flood prevention), air-pollution reduction reduced costs of government services, etc. Several studies have been conducted to quantify the financial benefits that open spaces provide to local communities. For example, a 2010

study found that Long Island's parks and open space provided quantifiable economic benefits worth over \$2.74 billion a year (The Trust for Public Land 2010). It must be noted that the agricultural lands were included in the analysis, and had a combined estimated worth of \$288 million annually, slightly more than 10 percent of the total cost benefit. Nationwide, these cost-savings are substantial. It is estimated that within the contiguous 48 states, the total value of ecosystem services provided by wildlife refuge lands was estimated at over \$32 billion annually (Ingraham and Foster 2008). Cost savings associated with flood prevention and mitigation provided by wetlands and other open space are among the most important of all array of ecosystem services. For example, a study by American Forests (2003) determined that the forested open space in Mecklenburg County (NC) provides 935 million cubic feet of storm-water retention capacity. The group estimated that replacing this capacity with man-made infrastructure would cost approximately \$1.9 billion. Another study, conducted by the Minnesota Department of Natural Resources, showed that it would cost approximately \$370 to replace each acre-foot of flood storage capacity naturally provided by a wetland with artificial flood controls (Floodplain Management Association 1994).

Adverse

None anticipated under this alternative.

Land Use Patterns

Beneficial

Under the Proposed Action, the total area of protected lands used for habitat and wildlife conservation and compatible wildlife-dependent recreation could increase in the AOI by approximately 24,000 acres. Still, unprotected lands would likely continue to be converted to development and other land uses (Reid et al. 2008, Kirk 2009), as further detailed in the Land Use Patterns section of Alternative A.

Adverse

Establishment of a refuge would prohibit or limit the future uses deemed incompatible with the mission of the Refuge System (e.g. development, some aspects/forms of agriculture, etc.). However, because the total area of the proposed refuge comprises less than .001 percent of the unprotected acreage in the AOI (the AOI is 17 million acres), the effect on land use patterns under this alternative is expected to be moderate.

EFFECTS ON CULTURAL RESOURCES

This section discusses potential effects to cultural (e.g. archeological, historical) resources under the Proposed Action.

Beneficial

Beneficial impacts to cultural resources would be anticipated from the implementation of the Proposed Action. The 24,000-acre refuge would help increase the preservation of any archaeological and historic sites on otherwise unprotected lands within the AOI. The Service, like other federal agencies, has several legally mandated responsibilities that include development of a cultural resource management plan, compliance with the Section 106 of the National Historic Preservation Act prior to any undertaking that possesses the potential to

impact historic properties, archaeological inventory of its lands and subsequent National Register eligibility testing, research-directed testing or excavation, site protection, and interpretation. Critical to these efforts are the KY State Historic Preservation Office, the Eastern Band of Cherokee Indians, and a number of interested parties, such as nearby universities, adjacent landowners, and State resource agencies. The Service would, when possible, partner with the Eastern Band of Cherokee Indians and/or other interested Native American Tribes to facilitate archaeological and ecological investigations, protection, and interpretation of sites deemed to have cultural and religious significance for the Tribe(s). Protection of historic properties would be enhanced by incorporating concepts of site stewardship and ownership, where appropriate, into public use materials and interpretive panels. This effort would be further enhanced by providing advanced archaeological resource protection training to refuge law enforcement personnel.

Adverse

Minimal impacts to cultural resources could be anticipated under the Proposed Action. There could be some risk that refuge visitors may inadvertently or intentionally damage or disturb cultural resource sites; however, we would employ all means available to protect archaeological sites, historic structures, cemeteries, and historic landscapes through scientific investigations, public education, partnerships with tribal, state, and local governments, and law enforcement efforts.

CUMULATIVE EFFECTS

According to the Council on Environmental Quality NEPA implementing regulations in 40 CFR 1508.7, “cumulative impact” is the impact on the environment which results from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. For the purposes of this EA, the cumulative effects from the Proposed Alternative on each resource are discussed in terms of the net positive or negative impact, if any.

PHYSICAL RESOURCES

Some minimal and minor impacts on physical resources are expected, under the Proposed Alternative, but none of these are anticipated to be cumulatively significant. Cumulative effects on individual physical resource categories are further discussed below.

Topography and Geology

Under the Proposed Action, no adverse cumulative effects are predicted to this resource.

Soils

The Proposed Action is expected to have net beneficial effects on soils in the AOI as more lands would be protected from changing land uses. The Proposed Action would decrease soil disturbance since construction of buildings, roads, parking lots, and other infrastructure associated with development would not occur on refuge lands.

Climate Change

Lands protected under the Proposed Action would not have a significant cumulative negative effect on climate change. Under this alternative, additional lands that are believed to function as net carbon sinks would be protected. Growing vegetation and natural soil formation processes would continue to sequester carbon.

Air Quality

The Proposed Action is not expected to have significant cumulative adverse impacts on air quality, locally or regionally, since it would help retain vegetated areas within the proposed refuge. Some short-term, local deterioration in air quality would be expected from air emissions of motor vehicles used by refuge visitors and staff, as well as habitat management (e.g. prescribed burning).

Water Quality

Overall, the Proposed Action alternative is predicted to have a net positive cumulative impact to water quality in the AOI, as it would protect vegetated areas within the proposed refuge boundaries reducing sedimentation and slowing water for greater filtration, helping to improve water quality.

Hydrology and Water Quantity

The Proposed Action would likely protect lands from future development and associated adverse impacts to these resources. The Proposed Action would result in net cumulative benefits to the hydrology and water quantity in the AOI by protecting vegetated areas.

Noise

The Proposed Action would have a net beneficial effect on the area's soundscape by helping to maintain a more rural landscape. However, if the I69 ORX is realized, increased sources of noise could negatively impact the soundscape right near the final corridor.

BIOLOGICAL RESOURCES

Effects of Habitat Loss

If fully realized, the proposed refuge would protect a relatively large amount of habitat, constituting a moderate cumulative benefit.

Hunting Impacts

Under the proposed action, hunting on proposed refuge lands would not have regional population impacts on wildlife deemed as game species due to restricted home ranges and controlled hunting season, methods, and bag limits. When certain species become overabundant, diseases can reduce the populations. However, waiting for disease outbreak to regulate their numbers can be a human health hazard, a hazard to the other wildlife species and possibly detrimental to the diseased population as a whole. The proposed alternative is not expected to have a significant cumulative effect on local populations of these species.

NEPA considerations by the Service for hunted migratory game bird species are addressed by the programmatic document, "Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds (FEIS) (USFWS 1988) and the FEIS was updated in 2013 (USFWS 2013). Annual NEPA considerations for waterfowl hunting frameworks are covered under a separate Environmental Assessment. More information may be obtained from: Chief, Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, MS MBSP-4107-ARLSQ, 1849 C Street, NWR, Washington, DC 20240. Any hunting of migratory game birds on specific sites would not be expected to incur any significant negative cumulative effects on their populations.

Direct and cumulative effects on non-game species would be minimal through implementation of a controlled game-species hunting program. Although incidental take or illegal take of an individual animal cannot be eliminated, controlled hunt programs consider the risks/potential of such incidents in addition to undue disturbance and regulate through refuge specific regulations and law enforcement to ensure only minimal effects.

SOCIOECONOMIC ENVIRONMENT

The Proposed Action would have some positive effects on socioeconomic resources. Wildlife-dependent recreation would provide additional direct and indirect economic benefits to the region by drawing visitors. Increased opportunities for wildlife-associated recreation opportunities would further help improve the quality of life in the AOI, particularly as open space available to the public becomes increasingly scarce over the next decades as regional populations increase and demand for land related resources rise. Further, no significant negative impacts would be anticipated to neighboring landowners from the implementation of the Proposed Action alternative, including from management and public use activities.

CULTURAL RESOURCES

Under the Proposed Action, beneficial effects would occur because of increased land protection. In addition, increased field surveys would likely be conducted on Service-owned lands to identify and protect any sites discovered.

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects are the effects of those actions that could cause significant harm to the human environment and that cannot be avoided, even with mitigation measures. There would be some minor, localized unavoidable adverse effects under all the alternatives. Under the Proposed Action alternative, there could be, for example, localized adverse effects of building a new refuge headquarters and upgrading access roads. There would be potential property tax losses to towns and increased visitation that could be unavoidable effects in those years that revenue sharing payments are less than local property taxes. However, none of these effects rises to the level of significance. All would be mitigated, so there would be no significant unavoidable adverse impacts under the Proposed Action.

RELATIONSHIP BETWEEN SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The Proposed Action would strive to maintain or enhance the long-term productivity and sustainability of natural resources on proposed refuge lands. This alternative would strive to

conserve federal trust species and state-listed species and the habitats they depend on. It also strives to develop outreach and environmental education activities that would encourage visitors to be better stewards of the environment.

POTENTIAL IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Establishing a refuge, as described under the Proposed Action, may contribute to irreversible and irretrievable commitments of federal financial resources. For example, one would be the possible construction or modification of a refuge office and associated visitor facility, visitor amenities, and access road(s). These typically require long-term commitments of resources. Another irreversible commitment of resources impacting local communities is Service land acquisition. Once these lands become part of the refuge, it is unlikely they would revert back to private ownership.

SUMMARY

Based on the nature of the proposal, the location of the CPA, and current land use, the Proposed Action would not have any significant adverse effects on the quality of the human environment including public health and safety. Further, because the purpose of the proposal is to protect, maintain, and where possible, enhance the natural habitat of the lands within the proposed acquisition area, the proposal is not expected to have any significant adverse effects on the area's wetlands and floodplains, pursuant to Executive Orders 11990 and 11988.

Implementation of the Proposed Action would not involve any highly uncertain, unique, unknown, or controversial effects on the human environment. The Proposed Action would not establish a precedent for future actions with significant effects, nor would it represent a decision in principle about a future consideration. No cumulatively significant impacts on the environment would be anticipated.

In addition, the proposal would not significantly affect any unique characteristic of the geographic area, such as historical or cultural resources, wild and scenic rivers, or ecologically critical areas. The proposal would not significantly affect any site listed in or eligible for listing in the National Register of Historic Places, nor would it cause loss or destruction of significant scientific, cultural, or historic resources. The area's cultural resources would be protected under the regulations of the National Historic Preservation Act of 1966, as amended, the Archaeological Resources Protection Act, and the Advisory Council on Historic Preservation (36 CFR 800). The KY State Historic Preservation Offices would be contacted whenever any future management activities have the potential to affect cultural resource sites.

All tracts acquired by the Service in fee-title would be removed from local real estate tax rolls because federal government agencies are not required to pay state or local taxes. However, the Service makes annual payments to local governments in lieu of real estate taxes, as required by the Refuge Revenue Sharing Act (Public Law 95-469). No measures would be taken that would lead to a violation of federal, state, or local laws imposed for the protection of the environment.

RECOMMENDATION

The Service recommends Alternative B as the Proposed Action because it better serves the outlined purpose and need, stated goals and objectives, and vision and purposes of the refuge.

Through the establishment of a refuge as described in Alternative B, the Service would be able to fully participate with other conservation partners in the management and protection of the wildlife and habitats within the Conservation Partnership Area. Threatened and endangered species would receive additional management attention. Connectivity between existing conservation lands would be enhanced, and movement corridors would be protected. Opportunities for wildlife oriented recreational activities would be increased. Further, any cultural resources found within the proposed refuge would be afforded protection by the Service.

GLOSSARY

Appropriate Use - a proposed or existing use on a refuge that meets at least one of the following three conditions:

1. The use is a wildlife-dependent use.
2. The use contributes to fulfilling the refuge purpose(s), the National Wildlife Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the National Wildlife Refuge System Improvement Act was signed into law.
3. The use has been determined to be appropriate as specified in section 1.11 of the National Wildlife Refuge System Improvement Act.

Area of Influence (AOI) - a generalized area which contains lands of interest to the USFWS and within which the agency will analyze environmental impacts of a proposed action. The AOI for this project was limited to Henderson County, Kentucky. The AOI does not convey authority to establish rules and regulations and is only used to study the effects of a proposal on the human environment, including abiotic, biological, socioeconomic, and cultural resources.

Biological Diversity (or Biodiversity) - the variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur

Biological Integrity - biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms, and communities

Candidate Species - plants and animals for which the U.S. Fish and Wildlife Service (FWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

Categorical Exclusion - pursuant to the National Environmental Policy Act (NEPA), a category of federal agency actions that do not individually or cumulatively have a significant effect on the human environment [40 CFR 1508.4]

Compatible Use - "The term 'compatible use' means a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director [of the U.S. Fish and Wildlife Service], will not materially interfere with or detract from the fulfillment of the mission of the [National Wildlife Refuge] System or the purposes of the refuge." – National Wildlife Refuge System Improvement Act of 1997 [Public Law 105-57; 111 Stat. 1253]

Compatibility Determination - the process in which a wildlife-dependent use or any other public use on a refuge is found to be compatible or incompatible with the fulfillment of the National Wildlife Refuge System mission or the purposes of the refuge. This determination is a requirement for wildlife-dependent uses or any other public uses on a refuge.

Compatibility Policy - "The refuge manager will not initiate or permit a new use of a national wildlife refuge or expand, renew, or extend an existing use of a national wildlife refuge unless the refuge manager has determined that the use is a compatible use." [Service Manual 603 FW 2.3]

Comprehensive Conservation Plan (CCP) - Mandated by the National Wildlife Refuge System Improvement Act of 1997, a document that provides a description of the desired future conditions and long-range guidance for the refuge manager to accomplish purposes of the Refuge System and the refuge. CCPs establish management direction to achieve refuge purposes. [Public Law 105-57; Service Manual 602 FW 1.6]

Conservation Partnership Area (CPA) - a series of lands that would be indicated where potential refuge lands would be acquired totaling approximately 53,000 acres. Approximately 24,000 acres of proposed refuge lands, easements, etc. would be located within the CPA.

Cumulative Impact - according to NEPA, the impact on the environment which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Disjunct (populations) - populations with a *disjunct* distribution is one that has two or more groups that are related but widely separated from each other geographically.

Easement - an agreement by which landowners give up or sell one of their rights on their property (e.g. landowners may donate rights of way across properties). It is a non-possessory interest in a real property owned by another imposing limitations or affirmative obligations with the purpose of returning or protecting the property's conservation values.

Endangered - the classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

Endemic - native and restricted to a certain place.

Environmental Assessment (EA) - a concise public document, prepared in compliance with the National Environmental Policy Act (NEPA), that discusses the purpose and need for an action, alternatives that were considered, and provides sufficient evidence and analysis of the action's effects to determine whether it is necessary to prepare an Environmental Impact Statement (see immediately below) or a Finding of No Significant Impact (FONSI) [40 CFR 1508.9].

Environmental Impact Statement (EIS) - a detailed, written analysis of the environmental effects of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources [40 CFR 1508.1 1]

Fee-title - is a real estate term that means the type of ownership giving the owner the maximum interest in the land, and entitling the owner to use the property in any manner consistent with federal, state, and local laws and ordinances.

Finding of No Significant Impact (FONSI) - supported by an environmental assessment, a document that briefly presents why a federal action will have no significant effect on the human environment, and for which an environmental impact statement, therefore, will not be prepared [40 CFR 1508.13]

Land Protection Plan (LPP) - a document that identifies and prioritizes lands for potential U.S. Fish and Wildlife Service acquisition from a willing seller, and also describes other methods of providing protection (e.g. easements). This document is released with environmental assessments.

Land and Water Conservation Fund (LWCF) - One of several federal funds that may be used to purchase refuge lands. The primary source of income to this fund is fees paid by companies drilling offshore for oil and gas, as well as oil and gas lease revenues from federal lands. Additional sources of income include the sale of surplus federal real estate and taxes on motorboat fuel.

North American Waterfowl Management Plan (NAWMP) - The waterfowl management community in the United States and Canada developed a strategy to restore waterfowl populations through habitat protection, restoration and enhancement. Signed in 1986 by the United States and Canada and in 1994 by Mexico, the plan is the foundational waterfowl conservation partnership.

National Environmental Policy Act of 1979 (NEPA) - requires all agencies, including the U.S. Fish and Wildlife Service, to examine the environmental impacts of their actions, incorporate environmental information, and utilize public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements and prepare appropriate NEPA documents to facilitate better environmental decision-making. NEPA requires federal agencies to review and comment on federal agency environmental plans and documents when the agency has jurisdiction by law or special expertise with respect to the environmental impacts involved (42 U.S.C. 4321-4327) (40 CFR 1500-1508).

National Wildlife Refuge (refuge) - A designated area of land, water, or an interest in land or water within the Refuge System, but does not include Coordination Areas (Service Manual 603 FW 2.5 N).

National Wildlife Refuge System (Refuge System) - "All lands, waters, and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, coordination areas, and other areas for the protection and conservation of fish and wildlife including those that are threatened with extinction as determined in writing by the Director or so directed by Presidential or Secretarial order. The determination by the Director may not be delegated" (Service Manual 603 FW 2.5 I).

Relict (populations) - populations that once covered a larger range (e.g., during the last ice age) but have since declined and only remain as small, isolated populations in appropriate habitats.

Threatened - any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

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APPENDIX A. CONCEPTUAL MANAGEMENT PLAN

INTRODUCTION

The proposed Green River National Wildlife Refuge (NWR) is in Henderson County, Kentucky. If established, the refuge would protect a combination of upland and riparian habitats supporting multiple game and non-game species including threatened and endangered wildlife and other species of management concern. The Green River Basin is home to several federally listed species, such as gray and Indiana bats, fanshell, Catspaw, Snuffbox, Pink Mucket, Ring Pink, Sheepnose, Fat Pocketbook, American Burying Beetle, and Rabbitsfoot. Additionally, numerous state listed, imperiled and endemic species are found throughout the watershed. Important habitats of the watershed include bottomland hardwoods, canebrake, and streams.

Should the Proposed Action to establish Green River NWR be approved, it would potentially encompass approximately 24,000 acres of wildlife habitat that would be protected, in perpetuity, through fee-title acquisition, conservation easements, or other means.

This document, the Draft Conceptual Management Plan (Draft CMP), provides further details on the U.S. Fish and Wildlife Service's Proposed Action and how the lands identified therein would be administered.

PURPOSE OF CONCEPTUAL MANAGEMENT PLAN

The Draft Land Protection Plan and Environmental Assessment (Draft LPP/EA) examines the feasibility of establishing a National Wildlife Refuge in the Green River watershed. In Chapter III of the Draft EA, two alternatives are described--No Action (Alternative A), and Alternative B (Proposed Action). The Proposed Action would not be implemented until it had been officially reviewed and authorized.

If approved, the Proposed Action alternative would authorize a Conservation Partnership Area (CPA) of approximately 53,000 acres, within which approximately 24,000 acres would be conserved through fee-title purchase or less-than-fee-title (e.g., easements) purchase. For more specific information on the resources to be protected, refer to Chapter II of the Draft EA. The Service concludes that acquiring these lands over time would provide the needed protection of rare and unique habitats in the area, and build on the existing coalition of organizations and individuals that advocate conservation within Green River watershed. It would also provide the public with increased opportunities for wildlife-dependent recreation and ecotourism.

The Service developed this Draft CMP to describe the management direction for the proposed Green River NWR, as defined in the Proposed Action, and outlines possible interim habitat management priorities and compatible public uses on newly acquired lands, should a refuge be approved. The activities described in this Draft CMP would direct the way we pursue and manage acquisitions, conservation easements, and other land interests until a comprehensive conservation plan (CCP) is developed. By Service policy, a CCP must be developed within 15 years of the actual establishment of a refuge (i.e., acquisition of first land parcel). Any major changes in the activities described in this Draft CMP, any new activities, and our development of the CCP would be subject to public review and comment in accordance with the provisions of Service refuge planning policy (602 FW 1, 2, and 3) and Service and U.S. Department of the Interior policy implementing the National Environmental Policy Act (NEPA) of 1969 (Department of the Interior Manual 516, Appendix 1).

MISSION OF THE SERVICE AND THE NATIONAL WILDLIFE REFUGE SYSTEM

U.S. FISH AND WILDLIFE SERVICE

The mission of the Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The Service accomplishes this through federal programs relating to migratory birds, endangered species, certain marine mammals, fisheries, aquatic resources, and wildlife management activities.

As part of its mission, the Service manages at least 553 national wildlife refuges and other units of the Refuge System covering 150 million acres. These areas comprise the National Wildlife

Refuge System, the world's largest collection of lands and waters set aside specifically for fish and wildlife. The majority of these lands, 77 million acres, is in Alaska, while 54 million acres are part of three marine national monuments in the Pacific Ocean. The remaining acres are spread across the other 49 states and several United States territories. In addition to refuges, the Service manages thousands of small wetlands, 37 wetland management districts, 70 national fish hatcheries, 65 fishery resource offices, and 81 ecological services field stations. The Service enforces federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

NATIONAL WILDLIFE REFUGE SYSTEM

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

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

The wildlife and habitat vision for national wildlife refuges stresses that wildlife comes first; that ecosystems, biodiversity, and wilderness are vital concepts in refuge management; that refuges must be healthy and growth must be strategic; and that the refuge system serves as a model for habitat management with broad participation from others.

Actions were initiated in 1997 to comply with the direction of this new legislation, including an effort to complete comprehensive conservation plans (CCP) for all refuges. These plans, which are completed with full public involvement, help guide the future management of refuges by establishing natural resources and recreation/education programs. Consistent with the National Wildlife Refuge System Improvement Act (Improvement Act), approved plans will serve as the guidelines for refuge management for the next 15 years. The Improvement Act states that each refuge shall be managed to:

- Fulfill the mission of the Refuge System;
- Fulfill the individual purposes of each refuge;
- Consider the needs of wildlife first;
- Fulfill requirements of comprehensive conservation plans that are prepared for each unit of the Refuge System;
- Maintain the biological integrity, diversity, and environmental health of the Refuge System;
- Recognize that wildlife-dependent recreation activities including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation are legitimate and priority public uses; and
- Allow refuge managers authority to determine compatible public uses.

National wildlife refuges connect visitors to their natural resource heritage and provide them with an understanding and appreciation of fish and wildlife ecology to help them understand their role

in the environment. Wildlife-dependent recreation on refuges also generates economic benefits to local communities. According to the report, "*Banking on Nature 2013: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation*," recreational visits to national wildlife refuges generate substantial economic activity. In FY 2011, 46.5 million people visited refuges. Their spending generated \$2.4 billion of sales in regional economies. As this spending flowed through the economy, over 35,000 people were employed and \$792.7 million in employment income was generated. About 72 percent of total expenditures are generated by non-consumptive activities on refuges. Fishing accounted for 21 percent and hunting 7 percent. Local residents accounted for 23 percent of expenditures while visitors coming from outside the local area accounted for 77 percent. Refuge recreational spending generated about \$342.9 million in tax revenue at the local, county, state and Federal level (Carver and Caudill 2013). As the number of visitors grows, significant economic benefits are realized by local communities. In 2006, 87 million people, 16 years and older, fished (30 million), hunted (12.5 million), or observed wildlife (71 million), generating \$120 billion (U.S. Fish and Wildlife Service and U.S. Census Bureau 2006). In a study completed in 2002 on 15 refuges, visitation had grown 36 percent in 7 years. At the same time, the number of jobs generated in surrounding communities grew to 120 per refuge, up from 87 jobs in 1995, pouring more than \$2.2 million into local economies. Other findings also validate the belief that communities near refuges benefit economically. A recent study determined that refuges can also have a positive effect on nearby home values (Taylor et al. 2012). Expenditures on food, lodging, and transportation grew to \$6.8 million per refuge, up 31 percent from \$5.2 million in 1995. For each federal dollar spent on the Refuge System, surrounding communities benefited with \$4.43 in recreation expenditures and \$1.42 in job-related income (Caudill and Laughland, unpublished data). Visitation is growing with 41 million visitors to national wildlife refuges in 2008.

Volunteers continue to be a major contributor to the success of the Refuge System. In 2009, 42,918 volunteers donated 1,611,388 hours. The value of their labor was \$32,630,607, the equivalent of 775 full-time employees. More than 200 friends' organizations support the work of the Service (USFWS 2009b).

The Improvement Act stipulates that CCPs be prepared in consultation with federal and state governmental agencies and adjoining private landowners and that the Service develop and implement a process to ensure an opportunity for active public involvement in the preparation and revision (every 15 years) of the CCPs. All lands of the Refuge System will be managed in accordance with an approved CCP that will guide management decisions and set forth strategies for achieving refuge unit purposes. Each CCP will be consistent with sound resource management principles, practices, and legal mandates including Service compatibility standards and other Service policies, guidelines, and planning documents (602 FW 1.1).

BACKGROUND AND RATIONALE FOR THE ESTABLISHMENT OF A GREEN RIVER NWR

The land being proposed for protection includes a diverse system of bottomland hardwood forests and wetlands, uplands and agricultural lands. In addition, numerous streams criss-cross the landscape. These and other habitats are home to many rare and endemic plant communities. Wildlife is also varied, diverse and includes numerous imperiled species with over 15 federal and dozens of state listed animal species. Threats to these plants and animals range from habitat fragmentation and isolation of small breeding populations to reductions in water quality and conversion of habitat to other land uses.

The water resources of the Green River watershed are important for several reasons. The

quality and quantity of water affects all downstream users, from the diverse aquatic species to human needs, such as recreational anglers, boaters, and residents downstream. In some areas, streamside vegetation has been cleared, accelerating erosion and polluting waterways with sediments. In addition, certain land uses and unimproved roads can erode, contributing to sedimentation of streams. Vegetated areas are also important in regulating the supply of water. As forests are cleared, areas are unable to store water, increasing the frequency of flood events during heavy rains. Conversely, areas with little or no vegetation dry out faster, worsening the impacts of droughts. Rare species, such as many freshwater mussels, are negatively impacted by drainage and sedimentation. Restoration can be accomplished by repairing roads, restoring stream banks, replanting cleared areas, etc.

Throughout this landscape there are several existing conservation lands, ranging from private preserves to state wildlife management areas. It is becoming increasingly important, especially with the threats and uncertainties of global climate change and what it might mean for species ability to adapt, to work collectively with all partners, from the traditional conservation agencies and organizations to the landowners who are integral to assuring that the rural landscapes would persist into the future.

The Service also sees a need to provide additional opportunities for wildlife-dependent recreation and education. It is well recognized that many of our youth no longer have an attachment with the outdoors and outdoor activity (Louv 2006). Establishing a new national wildlife refuge in this landscape would provide these additional opportunities.

It is envisioned that the proposed refuge would:

- Establish a second national wildlife refuge in Kentucky to support conservation of fish, wildlife, and plants;
- Protect and manage wetlands and bottomland forest habitats to support waterfowl, migratory birds, and threatened and endangered species;
- Provide high-quality hunting and sport fishing opportunities;
- Provide opportunities for public use and environmental education and interpretation;
- Collaborate with partners to protect and enhance biodiversity and water quality and quantity within the Ohio River and Green River watersheds, benefiting both humans and wildlife; and
- Ensure healthy wildlife populations for the benefit of Kentuckians and all Americans.

LAWS GUIDING THE NATIONAL WILDLIFE REFUGE SYSTEM

A number of laws, policies and regulations, including the following, govern the acquisition and management of land in the AOI or Lower Green River landscape, including the Improvement Act, the National Wildlife Refuge System Administration Act, Endangered Species Act, and Migratory Bird Treaty Act.

National Wildlife Refuge System Improvement Act of 1997

The Improvement Act guides the development and operation of the Refuge System. It clearly identifies the mission of the Refuge System; requires the Secretary of the Interior to maintain the biological integrity, diversity, and environmental health of refuge lands; mandates a “wildlife first” policy on refuges; and requires comprehensive conservation planning. It also designates the following six wildlife-dependent recreational uses as priority public uses of the Refuge

System: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. The Improvement Act amended the National Wildlife Refuge System Administration Act of 1966, which continues to serve as the parent legislation for the Refuge System.

National Wildlife Refuge System Administration Act of 1966

This Act defines the Refuge System, including refuges, areas for the protection and conservation of fish and wildlife threatened with extinction, wildlife ranges, wildlife management areas, and waterfowl production areas. It also authorizes the Secretary of the Interior to permit any use of an area, provided the use is compatible with the major purposes for establishing the area.

Endangered Species Act of 1973 (as amended)

The Endangered Species Act (ESA) directs all federal agencies to participate in endangered species conservation by protecting threatened and endangered species and restoring them to a secure status in the wild. Section 7 of the Act charges federal agencies to aid in the conservation of species listed as threatened or endangered under the ESA, and requires federal agencies to ensure that their activities will not jeopardize the continued existence of ESA-listed species or adversely modify designated, critical habitats.

Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act protects all migratory birds and their parts (including eggs, nests, and feathers) from illegal trade. The Migratory Bird Treaty Act is a domestic law that acknowledges the United States' involvement in four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. The bird resource is considered shared because these birds migrate between countries at some point during their annual life cycle.

National Environmental Policy Act of 1969

The National Environmental Policy Act (NEPA) requires that all federal agencies consult fully with the public in planning any action that may significantly affect the quality of the human or natural environment.

Land and Water Conservation Act of 1965

The Land and Water Conservation Fund uses monies from certain user fees, the proceeds from the disposal of surplus federal property, the federal tax on motor boat fuels, and oil and gas lease revenues (primarily Outer Continental Shelf oil monies) to fund matching grants to states for outdoor recreation projects and to fund land acquisition for various federal agencies.

Migratory Bird Conservation Act of 1929

The Migratory Bird Conservation Act provides for the acquisition of suitable habitats for use as migratory bird refuges, and the administration, maintenance, and development of these areas, under the administration of the Secretary of the Interior.

Archaeological Resources Protection Act of 1979 (ARPA)

ARPA provides protection for archeological resources on public lands by prohibiting the “excavation, removal, damage or defacing of any archeological resource located on public or Indian lands,” and sets up criminal penalties for those acts. It also encourages the increased cooperation and exchange of information between governmental authorities, the professional archeological community, and private individuals having archeological resources or data obtained before 1979.

National Historic Preservation Act of 1966

The National Historic Preservation Act requires all federal agencies to consider the effects of their undertaking on properties meeting criteria for the National Register of historic places, and ensures that historic preservation fully integrates into the ongoing programs and missions of federal agencies.

PURPOSE OF ESTABLISHMENT AND LAND ACQUISITION AUTHORITY

Refuge lands can be acquired under various legislative and administrative authorities for specified purposes. Establishment of and land acquisition for the proposed Green River National Wildlife Refuge would be authorized by the Migratory Bird Conservation Act, National Wildlife Refuge System Administration Act, Endangered Species Act, Emergency Wetlands Resources Act, Fish and Wildlife Act, or Refuge Recreation Act. The purposes guide the long-term management of the refuge, prioritize future land acquisition, and play a key role in determining the compatibility of proposed public uses. Establishment of the proposed Green River NWR could be authorized by the Migratory Bird Treaty Act, National Wildlife Refuge System Improvement Act, Endangered Species Act, Emergency Wetlands Resources Act, and/or Fish and Wildlife Act.

DRAFT VISION FOR THE PROPOSED GREEN RIVER NATIONAL WILDLIFE REFUGE

The Green River National Wildlife Refuge will conserve floodplains of the Ohio and Green Rivers and portions of their surrounding landscapes for current and future generations. Refuge lands and waters will be managed for fish and wildlife populations with an emphasis on the management of waterfowl and other migratory birds, imperiled federal trust species, and improve water quality and quantity within the watersheds surrounding the refuge. As part of a system of public and private conservation lands, the refuge will expand outdoor recreational and educational opportunities, helping to support local economies.

GOALS FOR THE PROPOSED GREEN RIVER NATIONAL WILDLIFE REFUGE

Four overarching goals were developed for the proposed refuge, as listed.

Goal 1. Protect, Restore, and Manage Habitats for Fish and Wildlife. The proposed Green River NWR would restore, manage, and conserve bottomland hardwoods, adjacent upland habitats, and plant and animal species associated with these communities. The proposed refuge would contribute to the habitat goals presented in the North American Waterfowl Management Plan (NAWMP), various Threatened and Endangered recovery plans, and Kentucky’s State Wildlife Action Plan.

Goal 2. Provide Landscape-Level Conservation. The proposed Green River NWR would contribute to a more connected and functional conservation landscape targeted by the Southeast Adaptation Conservation Strategy (SECAS) Partners by reducing habitat fragmentation and protecting and restoring a network of rare and declining wetland types and their surrounding landscapes. The proposed refuge would also protect and enhance water quality and quantity in localized portions of the Ohio River and Green River watersheds, benefiting both humans and wildlife.

Goal 3. Connect People with Nature. Visitors would have access to the proposed Green River NWR in order to enjoy and take advantage of opportunities for compatible hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Goal 4. Promote Conservation Partnerships. The proposed Green River NWR would increase opportunities for collaboration and partnerships in science, education, and research with conservation organizations, private landowners, government agencies, and others. These collaborative efforts will help inform land management decisions on the proposed refuge and encourage continued responsible stewardship of the refuge and its natural resources.

The rationale for each goal is summarized and described below.

Goal 1. Protect, Restore, and Manage Habitats for Fish and Wildlife

Refuge lands would provide an important link for migratory birds and important habitat for numerous other imperiled species. Proposed management would complement the management of adjacent and nearby conserved lands, both public and private, helping to make the regional landscape a more functional conservation landscape. Links to existing conserved lands would also provide the opportunity for species to migrate and adapt to changes in habitats anticipated to occur from the impacts of global climate change. A National Wildlife Refuge in the Green River watershed would provide local and regional benefits to wildlife by working in concert with existing partners, including the Kentucky Department of Fish and Wildlife Resources (KDFWR), other State/Federal agencies, and non-governmental organizations.

Refuge lands would substantially increase opportunities to conserve the floodplain habitats and their associated uplands. If approved, this proposal would authorize the Service to work with willing landowners to purchase, outright or as easements, lands and waters within the CPA. On fee-title interest tracts, where the Service would become the land manager, bottomland hardwoods could be restored and managed, with a focus towards land management improving overall habitat conditions, including those for federally listed species as well as state listed and rare species.

A management plan would be developed to ensure the protection and recovery of trust species and other rare species within the sites, and restoration and management needs would be addressed, with a focus on hydrology and vegetation. Types of potential restoration would include restoring hydrology by plugging ditches that drain portions of sites and controlling nonnative invasive plants. Long-term management may include establishment and protection of a forest around sites would protect the rivers from pesticide drift, runoff containing nutrients, and nonnative invasive plants. Impoundments could be created on some sites to provide feed and resting places for migrating waterfowl and wading birds.

Working with partners, the refuge would work to protect the following trust species: wintering and migrating waterfowl, forest breeding birds, threatened and endangered wildlife including the

Indiana, gray and Northern long-eared bats, American Bald Eagle, fanshell, catspaw, snuffbox, pink mucket, ring pink, sheepsnose, fat pocketbook, rabbitsfoot mussels, etc., State species listed at risk or need in of special management concern, etc. Activities would be implemented on refuge lands to help safeguard these species. Such activities would include law enforcement, and involvement/education of stakeholders in the region. Biological surveys would be conducted in association with stakeholders to address necessary inventory and monitor for species of concern

Goal 2. Provide Landscape-Level Conservation

The refuge would contribute to the regional landscape-level conservation efforts such as, SECAS and the Appalachian LCC, to help protect the Green River watershed floodplains and associated uplands along the confluence of the Ohio and Green. Water resources important to Green and Ohio Rivers watersheds would be further protected and enhanced under this alternative. We would also conduct public outreach and education efforts, including those aimed at reducing runoff volume and pollutants and encourage voluntary landowner action to restore and protect the surrounding hydrology. Restoration of the hydrology and developing impoundments will help in meeting North American waterfowl population objectives and Partners in Flight objectives. Establishing and restoring a forested landscape would aid in the protection of habitat and hydrology and would aid in establishing wildlife corridors.

Goal 3. Connect People with Nature

With the addition of approximately 24,000 acres of Service-managed lands to the conservation landscape that could support compatible wildlife-dependent public use opportunities, these opportunities would be expected to increase. The Service would work cooperatively with partners to provide public hunting and fishing opportunities, and the Service would provide interpretive and educational programs.

The Refuge System Improvement Act of 1997 establishes six priority public uses on refuges. Those priority uses depend on the presence, or the expectation of the presence, of wildlife. These uses are: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. Although these priority uses must receive consideration in planning for public use, they also must be compatible with the purposes for which a refuge is established and the mission of the Refuge System. Compatibility determinations, which evaluate the effects of a particular use or activity in the context of species or habitats on a refuge, aid in making those decisions. If refuge lands were acquired, compatibility determinations would be used to decide which, where, and how public use opportunities would be permitted.

Opportunities for wildlife-dependent recreation would be increased, helping to connect people with nature, with the aim of promoting a conservation ethic and stewardship. While some of the parcels proposed for acquisition that have a high frequency of flooding, other sites well-suited to wildlife-dependent public use were included in the CPA. The Service would work cooperatively with its conservation partners and other stakeholders to determine what areas are suitable to provide public use opportunities, including hunting, fishing, wildlife observation, photography, and interpretive and educational programs. Where needed and appropriate, we would initiate development of facilities to engage the public in these activities. More specific management plans would be developed to address all aspects of outdoor wildlife-dependent recreation identified in the interim compatibility determinations. We would develop opportunities for volunteer involvement in refuge management and outreach efforts, and would work with school

districts and teachers to develop an environmental education program featuring unique species or communities on the refuge.

Public use opportunities contribute to the long-term protection of wildlife resources by promoting understanding, appreciation, and support for wildlife conservation. The six priority public uses would be accommodated to the maximum extent possible, where they would not have significant negative effects on wildlife. All of the proposed public use activities are contingent upon availability of staff and funding to develop and implement these programs. Some of the public uses found compatible may require additional planning, fee considerations and other authorizations prior to being formally initiated. The Service would promote opportunities for volunteers and develop community interpretive materials and programs to enhance awareness of and appreciation for the area's resources. School and other group programs would be considered. If a refuge is established, an increase in public use would be expected from new facilities and programs such as hunts, trails, parking areas, fishing access, interpretive overlooks, and observation towers that would potentially be a part of a new refuge. The Service would allow public access for day use on many newly acquired lands, provided there are no expected negative effects on sensitive species (e.g., endangered or threatened species) or habitats, and would consider overnight access as a component of other public use activities (e.g., hunting in remote locations). See Appendix B for the interim compatibility determinations for the Proposed Action.

Hunting and Fishing

The Service would open newly acquired lands for hunting and fishing that could biologically, ecologically, and safely accommodate these activities within the state's regulation framework. Newly acquired lands would be subject to interim compatibility determinations (Appendix B) until the Service completed the planning process to formally open the refuge to these activities. Per Service policy, refuge lands have to be formally opened to hunting through a process subject to NEPA, including inter-agency consultation, public scoping and commenting, etc. As part of the planning process, the Service would coordinate with KDFWR regarding hunting, fishing, and other recreational activities associated with this proposal. If possible, the Service would provide American with Disabilities Act-compliant and youth hunting opportunities. Fishing would be allowed, where accessible.

Wildlife Observation, Photography, Environmental Education, and Interpretation

Beyond hunting and fishing, the refuge would also provide opportunities for wildlife observation; photography, environmental education, and interpretation. Working with state and local agencies, the Service would study the feasibility of connecting existing hiking, biking, or compatible outdoor recreation trails (only on improved roads open to public vehicular traffic) through refuge lands. A refuge may also provide interpretive and environmental education programs and increase partnership opportunities to interpret the cultural and natural resources, including the role which Native Americans and European settlers contributed to the environment of the watershed.

Environmental education, one of the six priority wildlife-dependent uses encouraged on refuge lands, incorporates on-site, off-site, and distance-learning materials, activities, programs, and products that address the audience's course of study, the mission of the Refuge System, and the management purposes of the refuge. The goal of environmental education is to promote an awareness of the basic ecological foundations of the interrelationship between human activities and natural systems.

For years, national wildlife refuges have been connecting children and others with the land and with the agencies' conservation mission. It is now apparent that such connections are of immense importance, especially for children. New information shows that instead of being outdoors enjoying self-discovery of wild things, most children spend their time indoors glued to their televisions, video games, computers, and cell phones, rather than experiencing nature. "Last Child in the Woods: Saving Our Children from Nature Deficit Disorder," documents this trend (Louv 2005). According to the author, increased urbanization, parental anxiety, residential development restrictions, and structured play have kept children inside rather than out. This separation from the natural world can result in a host of physical and mental ailments, from childhood obesity to Attention Deficit Hyperactivity Disorder (ADHD), and can erode future support for conservation (Louv 2005). As the nation's primary conservation agency, the Service has a role in addressing this concern. The Service would also have a strong incentive to promote children in nature activities along with our other conservation partners.

The Service would attempt to work with school districts and teachers to develop environmental education programs featuring unique species and communities of the refuge and the Green River watershed. The Service would work with the partners to promote environmental education, thereby maximizing the use of resources and time commitments for each partner organization. The Service would also consider the role of a refuge in other potential opportunities such as small habitat restoration projects through the use of our Partners for Wildlife program, guided trail walks, birding festivals, guest lectures, youth hunting and fishing efforts, and even simple monitoring of various forms of wildlife on and off the refuge.

Specific programs of study may include water quality and habitat restoration and the land stewardship within the community. Through curriculum-based environmental education, on- and off-refuge, refuge staff, educators, and partners hope to motivate students and other persons interested in learning the role of management in the maintenance of healthy ecosystems, working landscapes, and conservation of our fish and wildlife resources

Goal 4. Promote Conservation Partnerships

The addition would increase and strengthen our collaborative efforts with conservation partners and other stakeholders. We would also work to foster better communication between the Service and neighboring landowners, and provide them with information on how to manage their lands for the benefit wildlife if desired. The creation of the refuge would provide opportunities for the Service to help focus the efforts of other partners towards strategic habitat conservation (SHC). Using the SHC model, the establishment of Green River NWR would coordinate and link actions that various programs and partners perform at individual sites, so that their combined effects would achieve conservation of species and their habitats on a regional landscape-level scale. In addition, this leadership role would assist with collaboration among partners to learn from one another.

ADMINISTRATION

The proposed refuge may be managed as a standalone refuge or as part of a refuge complex. Generally, a standalone refuge has a dedicated staff and equipment and is managed locally. As part of a complex, Green River NWR would likely have less on-site staff initially and would share

staff and equipment with one or more other refuges. Sometimes, refuges initially are part of a complex, but as they grow in size and complexity, are then separated to become standalone refuges. Under the refuge complex scenario, the refuge staff of the Clarks River National Wildlife Refuge in Benton, Kentucky would have the responsibility for managing the newly established refuge. During the interim period, the Service would seek funding for refuge staff within the project boundary. Initially, staff would likely consist of a refuge manager, wildlife biologist, and maintenance worker. Other staff such as visitor service specialists, fire management specialists, and law enforcement officers would be phased in over time as need and funding permitted. In the long-term, the Service's Southeast Regional Office would evaluate the need for additional full-time staff based on management needs, project loads, public use activities, and other factors, and could move forward with providing additional staff when justified. The ability to fill staff positions would depend on availability of funds and regional priorities.

FACILITIES

Because no actual lands have been acquired as of yet, it is difficult to discuss specifics of facilities and improvements that may be appropriate to effectively manage the refuge. This document will discuss general approaches adopted elsewhere when establishing a new refuge, as well as unique partnership opportunities that may present themselves in this landscape. As such, the Service may opt for the listed facilities when and where appropriate and compatible.

The proposed Green River NWR would have good access via state and local roads. Existing access roads on acquired properties would be evaluated for use depending on access needs, presence of sensitive species and/or habitats, public use, and other potential future needs. Some roads may be retained and improved, while others may be abandoned and removed. Legal access to inholdings and homes would be maintained.

Conversion of existing trails and roads to public use and/or refuge management access corridors may occur. Such roads may also be abandoned to limit access to sensitive habitats and protected species. Roads and trails may only be open during certain times of year, or may have other restrictions to protect wildlife resources or to provide access for visitor programs, such as hunting activities. Vehicle access to refuge resources would only be allowed on designated roads and trails.

Small areas may be constructed to provide for adequate and safe parking of vehicles in potential public use areas.

Because of the potential wide geographic distribution of refuge lands across this landscape, one or more refuge headquarters and visitor contact stations may be established through the adaptive reuse of buildings acquired through land acquisition (e.g., a farmhouse or hunt lodge, etc. may be used as a refuge office or education facility; a pole building or barn may be used for equipment storage). Additionally, shared facility use options may be available with stakeholders who already have adequately sized facilities in the area and available space. Other potential future on-site improvements, including additional trails, improved access roads, observation platforms, photography blinds, and parking areas may be discussed in a future comprehensive conservation plan. The construction of new facilities or conversion of existing structures is contingent upon availability of funds and acquisition of appropriate sites.

Where facility construction, operation, or maintenance may conflict with the conservation of federally listed species, appropriate measures (e.g., buffers and seasonal restrictions) would be identified and implemented to avoid adverse effects. This would be done in consultation with the Service's Ecological Field Office located in Frankfort, Kentucky.

Generally, public use areas would be open daily during daylight hours, unless a biological or safety justification supports closure. Some areas could be closed to the public and others (except for emergency, fire, and police response) seasonally or year-round if deemed necessary for protection of sensitive resources, property, the public, etc. Special use permits would be issued to researchers, educational groups, and others on an as-needed basis, providing that the activities are compatible with refuge purposes, goals, and objectives, and contribute to the ecological understanding, biological survey, or baseline data needs. Hunting, environmental education, and interpretive walks are some examples of activities that may be allowed, depending on the season and other factors.

FUNDING

We would maintain a current inventory of management needs in appropriate Service database(s) and update the associated costs and priorities annually. Those databases provide a mechanism for each unit of the Refuge System to identify its essential staffing, mission-critical projects, and major needs, and form a realistic assessment of the funding needed to meet each refuge's goals, objectives, and strategies.

Since this refuge is only proposed and is not yet approved, no funding has been identified to support management activities and no budget has been developed and approved. Any funding for the proposed refuge would be dependent upon a variety of factors, including Southeast Region budget priorities and allocations.

STAFFING

As stated above, the staffing situation on national wildlife refuges is based on a number of factors including refuge size and complexity, proximity to other refuges, and funding. Based on these and other factors, the proposed refuge may be managed as a standalone refuge or as a unit of a refuge complex. A standalone refuge has a dedicated staff and equipment and is managed locally whereas a unit of a complex refuge would share staff and equipment with other refuge units. Typically, as new refuges are established, they operate as a unit of a complex refuge until such time that sufficient land has been acquired to warrant a dedicated staff. At this time, it is difficult to delineate staffing specifics for the proposed refuge because of the uncertainties associated with the refuge's size, complexity, resource issues, funding, and other factors. Because of this uncertainty, two staffing models that depict both staffing scenarios have been evaluated to better illustrate how these variables interact to determine levels of staffing. These models may serve to guide how this refuge may grow in staff over time. Initially however, the proposed refuge would be managed as a complex unit under the supervision and management of the Clarks River National Wildlife Refuge located in Benton, Kentucky.

Refuge Complex Staffing Strategy

The initial staffing strategy for the proposed refuge under the refuge complex scenario identifies few new positions. A refuge manager would provide direction, supervision, and coordination for all management activities and ensure the effective oversight and community outreach for the

successful management of acquisitions and easements. A maintenance worker would assure that management projects are completed such as invasive species control, mowing, and other general maintenance activities. Refuge staff would assist in delivering the full range of wildlife conservation and restoration projects on public land, provide technical assistance, assist in the restoration and management of new acquisitions, and monitor and inventory wildlife and habitat use and conditions. All other refuge functions such as law enforcement, outreach, or prescribed fire would be provided by the overlying refuge complex staff.

Refuge Standalone Staffing Strategy

As refuge lands were acquired, ideally an independent, stand-alone refuge staff would build upon the refuge complex staffing strategy. Service staff (likely a park ranger) would provide the needed link with local community educational institutions for wildlife-dependent education and oversee plans for any public use activities, such as the implementation of a hunting program. Refuge law enforcement would ensure the safety of the visiting public and assure that wildlife laws are enforced. An administrative office assistant could also be required to handle an increasing budget and workload. An assistant refuge manager; private lands program biologist; equipment operator, maintenance mechanic, etc., would assure all aspects of land management were facilitated and maintained. Additionally, collaborative staffing approaches, such as a co-located, multi-agency/organization visitor service, fire, etc. facilities and programs would be explored as options as needs and opportunities were presented. In the long term, the Service's Southeast Regional Office would evaluate the need for additional full-time staff based on management needs, project loads, public use activities, regional priorities, funding and other factors.

PARTNERSHIPS

The proposed establishment of the refuge is one component of a larger landscape-scale, partnership driven initiative, the Appalachian LCC. The Service currently is facilitating Initiative discussions with multiple agencies and organizations. It is built upon the premise that many conservation partners in this landscape have programs that are complementary to one another, and that it is not only important, but critical for any individual agency or organization to work collaboratively toward conservation in the Green and Ohio Rivers watersheds. These partner discussions have led to the overall development of this proposal, and also would play an integral part in any future activities if the proposal were to be approved. Examples of these partnerships activities include those listed below.

Law Enforcement

Public use areas of the refuge would be open to the public year-round from during daylight hours. The Service may restrict access at times to address issues such as concerns about human safety, wildlife and/or habitat impacts, illegal activities, etc. The Service would work with the refuge zone officer to establish formal, cooperative agreements with local law enforcement departments, the county sheriff's department, and KDFWR to provide protection, enforcement, and appropriate law enforcement response for the proposed refuge. Conservation law enforcement personnel from the Service and KDFWR would also likely patrol intermittently and monitor hunting, fishing, and other public use activities.

Wildlife-dependent Recreational Opportunities

The Service recognizes the need to provide increased opportunities for wildlife-dependent recreation and education and has included this as one of the primary goals for the proposed refuge. Hunting and fishing are two wildlife-dependent recreational activities that both the Service and KDFWR fully support. The hunting and fishing resources found within the area are well known. The Service would work to coordinate these and other recreational opportunities with KDFWR and other state agencies to benefit the visiting public.

Summary

In summary, working partnerships with surrounding landowners; conservation organizations; and municipal, state, and federal agencies would be critical to successful refuge management and the conservation of the Green and Ohio Rivers watersheds. We would continue to cooperate with our conservation partners, all of whom are instrumental in helping us accomplish habitat management goals and objectives. It is clear that partnerships with the public; landowners; neighbors; conservation organizations; and tribal, state, municipal, and other federal agencies would be the only path to a successful Green River NWR.

MANAGEMENT OF GREEN RIVER NWR

The previously listed goals are intentionally broad, descriptive statements of the desired resource condition of proposed refuge land in the Green River watershed. They embrace the proposed refuge purposes, and the proposed vision statement. They provide general, interim management direction for a new refuge until approval of a considerably more detailed comprehensive conservation plan.

Goals are descriptive, open-ended, and broad statements of desired future conditions. More descriptive statements related to the goals are termed objectives. Objective statements contain the distinctive characteristics of being specific, measurable, achievable, realistic, and time sensitive. The following table organizes goal statements with their respective objectives, and provides the rationale used for the development of them. The listed objectives would be revisited and revised during the planning process to develop a comprehensive conservation plan, if the refuge were to be approved.

The rationale for each goal is summarized and described below.

Goal 1. Protect, Restore, and Manage Habitats for Fish and Wildlife.	
The proposed Green River NWR would restore/conservate bottomland hardwoods, their adjacent upland habitats, and plant and animal species associated with these communities. The proposed refuge would contribute to the habitat goals presented in the North American Waterfowl Management Plan (NAWMP), various Threatened and Endangered recovery plans, and Kentucky's State Wildlife Action Plan.	
Objectives:	
<ul style="list-style-type: none"> Complete baseline habitat inventory on all refuge and easement lands within 3 years of acquisition. Prioritize restoration needs for riparian and upland forests. Complete at least one habitat restoration project every 5 years. 	
Rationale	

The habitats associated with the existing conservation lands are well known. However, little of the private landholdings have been surveyed for wildlife or habitat. An initial baseline monitoring and ground-truthing of lands within the CPA needs to be completed in order to assist in the prioritization process. In addition to hardwood forests, restoration potential needs to be assessed for other habitats in order to prioritize restoration activities. Furthermore, more information needs to be obtained to determine what the historic forest types were in the area. This would aid in developing forest management prescriptions using such tools as selective thinning, prescribed fire, and other methods to help improve forest stand diversity and age structure.

Goal 2. Provide Landscape-Level Conservation.

The proposed Green River NWR, would contribute to a more connected and functional conservation landscape targeted by the Southeast Adaptation Conservation Strategy (SECAS) Partners by reducing habitat fragmentation and protecting and restoring a network of rare and declining wetland types and their surrounding landscapes. The proposed refuge would also protect and enhance water quality and quantity in localized portions of the Ohio River and Green River watersheds, benefiting both humans and wildlife.

Objectives:

- Where feasible, focus on parcels that connect existing conservation lands

Rationale

The landscape of the Green and Ohio Rivers watersheds exhibits multiple conservation lands, managed by a network of conservation agencies and organizations. However, many gaps currently exist between these conservation lands. These gaps fragment otherwise contiguous hardwood forests, a declining habitat type which supports numerous forest interior bird species.

Some of the management activities which would occur might include:

- Evaluate and rank all interested landowner parcels to assure the highest conservation value lands and connectivity with existing conservation lands are protected
- Work with partner agencies to identify key habitat corridors for focused conservation efforts
- Integrate climate change predictions, as they become available, into land conservation priorities.

Goal 3. Connect People with Nature.

Visitors of all abilities would have access to the proposed Green River NWR in order to enjoy and take advantage of opportunities for compatible hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Objectives:

- Develop a Hunt Plan once acreage suitable to support hunt programs is available
- Within 2 years of suitable land acquisition, identify up to 3 sites suitable for development or restoration of facilities to engage public in outdoor recreation and educational programs
- Within 15 years, develop Comprehensive Conservation Plan and appropriate step-down management plans to address all aspects of outdoor wildlife-dependent recreation identified in the interim compatibility determinations

Rationale

The Service has a long history of supporting wildlife-dependent recreation, ranging from hunting and fishing to environmental education and interpretation. The hunting and fishing traditions of local residents and visitors to this landscape area is well known and the Service anticipates hosting a full complement of recreational activities.

Access to public lands is of concern to the public and the Service would seek to accommodate opportunities for mobility impaired persons and youth to visit the refuge. Being in close proximity to urban areas, the Service would hope to engage local residents and schools in multiple educational opportunities, ranging from self-guided interpretive trails to formal curriculum for local schools.

Facilities are keys for the Service to be able to engage and interact with the public. Since many conservation partners have similar missions and interest, it is important to seek out mutually beneficial opportunities to co-locate facilities and staff to be more cost efficient and effective.

Some of the management activities which would occur might include:

- Incorporate opportunities, in cooperation with KDFWR and other partners, for youth and mobility impaired hunting and fishing programs.
- Actively participate and host KDFWR sponsored wildlife-dependent recreational workshops.
- Evaluate opportunities, in cooperation with KDFWR and other partner groups, to connect and expand trail networks.
- Seek cooperative opportunities with partner agencies and organizations to co-locate and cooperate on educational and interpretive programs and facilities.

Goal 4. Promote Conservation Partnerships.

The proposed Green River NWR would increase opportunities for collaboration and partnerships in science, education, and research with conservation organizations, private landowners, government agencies, and others. These collaborative efforts will help inform land management decisions on the proposed refuge and encourage continued responsible stewardship of the refuge and its natural resources.

Objectives:

- Work with partners to restore bottomland hardwood forest in priority areas connecting lands in the Green and Ohio River Watersheds, near the Scuffletown Bottoms, near Henderson, Kentucky.

Rationale

Bottomland hardwoods have long been recognized for their biological importance, and the Service has worked since the early 1990s in conjunction with federal, state, and non-governmental partners and private landowners to develop a coordinated restoration and protection strategy for these habitats. A portion of the land adjacent and ecologically important to the proposed project is already owned by our partners or managed by our partners through conservation easements. Protection of these sites fits well into a large landscape scale protection effort in the area. Management and protection of lands by others would continue, and this proposed project would complement and expand on those efforts.

In 1958, the Service first identified this area as an acquisition priority for waterfowl. Again, in 1978, the Service recognized this area as important to waterfowl in the "Bottomland Hardwood Preservation Program" document. The New Madrid Wetlands project document of the NAWMP identified the area as a high priority site for waterfowl in 1989. Located in the Shawnee Hills subdivision of the Interior Low Plateaus (ILP) Bird Conservation Plan (physiographic area #14), the forested wetland habitat in the ILP has been mostly replaced by agriculture and is designated as priority habitat for restoration. This site is adjacent to and will augment two state-owned lands: the Green River State Forest and John James Audubon State Park. The U. S. Corps of Engineers, Louisville District, has also prepared an Interim Feasibility Report: Ohio River Ecosystem Restoration Projects (Illinois, Indiana, Kentucky, Ohio, West Virginia, and Pennsylvania). A key objective of the study is to restore bottomland hardwoods in identified high priority areas in partnership with federal and state agencies and private landowners/conservation groups. Each state in the study area has been tasked to identify its top priority sites for restoration. The Commonwealth of Kentucky has identified Scuffletown Bottoms, one of the proposed units for Green River NWR, in the original New Madrid Project Joint Venture Initiative as the number one priority site for Kentucky.

The following partners provide assistance to manage or own property in or that are ecologically associated with the project area:

- Kentucky Department of Fish and Wildlife Resources
- Henderson County
- Ducks Unlimited
- CPA Landowners
- National Wild Turkey Federation
- University of Kentucky Cooperative Extension Office
- Aluminum Company of America (ALCOA) Land Manager
- Landowners located within the CPA
- Henderson County Tourism
- Audubon State Park
- Kentucky Division of Forestry
- Henderson County NRCS
- Henderson County FSA
- Louisville District - U. S. Corps of Engineers
- The Nature Conservancy
- Southern Conservation Corp.

Acquisition Management

Protection of lands would be accomplished by targeting approximately 24,000 acres of refuge lands within the approximate 53,000-acre acquisition boundary. The reader is referred to the Draft LPP for more specific details regarding the Service's land acquisition program.

Public Use Management

The initial decision-making process a refuge manager follows when first considering whether or not to allow a proposed use on a refuge involves an evaluation of the appropriateness of a given activity on a national wildlife refuge. The refuge manager must find a use to be appropriate before undertaking a compatibility review of the use. If a proposed use is not found to be appropriate, the refuge would not allow the use and would not prepare a compatibility determination. By screening out proposed uses that are not appropriate to the refuge, the refuge manager avoids unnecessary compatibility reviews. By following the process for finding the appropriateness of a use, we strengthen and fulfill the Refuge System mission. The collection of interim appropriateness reviews for this project can be found in Appendix B.

The Improvement Act establishes six priority public uses on refuges. Those priority uses depend on the presence, or the expectation of the presence of wildlife. These uses are: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. Although these priority uses must receive our consideration in planning for public use, they also must be compatible with the purposes for which the refuge was established and the mission of the Refuge System. Compatibility determinations, which evaluate the impacts of a use that has been determined to be appropriate in the context of species or habitats, aid in making those decisions. As lands are acquired in the Green River areas, compatibility determinations would be used to decide what public use opportunities are compatible and can be permitted. The interim compatibility determinations for these priority public uses, which would allow existing uses to continue until such time that a more comprehensive management plan is developed, can be found in Appendix B.

The following table summarizes the public uses that would likely be evaluated during the interim phase and their potential limitations under current conditions. More specific discussion of these public use activities follows.

Public Use Activity	Would this use be provided during the interim phase?
Public Hunting	Yes once hunt plan is developed, limited by available hunting areas, state hunting regulations, and potentially restricted access to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.
Public Fishing	Yes once fish plan is developed, limited by available hunting areas, state hunting regulations, and potentially restricted access to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Environmental Education	Yes, limited due to staffing, partnership development, and facilities
Interpretation	Yes, limited due to staffing, partnership development, and facilities
Wildlife Observation	Yes, limited due to staffing, partnership development, and facilities
Photography	Yes, limited due to staffing, partnership development, and facilities
Horseback Riding	Yes, limited to established roadways or improved trails that are owned or managed as a part of the Green River NWR; daylight hours only, except during the refuge's muzzleloader and modern gun deer hunts. Some areas/ trails may only be open seasonally.
Bicycling	Yes, limited to established roadways or improved trails that are owned or managed as a part of the Green River NWR; daylight hours only unless the use is to facilitate hunting, then the use would be permitted from two hours prior to sunrise until two after sunset. Some areas/ trails may only be open seasonally.
Exercise and Meditation	Yes, potentially restricted access to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.
Recreational Use of Off-road Vehicle	Yes, by Special Use Permit Only permitted on a case-by-case basis for Mobility Impaired Visitors participating in approved activities; restricted to improved roads or trails
Camping	No
Boating	Yes, limited by available fishing areas, state fishing regulations, and potentially restricted access to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.
Bee Keeping	No
Ceremonies	No
Collecting Natural Resources	Yes, by Special Use Permits Only permitted on a case-by-case basis
Forest Management for Wildlife Habitat Enhancement and Improvement	Yes

Commercial Photography	Yes, by Special Use Permits Only permitted on a case-by-case basis
Commercial Guide Operation	Yes, by Special Use Permits Only permitted on a case-by-case basis
Cooperative Farming	Yes, by Special Use Permit Only
Competitive Races	No
Firewood Cutting	Yes, by Special Use Permits Only permitted on a case-by-case basis
Field Trials	Yes, by Special Use Permits Only permitted on a case-by-case basis
Geocaching	Yes, by Special Use Permits Only permitted on a case-by-case basis
Release of Rehabilitated Wildlife	Yes, by Special Use Permits Only permitted on a case-by-case basis
ROW Maintenance	Yes, by Special Use Permits
Unmanned Aerial System	Yes, by Special Use Permits Only permitted on a case-by-case basis
Picnicking	Yes, in areas open to the public
Dogwalking	No
Integrated Pest Management	Yes, as part of habitat management
Metal Detecting	No
Model Boats and Planes	No
Off-Trail Bicycling	No

Research	Yes, by Special Use Permits Only permitted on a case-by-case basis
Water Extraction	No
Swimming	No

Operations and Planning

Specific actions for on the ground work, such as operation procedures, wildlife inventory plans, habitat management actions, public use, and other management activities are covered in detail in refuge-specific management plans. An annual work plan may be used and would generally state, for example, that a certain length of eroding roads would be repaired or maintained, helping reduce sedimentation risks to water quality. Long-term planning would include the need to develop a comprehensive conservation plan for the refuge, as discussed previously.

Conclusion

Should the refuge proposal go forward, the Service and the Refuge System would work towards meeting the overarching goals outlined in this Conceptual Management Plan. Partnerships with landowners, neighbors, conservation organizations and local, state, tribal, and other federal government agencies are a crucial component of the success of the Green River NWR.

APPENDIX B. INTERIM COMPATIBILITY DETERMINATIONS

INTERIM COMPATIBILITY DETERMINATIONS

The legal provision (16 U.S.C. 668dd-668ee) states that lands within National Wildlife Refuge System (NWRS) are closed to public use unless specifically and legally opened. No refuge use may be allowed unless it is determined to be compatible. A compatible use is one that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the mission of NWRS or the purposes of the refuge. All programs and uses must be evaluated based on the mandates set forth in the National Wildlife Refuge System Improvement Act (Improvement Act) as follows:

- Contribute to ecosystem goals, as well as refuge purposes and goals;
- Conserve, manage, and restore fish, wildlife, and plant resources and their habitats;
- Monitor the trends of fish, wildlife, and plants;
- Manage and ensure appropriate visitor uses as those uses benefit the conservation of fish and wildlife resources and contribute to the enjoyment of the public; and,
- Ensure that visitor activities are compatible with refuge purposes.

The Improvement Act further identifies six priority wildlife-dependent recreational uses. This use are hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. As priority public uses on the NWRS, they receive priority consideration over other public uses in planning and management.

The public use program will be reviewed annually to ensure that it contributes to refuge objectives in managing quality recreational opportunities and protecting habitats, and is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in unanticipated negative impacts to natural communities, wildlife species, or their habitats. Refuge law enforcement officer(s) will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Refuge law enforcement personnel will monitor all areas and enforce all applicable State and Federal regulations.

INTERIM USES:

The following uses were found to be appropriate and evaluated below to determine their compatibility with the mission of the Refuge System and the purposes of the proposed Refuge:

Bicycle Use for Priority Public Uses
Boating for Wildlife Dependent Activities
Commercial Guided Wildlife Observation (Special Use Permit only)
Commercial Photography (Special Use Permit only)
Cooperative Farming
Environmental Education and Interpretation
Exercise and Meditation
Firewood Cutting for Personal Use (Special Use Permit only)
Forest Management for Wildlife Habitat Enhancement/Improvement (Special Use Permit only)
Horseback Riding
Picnicking
Recreational Fishing
Recreational Hunting
Release of Rehabilitated Wildlife (Captive or Feral) (Special Use Permit only)

Recreational Use of Off-road Vehicles (Special Use Permit only)
Rights-of-way Maintenance
Scientific Research and Inventory and Monitoring (Special Use Permit only)
Wildlife Observation
Wildlife Photography

Some of the public uses found compatible may require additional planning, fee considerations and other authorizations prior to being formally initiated.

PROPOSED REFUGE NAME:

Green River National Wildlife Refuge, hereafter referred to as the Refuge, will be located in Henderson County in Kentucky along the Green and Ohio Rivers, if established.

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

Establishment of the proposed Green River NWR could be authorized by:

- (1) Migratory Bird Conservation Act {16 U.S.C. 715}
- (2) National Wildlife Refuge System Administration Act {16 U.S.C. 668(a)(2)}
- (3) Fish and Wildlife Act of 1956 {16 U.S.C. 742 (b)(1)}
- (4) Endangered Species Act of 1973 {16 U.S.C. 1531 et seq; 87 Stat. 884}
- (5) Emergency Wetlands Resources Act of 1986 S.B. 740}

PROPOSED REFUGE PURPOSE(S):

The purposes of a refuge are derived from legislative authorities that established the refuge and would:

- Establish a second National Wildlife Refuge in Kentucky in support of the natural resource conservation of Kentucky which includes habitat for waterfowl, nongame birds, fish, and wildlife;
- Provide high-quality hunting and sportfishing opportunities;
- Provide opportunities for public use and environmental education and interpretation;
- Enhance the ecological function of the project area by working with partners to achieve mutual conservation priorities; and
- Ensure healthy wildlife populations for the benefit of the community, state, and nation.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant

resources and their habitats within the United States for the benefit of present and future generations of Americans.

OTHER APPLICABLE LAWS, REGULATIONS, AND POLICIES:

Antiquities Act of 1906 (34 Stat. 225)
Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755)
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451)
Criminal Code Provisions of 1940 (18 U.S.C. 41)
Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)
Wilderness Act (16 U.S.C. § 1131; 78 Stat. 890)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
Land and Water Conservation Fund Act of 1965
Animal Welfare Act of 1966, Public Law 89-544. (7 U.S.C. 2131 et. seq.)
National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
National Wildlife Refuge Regulations for the Most Recent Fiscal Year:
(Title 50 Code of Federal Regulations Subchapter C; 43 CFR 3103.3.3)
Title 50 Code of Federal Regulations, Parts 25-33
Emergency Wetlands Resources Act of 1986 (S.B. 740)
North American Wetlands Conservation Act of 1990
Food Security Act (Farm Bill) of 1990 as amended (HR 2100)
The Property Clause of the U.S. Constitution Article IV 3, Clause 2
The Commerce Clause of the U.S. Constitution Article 1, Section 8
The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, USC668dd)
Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System. March 25, 1996
Executive Order 11644, Use of Off-Road Vehicles on Public Lands, as amended by E.O. 10989.
Archaeological Resources Protection Act of 1979
Native American Graves Protection and Repatriation Act of 1990
Consolidated Appropriations Act of 2004 - Section 145 of PL 108-199 is known as the Theodore Roosevelt National Wildlife Refuge System Improvement of 1997 Act (Public Law 105-57)

DEFINITIONS

Appropriate Use - A proposed or existing use on a refuge that meets at least one of the listed four conditions:

1. The use is a wildlife-dependent recreational use as identified in the Improvement Act.
2. The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act was signed into law.

3. The use involves the take of fish and wildlife under state regulations.
4. The use has been found to be appropriate as specified in 603 FW 1 1.11.

Native American - American Indians in the conterminous United States and Alaska Natives (including Aleuts, Eskimos, and Indians) who are members of federally recognized tribes.

Priority General Public Use - A compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Quality - The criteria used to determine a quality recreational experience include:
Promotes safety of participants, other visitors, and facilities.
Promotes compliance with applicable laws and regulations and responsible behavior.
Minimizes or eliminates conflicts with fish and wildlife population or habitat goals or objectives in a plan approved after 1997.
Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation.
Minimizes conflicts with neighboring landowners.
Promotes accessibility and availability to a broad spectrum of the American people.
Promotes resource stewardship and conservation.
Promotes public understanding and increases public appreciation of America's natural resources and the Service's role in managing and protecting these resources.
Provides reliable/reasonable opportunities to experience wildlife.
Uses facilities that are accessible and blend into the natural setting.
Uses visitor satisfaction to help define and evaluate programs.

Wildlife-Dependent Recreational Use

As defined by the Improvement Act, a use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

PUBLIC REVIEW AND COMMENT:

The compatibility determination for the proposed Green River National Wildlife Refuge will be made available for public review and comment for more than 30 days beginning July 24, 2019 and ending August 30, 2019. Announcements will be made to local and regional media and posted on the Refuge's website and facebook pages.

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

- ☐ Categorical Exclusion without Environmental Action Statement
- ☐ Categorical Exclusion and Environmental Action Statement
- ☐ Environmental Assessment and Finding of No Significant Impact
- ☐ Environmental Impact Statement and Record of Decision

USE:

Bicycle Use for Priority Public Uses

DESCRIPTION OF USE:

(a) *What is the use?*

The use considered in this Pre-Acquisition Compatibility Determination is Recreational Bicycling. Recreational bicycling as a mode of transportation facilitates travel and access for the priority public uses.

(b) *Where would this use be conducted?*

This use would be conducted on improved roads and trails owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

Recreational biking would be permitted from sunrise to sunset, unless the use is to facilitate hunting, then the use would be permitted from two hours prior to sunrise until two after sunset.

(d) *How would this use be conducted?*

Access to the refuge is open every day; however certain portions of the refuge may be closed to access by the public for purposes of sanctuary to migratory birds or for management activities. In addition, entry on all or portions of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife populations, or public safety.

(e) *Why is this use being proposed?*

Bicycling as a lone activity is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

Bicycles are considered legal modes of transportation on local state and county roads. Like walking, bicycling can be used as transport to wildlife observation and photography areas.

Bicycling has also been used by hunters and anglers to reach areas along roads closed to vehicle use.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon Comprehensive Conservation Plan (CCP) development and implementation of final Compatibility Determinations (CDs). No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities may need to be developed to facilitate this use.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Impacts associated with bicycling as a form of transport for hunters, anglers and wildlife observers are minimal on the refuge due to this use being limited to the paved or gravel roads managed as a part of by Green River NWR. Bicycling has the potential to affect a variety of migratory and resident wildlife and their habitats. Possible negative effects include disturbing wildlife, removing or trampling vegetation, littering, vandalism, and entering closed areas. Disturbances vary with the wildlife species involved and the type, level, frequency, duration and the time of year that human activities occur. The responses of wildlife to human activities include avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Henson and Grant 1991, Kahl 1991, Klein 1993, Whittaker and Knight 1998), the use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993, Whittaker and Knight 1998), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). Mammals may become habituated to humans making them easier targets for hunters. Disturbance can cause shifts in habitat use, abandonment of habitat and increased energy demands on affected wildlife (Knight and Cole 1991). Short-term and negligible disturbance to wildlife may occur due to visitor-wildlife encounters. In most cases, wildlife would be expected to become accustomed to the presence of visitors and their associated modes of transportation.

Bicycle wheels can cause physical impacts to soil surfaces. Cessford (1995) notes the shearing action of wheels creates damage to roads and trails, which increases when trail conditions are wet or when traveling up a steep slope. When traveling down slope, skidding with hard braking can result in loosening soil surfaces, which leads to rutting and erosion by channeling water down wheel ruts. If braking is not performed on downhill travel, the impact of tires on the slope will be much less damaging (Cessford 1995). Biking on any area other than paved or graveled roadways managed as a part of the Green River NWR would be prohibited.

Bicycle use can cause compaction of presently uncompacted soils, particularly when soils are wet, which can degrade plant communities associated with fragile organic soils. Soil compaction can diminish the soil porosity, aeration, and nutrient availability. These directly affect plant growth and survival (Kuss 1986). Compaction can also limit the re-colonization of areas due to increased difficulty for root growth and penetration in the affected soils (Hammitt and Cole 1998). Kuss (1986) found plant species adapted to wet or moist habitats are the most sensitive, and increased moisture content reduces the ability of the soil to support recreational traffic. Exposed soil and an abundance of sunlight along roads and trails provide ideal conditions for the establishment of invasive plant species. Bicycle use may impact vegetation and create bare soil conditions, thus creating conducive conditions for invasive species growth. Invasions result from the use of foreign material to construct and maintain roads and trails, and from seed transport via visitors and vehicles traveling on roads and trails. Invasive plants, if allowed to establish and spread, can cause major damage to native plant assemblages and the wildlife they support. We will monitor for invasive species and control or eliminate them annually. Key among these invasive plants species are reed canary grass (*Phalaris arundinacea*), multiflora rose (*Rosa multiflora*), yellow flag iris (*Iris pseudacorus*), and cattails.

The effects of roads and trails on plants and animals are complex and not limited to the trail width. Trail use can disturb areas outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al.

2001). Miller et al. (1998) describe a 75-meter zone of influence where bird abundance and nesting activities (including nest success) were found to increase as distance from a recreational trail increased in both grassland and forested habitats. Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981, Burger 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbances from recreation activities have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, Burger 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1997, Burger and Gochfeld 1998). Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young. Some uses, such as bird observation, are directly focused on viewing certain wildlife species and can cause more significant impacts during breeding season.

Wildlife associated with aquatic habitats may also be affected by bicycles on trails. Impacts may be indirectly caused by erosion and subsequent sedimentation of streams and vernal pools as a result of poorly designed trails and bicycle travel over bare soils and around drainages.

Increased sediment loads can reduce aquatic vegetation and dissolved oxygen concentrations (Sadoway 1986). Sedimentation can directly kill aquatic invertebrates, affecting the success of amphibian larvae and adults (Sadoway 1986).

Knight and Cole (1991) suggest recreational activities occurring simultaneously may have a combined negative impact on wildlife. Hammitt and Cole (1998) conclude that the frequent presence of humans in 'wildland' areas can dramatically change the normal behavior of wildlife mostly through 'unintentional harassment.' Anticipated impacts of bicycle use on wildlife include temporary disturbances to species using habitats on the trail or directly adjacent to the trail. Bicycle use typically only occurs from spring through fall and usually when the ground is dry. In areas where the distance between trails, roads and wetlands is short, there may be some minor

and short-term disturbances to shorebirds associated with bicycling. These areas may be seasonally closed to this use. Use of some roads and trails may cause direct impacts such as mortality (e.g., crushing amphibians foraging on grassy roads and trails) to nest abandonment of bird species nesting on trails. Long-term impacts may include certain wildlife species avoiding trail corridors as a result of this use over time. No significant adverse impacts to non-target species are expected. Negative impacts between concurrent public use activities are not expected and no adverse socioeconomic impacts are anticipated. This use should not result in short-term impacts that adversely affect the purpose for this refuge or the mission of the National Wildlife Refuge System. It is intended that the primary positive impact will be a better appreciation of the role of the U.S. Fish & Wildlife Service in the conservation arena. The Refuge will take all appropriate measures to avoid or minimize any negative effects. Roads and trails will be evaluated periodically to assess whether they meet established suitability criteria and to prevent habitat degradation. We will post and enforce refuge regulations, and establish, post, and enforce closed areas as needed. Based on the information provided above, this use is not anticipated to significantly increase wildlife habitat fragmentation or cause significant impacts on wildlife through disturbance.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas. If there is evidence of unacceptable adverse impacts on wildlife, we will reroute, curtail, or close trails to this use as deemed appropriate.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

We will allow bicycling only in designated areas specifically developed to prevent the erosion and degradation of wetlands or water quality and ensure public safety. Bicycles will not be allowed in areas or along trails if there are safety issues or wildlife disturbance issues. Bicycles are allowed for wildlife dependent activities including but not limited to access related to hunting, fishing, and wildlife observation.

The use of bicycles to go cross country or off designated trails will be prohibited.

Bicycle riding as a general mode of transportation is allowed on improved roads and trails managed as a part of the by Green River NWR. Organized rides and club rides involving more than 10 bicycles will be required to obtain a special use permit as these large groups may require greater management to prevent negative interactions with other public users and wildlife.

JUSTIFICATION:

Hunting, fishing wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the Refuge System, and have been determined to be compatible activities on many refuges nationwide. The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate those six uses. Bicycling is allowed as a means to facilitate these priority public uses on Green River NWR. Bicycling activities will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established. Bicycling will not pose significant adverse effects on refuge resources; interfere with public use of the refuge; nor cause an undue administrative burden.

MANDATORY 10-YEAR RE-EVALUATION DATE:

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USE:

Boating for Wildlife Dependent Activities

DESCRIPTION OF USE:

(a) *What is the use?*

The use considered in this Pre-Acquisition Compatibility Determination is Boating. Boating would be allowed as a means to facilitate refuge public use programs, namely the priority public use programs of hunting, fishing, wildlife observation and photography, and environmental education and interpretation. The use would be conducted consistent with refuge and Kentucky's state boating regulations, with some additional restrictions to protect fish, wildlife and habitat, and reduce potential conflicts among public uses.

(b) *Where would this use be conducted?*

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

Boating would be allowed from sunrise to sunset, unless the use is to facilitate hunting then the use would be allowed from two hours prior to sunrise until two after sunset.

(d) *How would this use be conducted?*

Access to the refuge is open every day; however certain portions of the refuge may be closed to access by the public for purposes of sanctuary to migratory birds or for management activities. In addition, entry on all or portions of individual areas may be temporarily suspended by posting and/or size of vessels or motor may be regulated upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife populations, or public safety.

(e) *Why is this use being proposed?*

Boating as a lone activity is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

Boating can be used as transport to wildlife observation and photography areas. Boating has also been used by hunters and anglers to reach areas along roads closed to vehicle use.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities will need to be developed to facilitate this use.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Impacts associated with boating as a form of transport for hunters, anglers and wildlife observers are minimal on the refuge. Short-term and negligible disturbance to wildlife may occur due to visitor-wildlife encounters. Popular public use boating seasons in Kentucky, coincide in part, with spring-early summer nesting and brood-rearing periods for many species of aquatic-dependent birds. Boaters may disturb nesting birds by approaching too closely to nests, causing birds to flush. Flushing may expose eggs or nestlings to predation or cooling (nestling hypothermia), or overheating in the sun, resulting in mortality. While motorized boats generally have a greater effect on wildlife, non-motorized vessels may also alter wildlife use patterns, reduce wildlife use of particular habitats, alter feeding behavior and nutritional status, and cause premature departure by migratory birds from areas (Knight and Cole 1995). However, one study found that when boats travel at or below 5 mph, disturbance to birds was reduced (Huffman 1999). Boats approaching nesting colonies may interrupt critical bird behaviors by eliciting attention, nervousness, movement or departure. Different species respond in different ways. Response distance is the distance a bird will allow a human (or boat) to approach without demonstrating behavioral effects (Hockin et al. 1992, Rogers and Smith 1997, Gutzwiller et al. 1998, Fernandez-Juricic et al. 2007; Gonzalez et al. 2006) in breeding colonies (Burger and Gochfeld 1993, 1999; Rogers and Smith 1995, 1997; Fowler 1999; McClung et al. 2004; Holmes et al. 2005) or foraging groups (Burger and Gochfeld 1991a, b; 1998; 2001; Ronconi and St. Clair 2002). Flush distance can be used to establish a buffer zone to reduce adverse effects on birds (Rodgers and Schwidert 2002). Recreationists are not likely to be aware of the negative impacts that their presence may have on wildlife (Carney and Sydeman 1999). In most cases, wildlife would be expected to become accustomed to the presence of visitors and their associated modes of transportation. However, these areas may be seasonally closed to this use. No significant adverse impacts to non-target species are expected.

Another negative impacts is the accidental introduction of invasive plants, pathogens, or exotic invertebrates, attached to boats. This impact will be offset by the stipulation of boats being cleaned to reduce the introduction of invasive species. Additional negative impacts on water quality could occur from motorboat and other pollutants, human waste, bank and trail erosion from human activity (boat landings, foot traffic), and litter. Each of these impacts may increase aquatic sediment loads of streams and rivers or alter riparian or lakeshore habitat or vegetation

in ways harmful to fish or other wildlife. Negative impacts between concurrent public use activities are not expected and no adverse socioeconomic impacts are anticipated. This use should not result in short-term impacts that adversely affect the purpose for this refuge or the mission of the National Wildlife Refuge System. It is intended that the primary positive impact will be a better appreciation of the role of the U.S. Fish & Wildlife Service in the conservation arena.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Use of boats is considered an acceptable for of transportation as part of hunting, fishing, wildlife observation and photography.

The refuge will close areas seasonally to all boating activities, if needed to prevent negative effects on wildlife such as in accordance with regulations regarding bald eagle nesting.

The refuge will increase public outreach and education to minimize conflicts among user groups, help control aquatic invasive plants and lead in the environment, reduce the introduction of nonnative fish species, and minimize the disturbance of wildlife and habitat.

A Federal Wildlife Officer will help to promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions.

Boating would be allowed as a means to facilitate refuge public use programs, namely the priority public use programs of hunting, fishing, wildlife observation and photography, and environmental education and interpretation. The use would be conducted consistent with refuge and Kentucky regulations, with some additional restrictions to protect fish, wildlife and habitat, and reduce potential conflicts among public uses.

The public must inspect all boats and boat trailers and clean them of aquatic invasive species before launching and leaving refuge sites. Cleaning of boats should take place on dry ground well away from the water and not on the Refuge. Exotic, nuisance plants or animals on boats, trailers, diving equipment, or in bait buckets can disrupt aquatic ecosystems and negatively affect native fish and plant species.

Regulatory signs and procedures would be made posted in high use areas as well as on the refuge website.

JUSTIFICATION:

Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are the six priority public uses of the Refuge System, and have been determined to be compatible activities on many Refuges nationwide. The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate those six uses. Boating is allowed as a means to facilitate these priority public uses on Green River NWR. Boating activities will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established. Motorized and non-motorized boating will not pose significant adverse effects on refuge resources; interfere with public use of the refuge; nor cause an undue administrative burden. In addition, this activity will fulfill one or more purposes of the Refuge or Refuge System including hunting, fishing, wildlife observation and photography.

MANDATORY 10-YEAR RE-EVALUATION DATE:

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USE:**Commercially Guided Wildlife and Nature Observation (Special Use Permit only)****DESCRIPTION OF USE:*****(a) What is the use?***

The use considered in this Pre-Acquisition Compatibility Determination is Commercially Guided Wildlife and Nature Observation. Commercial guided wildlife and nature observation involves an individual or company taking clients on tours of the Refuge to view wildlife and nature for commercial gain. Guiding also includes outfitting operations which may not provide an accompanying guide. These activities are varied in their scopes and impacts, ranging from a single individual in a single vehicle to numerous people and associated support vehicles. The refuge will authorize commercially guided wildlife observation within the refuge and will regulate such use through the implementation of a commercial wildlife guide management program, including issuance of Special Use Permits (SUPs) with conditions. Guiding does not include no-fee or not-for-profit guided tours conducted by non-profit groups, schools and colleges, or other agencies. This use also does not include tour bus or other road-based commercial tours which may stop at refuge administered overlooks or landings.

This activity provides recreational, and often educational, opportunities for the paying public who desire a successful, quality experience, but who may lack the necessary equipment, skills, or knowledge to observe wildlife or otherwise experience the refuge. Commercial guiding for wildlife or other observation is an existing activity on the refuge, but it has not been consistently administered. This use is not a priority public use but will contribute to priority public uses.

(b) Where would this use be conducted?

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) When would this use be conducted?

This use would be conducted year-round in areas open to the general public from sunrise to sunset.

(d) How would this use be conducted?

Each request for this use will be considered, and if appropriate, will be issued a special use permit (SUP) by the refuge manager. Each request must be presented in writing with details of who, what, where, when, why, and how the commercial operation will be conducted. Requests for this use will be reviewed on a case-by-case basis to ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs. The refuge manager will use professional judgment and ensure that the request will have no considerable negative impacts to natural, cultural, or visitor services, does not violate refuge regulations, and contributes to the achievement of the refuge purpose or the Refuge System mission. Special needs will be considered on a case-by-case basis and are subject to the refuge manager's approval. Any approved SUP will outline the framework in which the use can be conducted and refuge staff will ensure compliance with the permit.

Opportunities for commercially guided wildlife observation is available via existing trails, already maintained trail/road networks, and existing observation tower from one hour before sunrise to one hour after sunset. Using existing roads will minimize impacts to refuge resources. Moderate beneficial impacts are expected. Some conflict between refuge users is expected to result in short-term moderate adverse impacts, which will be managed through seasonal closures. These seasonal closures are in place to minimize wildlife disturbance.

Often guides and clients use the same site, route, or one of several locations selected by the guide. Some guided programs may walk to sites/routes from parking lots or roadsides. Guided wildlife viewing operations have typically used existing refuge or other public observation sites. In addition to the observation activities, guides and clients may use refuge facilities for breaks, lunch, or other activities during the outing, and in accordance with refuge regulations.

The total number of wildlife observation guides and clients on the refuge is not known. A first step in establishing a commercial guiding program on the refuge will be to identify existing guides and outfitting businesses through a review of public records and outreach through news releases and special meetings.

Administration of commercially guided wildlife activities will be conducted in accordance with commercial guide use stipulations (attached) developed to ensure consistency throughout the refuge; provide a safe, quality experience; protect resources; and to ensure compliance with pertinent Refuge System regulations and policies.

(e) *Why is this use being proposed?*

Commercially guided wildlife observation as a lone activity is not priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 and against Code of Federal Regulations. The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

Wildlife observation is a compatible educational and recreational opportunities for visitors to enjoy the resource and to gain understanding and appreciation for fish and wildlife, wild lands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. Based on apparent existing client demand, a significant number of the public are willing to pay for the additional expertise and local knowledge provided by commercial businesses and guides. The refuge provides excellent populations of watchable wildlife in a wild and scenic setting. It is expected that demand for guided wildlife observation will continue to increase, and with it, the number of interested commercial operators.

The guide use stipulations will address all aspects of the guided wildlife observation program including the number of permits to be issued, guide qualifications, permit cost, and selection

methods. Commercial Guide Use Areas will be established based on factors such as habitat and wildlife sensitivity, other refuge resources and users, and other pertinent issues.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs. Additional staff costs are incurred to review each request, analyze affected habitats and wildlife, coordinate with the outside entity, and process a permit if necessary. Compliance with the terms of the permit is within the regular duties of the Refuge's law enforcement officers.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities may need to be developed to facilitate this use.

Minimal costs are associated with the use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

A special use permit is required, which obligates administrative time to complete. Additionally, costs may be assumed by the requestor as appropriate given the level of oversight needed. The Service requires the permittee to offset any cost incurred by the Refuge. This will be determined on a case-by-case basis. The offsetting cost should always be equal to the Refuge -incurred cost and would come to the Refuge in the form of fees paid by the commercial permittee. These fees should at least equal our cost to administer the use, including any costs associated with facilities, equipment, supplies, and services.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Commercially guided wildlife observation can result in positive or negative impacts to the wildlife resource. A positive effect of allowing visitors access to the refuge will be the provision of additional wildlife-dependent recreational opportunities and a better appreciation and more complete understanding of the wildlife and habitats associated with the ecosystem. Short-term and negligible disturbance to wildlife may occur due to visitor-wildlife encounters. Popular public use seasons, coincide in part, with spring-early summer nesting and brood-rearing periods for many species of aquatic-dependent birds. Visitors may disturb nesting birds by approaching too closely to nests, causing birds to flush. Flushing may expose eggs or nestlings to predation or cooling (nestling hypothermia), or overheating in the sun, resulting in mortality. Transportation for tours may also alter wildlife use patterns, reduce wildlife use of particular habitats, alter feeding behavior and nutritional status, and cause premature departure by migratory birds from areas (Knight and Cole 1995). Approaching nesting colonies may interrupt critical bird behaviors by eliciting attention, nervousness, movement or departure. Different species respond in different ways. Response distance is the distance a bird will allow a human (or boat) to approach without demonstrating behavioral effects (Hockin et al. 1992, Rogers and Smith 1997, Gutzwiller et al. 1998, Fernandez-Juricic et al. 2007; Gonzalez et al. 2006) in breeding colonies (Burger and Gochfeld 1993, 1999; Rogers and Smith 1995, 1997; Fowler 1999; McClung et al. 2004; Holmes et al. 2005) or foraging groups (Burger and Gochfeld 1991a,

b; 1998; 2001; Ronconi and St. Clair 2002). Flush distance can be used to establish a buffer zone to reduce adverse effects on birds (Rodgers and Schwidert 2002). Recreationists are not likely to be aware of the negative impacts that their presence may have on wildlife (Carney and Sydeman 1999). In most cases, wildlife would be expected to become accustomed to the presence of visitors and their associated modes of transportation. However, these areas may be seasonally closed to this use. No significant adverse impacts to non-target species are expected.

Another negative impacts is the accidental introduction of invasive plants, pathogens, or exotic invertebrates, attached to boats. This impact will be offset by the stipulation of transportation being cleaned to reduce the introduction of invasive species. Additional negative impacts on water quality could occur from motorboat and other pollutants, human waste, bank and trail erosion from human activity (boat landings, foot traffic), and litter. Each of these impacts may increase aquatic sediment loads of streams and rivers or alter riparian or lakeshore habitat or vegetation in ways harmful to fish or other wildlife.

Visitors engaging in commercially guided activities are expected to use and stay on hiking and canoe trails or roads to access the interior of the refuge. Disturbance of refuge resources is the primary concern regarding commercially guided activities for wildlife observation. While field trip routes and observation sites are usually located in areas open to the public, disturbance caused by large groups could be more intense because the number of people, and desire to get close to wildlife, may be greater than what normally occurs during general public activities. This disturbance will displace individual animals to adjacent areas of the refuge. Commercially or recreationally, groups of 6 or more cyclists or groups of 15 or more pedestrian travelers will require an SUP.

Guided tour activities may conflict with other refuge users, including commercial or non-commercial tours that will likely use the same areas as independent wildlife viewers, kayakers and canoeists, and hunters and anglers during open seasons. Unregulated or inadequately regulated commercial guiding operations may adversely affect the safety of other refuge users, the quality of their experience, and the equity of opportunity. The refuge's visitor use programs will be adjusted as needed to eliminate or minimize each conflict and provide quality wildlife dependent recreational opportunities.

Negative impacts between concurrent public use activities are expected to be negligible and no adverse socioeconomic impacts are anticipated. This use should not result in short, long-term, or cumulative impacts that adversely affect the purpose for this refuge or the mission of the National Wildlife Refuge System. It is intended that the primary positive impact will be a better appreciation of the role of the U.S. Fish & Wildlife Service in the conservation arena. Each application will be evaluated on its own merit and stipulations will be adapted to individual requests to minimize impacts to vegetation and wildlife and ensure that the use is consistent with goals of the refuge and the Refuge System.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The following stipulations apply to the special use permits issued for commercial guided recreational tours. Law enforcement and administrative monitoring of permit holders will continue for compliance with the following conditions, which are incorporated into all permits to minimize impacts on refuge lands and resources:

1. Impacts of the commercial guiding for wildlife observation will continue to be assessed and adjustments made to the program to prevent conflicts to wildlife, habitats and other refuge users.
2. Qualified individuals must apply 12 months in advance to conduct guided tours. Qualified individuals are defined as:
 - a. Licensed as a commercial guide by the state in which they operate, as applicable and must also be certified by applicable associations such as the American Canoeing Association (<http://www.americancanoe.org/>) or similar certification if available.
 - b. When operating a boat, possess a current vessel operator license issued by the U.S. Coast Guard, as applicable. Minimum license shall be Operator Uninspected Passenger Vessel. The license shall be valid for the area of operations and type(s) of vessel operated. This license applies to guides transporting patrons by water.
 - c. Possess and provide proof of a current CPR and First Aid training certificate issued by a recognized national organization.
 - d. Provide proof of insurance, including minimum coverage for general liability and comprehensive for all operations.
 - e. Certified as a "Certified Interpretive Guide" through the National Association for Interpretation (<http://www.interpnet.com>) and certified annually by the refuge manager through an orientation of current Refuge news and information.
3. The permittee will not advertise on refuge property or distribute leaflets via the refuge visitor contact station, refuge headquarters, etc. They may distribute leaflets only during the approved programs covered by the permit and only to those participants registered for that program.

4. All special use permits will expire on September 30, regardless of the date of issue. The permittee is responsible for accurate record keeping and shall provide the refuge manager with the following information by October 10 of each year:
 - a. Number of guided or outfitted trips performed on the refuge
 - b. Number of individuals guided or outfitted
 - c. Date of each trip
 - d. Location of each trip, or general area of activity
 - e. Individual names and description of duties for all additional staff who assist with a trip on the refuge.
5. A copy of a valid special use permit must be available for inspection on request by any law enforcement officer or refuge staff member, whenever an activity authorized by the permit is occurring. Storing permits in the glove box of a vehicle is acceptable; however, all guides must be knowledgeable about the permit and its conditions.
6. Violation of any special conditions of the permit or of any federal, state, local, or refuge regulations may result in a Notice of Violation being issued or the revocation or cancellation of the permit without written or verbal warning. In that case, the permit holder will receive immediate notification by phone with follow-up notification by mail. The permit holders are responsible for the actions of their employees, agents, others working under their special use permit, and their clients.
7. Regardless of the reason for the revocation or cancellation of a permit, no refund will be made to the permit holder.
8. The refuge will issue permits on a year-to-year basis, and will not reissue them automatically on consecutive years.
9. Permit holders will provide all participants with relevant refuge information, including the refuge's brochures. The refuge will supply information to the permit holder.
10. All boats must comply with U.S. Coast Guard, state and refuge requirements.
11. Tours must begin and end during daylight hours only.
12. Groups will police their routes for litter, vandalism, etc., and report any problems to the refuge office.
13. All vessels and vehicles used in guide operations shall be marked with a guide identifier.
14. The permittee and their clients shall save, hold harmless, defend and indemnify the United States of America, its agents, and employees for losses, damages, or judgments and expenses on account of fire or other peril, bodily injury, death, or property damage, or claims for bodily injury, death, or property damage of any nature whatsoever, and by whomsoever made, arising out of the activities of the permittee, its employees, subcontractors, or agents under this Special Use Permit.

15. a. The permittee shall purchase at a minimum the types and amounts of insurance coverage as stated herein and agrees to comply with any revised insurance limits that the Refuge Manager may require during the term of this Special Use Permit.

b. Upon request of the Refuge Manager, the permittee shall provide a Statement of Insurance and Certificate of Insurance.

c. The U.S. Fish and Wildlife Service will not be responsible for any omissions or inadequacies of insurance coverages and amounts if such prove to be inadequate or otherwise insufficient for any reason whatsoever.

16. Public Liability. The permittee shall provide comprehensive general liability insurance against claims occasioned by actions or omissions of the permittee or its designees in carrying out the activities and operations authorized hereunder. Such insurance shall be in the amount commensurate with the degree of risk and the scope and size of such activities authorized herein, but in any event, the limits of liability shall not be less than (\$300,000) per occurrence covering both bodily injury and property damage. If claims reduce available insurance below the required per occurrence limits, the permittee shall obtain additional insurance to restore the required limits. An umbrella or excess liability policy, in addition to a comprehensive general liability policy, may be used to achieve the required limits.

a. All liability policies shall specify that the insurance company shall have no right of subrogation against the United States of America or shall provide that the United States of America is named an additional insured.

b. The permittee agrees that the U.S. Fish and Wildlife Service does not take any responsibility or liability for the security, loss, damage, or otherwise of any vehicle, machinery, equipment, or other goods or property owned by, or under the control of, the permittee.

The refuge shall also collect any costs incurred by the refuge as a result of photography activities, including but not limited to administrative, security and personnel costs in accordance with policy.

JUSTIFICATION:

Allowing commercially guided wildlife observation on the refuge will not materially interfere with the purposes of the refuge or the mission of the Refuge System because:

1. Existing federal and state agency oversight and regulation of affected species and habitat is sufficient to ensure healthy populations. Disturbance to fish and wildlife will be local, short-term, and not adversely impact overall populations.
2. There are adequate state and federal enforcement officials to enforce state and federal regulations.
3. Qualifying standards for commercial operators will help ensure that the public is guided by competent individuals.

4. Restricting the number of guides and managing how guided activities are conducted will reduce adverse habitat effects, conflicts between competing guide services, and conflicts between guided operations and other refuge users.
5. Designated areas of operation (Guide Use Areas), operating requirements, and other regulation of guided activities will minimize conflicts with other refuge users.
6. Regulating and limiting the number of commercial operators as stated in the refuge commercial guide program stipulations will provide a safe, quality experience to individuals who want to enjoy the resources of the refuge. It will also increase opportunities for those who wish to observe wildlife and experience the scenic and wild nature of the refuge, but may lack the required equipment, knowledge, or expertise.

This activity will not materially interfere with, or detract from, the mission of the Refuge System or purposes for which the refuge was established. In addition, this activity will fulfill one or more purposes of the refuge or Refuge System.

MANDATORY 10-YEAR RE-EVALUATION DATE: _____

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USE:

Commercial Filming, Television, Motion Picture Production, Photography, and Recordings
(Special Use Permit only)

DESCRIPTION OF USE:**(a) *What is the use?***

The use considered in this Pre-Acquisition Compatibility Determination is Commercial Filming, Television, Motion Picture Production, and Recordings. Commercial filming involves an individual or company taking recordings, photographs, films, or videos for commercial gain. Photography classes, television and film documentary crews, and photographic production shoots are examples of commercial photography. This category applies to any photography, filming, or videography activity that results in images that are intended for sale or where the person is otherwise paid for the work by salary, contract, or other means. These activities are varied in their scopes and impacts, ranging from a single individual in a single vehicle to numerous people and associated support vehicles (e.g., trucks with aerials). The definition of commercial photography in Public Law 106-206 (16 U.S.C. 4601.6d) is as follows: "... commercial filming means the film, electronic, magnetic, and digital or other recording of a moving image by a person, business or other entity for a market audience with the intent of generating income. Examples include, but are not limited to feature film, video, television broadcast, documentary, or similar projects. Commercial filming may include the advertisement of a product or service and/or the use of actors, models, sets, or props.

(b) *Where would this use be conducted?*

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

This use would be conducted year-round in areas open to the general public.

(d) *How would this use be conducted?*

Each request for this use will be considered, and if appropriate, will result in a special use permit being issued by the Refuge Manager. Each request must be presented in writing with details of who, what, where, when, why and how the commercial operation will be conducted. Requests for this use will be reviewed on a case-by-case basis to ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs. The Refuge Manager will use professional judgment in ensuring that the request will have no considerable negative impacts; will not violate Refuge regulations; and that it will contribute to the achievement of the Refuge purpose or the Refuge System mission. Special needs will be considered on a case-by-case basis and are subject to the Refuge Manager's approval and may include a secondary component negotiated to ensure compatibility (if appropriate). Any approved special use permit will outline the framework in which the use can be conducted, and Refuge staff will ensure compliance with the permit.

For proposed commercial filming where the environmental educational/awareness values are not clear to the Refuge Manager, the use would be considered not compatible. For example, if

filming could more appropriately be conducted on non-refuge lands, interference with priority public uses or other stipulations mentioned below cannot be accounted for properly and no educational/environmental component is offered as part of the request, the use would be considered not appropriate or compatible and the permit request will be denied.

Filming efforts may take one day to multiple days and may involve multiple periods throughout the year as stated in the special use stipulations that are approved for each request. Two types of commercial filming may occur including requests where a film crew accompanies Refuge staff or cooperators on projects or where a film crew has a specific project that has been reviewed as appropriate by Refuge staff and the filming will occur in open public use areas of the Refuge with limited supervision.

(e) *Why is this use being proposed?*

Commercial photography/filming as a lone activity is not priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 and against Code of Federal Regulations. The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

Commercial photography/filming is a popular enterprise on the refuge due to the scenic natural habitats and abundant wildlife in the area. The Refuge staff anticipates that an increase in commercial photography and filming will occur in the area over the next few years as the Refuge gains visibility and areas of natural habitat in the surrounding areas decrease. If the number of requests expands dramatically, this use and its stipulations to ensure compatibility may need to be re-evaluated prior to the mandatory re-evaluation date.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs. Additional staff costs are incurred to review each request, analyze affected habitats and wildlife, coordinate with the outside entity, and process a permit if necessary. Compliance with the terms of the permit is within the regular duties of the Refuge's law enforcement officers.

No special equipment, facilities, or improvements are necessary to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge.

Minimal costs are associated with the use to monitor consequences of the public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

A special use permit is required, which obligates administrative time to complete. Additionally, costs may be assumed by the requestor as appropriate given the level of oversight needed. The Service requires the permittee to offset any cost incurred by the Refuge. This will be determined on a case-by-case basis. The offsetting cost should always be equal to the Refuge -incurred cost and would come to the Refuge in the form of fees paid by the commercial media permittee. These fees should at least equal our cost to administer the use, including any costs associated with facilities, equipment, supplies, and services.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Any public use activity has the potential for impacts; however, the focus is to minimize any potential impacts to within acceptable limits. Each request for a filming permit will be evaluated for impacts to wildlife, habitats and priority public uses. Stipulations will be added to the Special Use Permit to minimize the anticipated impacts.

Wildlife recording, filming, and photography can negatively impact wildlife by altering wildlife behavior, reproduction, distribution, and habitat (Purdy et al 1987, Knight and Cole 1995). Of the wildlife observation techniques, photographers tend to have the largest disturbance impacts (Klein 1993, Morton 1995, Dobb 1998). While wildlife observers frequently stop to view species, wildlife photographers are more likely to approach wildlife (Klein 1993). Even a slow approach by photographers tends to have behavioral consequences to wildlife species (Klein 1993). Other impacts include the potential for videographers to remain close to wildlife for extended periods of time, in an attempt to habituate the wildlife subject to their presence (Dobb 1998) and the tendency of casual photographers, with low power lenses, to get much closer to their subjects than other activities would require (Morton 1995), including wandering off trails. This usually results in increased disturbance to wildlife and habitat, including trampling of plants. Klein (1993) recommended that refuges provide observation and photography blinds to reduce disturbance to wildlife when approached by visitors. Potential impacts from this use include purposeful or inadvertent disturbance to wildlife. Large commercial activities could also interfere with priority public uses.

Special use permit conditions and associated monitoring of permitted activities would be designed to minimize wildlife and habitat impacts of this use. Some requests may require further analysis of the impacts of the proposed activity which may also require additional compliance with the National Environmental Policy Act (NEPA) and consultation under any other relevant laws.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Each request must comply with 43 CFR Part 5, Public Law 106-206 of May 2000, 8 RM 16 (Refuge Manual) and 50 CFR 27.71 a,b 1-4. To ensure compatibility with the Refuge System and refuge goals and objectives and to minimize or exclude adverse impacts as described above, additionally, the activity will be subject to the following stipulations:

1. Only commercial photography/filming that are in support of conservation, Refuge purposes, the Refuge System mission, or for educational and interpretation purposes will be permitted. Requests that do not directly support these will be considered on a case-by--case basis to see if a secondary component can be considered to ensure compatibility and appropriateness.
2. Any permittee or other non-Service unescorted personnel acting under a Special Use Permit accessing any area within the Green River NWR must notify the appropriate Refuge personnel and give at least a 72 hour advance notice prior to access for filming/photography. In most cases, the photographer's access is limited to the same areas in which the general public is allowed to go, but this will be evaluated on a case by case basis. Filming/photography activities approved in areas of the Refuge closed to the public will require Refuge staff to be present as an escort. The permittee acknowledges and agrees that this Special Use Permit does not give the permittee or its designees exclusive use or access to any site, facility, or wildlife.
3. Permittee will limit the crew size to the smallest number possible and necessary for filming.
4. Permittee shall provide a detailed description of filming/photography plans, including site specific location, support equipment, number of persons involved, client name, description of the project theme and key messages, and other details that would allow for evaluation of the project. The special use permit will detail who, what, where, when, why and how the commercial operation will be conducted.
5. Permittee will not clear, trim, cut, or disturb vegetation nor erect any facilities or structures, whether temporary or permanent, without written approval of the Refuge Manager.
6. All methodologies, e.g., aerial photography via drone or helicopter, must be requested and approved through the Special Use Permit process prior to filming.

7. Permittee is responsible for acquiring and/or renewing any necessary state and federal permits prior to beginning or continuing the project.
8. Firearms, weapons, alcohol, controlled substances or fires associated with filming/photography is prohibited.
9. Permittee will not capture or retain wildlife without specific written permission from the U.S. FWS as well as having all required permits.
10. Staging of equipment will not be allowed on the Refuge. The permittee agrees to remove all equipment and completely clear and clean each location of any materials brought to the site upon leaving a site each day.
11. Proper credit to the Refuge and the Service will be requested for all commercial filming, including commercial recording of images and sounds collected on the Refuge. Any footage used from Green River NWR must include a credit, acknowledgement, or caption acknowledging the U.S. Fish and Wildlife Service: "Filmed on location at Green River National Wildlife Refuge, Benton, Kentucky courtesy of the U.S. Fish and Wildlife Service".
12. Permittee will not capture or retain wildlife without specific written permission from the Service, as well as having all required permits.
13. Priority consideration is extended to producers of wildlife and natural resource related audio or visual materials. Producer's credentials will be verified by the appropriate Refuge personnel.
14. Production activities will be conducted so as to minimize impact or interference with Refuge visitors, wildlife or natural and/or cultural resources within the Refuge.
15. Disturbing, injuring, destroying or collecting or attempting to disturb, injure, destroy or collect any plant or animal is prohibited.
16. Permittee is required to adhere to all Refuge rules and regulations.
17. Failure to comply with any of the special conditions will result in revocation of the permit and the permit fee will not be refundable.
18. Permittee will provide the Refuge Manager with a copy of the final product of the commercial filming project within 180 days of completion of the project.
19. The U.S. Fish and Wildlife Service is not responsible for any mishaps or injuries that may occur during filming and associated activities. The permittee acknowledges and agrees to provide appropriate safety equipment and training to all people participating in the filming/photographic and associated activities with regard to hazards likely to be encountered on Green River NWR managed lands and waters.
20. Indemnification: The permittee shall save, hold harmless, defend and indemnify the United States of America, its agents, and employees for losses, damages, or judgments and expenses on account of fire or other peril, bodily injury, death, or

property damage, or claims for bodily injury, death, or property damage of any nature whatsoever, and by whomsoever made, arising out of the activities of the permittee, its employees, subcontractors, or agents under this Special Use Permit.

21. a. The permittee shall purchase at a minimum the types and amounts of insurance coverage as stated herein and agrees to comply with any revised insurance limits that the Refuge Manager may require during the term of this Special Use Permit.

b. Upon request of the Refuge Manager, the permittee shall provide a Statement of Insurance and Certificate of Insurance.

c. The U.S. Fish and Wildlife Service will not be responsible for any omissions or inadequacies of insurance coverages and amounts if such prove to be inadequate or otherwise insufficient for any reason whatsoever.
22. Public Liability. The permittee shall provide comprehensive general liability insurance against claims occasioned by actions or omissions of the permittee or its designees in carrying out the activities and operations authorized hereunder. Such insurance shall be in the amount commensurate with the degree of risk and the scope and size of such activities authorized herein, but in any event, the limits of liability shall not be less than (\$300,000) per occurrence covering both bodily injury and property damage. If claims reduce available insurance below the required per occurrence limits, the permittee shall obtain additional insurance to restore the required limits. An umbrella or excess liability policy, in addition to a comprehensive general liability policy, may be used to achieve the required limits.

a. All liability policies shall specify that the insurance company shall have no right of subrogation against the United States of America or shall provide that the United States of America is named an additional insured.

b. The permittee agrees that the U.S. Fish and Wildlife Service does not take any responsibility or liability for the security, loss, damage, or otherwise of any vehicle, machinery, equipment, or other goods or property owned by, or under the control of, the permittee.

The refuge shall also collect any costs incurred by the refuge as a result of photography activities, including but not limited to administrative, security and personnel costs in accordance with policy.

JUSTIFICATION:

Wildlife photography is a priority wildlife-dependent use for the Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57)). The Service's policy is to provide expanded opportunities for wildlife-dependent uses when compatible and

consistent with sound fish and wildlife management, ensuring that they receive enhanced attention during planning and management.

Specific refuge regulations address equity and quality of opportunities for visitors and help safeguard refuge habitats. Impacts from this proposal, short-term and long-term, direct, indirect, and cumulative, are expected to be minor and are not expected to diminish the value of the refuge for its stated objectives.

Stipulations above will ensure proper control of the use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on the refuge.

Commercial photography/filming, although not a priority public use, has been determined to be compatible provided the Permit Special Conditions are implemented because it may increase the public's understanding of America's wildlife, wildlife conservation, and the Service's role in managing and protecting natural resources. We do not expect this use to materially interfere with or detract from the mission of the National Wildlife Refuge System nor diminish the purposes for which the refuge was established. It will not pose significant adverse effects on Refuge resources, nor interfere with public use of the refuge, nor cause an undue administrative burden.

Commercial photography is considered an economic use of a national wildlife refuge and is guided by the following policies:

16USC668dd, 50 CFR 27.71, Motion or Sound Pictures

The taking or filming of any motion or sound pictures on a national wildlife refuge for subsequent commercial use is prohibited except as may be authorized under the provisions of 43 CFR part 5.

16USC668dd, 50 CFR 27.97, Private Operations

Soliciting business or conducting a commercial enterprise on any national wildlife refuge is prohibited except as may be authorized by special permit.

16USC668dd, 50 CFR 27.86, Begging

Begging on any national wildlife refuge is prohibited. Soliciting of funds for the support or assistance of any cause or organization is also prohibited unless properly authorized.

16USC668dd, 50 CFR, Subpart A, 29.1 Allowing Economic Uses on National Wildlife Refuges

We may only authorize public or private economic use of the natural resources of any national wildlife refuge, in accordance with 16 U.S.C. 715s, where we determine that the use contributes to the achievement of the national wildlife refuge purposes or the Refuge System mission.

8 RM 16, Audio Visual Productions

5 RM 17, Commercial and Economic Uses on National Wildlife Refuges

43 CFR Part 5, Making Pictures, Television Productions or Sound Tracks on Certain Areas Under the Jurisdiction of the Department of the Interior

Public Law 106-206, Commercial Filming

Under certain circumstances, commercial photography, filming, and videography can support priority public uses of the National Wildlife Refuge System such as environmental education, interpretation, and wildlife observation by increasing public awareness, understanding, and support of the U.S. Fish and Wildlife Service, the National Wildlife Refuge System, and conservation of natural resources, in general. Further, commercial photography, filming, and videography can promote ethical outdoor behavior, thereby helping to reduce and minimize adverse impacts to wildlife and habitats. Commercial photography and/or filming have the potential to inspire and educate the public about the National Wildlife Refuge System (Refuge System), natural habitats, and wildlife. These activities will not materially interfere with, or detract from, the mission of the Refuge System or purposes for which Green River National Wildlife National Wildlife Refuge was established. In addition, these activities will fulfill one or more purposes of the refuge or the Refuge System. Commercial photography and/or filming are an appropriate use of the Refuge with special conditions. A Special Use Permit will be issued for each commercial operation and special conditions will be determined on an individual bases. In addition, this activity will fulfill one or more purposes of the Refuge or Refuge System.

MANDATORY 10-YEAR RE-EVALUATION DATE:

LITERATURE CITED:

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- Purdy, K.G., G.R. Goft, O.J. Decker, G.A. Pomerantz, and N.A. Connelly. 1987. *A guide to managing human activity on National Wildlife Refuges*. Office of Information Transfer, U.S. Fish and Wildlife Service, Ft. Collins, CO. 57 pp.

USE:

Cooperative Farming

DESCRIPTION OF USE:

(a) What is the use?

The use considered in this Pre-Acquisition Compatibility Determination is Cooperative Farming. Farming is used by the U.S. Fish and Wildlife Service on national wildlife refuges in the Southeast Region as a habitat management tool to provide high energy food sources for millions of wintering ducks, geese, and swans and other migratory bird species. Within the lower Mississippi Valley, these food resources are critical to each refuge's ability to successfully meet the goals and objectives set by the Lower Mississippi Valley Joint Venture (LMVJV 2016) as stepped down from the North American Waterfowl Management Plan (NAWMP 2012) and the respective Comprehensive Conservation Plans (CCPs) and Habitat Management Plans (HMPs) developed for each refuge in this landscape.

Normal human expansion in our nation will continue to eliminate wildlife habitats that have previously been relied upon for successful wildlife restoration. Therefore, our professional wildlife managers will need to work more diligently than ever to ensure that those remaining important places have the best available food resources and other important conditions to ensure they can persist. Throughout the expansion of the National Wildlife Refuge System (NWRS), many refuges were acquired for the purposes of specifically benefiting and enhancing waterfowl and other migratory bird species. Further, in recognition of the need to provide adequate forage for waterfowl and migratory birds many refuges currently, and historically, maintain active farming practices that produce a variety of crops to support birds and other species (USFWS 2018).

Green River NWR will have a wintering waterfowl habitat objective to provide adequate flooded hardwoods, moist-soil, and agriculture habitats to meet the foraging needs. Continental waterfowl population objectives for the proposed refuge can be stepped down from the North American Waterfowl Management Plan using county-level harvest data (1999-2013) following Fleming et al. (2017; Method 4D). Using a 50-km buffer around the AOI, assigned population objectives from each county overlapped by the buffer and local eBird data (avg. abundance during 1 November – 31 April 2012–2017 (Soulliere et al. 2013), a migration curve was developed to extrapolate waterfowl population estimates over a typical fall/winter/spring period. Total use day objectives for dabbling ducks, diving ducks, and geese were then estimated following Soulliere et al. (2013). Based on these analyses, the proposed Green River NWR's target use day objectives for the proposed Green River NWR would be approximately 3,697,788 dabbling ducks, 155,328 diving ducks, and 884,357 geese.

The Refuge could use a combination of farming, moist soil management, and managed forested wetlands to provide suitable wintering waterfowl habitat. Studies have documented that wintering waterfowl in the Mississippi Alluvial Valley (MAV) prefer regions composed of 50% cropland, 20% moist soil wetlands, 20% forested wetlands, and 10% open water habitats. (Strickland et. al 2009). These acres of natural food and open water, in conjunction with farming, will allow the Refuge to mimic the preferred composition of wintering waterfowl habitats found by Strickland et al. (2009).

There are three primary management options to meet step-down habitat objectives for wintering waterfowl on the Refuge: 1) moist soil management, 2) force account farming (i.e., Refuge staff farms the fields), and 3) cooperative farming (i.e., private farmer farms the fields and leaves 25% of crops unharvested).

Moist soil management is the manipulation of naturally occurring wetland plants to produce preferred waterfowl forage (Strader and Stinson 2005). Under moist soil management, staff uses a combination of 1) disking, mowing, and/or burning wetland plants to set back plant succession, 2) application of herbicides or mechanical disturbance to control undesirable plants, and 3) prescribed flooding of natural wetlands or wetland impoundments to make forage available to waterfowl. Several natural-occurring moist soil wetlands may already present on Green River NWR, depending on lands acquired.

Force account farming is farming conducted by the Refuge staff which allows 100% of the crop to be retained for waterfowl use. Extensive staff time and farming equipment (e.g., farm tractors, seed drill(s), boom sprayers, and other farming implements) are used by the Service to force account farm. Knowledgeable staff are also needed to ensure desired crop productivity is obtained, which will meet habitat objectives and energetic requirements of wintering waterfowl. Cooperative farming is an economic use whereby a farmer produces crops (primarily corn, grain sorghum, and rice) on a refuge and, in lieu of a rental payment, leaves an unharvested 25% share of the planted crop for wintering waterfowl and other wildlife species. The farmer is responsible for all equipment, fuel, seed, fertilizer, approved herbicides, and labor necessary to farm the Refuge. The Refuge is responsible for identifying the type and location of crops to be planted, providing the farmer with an approved list of herbicides for use, and identifying the Refuge's 25% crop share which will contribute to the waterfowl management goals and objectives.

Of the three management options available to meet wintering waterfowl objectives, force account farming and moist soil management require high initial investments by the Service for equipment and high annual expenses such as equipment repair and replacement, large requirements of staff time, seed, fertilizer, lime, diesel fuel, and herbicide costs. Refuge Managers also must decide if staff time dedicated to these management options can be conducted in a way that does not limit other management needs such as threatened and endangered species management, forest management, and management of priority public uses. If waterfowl food resource objectives cannot be provided through the management of natural habitats on a NWR, then farming should be utilized. Cooperative farming is therefore considered to be the most effective option for the Refuge to meet wintering waterfowl habitat objectives.

(b) *Where would this use be conducted?*

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR.

(c) *When would this use be conducted?*

Cooperative farming activities (field-prep, planting, harvesting, etc.) generally occur between March 15 and November 15.

(d) *How would this use be conducted?*

The cropping is done under the terms and conditions of a cooperative farming agreement or special use permit issued by the Project Leader. The terms of the permit insure that all current Service and Refuge guidelines and restrictions are followed. Permittee selection and associated determination of cost or shares will follow relevant Refuge Manual guidance (5 RM 17 and 6 RM 4) and Region 4 specific guidance for farming.

The cooperative farming program is a component of the refuge's annual habitat management program and activities conducted by the cooperators support the accomplishment of refuge habitat management objectives. We follow best management practices in the implementation of the cooperative farming program. Forested or grass buffers are established between all farm fields and any adjacent wetlands and streams. We prepare pesticide use proposals (7 RM 14) for application of all pesticides, and only those that are shown to not impact fish and wildlife resources are approved.

Annual cooperative farming agreements (agreement) are established with farmers prior to the planting season. An agreement outlines the crop(s), location, and amount of acreage to be planted during the coming year and is signed by the cooperative farmer (cooperator) and the Refuge Manager or designee. The cooperator is responsible for all equipment, fuel, seed, fertilizer, chemicals, and labor necessary to produce the crop. Shares are acreage-based with a 75% cooperator's share and 25% Refuge's share. Cooperative farmers are required to perform soil tests to determine nutrient needs (fertilizer and lime applications) according to the local Agriculture Extension Service. Application of pesticides must follow the Refuges Integrated Pest Management plan and be approved through the U.S. Fish and Wildlife Service's Pesticide Use Proposal System (PUPS) process. Attached to the agreement will be a list of pesticides approved for use through the PUPS process. The cooperator assumes responsibility for all associated costs for the crops grown. Modifications to the original farming agreement may occur throughout the farming season, by writing addendums to the original agreement which have been agreed upon and signed by both the cooperator and Refuge Manager or designee. The Refuge Manager or designee will administer the cooperative farming program and be required to prepare farming contracts, meet with farmers, verify crop plantings, verify pest problems, and negotiate any needed addendums during the year.

(e) *Why is this use being proposed?*

The Mississippi Alluvial Valley (MAV) is a continentally important region for migrating and wintering waterfowl in North America (Reinecke et al. 1989). The total wintering waterfowl population objective in the MAV is 4.2 million ducks and geese (Reinecke and Loesch 1996; Lower Mississippi Valley Joint Venture (LMVJV) 2016), which includes Mallard, Northern Pintail, American Black Duck, Gadwall, American Wigeon, Green-winged Teal, Northern Shoveler, Wood Duck, and geese. The initial population goals were adjusted for 15% winter mortality (Reinecke and Loesch 1996) and to account for early migrating ducks that winter in Mexico (LMVJV 2007). Waterfowl habitats are ranked with a value that describes the amount of energy they provide in food resources, known as "duck-energy-days" or DED's. DEDs are defined as the number of ducks that can be energetically sustained in one acre of foraging habitat for one day (LMVJV 2016). Waterfowl energy needs are modeled for an overwintering period of 110 days, representing early November to late February (Reinecke and Loesch 1996). Additionally, DED objectives were adjusted to account for goose competition (LMVJV 2016) and Wood Ducks were assumed to feed 75% in forested wetlands and 25% in moist-soil wetlands (LMVJV 2016).

As a result, across the 110-day period the overall NAWMP goal for the MAV is 469,336,891 DEDs. Kentucky is above its target objective for providing DEDs, whereas the MAV as a whole remains below objective, it is imperative that partners, at minimum, maintain current DED production (LMVJV 2016).

The primary purpose for farming on national wildlife refuges is to ensure that waterfowl can meet their foraging needs which enhances their body condition and supports reproductive output. Female ducks that are in good physical condition when leaving the wintering grounds, nest earlier and have larger clutch sizes than those in poor condition (Ringelman 1990, Dzus and Clark 1998). Early nests and larger clutch sizes produce a greater number of fledgling ducks than late nests and smaller clutches (Krapu 1981, Heitmeyer 1988, Strickland et al. 2009). Thus, availability of high-quality foraging habitat on the wintering grounds, especially in disturbance-free areas (sanctuary), is positively related to the reproductive output of waterfowl during breeding season. Waterfowl habitat in the Southeastern United States is of paramount importance since 50% of the continental waterfowl population winter in this region annually (unpubl. data, M. Koenff, USFWS). The Refuge would not have staff or equipment necessary to manage and maintain acreage, if acquired, needed to meet its waterfowl needs without the assistance of the cooperative farming program. Refuge cooperative farming operations will continue under carefully regulated conditions. Thus, the cooperative farming program adds essential capacity in the ability of National Wildlife Refuges to significantly contribute to its goals.

TABLE 1. DUCK ENERGY DAY (DED) OBJECTIVES BASED ON ENERGY DEMAND OF STEPPED-DOWN NAWMP OBJECTIVES FOR THE MAV PORTION OF THE LMVJV (LMVJV 2016).

State	DED Objective¹
Arkansas	219,427,337
Kentucky	4,708,843
Louisiana	120,913,290
Mississippi	72,637,077
Missouri	18,025,015
Tennessee	33,625,658
MAV TOTAL	469,336,891

Compatibility policy (603 FW 2) requires that the Service reevaluate these types of uses at least every 10 years; the previous compatibility determination for cooperative farming had a Finding of No Significant Impact. This compatibility determination updates and replaces the previous compatibility determination for cooperative farming.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

The decision to use a cooperative farmer would occur as part of strategies developed under habitat management planning and discussions (USFWS, 2013).

Refuge staff is responsible for drafting the Cooperative Farming Agreement and necessary Pesticide Use Proposals. Administration of the cooperative farming program consists of approximately 20 staff days or less than five percent of refuge staff time devoted to administering this activity.

Waterbird impoundments could be necessary to support the use. Future maintenance costs would depend on the number of impoundments created on the refuge.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

No offsetting revenues exist for this use.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

In terms of the impacts related specifically to habitat objectives of the Refuge, we expect no impact to the diversity of fish, wildlife or plants occurring on the Refuge. The relatively small impact area (10% of the Refuge) suggests that no plant or species of fish and wildlife will be negatively impacted or extirpated from the refuge.

Soil disturbance is likely to occur when the areas are disked during the spring planting season, but these impacts can be lessened by the implementation of no-till and conservation tillage farming methods. It is Service policy that the long-term productivity of the soil will not be jeopardized to meet wildlife objectives (6 RM 4). Buffer strips adjacent to waterways and sensitive areas help trap sediments and hold agricultural run-off.

Pesticides will be used and approved through the PUPS process prior to application. The minimum effective volume will be applied and Best Management Practices will be followed.

Both current and proposed management recognize the benefits for providing supplemental forage for migratory waterfowl and waterbirds within the Mississippi Flyway. Refuge farming practices (both current and proposed) are designed for the predominate benefit of waterfowl (ducks and geese). However, many other species would benefit directly or indirectly from Refuge crops. Croplands on the Refuge provide an accessible, high-energy food source during the wintering period of migratory waterfowl. Most waterfowl are opportunistic feeders, and some species such as Canada geese, snow geese, mallard, northern pintails, and teal have learned to capitalize on the abundant foods produced by agriculture (Bellrose 1976). During the last century, migration routes and wintering areas have changed in response to availability of these foods (Fredrickson and Drobney 1979). Some species have developed such strong migratory traditions that many populations are now dependent on agricultural foods for their migration or winter survival (Ringelman 1990). However, during breeding and molting periods, waterfowl require a balanced diet with high protein content. Agricultural foods, most of which are neither nutritionally balanced nor high in protein, are seldom used during these periods. During fall, winter, and early spring, when vegetative foods make up a large part of their diet, agricultural foods are preferred forage except in arctic and subarctic environments (Sugden 1971).

The U.S. Fish and Wildlife Service (Service) relies on four tiers of analysis for the use of pesticides on units of the National Wildlife Refuge System to ensure NEPA compliance:

- Pesticide specific analysis by the U.S. Environmental Protection Agency (EPA);
- Pesticide specific analysis through the Service's Pesticide Use Proposal System (PUPS) process;
- Analysis of pesticides in general for a specific NWR or NWR complex through an EA/FONSI or EIS/Record of Decision (ROD) (e.g., EA/FONSI for a CCP or Habitat Management Plan (HMP)); and
- Analysis of pesticides in general through an Environmental Action Statement (EAS) that documents the pesticide uses/treatments planned for a particular NWR or NWR complex (note: update the EAS as needed if uses/treatments change).

Cooperative farmers are only allowed to use EPA registered pesticides. These pesticides are reviewed and approved by the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (7 USC §136) (FIFRA). EPA conducts risks assessments to ensure registered pesticides will not generally cause unreasonable adverse effects on the environment. In addition to EPA's review of each pesticide, each pesticide that is proposed for use on the refuge must first be approved under the Service's PUP process (569 FW 1), through which each pesticide is analyzed for the toxicological effects in relation to human/environmental aspects associated with the refuge. Each chemical is carefully evaluated and ultimately approved by the Regional Integrated Pest Management (IPM) Coordinator through the PUPS process. This review process provides the refuge with best management practices (BMP's) that provides guidance to assist the refuge with the proper use of each pesticide and reduces potential impacts to non-target pest species. The Service is typically more restrictive than what is called for on the label, particularly when it comes to buffers. As part of the PUPS process, an Intra-Service Section 7 Endangered Species Act (ESA) consultation is conducted, for each pesticide, which evaluates any possible impacts to threatened and/or endangered species that are near and/or adjacent to the spray area. Application of pesticides on the refuge will adhere to the Department of the Interior's Pesticide Use Policy (517 DM 1), the Service's Integrated Pest Management Policy (569 FW 1), and other applicable policies (e.g., 601 FW 3 Biological Integrity, Diversity, and Environmental Health; 620 FW 2 Cooperative Agriculture Use; 603 FW 1 Appropriate Use; and/or 603 FW 2 Compatibility).

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

- ☐ Use is not compatible
- ☒ Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The cooperative farming program is regulated through annual cooperative farming agreements that specify the fields, crops to be grown, acceptable farming practices, and approved pesticides and use procedures. Examples of special conditions contained in each cooperative farming agreement include:

1. The program will adhere to general conditions for cooperative farming programs as listed in the Refuge Manual (6 RM 4 Exhibit 1).
2. All operations on the refuge cropland are to be carried out in accordance with the best management practices (BMPs) and soil conservation practices
3. Fifty foot (50') vegetative buffer strips are maintained around all fields and water bodies
4. Cooperating farmers will be subject to Service policy and regulations regarding use of chemicals. Herbicide and pesticide use is restricted by type and to the minimum necessary amount applies.
5. Special conditions of special use permits will address unique local conditions as applicable.

JUSTIFICATION:

Conditions/stipulations imposed in cooperative farming agreements ensure that farming activities minimize impacts to Refuge resources.

The Biological Integrity, Diversity, and Environmental Health Policy (601 FW 3) was approved in 2001 and updated in 2006 as one of the 14 directives contained within the NWRS Improvement Act of 1997. This policy provides Refuge Managers with an evaluation process to analyze refuge resources and recommend the best management practices in concert with the Refuge purpose(s) and the NWRS mission. This policy specifically addresses farming in 601 FW 3.15(B) and 601 FW 3.15(C).

“Our habitat management plans call for the appropriate management strategies that mimic historic conditions while still accomplishing refuge objectives... Farming, haying, logging, livestock grazing, and other extractive activities are permissible habitat management practices only when prescribed in plans to meet wildlife or habitat management objectives, and only when more natural methods, such as fire or grazing by native herbivores, cannot meet refuge goals and objectives.” [601 FW 3.15(B)]

“We do not allow refuge uses or management practices that result in the maintenance of non-native plant communities unless we determine there is no feasible alternative for accomplishing refuge purpose(s).” [601 FW 3.15(C)]

In addition this policy provides guidance on biological integrity, diversity, and environmental health in a landscape context (601 FW 3.7(C)).

“In pursuit of refuge purposes, individual refuges may at times compromise elements of biological integrity, diversity, and environmental health at the refuge scale in support of

those components at larger landscape scales. When evaluating the appropriate management direction for Refuges, refuge managers will consider their Refuges' contribution to biological integrity, diversity and environmental health at multiple scales."

The Refuge acknowledges that the cooperative farming program may influence some aspects of biological integrity, diversity, and environmental health from the cooperating farmer's share on the Refuge. We try to minimize these impacts using best management practices. However, cooperative farming through the refuge's share on Green River NWR will allow the Refuge to meet objectives and contribute to, regional (LMVJV 2016), and national objectives (NAWMP, 2012) for providing vital wintering waterfowl habitat in the most productive and cost-effective manner.

In the case of Green River NWR, croplands constitute approximately 70% of the acreage within the Conservation Partnership Area. Management of agricultural lands acquired will be based on scientific calculations to determine foraging needs of waterfowl and or other wildlife species. The use of cooperative farming is the viable and efficient method available to meet these goals. Measures are taken to ensure that Integrated Pest Management and best management practices are followed by the cooperative farmers. Cooperative farming is the most cost effective method to produce the necessary foods to support wintering waterfowl and associated objectives.

The missions of the Refuge System provided in the Refuge Improvement Act of 1997 states that the "...mission of the National Wildlife Refuge System is to administer a national network of lands for the conservation, management and, where appropriate, restoration of fish, wildlife, and plant resources, and their habitats with the United States for the benefit of present and future generations of Americans (emphasis added).

Conservation and management means to sustain and, where appropriate, restore and enhance, healthy populations of fish, wildlife, and plants utilizing, in accordance with applicable Federal and State laws, methods and procedures associated with modern scientific resource programs. These definitions denote active management and is in keeping with the House report on the Act which states that the "Refuge System should stand as a monument to the science and practice of wildlife management."

It thus follows, that if an economic use of a natural resource is shown to be conservation and management as defined in the Act, it does contribute to the mission by the very definition of terms used. If a use contributes to the mission, it thus meets the standard or threshold established in 50 CFR 29.1. In accordance with 50 CFR 29.1, cooperative farming, as described in this compatibility determination, significantly contributes to the mission, purposes, goals, and objectives of Green River NWR and Refuge System mission.

MANDATORY 10-YEAR RE-EVALUATION DATE:

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USE:

Environmental Education, and Environmental Interpretation

DESCRIPTION OF USE:

a) What is the use?

The use considered in this Pre-Acquisition Compatibility Determination is Environmental Education and Environmental Interpretation. Environmental education, and environmental interpretation are the practice of noting, documenting, or learning about the occurrence or abundance of a living plant or animal species. This wildlife-dependent recreational use is recognized as priority use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would this use be conducted?

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) When would this use be conducted?

This use are conducted year-round from sunrise to sunset. The U.S. Fish and Wildlife Service has specific regulations further restricting certain uses. The Refuge annual hunting and fishing permit is defines parameters of public uses on the Refuge. This use may also be subject to regulations established by the State of Kentucky.

(d) How would this use be conducted?

Fish and Wildlife Service has specific regulations restricting certain uses published in 50 CFR. The Refuge annual hunting and fishing permit is defines parameters of public uses on the Refuge. This use may also be subject to regulations established by the State of Kentucky. Brochures and maps depicting the roads and trails open for this use are available on the refuge's Web site.

Environmental education and interpretation will be conducted by way of personal presentations by staff and volunteers, teachers and other youth leaders, and at special events and displays both on and off the refuge. For special educational events/displays in which collection of natural resources are required, a special use permit may be issued to collect the required resource from the refuge, if appropriate and approved by the refuge manager. Educational and interpretive information will also be provided via signage, printed information, audiovisual presentations, and lecture programs.

(e) Why is this use being proposed?

Environmental education, and environmental interpretation are priority public uses as defined by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and if compatible, are to receive enhanced consideration over other general public uses.

This use are conducted to provide compatible educational and recreational opportunities for visitors to enjoy the resource and to gain understanding and appreciation for fish and wildlife, wild lands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. This use will provide opportunities for visitors to observe and learn about wildlife and wildlands at their own pace in an unstructured environment and to observe wildlife habitats firsthand. This use will enhance the public's understanding of natural resource management programs and ecological concepts to enable the public to better understand the problems facing our wildlife/wild lands resources, to realize what effect the public has on wildlife resources, to learn about the Service's role in conservation, to better understand the biological facts upon which Service management programs are based, and to foster an appreciation for the importance of wildlife and wildlands. It is anticipated that participation in this use will result in a more informed public, with an enhanced stewardship ethic and enhanced support and advocacy for Service programs.

This use will also provide wholesome, safe, outdoor recreation in a scenic setting, with the realization that those who come strictly for recreational enjoyment will be enticed to participate in the more educational facets of the public use program, and can then become informed advocates for the refuge and the Service.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities will need to be developed to facilitate this use. Funding for improvements to visitor amenities is lacking in the current budget, however additional funding for visitor services improvements can come from challenge cost share projects, grant funds, and contributions. As funding is available, the refuge will improve projects and facilities.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Environmental education, and interpretation can produce positive or negative impacts to the wildlife resource. A positive effect of public involvement in these priority public uses will be a better appreciation and more complete understanding of the wildlife and habitats associated with Refuges. This can translate into more widespread and stronger support for the refuge, the National Wildlife Refuge System, and the Service.

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeal et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at J.N. "Ding" Darling Refuge, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Ardeids were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and little blue herons were observed to be disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern United States. Klein (1993), in studying waterbird response to human disturbance, found that as intensity of disturbance increased, avoidance response by the birds increased and that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductive functions of song (Arrese 1987). Disturbance, which leads to reduced singing activity, will make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Travel routes can disturb wildlife outside the immediate trail corridor (Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where "generalists" (American robins) were found near trails and "specialist" species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Hammitt and Cole (1998) conclude that the frequent presence of humans in "wildland" areas can dramatically change the normal behavior of wildlife mostly through "unintentional harassment."

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby

consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young.

Environmental education, and interpretation are expected to have negligible adverse short-term, long-term, or cumulative impacts on birds, mammals, amphibians, reptiles, and invertebrates. The beneficial impacts of providing the existing level of wildlife-dependent activities, with some modest increases, include helping meet existing and future demands for outdoor recreation and education. Visitor use may increase over time as local residents and visitors become increasingly aware of refuge opportunities, and as we progress in creating new facilities and programs. The economic benefits of increased tourism likely would also benefit local communities.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

- _____ Use is not compatible
- X** Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge will manage these priority public uses (environmental education, and interpretation) in accordance with Federal and State regulations and review it annually to ensure wildlife and habitat goals are achieved and that these programs are providing safe, high-quality experiences for participants.

To ensure compatibility with refuge purposes and the mission of the Refuge System environmental education, and interpretation can occur on the refuge if the refuge-specific regulations are followed and following stipulations are met:

1. This use must be conducted in accordance with State and Federal regulations (50 CFR), and special refuge specific regulations published in the Public Use Regulations brochure.
2. The public use program will be reviewed annually to ensure that it contributes to refuge objectives in managing quality recreational opportunities and protecting habitats, and is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in unanticipated negative impacts to natural communities, wildlife species, or their habitats. Refuge law enforcement officer(s) will promote compliance with refuge regulations, monitor public use patterns and public safety, and document

visitor interactions. Refuge law enforcement personnel will monitor all areas and enforce all applicable State and Federal regulations.

3. Areas may be closed on the refuge to protect resources or prevent unwanted disturbance.
4. The activities prohibited are identified in 50 CFR Part 27.
5. If collection of natural resources in need to facilitate environmental education, a Special Use Permit must be acquired from the Refuge Manager.

JUSTIFICATION:

Environmental education, and interpretation are priority wildlife-dependent uses for the Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57)). The Service's policy is to provide expanded opportunities for wildlife-dependent uses when compatible and consistent with sound fish and wildlife management and ensure that they receive enhanced attention during planning and management.

Specific refuge regulations address equity and quality of opportunities for visitors and help safeguard refuge habitats. Impacts from this proposal, short-term and long-term, direct, indirect, and cumulative, are expected to be minor and are not expected to diminish the value of the refuge for its stated objectives. Available parking and size of the facilities will typically limit use at any given time, except during special events.

Conflicts between visitors are localized and are addressed through law enforcement, public education, and continuous review and updating to public use regulations. Conflicts are further reduced by the establishment of seasonal area closures.

Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on the refuge.

This activity will not materially interfere with, or detract from, the mission of the Refuge System or the purpose for which the refuge was established.

MANDATORY 15-YEAR RE-EVALUATION DATE:

LITERATURE CITED:

Arcese, P. 1987. Age, intrusion pressure and defense against floaters by territorial male Song Sparrows. *Anim. Behav.* 35:773-784.

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- Freddy, D. J., W. M. Bronaugh, and M. C. Fowler. 1986. Responses of mule deer to disturbance by persons afoot and in snowmobiles. *Wildl. Soc. Bull.* 14:63-68.
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- Klein, M. L. 1989. Effects of high levels of Human Visitation on Foraging Waterbirds at J.N. "Ding" Darling Refuge, Sanibel, Florida. Final Report to Service. 103pp.
- Knight R. L., and D. N. Cole. 1995. Wildlife responses to recreationists. Pages 51-69 in R.L. Knight and D.N. Cole, editors. *Wildlife and recreationists: coexistence through management and research.* Washington, D.C., Island Press. Knight, R. L., and K. J. Gutzwiller eds. 1995. *Wildlife and recreationalists: coexistence through management and research.* Island Press, Washington, D.C. 372 pp.

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Kushlan, J. A. 1978. Feeding ecology of wading birds. Pages 249-297 in A. Sprunt IV, J.C. Ogden, and S. Winckler, eds. *Wading Birds*. Nat. Audubon Soc., New York, NY.

McNeil, R., P. Drapeau, and J. D. Goss-Custard. 1992. The occurrence and adaptive significance of nocturnal habitats in waterfowl. *Biol. Rev.* 67: 381-419.

Miller, S.G., R.L. Knight, and C.K. Miller. 2001. Wildlife responses to pedestrians and dogs. *Wildlife Society Bulletin* 29(1): 124-132.

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USE:

Exercise and Meditation

DESCRIPTION OF USE:

(a) *What is the use?*

The use considered in this Pre-Acquisition Compatibility Determination is Exercise and Meditation. Walking, hiking, yoga, meditation, jogging and running can be another means to observe wildlife and reconnect with nature but its primary goal is personal health. Exercise and meditation would be allowed as a means to facilitate connection to natural resources and a sense of stewardship for the Refuge system.

(b) *Where would this use be conducted?*

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

Exercise and meditation would be permitted from sunrise until sunset.

(d) *How would this use be conducted?*

Access to the refuge is open every day; however certain portions of the refuge may be closed to access by the public for purposes of sanctuary to migratory birds or for management activities. In addition, entry on all or portions of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife populations, or public safety.

(e) *Why is this use being proposed?*

Exercise and meditation as a lone activity are not priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997. The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

This use may provide a connection to natural resources and a sense of stewardship for the Refuge system. Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of Refuge regulations, a Special Use Permit

will be issued outlining the framework in which this use can be conducted. Refuge staff will ensure compliance with the Permit.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities may need to be developed to facilitate this use.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Exercise (walking, hiking, jogging, and running) and meditation/yoga on native surfaces can cause structural damage to plants and increase soil compaction. The degree of surface compaction is dependent on topography, soil structure, and soil moisture. Impacts of trampling on vegetation and soils are unlikely to occur on the well-defined, mulched trails, gravel roads, or paved surfaces. The Service repairs, operates, and patrols the trails and roads. Maintenance activities include mulching, pesticide spraying, road grading, and gravel replenishment, as needed. Well-maintained paved roads provide an appropriate surface for this type of user.

Exercise (walking, hiking, jogging, and running) and meditation/yoga can cause wildlife disturbance. Immediate responses by wildlife to recreational activity can range from behavioral changes, physiological changes, or mortality (Knight and Cole 1995). The long-term effects are more difficult to assess. Wildlife responses to human disturbance include avoidance, habituation, and attraction (Knight and Cole 1991). A key factor in predicting how wildlife would respond to disturbance is the predictability of the activity within the habitat. The use of trails or boardwalks for wildlife viewing during predictable times will mitigate the impacts (Oberbillig 2001). Wildlife has a greater reaction to humans moving unpredictably (Gabrielsen and Smith 1995). Migratory wildlife tend to be more susceptible to human disturbance (Klein 1993). Wildlife may also be attracted to human presence if provided a reward. Habituation of wildlife to visitors may increase mortality of wildlife due to nuisance behavior, vehicle collisions, or illegal harvest. Visitors are encouraged to use developed trails, roads, boardwalks, and overlooks to limit disturbances and concentrate visitor activities to less sensitive areas.

Trails attract a variety of user groups who often have conflicting needs. Cross-country jogging may appeal to many users and greater impact to the environment and wildlife would be expected in these areas. People with disabilities may be particularly affected by trail conflicts if they do not have the ability to quickly detect or react to hazards or sudden changes in the environment. If the number of users increases as expected, the potential for accidents or user group conflicts may also increase.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

1. Exercise (walking, hiking, jogging, and running) and meditation would occur only on improved roads and trails that are managed as a part of the by Green River NWR.
2. No cross country (off-trail) exercises (jogging and running) would be allowed.
3. Training runs by high school and collegian sports teams would be allowed to occur along refuge paved and gravel roads under a Special Use Permit. Again, no cross-country exercises would be allowed.
4. Exercise (walking, hiking, jogging, and running) and meditation would be restricted to daylight hours only.
5. A Federal Wildlife Officer will help to promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions.

JUSTIFICATION:

Exercise (walking, hiking, jogging, and running) and meditation/yoga are not a wildlife-dependent public use of the Refuge as defined by statute (16 U.S.C. 668dd et seq.), but it can contribute to the fulfillment of refuge purposes by connecting people with nature. Potential for wildlife disturbance is minimal given the non-threatening, indirect approach of this activity. Restricting the disturbance to designated established roads would increase the predictability of public use on the refuge, allowing wildlife to habituate to non-threatening activities. Moreover, consolidating compatible recreational activities to the Environmental Education and Recreation Area (EERA) reduces habitat fragmentation. These impacts would be monitored. Direct costs to administer existing levels of jogging on the refuge would be minor. This activity will not materially interfere with, or detract from, the mission of the Refuge System or purposes for which the refuge was established. In addition, this activity will fulfill one or more purposes of the Refuge or Refuge System.

MANDATORY 10-YEAR RE-EVALUATION DATE: _____

LITERATURE CITED:

Gabrielson, G. W. and E.N. Smith 1995. Physiological responses of wildlife to disturbance. Pages 95-107 in R. L. Knight and K. J. Gutzwiller, ed. *Wildlife and Recreationists; coexistence through management and research*. Island Press, Washington, D. C. 372 pp.

Klein, M. L. 1993. Waterbird behavioral responses to human disturbances. *Wildlife Society bulletin* 21: 31-39.

Knight, R.L., Cole, D.N. 1991. *Effects of recreational activity on wildlife in wildlands*. Transcripts of the 56th North American Wildlife and Natural Resources Conference (238-246).

Knight, R.L., and D.N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71-79 in R. L. Knight and K.J. Gutzwiller (eds.) *Wildlife and recreationists; coexistence through management and research*. Island Press, Washington, D.C.

Oberbillig, D.R. 2001. Providing positive wildlife viewing experiences. Deborah Richie Communications, Missoula, MT.

USE:

Firewood Cutting for Personal Use Only (Special Use Permit only)

DESCRIPTION OF USE:

(a) *What is the use?*

The use considered in this Pre-Acquisition Compatibility Determination is Firewood Cutting. Firewood gathering is the cutting and removal of woody material for private use. Individuals would be permitted to remove, for personal use only, fallen timber or marked standing timber as designated by the refuge manager.

(b) *Where would this use be conducted?*

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

This use would be conducted year-round in areas open to the general public from sunrise to sunset.

(d) *How would this use be conducted?*

Oversight and administration of public firewood gathering would be by the assistant refuge manager or by other staff experienced with the program. The scope of the use will be determined by the management objective for the area and by the quantity and quality of available wood. Harvest sites will vary in size from a portion of an acre up to several hundred acres depending on the site and management objectives. Wood removal activities may be authorized throughout the year when ground conditions allow access without damaging refuge roads and resources via a Special Use Permit. Requests for this use will be reviewed on a case-by-case basis to ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs.

Chainsaws and axes may be used to harvest firewood. Access may be by car and trailer or pickup truck. Differences in scope and necessary equipment will occur depending on the amount, type of wood available and location where removal is to occur. This activity will only occur where the Service has determined that a management need exists to remove wood.

(e) *Why is this use being proposed?*

Firewood cutting for personal use as a lone activity is not priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 and against Code of Federal Regulations. The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will

encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

This use would assist in Refuge management in improving wildlife habitat, restoring rare habitats, and maintenance of roads, trails, and firebreaks as well as benefiting the public. Firewood gathering would be offered to the public following forest management for wildlife habitat improvements in small lots or areas, or at times when commercial operations are not feasible. In young tree plantations, firewood gathering could be offered in lieu of a commercial timber harvest operation. It may also be permitted when trees that have fallen across roads, trails, or firebreaks must be removed.

Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of Refuge regulations, a Special Use Permit will be issued outlining the framework in which this use can be conducted. Refuge staff will ensure compliance with the Permit

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

A special use permit is required, which obligates administrative time to complete. However, a fee may be charged to off-set this cost.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

The potential exists to directly impact wildlife by displacing animals from localized areas due to disturbance, noise, or removal of nesting areas. Due to the small scale of firewood gathering on the refuge, disturbance to wildlife would be negligible. Avoidance of nesting periods for migratory birds would reduce impacts on populations. Most impacts can easily be avoided by timing of season in accordance with site-specific characteristics.

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant

1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschner et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990).

Large, dead, and downed trees and standing snags are extremely important habitat components that should remain on the refuge unless they pose a danger to the public in concentrated use areas or to refuge operations. Unlikely incidents affecting hunters during general hunts would not be considered reason enough to remove snags. In some cases, the removal of trees along roads, trails, and dikes is necessary to reduce hazards to users caused by falling trees and limbs.

Forest management activities may also alter the litter layer, coarse woody debris, snags, or cavity trees important for wildlife (DeMaynadier and Hunter 1995, Fraver et al. 2002, Sittonen 2001, Strojny and Hunter 2010, Yahner et al. 2012). Skidding operations may cause residual damage to trees in the stand (Nichols et al. 1994), harvesting may also leave the remaining trees more susceptible to wind throw (Ruel 1995), forest roads can facilitate the spread of invasive plants (Mortensen et al. 2009), and resulting habitat alterations can cause short and long-term changes in wildlife communities (Campbell et al. 2007, DeMaynadier and Hunter 1995, Holmes and Pitt 2007). Impacts to refuge roads and trails due to soil compaction from vehicles, rutting, or root damage can be avoided by restricting use to dry ground conditions. Traffic on refuge roads will need to be carefully controlled (via special use permit) to avoid impacts such as rutting and potholes. Because few requests are received for this type of activity, halting the practice entirely should not create a problem because local residents do not generally rely upon a supply of wood for home heating. Firewood cutting benefits the public and can be used as a management tool in forested habitats and as a maintenance tool on roads, trails, and grounds. The removal of dead trees reduces litter buildup and the potential for damaging wildfires. Direct impacts on wildlife can be avoided by timing the activity so that it is not coincide with the breeding/production season. Individuals gathering firewood would be required to comply with special use permit conditions and site-specific stipulations to ensure that resources are protected and management goals are achieved.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

- _____ Use is not compatible
- X** Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Firewood gathering would be regulated by Special Use Permit so that site-specific impacts can be reduced or eliminated and Service management goals are met. The permit would include stipulations that ensure the practice is allowed only when it benefits refuge operations or habitat conditions, areas and times of use are specified, ingress and egress points controlled, trees to be removed are marked by refuge staff, allowable equipment is identified, and other important conditions are specified.

1. The use would be restricted to periods of dry ground conditions to avoid rutting and soil compaction on refuge roads, to the extent practicable.
2. Firewood cutting would be limited to weekday only to allow for oversight by the refuge's assistant manager.
3. Firewood removed from refuge lands is for personal use only and may not be sold.
4. Chainsaws and axes may be used to harvest firewood.
5. Access with car and trailer or truck would only occur in areas already having developed access routes. No off-road vehicle use would be allowed under this program.
6. This activity will only occur where the Service has determined that a management need exists to remove wood.
7. The permittee shall save, hold harmless, defend and indemnify the United States of America, its agents, and employees for losses, damages, or judgments and expenses on account of fire or other peril, bodily injury, death, or property damage, or claims for bodily injury, death, or property damage of any nature whatsoever, and by whomsoever made, arising out of the activities of the permittee, its employees, subcontractors, or agents under this Special Use Permit.

JUSTIFICATION:

Firewood cutting and gathering allows the refuge the option to maintain and enhance necessary habitat for trust species by promoting plant communities beneficial to these species, manage forest stands by manipulating stand composition in order to produce high-quality habitats for trust resources, and manipulate forest stands to provide diverse plant successional stages ranging from regeneration to mature timber, which will support a variety of wildlife species. Additionally, forest health can be protected by emergency forest actions to prevent unwanted spread of insect or disease outbreaks. Silvicultural decisions will be based upon the resources of concern and their habitat requirements as it relates to forest composition and structure.

This activity will not materially interfere with, or detract from, the mission of the Refuge System or purposes for which the refuge was established. In addition, this activity will fulfill one or more purposes of the Refuge or Refuge System.

MANDATORY 10-YEAR RE-EVALUATION DATE:

LITERATURE CITED:

Belanger, L. and J. Bedard. 1990. Energetic cost of man-induced disturbance to staging snow geese. *J. Wildl. Manage.* 54:36-41.

Boyle, S. A., F. B. Samson. 1985. Effects of non-consumptive recreation on wildlife: A review. *Wildl. Soc. Bull.* 13:110-116.

Burger, J. 1981. Effect of human activity on birds at a coastal bay. *Biol. Conserv.* 21:231-241.

Campbell, S.P., J.W. Witham, and M.L. Hunter Jr. 2007. Long-term effects of group-selection timber harvesting on abundance of forest birds. *Conservation Biology* 21(5): 1218-1229.

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Henson, P. T., and A. Grant. 1991. The effects of human disturbance on trumpeter swan breeding behavior. *Wildl. Soc. Bull.* 19:248-257.

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Kahl, R. 1991. Boating disturbance of canvasbacks during migration at Lake Poygan, Wisconsin. *Wildl. Soc. Bull.* 19:242-248.

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Nichols, M.T., R.C. Lemin Jr., and W.D. Ostrofsky. 1994. The impact of two harvesting systems on residual stems in a partially cut stand of northern hardwoods. *Canadian Journal of Forest Research* 24(2): 350-357.

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Sittonen, J. 2001. Forest management, coarse woody debris and saproxylic organisms: Fennoscandian boreal forests as an example. *Ecological Bulletins* 49: 11-41.

Strojny, C.A. and M.L. Hunter, Jr. 2010. Relative abundance of amphibians in forest canopy gaps of natural origin vs. timber harvest origin. *Animal Biodiversity and Conservation* 31(1): 1-13.

Ward, D. H., and R. A. Stehn. 1989. Response of brant and other geese to aircraft disturbance at Izembek Lagoon, Alaska. U.S. Fish and Wildlife Service, Alaska Fish and Wildlife Research Center. Final report to the Minerals Management Service. Anchorage, Alaska. 193 pp.

Williams, G. J., and E. Forbes. 1980. The habitat and dietary preferences of dark-bellied brant geese and widgeon in relation to agricultural management. *Wildfowl.* 31:151-157.

Yahner, R.H., C.G. Mahan, and A.D. Rodewald. 2012. Managing forests for wildlife. Pages 55-73 in N.J. Silvy, editor. *The Wildlife Techniques Manual*. Volume 2. Johns Hopkins University Press, Baltimore, USA.

USE:

Forest Management for Wildlife Habitat Enhancement and Improvement

DESCRIPTION OF USE:

(a) *What is the use?*

The use considered in this Pre-Acquisition Compatibility Determination is Forest Management for Wildlife Habitat Enhancement and Improvement. Forest Management for wildlife habitat enhancements and improvements included timber thinning, regeneration of timber stands, treatment of disease outbreaks, and other silvicultural practices used to improve forest habitat conditions. Forest management for wildlife habitat enhancements and improvements are conducted solely to enhance habitats just like other resource management actions, it may involve the use of commercial vendors hence constituting an economic use that requires a compatibility determination. Commercial activities are permitted activities and are directed under the guidance of a Special Use Permit, which is issued by the refuge.

Forest management for wildlife habitat enhancements and improvements, including when necessary, the use of commercial silvicultural contractors and techniques, including the use of pesticides to control exotic and nuisance plant species, will contribute to the purposes, for which the Green River National Wildlife Refuge (NWR, refuge) was established, the mission of the Refuge System, the enhancement of biological integrity, diversity, and environmental health and to facilitate the ability of the refuge to meet its habitat and wildlife management objectives. Forest management for wildlife habitat enhancement and improvement is necessary for Green River NWR to meet the establishing purposes that maintain and enhance necessary habitat for priority species by promoting plant communities beneficial to these species, habitats for trust resources, and multiple forest stands to provide diverse plant successional stages ranging from regeneration to mature trees, which will support a variety of wildlife species (Lower Mississippi Valley Joint Venture [LMVJV] 2007). Forest management for wildlife habitat enhancement and improvements will be based upon resources of concern and their habitat requirements for the promotion of hard mast species and ensure adequate number of den and stages remain in the forest. Den trees provide cavities used by birds, reptiles and mammals for roosting and nesting. Different wildlife require various stages of forest growth to meet the life requirements for food, cover, water and space.

To achieve goals, manipulation through wildlife habitat enhancements and improvements is essential. The refuge does not have the required staffing, equipment and expertise to harvest timber on a large scale. Commercial silvicultural contractors can assist refuge managers in providing habitat for endangered species, forest breeding birds (Twedt and Somershoe 2009, Rosenberg et al. 2016) and other forest-dependent species (LMVJV 2007).

(b) *Where would this use be conducted?*

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR.

(c) *When would this use be conducted?*

Different aspects of wildlife stand enhancements and improvements will take place at various times throughout the year including but not limited to inventory, planting, tree marking, harvesting, injecting, monitoring, and various other tasks involved with habitat administration. The harvesting portion of this process would be conducted during the dry periods of the year. This period is normally between July and December, but could occur during other times of the year if conditions were acceptable.

(d) *How would this use be conducted?*

Forest management for wildlife habitat enhancements and improvements would be conducted to achieve the Desired Forest Conditions described in the 2013 HMP developed by the LMVJV (LMVJV 2007) for bottomland hardwoods.

(e) *Why is this use being proposed?*

Green River NWR would be established for use as a refuge and wildlife management area for migratory birds and other wildlife and the conservation of threatened and endangered species. Forest management for wildlife habitat enhancement and improvement were designed to emulate natural disturbances, create forest with multiple ages and structure, promote regeneration, and provide habitat needed by a wide variety of wildlife. The LMVJV Desired Forest Conditions are a quantified set of landscape and local level conditions deemed desirable for wildlife habitat. Some species of migratory birds which have significant regional or continental population declines are shown to increase occupancy of treated stands (Twedt and Wilson, 2017). These conditions appear to benefit multiple bat species by promoting dead wood, large diameter trees, high tree species diversity, and by increasing insect prey abundances (USFWS Final Report, 2016). Desired Forest Conditions, through wildlife enhancement and improvement treatments, are designed to create a diverse landscape with a mosaic of forest having varied structures to appeal to a wide variety of migratory birds and other wildlife.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

Minimal special equipment is needed to facilitate this use with a cost less than \$5,000. No additional facilities, or improvements are necessary to support the uses. Maintenance costs are not directly attributable to these incidental uses on the refuge.

Refuge staff will conduct monitoring protocols according to the individual prescription, to determine when habitat conditions warrant treatment and to monitor achievement of habitat condition objectives post treatment.

Utilizing contract loggers to achieve forest habitat management goals is the only way to achieve improvement given inadequate staff to implement force account harvest activities. Receipts generated from the sale of forest products removed from the refuge are deposited into the Refuge Revenue Sharing Account. The funds collected annually from all Refuges are distributed to the counties on a prorated basis (acreage of refuge land within each county and

appraised value of this land) as an “in-lieu-taxes payment” as directed by the Refuge Revenue Sharing Act.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

The operation of heavy equipment for wildlife habitat enhancements and improvements over refuge roads and through natural habitats has the potential to impact soils, cause severe rutting, result in increased site erosion, or degrade near-by wetlands or water resources. Unregulated or poorly planned habitat operations can result in increased run-off, sedimentation, and altered surface and groundwater hydrology and water storage capability. The effects of multiple harvests in a watershed can accumulate over time. Maintaining forested buffers around waterways will minimize impacts on water resources and water quality. Therefore, all wildlife habitat enhancements and improvements actions will be mitigated by following forestry management procedures described in Kentucky’s Forestry Best Management Practices Manual.

The construction of roads, creation of landings, and operation of heavy equipment can result in localized impacts and damage or destruction of vegetation and alteration of habitats. Forest management activities may also alter the litter layer, coarse woody debris, snags, or cavity trees important for wildlife (DeMaynadier and Hunter 1995, Fraver et al. 2002, Sittonen 2001, Strojny and Hunter 2010, Yahner et al. 2012). Skidding operations may cause residual damage to trees in the stand (Nichols et al. 1994), harvesting may also leave the remaining trees more susceptible to wind throw (Ruel 1995), forest roads can facilitate the spread of invasive plants (Mortensen et al. 2009), and resulting habitat alterations can cause short and long-term changes in wildlife communities (Campbell et al. 2007, DeMaynadier and Hunter 1995, Holmes and Pitt 2007).

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). Mitigation of these impacts is possible by placing seasonal restrictions on harvesting to avoid disturbing wildlife, the careful layout of skid trails and bumper trees, the use of mechanical harvesters and pre-harvest surveys of resources of concern. We will encourage commercial operators to leave tops, branches and other downed wood on site where appropriate.

Under refuge habitat management strategies, the overall impact of the forest management program would be positive for wildlife and vegetation. Prescriptions will generally mimic the natural disturbance patterns common to the forest type being treated (Franklin et al. 2007). The resulting mosaic of forest structure and composition would provide habitat for a wide array of forest dependent wildlife.

Forest management activities have the potential to disturb refuge visitors, cause safety issues, or detract from visitors’ aesthetic experience. When safety considerations warrant, areas of the refuge undergoing active management will be temporarily closed to public access. Because

small portions of the refuge's acreage will be actively harvested at any one time, impacts to visitors will be minimal.

Forest management is anticipated to have no effect on threatened and endangered species, but Refuge staff will coordinate with Service's Endangered Species staff with the Frankfort Field Office to ensure there are no negative impacts to these species.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Close inspection and supervision of all wildlife habitat enhancements and improvements is necessary to ensure that harvesting operations meet the special conditions of the Special Use Permit and produce the outcome needed to meet refuge goals and objectives. The refuge's assistant manager will inspect the treatment site and assess effectiveness of the treatment.

1. The following example Special Conditions are included in the bid invitation and permits for all wildlife habitat enhancements and improvement activities to further protect the resources of the refuge. These conditions may be modified at any time to provide better guidance to operators and protection of refuge resources.
2. A pre-entry conference with permittee and loggers will be held prior to any work being done on the sale area or haul roads associated with the sale area. A pre-entry meeting will be held before initiation of activity within each Compartment and Stand prior to start of any work. The Refuge Manager or their representative retains authority to stop logging operations at any time if road, weather, water, or other unsatisfactory conditions exist.
3. The permittee will maintain any Refuge road, right-of-way, or easements. The permittee will repair any damages to the haul roads, primary gravel roads or paved roads resulting from logging operations to standards existing prior to timber harvest activities. Repair and maintenance work may include, but is not limited to, grading, graveling, or rocking. Cost to repairs or replacements of damaged culverts or other infrastructure

caused by logging equipment will be the sole responsibility of the permittee. When applicable, reasonable actual costs for work on Refuge gravel roads will be refunded from performance deposits. The expense of work on dirt roads within the sale area is the sole responsibility of the permittee. No new roads will be created and all access will be limited to existing roads and infrastructure.

4. The location of loading decks and logging roads will be mutually agreed to by permittee (or representative) and Refuge Manager or designee prior to their placement. All primary haul roads used by permittee will be left in good condition or blocked after operations are completed by placing logging slash and/or dirt mounds across all entrance points as directed by Refuge Manager or designee. Those roads to be left open will be built up enough so that the road will not hold standing water any more than the adjacent area. This will require the use of equipment such as a bulldozer and/or road grader. If required as determined by the Refuge Manager or designee, blocked roads will be reseeded with refuge approved grasses to prevent erosion.
5. In wildlife habitat enhancements and improvements operations, no trees planned to be left (leave trees) following the operation will be cut or excessively damaged. Excessive is defined more specifically as, 1) bole damage that exposes cambium more than 6 inches (in any dimension) and 2) crown damage of 1/3 or more of the crown. As determined by the Refuge Manager or designee, penalties may be assessed for cutting or damaging leave trees at a rate of three (3) times the stumpage paid for the harvested merchantable timber.
6. Trees shall be cut so as to leave a stump not less than 4 inches high and no more than 12 inches high on the side adjacent to the highest ground. Ground level paint spot must be visible after the tree has been cut.
7. Skid trails with turn trees should be planned to prevent the damage to leave trees. Turn trees shall consist of trees being harvested and should be removed only after use of skid trails ends. Additional trees removed to prepare loading sites will be paid for at bid prices. Loading sites should be determined cooperatively between Refuge staff and permittee prior to clearing. Unmarked trees, which are cut or injured through carelessness, shall be paid for at double the bid price.
8. All wildlife habitat enhancement and improvement operations shall be conducted during daylight hours.
9. Trees and tops cut shall not be left hanging or supported by any other living or dead tree or brush and shall be pulled down immediately after falling.
10. Tops and logging debris shall be kept pulled back 50 feet from highways, county roads, refuge roads and trees with basal cavities. All roads, rights-of-way, streams, openings and fields must be kept clear of tops and debris. When a timber sale is adjacent to private land, all logging debris will be pulled back onto the refuge to avoid damage to private property. The permittee and his employees will do all in their power to prevent and suppress fires; shall pay the United State for any unnecessary damage to roads, rights-of-way, streams, fields, openings, and ditches resulting from operations.

11. Wildlife habitat enhancements and improvements operations will be allowed only when site conditions allow. Wildlife habitat enhancements and improvements will not be allowed when ground is wet and subject to rutting or severe soil compaction. At no time will rutting deeper than 6" be allowed.
12. The Refuge Manager or designee shall have the authority to temporarily close down all or any part of the operation during a period of high fire danger, inclement weather, refuge hunts, safety reasons or any other reason deemed necessary. Extensions to the Special Use Permit time period equal to the closed period will be granted to the permittee. Extensions will not be granted due to inactivity during favorable harvesting conditions.
13. The permittee (or his representative) will not litter. Disposal of petroleum products on-site is prohibited. Equipment must be maintained and not leak more than a few drops of petroleum product per day. Performance bond monies may be used to pay for litter clean-up.
14. Tree-length logging and skidders will be allowed. Unnecessary damage to the residual stand will not be tolerated (see Special Condition No 3). As determined by the Refuge Manager or his designee, penalties may be assessed for damage to unmarked trees at a rate of three (3) times the stumpage paid for the harvested merchantable timber.
15. If spacing between trees does not allow cutter head grapples to be used without damage to leave trees, alternative harvest methods should be used.
16. Sufficient cut trees, trees that are to be removed as part of the operation, should be left along the skid trails and deck to prevent skidder damage to leave trees and these cut trees should be the last trees removed as part of the operation.
17. Each portion of the sale area must be completed before moving to other portions of the area unless authorized by the Refuge Manager.
18. The permittee will be responsible for job safety while operating on the Refuge.
19. The use of firearms outside of a hunting season and alcohol on the refuge are prohibited.
20. All of the Best Management Practices for forestry in Kentucky will be followed as mandatory practices. Failure to follow BMPs is grounds for termination of the Special Use Permit.
21. If requested, satisfactory scale tickets for timber products shall be submitted to the Refuge Assistant Manager.
22. The permittee will remove temporary plugs, dams, and bridges, constructed by the permittee, upon completion of the contract. There are areas on the refuge where temporary plugs or dams in an intermittent stream would not be allowed.
23. Ownership of all products remaining on a sale area will revert to the U.S. Government upon termination of the permit.

24. The U.S. Government accepts no responsibility to provide right-of-way over private lands for materials sold under this contract.

The decision of the Refuge Manager shall be final in the interpretation of regulations and provisions governing the sale, cutting, and removal of the timber covered by the permit. Additional site-specific stipulations may be cover in the Habitat Management Plan and attached to the Special Use Permit.

JUSTIFICATION:

Forest management for wildlife habitat enhancements and improvements forest management operations, including when necessary, the use of commercial silvicultural contractors and techniques, will contribute to the purposes, for which the Green River NWR was established, the mission of the Refuge System, the enhancement of biological integrity, diversity, and environmental health, and to facilitate the ability of the refuge to meet its habitat and wildlife management objectives.

Forest management for wildlife habitat enhancements and improvements, to include such actions as commercial timber thinning, salvage, and other silvicultural practices, is used to improve wildlife habitat conditions. Forest management for wildlife habitat enhancements and improvements allow the refuge to maintain and enhance necessary habitat for wildlife including threatened and endangered species by promoting plant communities beneficial to these species. Additionally, use of commercial foresters can protect forest health during time requiring emergency forest actions to prevent unwanted spread of insect or disease outbreaks.

The use will not pose significant adverse effects of the refuge natural resources, interfere with the public use of the refuge, or cause undue administrative burden. Forest management for wildlife habitat enhancements and improvements on the refuge will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established as evidenced by the environmental assessment that shows this use will improve and advance our ability to achieve the goals and objectives. This use would be administered in compliance with 50 CFR 29.1.

This compatibility determination can be categorically excluded from further NEPA analysis under 40 CFR §1508.4, 516 DM 8.5(A)(1), 516 DM 8.5(B)(7), 516 DM 8.5(B)(9), and 516 DM 8.5(C)(5). Further, the actions do not trigger an extraordinary circumstance as outlined under 43 CFR §46.215.

MANDATORY 10-YEAR RE-EVALUATION DATE:

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USE:

Horseback Riding

DESCRIPTION OF USE:

(a) *What is the use?*

The use considered in this Pre-Acquisition Compatibility Determination is Horseback Riding. Horseback riding is an outdoor recreational activity in which participants ride horses to access the Refuge for wildlife viewing opportunities.

(b) *Where would this use be conducted?*

This use would be conducted on improved roads and trails by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

Horseback riding would be allowed year round during daylight hours, except during the refuge's muzzleloader and modern gun deer hunts, due to public safety concerns. Some areas/ trails will only be open seasonally. Individuals need to consult the public use regulations brochure to determine which improved roads and trails would be open. Horseback riding would also be allowed after sunset for raccoon and opossum hunters.

(d) *How would this use be conducted?*

Horseback riders are prohibited from leaving the roadways and trails open to this use and from entering areas closed to vehicular traffic.

(e) *Why is this use being proposed?*

Horseback riding as a lone activity is not priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 and against Code of Federal Regulations. The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

Horseback riding is not one of the six priority wildlife dependent uses of the National Wildlife Refuge System. Horseback riding is a historical recreational activity in Kentucky. Horseback riding is a popular enterprise due to the scenic natural habitats and abundant wildlife in Kentucky. Many visitors may use horses to access more remote sections of a refuge to observe or photograph wildlife. It is expected or anticipated that wildlife observation would be part of the horseback riding experience on the refuge. In addition, some hunters may elect to use horses as a mode of transportation to hunt raccoon and opossum.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities may need to be developed to facilitate this use.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

The presence of horseback riders on the refuge's trail and roadway system can lead to the displacement of animals, although disturbance usually is a negligible influence on large mammal distributions and movements (Boyle and Samson 1985). The effects on other forms of wildlife appear to be short term with the exception of breeding bird communities. Miller, Knight, and Miller (1998) study indicates that species composition and nest predation was altered adjacent to trails in both forested and grassland habitats. It appears that species composition changes are due to the presence of humans and not the preexisting trail or roadway. On the other hand, nest predation appears to be a function of the trail which allowed access to mammalian nest predators. The refuge has and will continue to close certain trails during the nesting season to protect breeding bird communities. The refuge will also continue its proven management strategies of educating trail and roadway users how their activities affect wildlife and how to modify their use to minimize impacts on wildlife (Miller, Knight, and Miller 1998).

The impact of horses on trails has been well documented. Some impacts include erosion, informal trail development, and invasive species introduction. The use of a trail and roadway system could lead to soil compaction, exposure of tree roots, and the modification of plant species 3 to 6 feet on either side of the trail which is a function of soil compaction, invasive species, and direct trampling of plants (Kuss 1986) and (Dale and Weaver 1978). All trail users do contribute to trail soil compaction and erosion, however Dale and Weaver (1978) found horse use causes a great a loss of vegetation cover, wider and deeper trails, and greater soil compaction when compared to hiker use on trail conditions. Deluca et al (1998) points out that horses may cause trail erosion by loosening the soil and increasing soil particle detachment under both wet and dry trail conditions. Hammitt and Cole (1987) stated erosion is considered

to be the most severe form of impact because its effects are long-lasting. Erosion can cause siltation which can impact nearby streams and rivers. Soil erosion resulting from horse use is a product of trampling and eventual loss of vegetative cover, soil compaction leading to lowered water infiltration rates, and the churning and lifting of surface soil particles (Widner and Marion, 1993). Wells and Lauenroth (2007) found horses used on recreational trails represent a potentially important dispersal vector for alien plants.

Short-term impacts associated with this use involve littering, minor vegetation disturbance on roadsides, and wildlife disturbance caused by the passage of horse and rider. On rare occasions, riders may illegally leave roadways and cause short-term habitat degradation, as a result of trampling of vegetation or soil compaction. Since riding is confined to improved roads and trails that are managed as a part of the Green River NWR it is not anticipated that this use would impact refuge resources any more than vehicle traffic.

At current use levels no long-term or cumulative impacts are anticipated. However, if monitoring detects resource damage and/or invasive species invasions on trails open to horseback riding, these trails may be closed immediately to mitigate resource damage.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

1. Horses are allowed on improved roads and trails that are managed as a part of the Green River NWR. Horses and mules are not permitted off these secondary access routes for any purpose.
2. The refuge is open to horseback riding from sunrise to sunset year round in areas open to the public except during refuge muzzleloader and modern gun deer hunts, except for raccoon and opossum hunting.
3. Trails can be closed without notice for resource damage, flooding, invasive species detections.
4. No organized trail rides by local clubs or organizations will be permitted.
5. Trucks and trailers are not to block roads or gates.

6. Organized trail rides with more than 10 participants would need to request a Special Use Permit. Each request will be reviewed on a case-by-case basis.

JUSTIFICATION:

Horseback riding is a historic use on lands associated with the Green River NWR and supports wildlife observation. Horseback riding on improved roads and trails that are managed as a part of the Green River NWR is a low impact activity that can be managed with existing refuge resources.

Specific refuge regulations address equity and quality of opportunities for visitors and help safeguard refuge habitats. Impacts from this proposal, short-term and long-term, direct, indirect, and cumulative, are expected to be negligible and are not expected to diminish the value of the refuge for its stated objectives. Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the National Wildlife Refuge System by providing activities and information for the benefit of the American public while conserving fish, wildlife, and plant resources on the refuge.

This activity will not materially interfere with, or detract from, the mission of the Refuge System or the purpose for which the refuge was established.

MANDATORY 10-YEAR RE-EVALUATION DATE:

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USE:

Picnicking in association with Wildlife Dependent Activities

DESCRIPTION OF USE:

(a) *What is the use?*

Picnicking is an outdoor excursion in which the participants carry food with them and share a meal in an open air setting.

(b) *Where would this use be conducted?*

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

This use would be conducted year-round in areas open to the general public from sunrise to sunset.

(d) *How would this use be conducted?*

Access to the refuge is open every day; however certain portions of the refuge may be closed to access by the public for purposes of sanctuary to migratory birds or for management activities. In addition, entry on all or portions of individual areas may be temporarily suspended by posting upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife populations, or public safety.

(e) *Why is this use being proposed?*

Picnicking as a lone activity is not priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 and against Code of Federal Regulations. The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

Picnicking has been occurring on Refuges since early in the Refuge System's history. By permitting picnicking, visitors have an opportunity to get a closer view of the refuge's important habitats and the wildlife that depend on these habitats, thus contributing to the public appreciation, understanding, and enjoyment of refuge lands and wildlife. This use also contributes to the mission of the National Wildlife Refuge System because it enables visitors to

enjoy wildlife-dependent recreation, thus enhancing understanding and appreciation of conservation, and benefiting present and future generations of Americans.

This use is conducted to provide compatible educational and recreational opportunities for visitors to enjoy the natural resources of the land and to gain understanding and appreciation for fish and wildlife, wildlands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. Following these activities it is often customary for visitors to break for lunch or other meal under a picnic style setting. These activities, and the picnic that follows, provides wholesome, safe, outdoor recreation in a scenic setting, with the realization that those who come strictly for recreational enjoyment will be enticed to participate in the more educational facets of the public use program, and can then become informed advocates for the refuge and the Service.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities may need to be developed to facilitate this use.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Environmental education, and interpretation can produce positive or negative impacts to the wildlife resource. A positive effect of public involvement in these priority public uses will be a better appreciation and more complete understanding of the wildlife and habitats associated with Refuges. This can translate into more widespread and stronger support for the refuge, the National Wildlife Refuge System, and the Service.

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeal et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at J.N. "Ding" Darling Refuge, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Ardeids were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and

little blue herons were observed to be disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern United States. Klein (1993), in studying waterbird response to human disturbance, found that as intensity of disturbance increased, avoidance response by the birds increased and that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductive functions of song (Arrese 1987). Disturbance, which leads to reduced singing activity, will make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Travel routes can disturb wildlife outside the immediate trail corridor (Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where “generalists” (American robins) were found near trails and “specialist” species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Hammitt and Cole (1998) conclude that the frequent presence of humans in “wildland” areas can dramatically change the normal behavior of wildlife mostly through “unintentional harassment.”

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young.

The adverse effects generally are short-term, and more than offset by the long-term gains in public education and appreciation. Short-term impacts to refuge resources are expected to be negligible.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge will manage the six priority public uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) with the associated picnicking in accordance with Federal and State regulations and review it annually to ensure wildlife and habitat goals are achieved and that these programs are providing safe, high-quality experiences for participants. To ensure compatibility with refuge purposes and the mission of the Refuge System, in addition to those refuge-specific regulations for hunting, fishing, wildlife observation, photography, environmental education, and interpretation the following stipulations will need to be met:

1. No food is to be made available for use by wildlife and no wildlife shall be intentionally fed.
2. The public use program will be reviewed annually to ensure that it contributes to refuge objectives in managing quality recreational opportunities and protecting habitats, and is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in unanticipated negative impacts to natural communities, wildlife species, or their habitats. Refuge law enforcement officer(s) will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Refuge law enforcement personnel will monitor all areas and enforce all applicable State and Federal regulations.
3. Refuge visitors are required to remove all trash and food products.
4. Areas may be closed on the refuge to protect resources or prevent unwanted disturbance.
5. Picnicking as a sole activity or as part of non-wildlife dependent activities is prohibited.

JUSTIFICATION:

Hunting, fishing, wildlife observation, photography, environmental education, and interpretation are priority wildlife-dependent uses for the Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57)). The Service's policy is to provide expanded opportunities for wildlife-dependent uses when compatible and consistent with sound

fish and wildlife management and ensure that they receive enhanced attention during planning and management. Picnicking is seen as a reasonable part of these six priority activities.

Specific refuge regulations address equity and quality of opportunities for visitors and help safeguard refuge habitats. Impacts from this proposal, short-term and long-term, direct, indirect, and cumulative, are expected to be minor and are not expected to diminish the value of the refuge for its stated objectives. Available parking and size of the facilities will typically limit use at any given time, except during special events.

Conflicts between visitors are localized and are addressed through law enforcement, public education, and continuous review and updating to public use regulations. Conflicts are further reduced by the establishment of seasonal area closures.

Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on the refuge.

This activity will not materially interfere with, or detract from, the mission of the Refuge System or the purpose for which the refuge was established.

MANDATORY 10-YEAR RE-EVALUATION DATE: _____

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USE:

Recreational Fishing

DESCRIPTION OF USE:

a) What is the use?

The use considered in this Pre-Acquisition Compatibility Determination is Recreational Fishing. Recreational fishing or recreational angling is fishing for pastime fishing, sport fishing, game fishing, or subsistence fishing. This wildlife-dependent recreational use is recognized as priority use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would this use be conducted?

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) When would this use be conducted?

Fishing is conducted year-round from sunrise to sunset and is subject to regulations established by the State of Kentucky. The U.S. Fish and Wildlife Service has specific regulations further restricting fishing by and the use of certain fishing methods. The Refuge annual hunting and fishing permit is required to fish on the Refuge which may be fee based.

(d) How would this use be conducted?

Several methods of fishing are employed, including boat fishing, wade fishing, and bank fishing. Boat and bank fishing are permitted, as provided by refuge special regulations and those published in Title 50, Code of Federal Regulations. Bank fishing will take place on designated areas with shallow slopes, mostly near existing footpaths and access trails.

(e) Why is this use being proposed?

Recreational fishing (a wildlife-dependent activity) has been identified in the National Wildlife Refuge System Improvement Act of 1997 as a priority public use, provided it is compatible with the purposes for which the refuge was established.

Sport fishing in refuge waters is an integral part of the overall public use program. The refuge website will be used to inform the public of the need for stewardship of public lands and waters and to increase the awareness of our natural resources.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will

be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities may need to be developed to facilitate this use.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

A recreational fee may be being implemented, which could offset costs.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Recreational fishing can impact the aquatic community by direct and indirect mortality (both of target and non-target species), changes in species composition and other trophic effects, and changes within species (i.e. stunting and changes in behavior) when fishing occurs at high levels (Blaber et al. 2000, Allen et al. 2005, Lewin et al. 2006). Many of the targeted species at the refuge are introduced species such as common carp that compete with native fish species. Removal of individuals of these non-native species may benefit native species by reducing competition and predation (Cornelius 2006).

Fishing can cause disturbance to birds and other wildlife that use the refuge. Species likely to experience some level of disturbance include foraging wading birds (e.g., great blue heron, American bittern, and snowy egret) foraging and nesting waterfowl (e.g., mallard, cinnamon teal, gadwall, Canada goose, and ring-necked duck) and secretive marsh birds (e.g., rails), foraging and nesting passerines (e.g., red-winged blackbird and marsh wren), foraging raptors (e.g., osprey and bald eagle), and mammals (e.g., white-tailed deer and skunk).

Most research studies have focused on short-term responses to human disturbance such as flushing, nest abandonment, site avoidance, etc. Little information is available on long-term or large-scale responses such as relocation of major staging areas, changes in productivity and demographics, or changes in prey/forage selection. Fishing has been shown to affect the reproduction, distribution, behavior, and abundance of bird species (Bell and Austin 1985; Cooke 1987; Korschgen and Dahlgren 1992).

When lead fishing sinkers or jigs are lost through broken line or other means, birds can inadvertently eat them. Water birds often swallow lead when they scoop up pebbles from the bottom of a lake or river to help grind their food. Eagles ingest lead by eating fish which have themselves swallowed sinkers (Minnesota Pollution Control Agency 2012). Lead is highly toxic to fish, birds, and other animals (including humans) and therefore the use of lead fishing tackle is being banned in a growing number of states. Discarded tackle and line also pose a threat to fish-eating birds, is unsightly, and could cause a threat to aquatic biota.

Activities associated with fishing, such as human noise, would cause some birds to flush and go elsewhere. In addition, vegetation trampling, and deposition of litter or lost gear are likely to occur.

Bank stability, soil compaction and water quality is impacted at the current participation levels and these impacts may increase occur should user numbers increase in the future.

As stated above, the number of anglers using the refuge is relatively low because there are limited places available for fishing opportunities. Since the level of fishing activity is low, there is very limited disturbance to birds and limited impacts to vegetation through trampling. Thus, impacts to fish and wildlife resources associated with this activity are not significant.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge will manage the six priority public uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) with Federal and State regulations and review it annually to ensure wildlife and habitat goals are achieved and that these programs are providing safe, high-quality experiences for participants. Stipulations for this activity are located in Title 50 Code of Federal Regulations and Green River National Wildlife Refuge Hunting and Fishing Regulations (annual). Green River National Wildlife Refuge Hunting and Fishing Regulations (annual) permits are required for anyone who is also required to have Kentucky State fishing license and is engaged in fishing activities on the Refuge.

JUSTIFICATION:

Fishing is listed as a priority wildlife-dependent use for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March

25, 1996 and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

The Service's policy is to provide expanded opportunities for wildlife-dependent uses when compatible and consistent with sound fish and wildlife management and to ensure that they receive enhanced attention during planning and management. Although fishing can result in disturbance to wildlife and habitat, disturbances on the refuge are expected to be intermittent, minor, and short-term, and are not expected to diminish the value of the refuge for its stated purposes. Facilitating this use on the refuge would increase visitor knowledge and appreciation of fish and wildlife resources. This enhanced understanding would foster increased public stewardship of natural resources and support for the Service's management actions in achieving the refuge purposes and the mission of the National Wildlife Refuge System.

There is more than an adequate amount of undisturbed habitat available to the majority of waterfowl, waterbirds, and other wildlife for escape and cover, such that their abundance and use of the refuge will not be measurably lessened from allowing fishing to occur. Stipulations will help reduce or eliminate any unwanted impacts of the use. The relatively limited number of individual animals expected to be adversely affected due to fishing will not cause wildlife populations to materially decline, the physiological condition and production of wildlife species will not be impaired, their behavior and normal activity patterns will not be altered dramatically, and their overall welfare will not be negatively impacted. Thus, allowing fishing will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the refuge was established.

Any new lands purchased as part of Green River NWR can be open to fishing depending on the manager's discretion using professional judgment, as long as there is no significant negative impact to natural resources or visitor services.

MANDATORY 15-YEAR RE-EVALUATION DATE:

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USE:

Recreational Hunting of Big Game, Small Game, and Migratory Birds

DESCRIPTION OF USE:

(a) *What is the use?*

The use considered in this Pre-Acquisition Compatibility Determination is Hunting. This use is the public hunting of migratory birds, big game, and/or small game. This wildlife-dependent recreational use is recognized as priority use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) *Where would this use be conducted?*

The U.S. Fish and Wildlife Service proposes to purchase approximately 24,000 acres near the confluence of the Green River and Ohio River in order to create Green River NWR. Historically, hunters were allowed access to the land in pursuit of game and the Service will continue this tradition once the properties are acquired. This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

Until sufficient land is acquired to fully implement a season structure similar to that of Kentucky Department of Fish and Wildlife Resources, interim hunting will be allowed for migratory birds, small game, and big game species. Hunt dates, species hunted, weapon type, etc. will be determined according to the amount of acreage acquired in order to ensure quality experience and public safety. Decisions regarding interim hunting at Green River NWR will be coordinated with the State of Kentucky and other area stakeholders. Although not all-inclusive, the following are popular game species which will be considered:

- White-tailed deer
- Turkey
- Waterfowl
- Small Game
- Furbearer.

(d) *How would this use be conducted?*

The U.S. Fish and Wildlife Service has specific regulations restricting certain uses published in Title 50 Code of Federal Regulations (CFR). The Refuge annual hunting and fishing permit would define parameters of public uses on the Refuge and would be required to hunt on the refuge. This permit may be fee based. This use may be subject to restrictions for ensuring public safety and/or limiting wildlife disturbance. This use may also be subject to regulations established by the State of Kentucky. Brochures and maps depicting the roads and trails open for this use would be available on the refuge's Web site.

Hunters under the age of 16 must be supervised by an adult 21 years of age or older, and must remain in sight and normal voice contact with the adult. On small game hunts the adult may

supervise no more than two youths, on big game hunts no more than one youth. Hunter orange must be worn as required by state regulations.

(e) *Why is this use being proposed?*

This compatibility determination considers hunting, which is one of the six priority wildlife-dependent recreation activities. The primary objectives of the hunting program (archery, firearm, handicapped and youth) on Green River NWR would be to: 1) provide a high-quality recreational and educational experience for a diverse audience through a varied hunt program; 2) provide an opportunity for the youth of Kentucky to engage in hunting, instill a basic understanding of conservation measures, and the role of the U.S. Fish & Wildlife Service in the conservation picture; 3) foster support and knowledge of refuge goals and objectives by working in close association with the general public, Kentucky Department of Fish and Wildlife Resources through their assistance with the harvest and thus management of resident species on the refuge while providing safe, educational, and instructive opportunities; 4) allow for the harvest of big game, small game, and waterfowl on the refuge to help maintain healthy population levels and facilitate maintenance of quality habitat for endangered species, migratory birds, and native flora and fauna; and 5) to help control nuisance and exotic wildlife.

Green River NWR could potentially provide annual archery, primitive weapons, and firearms hunts for white-tailed deer and turkey, quota hunts for waterfowl, and small game hunts for rabbit, squirrel, quail, raccoon, opossum, and woodcock. All regular hunts are by refuge permit only and are conducted during specific periods within the state's hunting seasons (general hunting seasons) for Henderson County.

The hunt program may also include:

1. developing a special hunting program to improve hunts to better accommodate individuals with disabilities on the refuge;
2. developing high quality, public hunts directed toward youths;
3. developing youth hunts to get the National Wildlife Refuge System message across;
4. developing opportunities for permitted adult hunters to mentor youth hunters;
5. updating the refuge website to provide public hunting information;
6. developing a better economy in implementing and conducting the various hunts;
7. developing a law enforcement presence on the refuge during the various hunting seasons to prevent poaching and illegal hunting in partnership with the Law Enforcement Division of Kentucky Department of Fish and Wildlife Resources;
8. developing a web-based permitting system and/or a fee based program;
9. evaluating the use of quota or lottery hunts on the refuge or specific areas

Additionally, sport hunting can be used as a tool to maintain wildlife populations at an acceptable level. The State establishes hunting seasons and bag limits to meet population objectives and to offer the public an opportunity to experience a traditional outdoor recreational activity. Game species population objectives are determined by a number of factors such as

habitat limitations and landowner tolerances, and each year the seasons and bag limits are designed to remove the harvestable surplus without long-term negative impacts to the population. The ability to effectively manage game species populations depends in large part on the availability of land with quality habitat. Providing hunting opportunities on the refuge will aid the State in meeting its management objectives and preserve a wildlife-dependent priority public use long associated with this land.

The Service intends to continue the tradition of wildlife-dependent recreation on the refuge by allowing hunting in compliance with State regulations. By allowing this use to continue, hunters can experience this traditional recreational activity, utilize a sustainable, renewable resource, aid the refuge and State in maintaining acceptable game species population levels, gain a better appreciation of the refuge's high quality wildlife habitats, observe wildlife, and become better informed about the refuge and the National Wildlife Refuge System.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities may need to be developed to facilitate this use.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

A recreational fee may be being implemented, which could offset costs.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Direct effects of hunting include mortality, wounding, and disturbance of target and non-target species (De Long 2002). Hunting can alter behavior (e.g., foraging time), population structure, general health (e.g., weight loss), and distribution patterns of all wildlife within the hunt area (Owens 1977, Raveling 1979, White-Robinson 1982, Thomas 1983, Bartelt 1987, Madsen 1985, Cole and Knight 1990).

The level of disturbance associated with hunting can be high due to the loud noises produced by guns and the rapid movement of both hunters and hunting dogs within the hunt area. This disturbance, especially when repeated over a period of time, compels waterfowl and other species to change foraging habits (e.g., foraging at night) or abandon areas of disturbance (Madsen 1995, Wolder 1993). In fact, studies indicate that prolonged and extensive disturbances can cause large numbers of waterfowl to leave disturbed areas and migrate elsewhere (Madsen 1995, Paulus 1984). Various studies indicate an inverse relationship between the numbers of birds using an area and hunting intensity (DeLong 2002). In Connecticut, lesser scaup were observed to forage less in areas that were heavily hunted (Cronan 1957). In California, the numbers of northern pintails on Sacramento Refuge non-hunt

areas increased after the first week of hunting and remained high until the hunting season was over (Heitmeyer and Raveling 1988). Following the close of hunting season, ducks generally increased their use of the hunt area on the Refuge, but use of this area was lower than before the hunting season began.

Impacts to waterfowl and other species can be reduced by providing adjacent sanctuary areas where hunting does not occur and where birds can feed and rest relatively undisturbed. Sanctuaries or non-hunt areas have been identified as the most common solution to disturbance problems caused from hunting (Havera et. al 1992). In Denmark, hunting disturbance effects were experimentally tested by establishing two sanctuaries (Madsen 1995). Over a 5-year period, these sanctuaries became two of the most important staging areas for coastal waterfowl. Numbers of dabbling ducks and geese increased four to 20 fold within the sanctuary (Madsen 1995). Thus, nonhunt areas are very important to waterfowl populations subject to hunting as they ensure the continued presence of the affected species within the general vicinity of the hunt area.

Intermittent hunting can also be a means of minimizing disturbance, especially if rest periods in between hunting events are weeks rather than days (Fox and Madsen 1997). It is common for refuges to manage hunt programs with non-hunt days. At Sacramento Refuge, three to 16 percent of northern pintails were located on hunted units during non-hunt days, but were almost entirely absent in those same units on hunt days (Wolder 1993). In addition, northern pintails, American wigeons (*Anas americana*), and northern shovelers reduced time spent feeding on days when hunting occurred on public shooting areas, as compared to non-hunt days (Heitmeyer and Raveling 1988).

The refuge may exclude hunting activities on portions of certain refuge units. Certain areas of the refuge may not be hunted specifically to provide areas of sanctuary. In some locations, special hunts may be used to manage hunting pressure and overall harvest at appropriate levels.

Dogs are permitted for hunting waterfowl, raccoon, opossum, squirrels, and rabbits. At present levels of use, dogs used for this purpose are not expected to adversely impact non-target species or cause conflict with other uses. As public use levels on the refuge expand across time, unanticipated conflicts between user groups may occur. The Refuge's Visitor Services programs will be adjusted as needed to eliminate or minimize each problem and provide quality wildlife-dependent recreational opportunities that include promoting public safety. Overall, the cumulative impact of hunting on other wildlife-dependent recreation or public safety at the refuge is expected to be minor.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas. Hunting is not expected to adversely affect migratory game bird populations that occur on the refuge. The U.S. Fish and Wildlife Service works closely with state and provincial governments, as well as with the public, in a joint effort to establish annual hunting regulations for migratory birds. The Service's Division of Migratory Birds establishes regulation frameworks to manage all migratory bird hunting in the United States. These regulations establish limitations by which States can then create season lengths, bag limits and areas of migratory bird hunting.

Regulations on migratory bird hunting are determined through the assessment of annual surveys, waterfowl banding data, and hunter harvest data. Survey data is obtained through aerial surveys of the North American Flyways, which count birds, ponds and nests, and provide

information for analyzing population and habitat conditions. Hunter surveys and questionnaires determine the number of hunters participating yearly and the impacts they have on waterfowl. Recommendations from the Flyway Council are considered when original rules are created. Rules are presented to the public through the Federal Register and followed by a series of public meetings for any recommendations. The final regulations are assessed based on a collective analysis of all factual information as well as council and public recommendations. The State of Kentucky annually reviews hunting seasons and bag limits and modifies them to avoid any long-term population declines. Hunting is not expected to adversely impact deer, turkey, or any other game species populations.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas. Hunting conducted in accordance with State and federal regulations is not expected to adversely affect wildlife populations that occur on the refuge and likely assists in maintaining the biological integrity, diversity, and environmental health of the refuge. Some species, such as white-tailed deer, today occur at levels well above those thought to occur under historic conditions. Left unchecked, high numbers of such species could adversely affect biological integrity, diversity, and environmental health. Hunting is a closely monitored tool that effectively regulates wildlife populations.

DETERMINATION (CHECK ONE BELOW):

- _____ Use is not compatible
- X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge will manage the six priority public uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) with Federal and State regulations and review it annually to ensure wildlife and habitat goals are achieved and that these programs are providing safe, high-quality experiences for participants. Stipulations for this activity will be located in Title 50 Code of Federal Regulations and Green River National Wildlife Refuge Hunting and Fishing Regulations (annual). Green River National Wildlife Refuge Hunting and Fishing Regulations (annual) permits will be required for anyone who is also required to have Kentucky State hunting license and is engaged in hunting activities on the Refuge.

The following stipulations will help ensure the refuge hunting program is compatible with refuge purposes.

- This use must be conducted in accordance with state and federal regulations, and special refuge regulations published in the annual refuge Hunting Regulations and Public Use Regulations brochures.
- This use is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in a determination that hunting is causing unanticipated negative impacts to natural communities, wildlife species, or their habitats.

- Hunting seasons may be more restrictive than state seasons and regulations to ensure compliance with visitor safety, reduce wildlife disturbance, and facilitate high-quality hunting.
- Law Enforcement Officer(s) will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Law Enforcement personnel will monitor all areas and enforce all applicable state and federal Regulations.

JUSTIFICATION:

Sport hunting on Green River NWR is clearly justified by law and policy. The Refuge Recreation Act of 1962 (16 U.S.C. 460K) authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use. The Refuge Recreation Act requires: 1) that any recreational use permitted will not interfere with the primary purpose for which the area was established and 2) that funds are available for the development, operation, and maintenance of the permitted forms of recreation.

The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57) is an amendment to the National Wildlife Refuge Administration Act of 1966 and is fundamental to the management of lands within the National Wildlife Refuge System (System). The NWRSA provides a mission for the System and clear standards for its management, use, planning, and growth. The NWRSA recognizes that wildlife-dependent recreational uses, including hunting, fishing, wildlife observation and photography, environmental education and interpretation, can be allowed when determined to be appropriate and compatible with the mission of the System and purposes of the Refuge. These six compatible wildlife-dependent recreational uses, known as the “Big 6”, are the priority general public uses of the System and shall receive priority consideration in planning and management over other uses. Hunting, as specified in this plan, is a Big 6 wildlife-dependent recreational use and the law states that as such, it “shall receive priority consideration in National Wildlife Refuge planning and management.” The Big 6 wildlife-dependent recreational uses are automatically considered appropriate uses. The Secretary of the Interior may then permit hunting on a refuge if it is determined that the use is also compatible and does not materially interfere with the primary purpose for which the refuge was established. The continuation of Sport Hunting on Green River NWR will not interfere with or detract from the fulfillment of the National Wildlife Refuge System mission. In fact, by helping to balance certain wildlife populations and connecting people to nature, hunting facilitates and is complimentary to the mission of the System and the establishing purpose of Green River NWR.

Public hunting on National Wildlife Refuges is supported by Executive Order No. 13443 Facilitation of Hunting Heritage and Wildlife Conservation. The purpose of the Executive Order is to “direct Federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management, including the Department of the Interior and the Department of Agriculture, to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

Public hunting on National Wildlife Refuges is further supported by the March 2, 2017 Secretarial Order No. 3347 regarding Conservation Stewardship and Outdoor Recreation. The purpose of this Order is to enhance conservation stewardship, increase outdoor recreation, and improve the management of game species and their habitat. Secretarial Order No. 3347 contains language that has specific application to public hunting on Green River NWR in Section (4) Part (C): (1) Identify specific actions to expand access significantly for recreational hunting and fishing on public lands as may be appropriate; (2) Identify specific actions to

improve recreational hunting and fishing cooperation, consultation, and communication with state wildlife managers; (3) Identify specific actions to improve habitat for fish and wildlife; (4) Identify specific actions to manage predators effectively and efficiently; and (5) Encourage, promote, and facilitate greater public access to all Department lands consistent with applicable laws.

According to Kentucky Department of Fish and Wildlife Resources, early in the 20th century, the deer population in the state of Kentucky was believed to number at 2600 individuals. After almost 90 years, 50 of which contained active restoration efforts, the deer herd now exceeds 750,000 individuals statewide. The overall herd estimate shows a stable to slightly increasing trend. The 2015-2016 white-tailed deer report estimated 827,355 deer statewide, post 2015-16 hunting season, which is a 3% increase from 2014-15. The 2015-16 deer harvest was one for the ages with a harvest of 155,734 deer, beating the previous record (144,409 in 2013-14) by 11,325 deer. It was a 12% increase from the 2014-15 season (138,899) and was an 8% increase from 2013-14 season (144,409).

The number of male and female deer harvested in Henderson County, KY.

Year	Male	Female	Total
2013	890	865	1755
2014	800	891	1691
2015	710	793	1503
2016	699	726	1425
2017	686	781	1467
2018	689	890	1579

The Kentucky Wild Turkey Population Status Report (2018) estimates the wild turkey population in Kentucky to be approximately 330,000 to 440,000. According to the report, wild turkey population trends from 2008 to 2017 are stable for Henderson County.

The number of male and female turkey harvested in Henderson County, KY.

Year	Male	Female	Total
2013	228	4	232
2014	217	8	225
2015	222	0	222
2016	233	0	233
2017	247	1	248
2018	188	0	188
2019	227	3	230

Suitable populations and habitat should exist on acquired refuge lands to support hunting as proposed. The viability of the game species populations proposed to be hunted will be evaluated for negatively affects by hunting according to state season guidelines, bag limits, and regulations in the hunt plan. This use is being permitted because it is a priority public use. It will not diminish the primary purposes for which the refuge was established. It also meets the mission of the National Wildlife Refuge System by providing renewable resources for the benefit of the American public while conserving viable populations of fish, wildlife and plant resources on these lands.

By allowing this use, the refuge would be providing opportunities and facilitating refuge programs in a manner and location that offer high quality, wildlife-dependent recreation and maintain the level of current wildlife values. The harvest of surplus animals is one tool used to manage wildlife populations at a level compatible with the environment, while providing wholesome recreational opportunities. Any new lands purchased as part of Green River NWR can be open to hunting depending on the manager's discretion using professional judgment, as long as there is no significant negative impact to natural resources or visitor services.

The refuge manager may, upon annual review of the hunting program and in coordination with the State, impose further restrictions on hunting, recommend that the refuge be closed to hunting, or further liberalize hunting regulations within the limits of state seasons and regulations, or as otherwise approved by State. Hunting restriction may be implemented if it conflicts with other, higher priority refuge programs or endangers refuge resources or public safety. This activity will not materially interfere with, or detract from, the mission of the Refuge System or the purpose for which the refuge was established.

MANDATORY 15-YEAR RE-EVALUATION DATE:

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USE:

Release of Rehabilitated Wildlife (Captive or Feral) (Special Use Permit only)

DESCRIPTION OF USE:

(a) *What is the use?*

The use considered in this Pre-Acquisition Compatibility Determination is Release of Rehabilitation Wildlife. Wildlife rehabilitation is the care of injured or orphaned wild animals with the specific goal of returning them to their native habitat with an optimal chance of survival. This involves emergency care, long-term rehabilitation, conditioning for release and ultimately, release back into the wild. Wildlife species are occasionally treated for injury, illness, or orphaned and may be returned to their native habitat in the Refuge by a licensed wildlife rehabilitator.

(b) *Where would this use be conducted?*

This use would be conducted on lands managed as a part of the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) *When would this use be conducted?*

This use would be conducted year-round.

(d) *How would this use be conducted?*

The release of wildlife or plants would require a Special Use Permit including the following stipulations:

1. Only a licensed wildlife rehabilitator or Refuge Staff may release local rehabilitated wildlife.
2. Only wildlife native to the area may be released on the Refuge.
3. Wildlife must be quarantined for a minimum of 2 weeks to check for diseases prior to release
4. Any planned release must be coordinated with Refuge Staff.

Release of rehabilitated wildlife from the local area or refuge as well as release of wildlife for species recovery may be approved by the refuge manager under a special use permit. Requests for this use will be reviewed on a case-by-case basis to ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs.

(e) *Why is this use being proposed?*

Release of wildlife is not a priority public uses of the National Wildlife Refuge System (Refuge System) under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Introduction of plants and animals on a National Wildlife Refuge is prohibited by 50 Code of Federal Regulations (CFR) 27.52, except by Special Use Permit. Release of Wildlife does not support the biological goals and objectives of Green River National

Wildlife Refuge. These goals and objectives emphasize promoting biological integrity, diversity, and environmental health. Allowing visitors to introduce animals or plants could lead to negative impacts to endangered species, migratory birds, and other wildlife and the habitats they rely on. Negative impacts may include introduction of exotic or invasive animals or plants, and spread of diseases. Control of already existing exotic species on the refuge remains a challenge and drain on limited refuge resources. However, several licensed rehabilitators are in the community and request to release wildlife from the local area that has been rehabilitated.

In these instances, the USFWS supports the release of rehabilitated wildlife on National Wildlife Refuges. Release of rehabilitated wildlife supports the Service's mission of working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs. A special use permit is required, which obligates administrative time to complete.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge. In the future, if the use is expanded, visitor amenities may need to be developed to facilitate this use.

Minimal costs are associated with this use to as release wildlife are not monitored.

ANTICIPATED IMPACTS OF THE USE:

Short-Term Impacts:

According to *Invasive Species: Vectors and Management Strategies* (2003), most invasions of exotic pets result from transportation of organisms by human activities from one place to another, whether intentional or unintentional, allowing a species to become established in new geographic regions. A steep rise in the number and impact of invasions has been observed for virtually all major habitats on Earth (Baskin 2002). Terrestrial vertebrates have been introduced to areas outside their native ranges since at least the Stone Age (Lever 1985). This provides many of the best-known examples of ecological loss caused by alien species introduction (Greenway 1967, Honegger 1981, Morgan and Woods 1986, Ebenhard 1988, Case and Bolger 1991, Henderson 1992). Release of pets on National Wildlife Refuges can have serious consequences. Most exotic pets are not native to the area of release, but often they will adapt to the environment and cause problems within the local ecosystem. Invasive species compete for food, habitat, and other resources required by native wildlife. Some invasives species may also consume native wildlife, significantly depleting numbers. Often the native animals being affected and pushed out by invasive species are those which are endangered or have unstable populations. Another reason it is illegal to release non-native species or pets is because of the possibility of disease transmission. For example, a pet reptile could have picked up an illness, bacteria, parasites, etc. in captivity that other wild animals have never been exposed to. Many of these conditions do not exhibit symptoms or give any indication that an animal is infected. Pets

often come through distributors, importers, breeders, pet stores, trade shows, and/or flea markets, and often animals in these situations are subjected to severe overcrowding, malnourishment, and other poor husbandry conditions that can have detrimental effects on health. Pets can spread these illnesses and disease to wildlife, which can lead to significant damage to wild populations. Releasing of pets into the wild can potentially harm other wildlife or cause ecological disaster; therefore it is not compatible on National Wildlife Refuges.

The treatment of wildlife casualties is often an attempt to counter the negative actions of man on species demographics and individual animal welfare. This moral and ethical responsibility is illustrated in large man-made catastrophes such as oil spills that impact upon large numbers of seabirds (Wernham et al. 1997, Mazet et al. 2005) and marine mammals (Baker et al. 1981). The same principles of “redressing the balance” can be applied to other man-made problems; 40% of European hedgehogs (*Erinaceus europaeus*) treated by wildlife rescue centers in the United Kingdom (UK) and the Netherlands arise from road traffic collisions (RTC), garden and pet injuries, poisoning, and disturbance of local environments (Reeve & Huijser 1999). Release is an underestimated component of the rehabilitation process with the potential for high losses (Vogelnest 2008). Animals need to re-integrate into the wild for the release to be considered truly successful (Grogan & Kelly 2013) and this includes normal behavior and future breeding. Release also has potentially negative ecological, genetic and disease effects on existing populations (Cunningham 1996, Robinson 2002, Vogelnest 2008), especially when animals are translocated (Griffith et al. 1993, Wobeser 2007). Release of native rehabilitated wildlife, after quarantine, back into a familiar area, not only pose minimal threats to the ecosystem, but increase the chance for survival. Therefore each request will be considered on a case-by-case basis by the Refuge staff. Past experience indicates requests for release of rehabilitated wildlife is minimal. Due to the low number of requests, release of rehabilitated wildlife supports the Service’s mission of working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

- _____ Use is not compatible
- X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

To ensure compatibility with refuge purposes and the mission of the Refuge System, in addition to those refuge-specific regulations the following stipulations will need to be met:

1. Only a licensed wildlife rehabilitator or Refuge Staff may release rehabilitated wildlife on Green River NWR
2. Only wildlife native to the area may be released on Green River NWR
3. Any planned release will be coordinated with Refuge Staff
4. All wildlife to be release on the Refuge must have a 2 week quarantine prior to release to reduce the possibility of disease transmission.

JUSTIFICATION:

Service's mission of working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people supports release of native rehabilitated wildlife on refuge lands. Additionally, this supports priority wildlife-dependent uses for the Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57)).

This activity will not materially interfere with, or detract from, the mission of the Refuge System or the purpose for which the refuge was established.

MANDATORY 10-YEAR RE-EVALUATION DATE:

LITERATURE CITED:

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USE:

Mobility Impaired - Operation of Off-road Vehicles (Special Use Permit only)

DESCRIPTION OF USE:

(a) What is the use?

The use considered in this Pre-Acquisition Compatibility Determination is Mobility Impaired Operation of Off-road Vehicles. Recreational use of off-road vehicles is the use of non-licensed off-road vehicles to facilitate wildlife-dependent activities for mobility impaired visitors.

(b) Where would this use be conducted?

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public. Specific trails for this use will be determined on a case-by-case basis and mapped in association with the Special Use Permit.

(c) When would this use be conducted?

This use could be conducted year-round in areas open to the general public from sunrise to sunset.

(d) How would this use be conducted?

A Special Use Permit request would be necessary in order for the Refuge to determine the positive or negative impact of non-licensed off-road vehicles, if the request met Refuge goals and objectives, and the appropriateness of the request. Each request must be presented in writing with details of who, what, where, when, why, and how the use will be conducted, and must comply with the stipulations listed in the hunting brochure and the mobility-impaired access application. Each request has different logistics, and therefore, would be evaluated individually for impacts on the Refuge mission. Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of Refuge regulations, a Special Use Permit will be issued on a case-by-case basis outlining the framework in which this use can be conducted. Refuge staff will ensure compliance with the Permit.

(e) Why is this use being proposed?

Recreational use of off-road vehicles as a lone activity is not priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997 and against Code of Federal Regulations. The Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand

on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

Non-licensed Off-road Vehicles (ATVs/UTVs) use is not a priority public use. ATVs/UTVs use would be prohibited at Green River National Wildlife Refuge with the following exceptions, mobility-impaired individuals, contractors, and scientific research, and search/rescue and/or law enforcement operations. Mobility-impaired individuals are allowed to use a personal ATV/UTV for access to designated areas of the refuge if a reasonable accommodation is required to participate in refuge programs. A formal request must be filed with the refuge with a verified physician's statement attesting to the nature of the disability. If approved, the individual is issued a special use permit (SUP) permitting ATV/UTV use for access purposes only in designated areas. The refuge will authorize the use within the refuge on a case by case basis, and will regulate such use through the issuance of Special Use Permits (SUPs) with conditions.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs. A special use permit is required, which obligates administrative time to complete.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

According to the 2017 article in the Journal of Fish and Wildlife Management "An Evaluation of U.S. National Wildlife Refuge Planning for Off-Road Vehicle Use" by Fischman et al.: "Recreational ATVs/UTVs activity can kill wildlife directly through collision but may also disturb animals by increasing stress and decreasing reproduction (Havlick 2002). In addition, ATVs/UTVs increase access for illegal hunting (Switalski and Jones 2012). But habitat modification poses a more common threat to wildlife. Soils are vulnerable to compaction and erosion from ATVs/UTVs use. Erosion in the form of mud holes and gullies causes sediment to be discharged to streams, decreasing water quality, destroying in-stream habitat, and harming aquatic organisms (Switalski and Jones 2012; Marion et al. 2014). In addition, oil and gasoline from ATVs/UTVs can enter soil and waters on public lands (Havlick 2002). Off trail ATVs/UTVs use may destroy vegetation and impair wildlife habitats. Surviving plants are often weakened and become more susceptible to diseases and insects. Diversity of vegetation often decreases and sensitive species may die out, allowing invasives species to spread. Recreational use of ATVs/UTVs also contributes to the spread of invasive species by transporting seeds and plant materials (Switalski and Jones 2012; Banha et al. 2014). Some ATVs/UTVs trails act as barriers

to animal movement and create fragmentation effects (Trombulak and Frissell 2000). On the other hand, ATVs/UTVs recreation also generates benefits—both to ATVs/UTVs users and to Refuges (Deisenroth et al. 2009; Jakus et al. 2010). It can facilitate the wildlife-dependent activities that Congress instructed Refuges to promote. In the case of people with disabilities, ATVs/UTVs use may be necessary for promoting wildlife-dependent recreation and complying with the Americans with Disabilities Act (42 U.S.C. ch. 126). Users report that ATVs/UTVs recreation connects them with nature, facilitates special activities in nature (such as hunting and fishing), and provides close access for wildlife observation (Mann and Leahy 2010). These pursuits are consistent with the goals of the System and the establishment purposes of many Refuges. However, ATVs/UTVs activity may create conflicts with other outdoor recreationists, often through vehicle noise and intrusion (Adams and McCool 2009).”

Non-licensed Off-road Vehicles (ATVs/UTVs) access on the refuge will be restricted to designated areas, for designated purposes and closely monitored. This activity may result in some potential disturbance to wildlife. Minimal impacts in the form of trampling small vertebrates, invertebrates, and vegetation, and littering may also occur. Significant short-term, long-term or cumulative adverse impacts to refuge resources are not expected.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

1. Areas may be closed on the refuge to protect resources or prevent unwanted disturbance.
2. Non-licensed Off-road Vehicles (ATVs/UTVs) access will be limited to daylight hours only and restricted to designated roads, trails, and parking areas only.

JUSTIFICATION:

According to the National Wildlife Refuge System Improvement Act of 1997, priority public use activities should be encouraged and expanded where possible. It is through compatible wildlife-dependent public uses that the public becomes aware of and provides support for national wildlife refuges. Use of off-road vehicles on Green River NWR is prohibited, except for routes designated by the refuge manager or pursuant to a valid permit (43 CFR 36.11). Mobility-impaired ATV access supports certain wildlife-dependent activities such as wildlife observation, hunting, and fishing by providing a reasonable access accommodation.

By limiting this activity, it will not materially interfere with or detract from the mission of the NWRs or purposes for which Green River NWR was established.

MANDATORY 10-YEAR RE-EVALUATION DATE: _____

LITERATURE CITED:

Adams JC, McCool SF. 2009. Finite recreation opportunities: the Forest Service, the Bureau of Land Management, and off-road vehicle management. *Natural Resources Journal* 49:45–116.

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Deisenroth D, Loomis J, Bond C. 2009. Non-market valuation of off-highway vehicle recreation in Larimer County, Colorado: implications of trail closures. *Journal of Environmental Management* 90:3490–3497.

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Mann M, Leahy J. 2010. Social capital in an outdoor recreation context. *Environmental Management* 45:363–376.

Switalski TA, Jones A. 2012. Off-road vehicle best management practices for forestlands: a review of scientific literature and guidance for managers. *Journal of Conservation Planning* 8:12–24.

Trombulak SC, Frissell CA. 2000. Review of ecological effects of roads on terrestrial and aquatic communities. *Conservation Biology* 14:18–30.

USE:

Scientific Research and Inventory and Monitoring (Special Use Permit only)

DESCRIPTION OF USE:

a) What is the use?

The use considered in this Pre-Acquisition Compatibility Determination is Scientific Research and Inventory and Monitoring. Research is conducted by Federal, State, and private entities, including the U.S. Geological Survey, State departments of natural resources, students and professors at State and private universities, and independent non-government researchers and contractors. This activity would allow permitted researchers access to the refuge's natural environment to conduct both short-term and long-term research projects.

The refuge issues special use permits for research studies investigating biological, physical, or social issues and concerns to address refuge management information needs, and to enhance the understanding of trust resources.

(b) Where would this use be conducted?

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) When would this use be conducted?

This use would be conducted year-round.

(d) How would this use be conducted?

In accordance with 16 U.S.C. 668dd(d) and 50 C.F.R. Part 25, Subpart D, the refuge manager is responsible for reviewing applications for special use permits (SUPs) and determining whether to authorize a proposed use. Uses must be "appropriate," and if so, also found to be "compatible" with the refuge purposes, and those of the Refuge System, prior to being approved and undertaken. These decisions are based on the Service's best professional judgment, consistent with Service regulations and policy, including the Policy on Maintaining the Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System (66 Fed. Reg. 3810 (2001); 601 FW 3).

Requests for this use will be reviewed on a case-by-case basis to ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs. Permitted research should result in better knowledge of the refuge's natural and cultural resources and improve methods to manage, monitor, and protect these resources.

The refuge manager will always have the discretion to reevaluate the appropriateness and compatibility of any specific 'research by non-Service personnel' request at any time [603 FW 2.1 H(1), (2)]. A specific research project denial will be based on the refuge manager exercising sound professional judgment based on field experiences, knowledge of the refuge's natural resources, particularly its biological resources and available scientific information. When a refuge manager is exercising sound professional judgment, the refuge manager will use available information that may include consulting with others both inside and outside the

Service. The refuge manager will specify in writing the rationale, conclusions, and decision when denying a specific research project request.

Sites for this use will be dependent on the particular study being conducted and could occur in a variety of habitat types. Access would be restricted by Special Use Permit to only the study sites needed to meet the objectives of the research.

The timing of research will be dependent on the type and subject(s) of the research project. Research could potentially occur throughout the year. Time-of-year restrictions could be imposed to protect threatened or endangered species or to prevent conflicts with other refuge uses or management activities.

Certain volunteer-based bird surveys focus on specific seasons in the avian life cycle. For example the Christmas Bird Count is conducted during the winter. Upland bird surveys would primarily be conducted in the spring and summer, whereas wetland bird surveys may also be conducted during migration and wintering periods as well.

(e) *Why is this use being proposed?*

The Service encourages and supports research and management studies on refuge lands that will improve and strengthen decisions on managing natural resources. The refuge manager encourages and seeks research that clearly relates to approved refuge objectives, improves habitat management, and promotes adaptive management. Priority research addresses information on better managing the Nation's biological resources that generally are important to agencies of the Department of Interior, the Refuge System, and state wildlife agencies, that address important management issues, or demonstrate techniques for managing species or habitats.

Consideration may also be given to research for other purposes that may not relate directly to refuge-specific objectives, but contribute to the broader enhancement, protection, use, preservation or management of native populations of fish, wildlife and plants, and their natural diversity in the region or the flyway. All proposals must comply with Service policy on compatibility.

Both the Refuge Manual and the Service Manual provide guidance on allowing research on Refuges. The Refuge Manual (4 RM 6.2) lists three objectives that can be met by permitting research on Refuges:

1. Promoting new information which will improve the quality of the refuge and other Service management decisions.
2. To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management and the environment in general.
3. To provide the opportunity for students and others to learn the principles of field research.

The Service Manual (603 FW 1.10D (4)) provides supplemental guidance in terms of the appropriateness of research on Refuges, as follows: "We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, review of all research activities will be made to

decide if they are appropriate or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research.”

The rationale for this conclusion is clearly stated in the preamble to that policy (71 Federal Regulation 36415):

1. Not all research may be appropriate. Some research may affect fish, wildlife, and plants in a manner neither consistent with refuge management plans nor compatible with refuge purposes or the Refuge System mission. Some research may interfere with or preclude refuge management activities, appropriate off the refuge, appropriate and compatible public uses, or other research.
2. Some research may be appropriate off the refuge, but not on the refuge. For example, some natural and physical research may not be wildlife-dependent and may be accomplished successfully at locations off the refuge. Because not all research support establishing purposes of refuges or the Refuge System mission, we cannot define research as a refuge management activity.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. Existing staffing and funding are adequate to support these activities. Refuge support for research may take the form of funding, in-kind services such as housing, the use of other refuge facilities, vehicles, boats, or equipment, the direct assistance of refuge staff in collecting data, providing historical records, conducting management treatments, or providing other assistance as appropriate. Generally, however, the bulk of the costs are incurred in staff time to review research proposals, coordinate with researchers, and write SUPs. In some cases, a research project may require only a few hours of staff time to review the proposal, coordinate with other reviewers, and write a SUP. In other cases, a research project may involve more significant staff time, because the refuge staff must coordinate with students and advisors and accompany researchers on site visits. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

No special equipment, facilities, or improvements are available at this time to support the use. Maintenance costs are not directly attributable to these incidental use on the refuge.

Minimal costs are associated with this uses for Refuge staff time to insure the Refuge receives copies of data collected and findings. Plants and wildlife will be monitored to determine any impacts as a result of this use.

No off-setting costs currently exist for this use unless the Refuge receives a grant for research, inventory, and/or monitoring.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

The Service encourages quality research to further the understanding of natural resources. Research by non-

Service personnel contributes to the availability of the best available scientific information to support refuge management decisions.

Disturbance to wildlife, vegetation, water, soils, or cultural resources could occur while researchers are accessing study sites on vehicles or by foot, or while they are engaged in their project. The presence of researchers could also indirectly disturb wildlife. Potential impacts include:

- Trampling, damage, and killing of vegetation from walking off trail (Kuss 1986, Roovers et al. 2004, Hammitt and Cole 1998).
- Soil compaction, soil erosion, and changes in hydrology from hiking on and off trail (Kuss 1986, Roovers et al. 2004).
- Disturbance to wildlife that causes shifts in habitat use, abandonment of habitat, increased energy demands on affected wildlife, changes in nesting and reproductive success, and singing behavior (Knight and Cole 1991, Miller et al. 1998, Shulz and Stock 1993, Gill et al. 1996, Arrese 1987, Gill et al. 2001).

Overall, we expect that these impacts would be negligible because of the low number of researchers and because, under this determination, only low impact projects would be allowed. As indicated under (a) above, low impact projects are those that would only minimally impact cultural resources or native wildlife and plants, and would not result in long-term, negative alterations to species' behavior, or their habitat, including vegetation, soils, and water. Research would only be conducted in approved locations and at approved times of day and times of season to minimize impacts to sensitive habitats and wildlife.

Animals may be temporarily disturbed during direct or remote observation, telemetry, capture (e.g., mist-netting), or banding. In very rare cases, direct injury or mortality could result as an unintended result of research activities. Mist-netting and banding, which are common research methods, can cause stress, especially when birds are captured, banded, and weighed. In very rare cases, birds have been injured or killed during mist netting, or killed when predators reach the netted birds before researchers. In a study of mist-netting and banding at 22 bird banding stations in the U.S. and Canada, Spotswood et al. (2012) found that the average rate of injury was very low (0.59 percent; mostly from damage to the wings, stress, cuts, or breaks) and the average rate of mortality was also very low (0.23 percent; mostly from stress and predation). Overall, they found that the likelihood of injury differed among species (e.g., heavier birds were more prone to incidents) and some species were more vulnerable to certain types of injuries. To minimize the potential for injuries, researchers should be properly trained (Fair et al. 2010, Spotswood et al. 2012) and look for signs of stress (e.g., lethargy, panting, raising feathers, closing eyes), wing strain, tangling, and predation (Spotswood et al. 2012). Impacts can also be minimized by considering the species to be captured, mesh size of net, time of day, time of year, weather, the number of birds that need to be captured, and the level of predation (Fair et al. 2010).

Barron et al. (2010) found that transmitters attached for research can also negatively impact bird species by affecting their behavior and ecology. The greatest impacts from transmitters were increased energy expenditure and decreased the likelihood of nesting. They also found that the method of transmitter attachment had an impact on the likelihood of injury or mortality, with anchored and implanted transmitters having the highest mortality due to the need for anesthesia. Collar and harness transmitters also had high mortality rates because they could cause birds to become entangled in vegetation. To minimize these risks, researchers can avoid anchored/implanted transmitters and use adjustable harnesses and collars with weak links that allow the device to detach if it becomes trapped in vegetation (Barron et al. 2010).

The U.S. Department of Agriculture's Animal Welfare Information Center maintains a website with resources to help minimize stress, injury, and mortality of wildlife in field studies at: <https://awic.nal.usda.gov/researchanimals/wildlife-field-studies>. Recommendations relevant to refuge research projects would be followed. Included on this site are links to the following guidelines to help researchers limit their impacts on wildlife:

- The Ornithological Council's "Guideline to the Use of Wild Birds in Research" (Fair et al. 2010).
- The American Society of Mammologists, "Guidelines of the American Society of Mammologists for the Use of Wildlife Mammals in Research" (2011).
- American Fisheries Society, "Guidelines for the Use of Fishes Research" (2004).
- American Society of Ichthyologists and Herpetologists, "Guidelines for Use of Live Amphibians and Reptiles in Field Research" (2006).

Researchers may also inadvertently damage plants (e.g. via trampling or equipment use) during the research project. To minimize impacts, the SUP will outline how researchers are allowed to access their study sites and use equipment to minimize the potential for impacts to refuge vegetation, soils, and water. We would not allow the collection and removal, or permanent damage, of any native plants under this determination.

Overall, allowing well-designed, properly reviewed, low impact research to be conducted by non-Service personnel is likely to have very little negative impact on refuge wildlife populations and habitats. We anticipate research will only have negligible to minor impacts to refuge wildlife and habitats because it will only be carried out after the refuge approves a detailed project proposal and issues a SUP including the stipulations in this determination to ensure compatibility. These stipulations are designed to help ensure each project minimizes impacts to refuge cultural resources, wildlife, vegetation, soils, and water. We also anticipate only minimal impacts because Service staff will supervise this activity, and it will be conducted in accordance with refuge regulations. In the event of persistent disturbance to habitats or wildlife, the activity will be further restricted or discontinued. If the research project is conducted with professionalism and integrity, potential minor adverse impacts are likely to be outweighed by the body of knowledge contributed to our understanding of refuge resources and our management effects on those resources, as well as the opportunity to inform, strengthen, and improve future refuge management decisions. An Intra-Service Section 7 Biological Evaluations for any proposal that could be anticipated to have an impact on any federally threatened or endangered species will be initiated. Researchers will be required to obtain any special permits, including collection and banding permits, required by State or Federal law prior to issuance of a SUP.

Long-term Impacts:

Long-term negative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas. Long term effects should generally be beneficial by gaining information valuable to refuge management. Permits for multi-year research projects are renewed annually, providing the opportunity for an analysis of any impacts before issuing a SUP renewal.

Cumulative Impacts:

Cumulative impacts may occur if multiple research projects were occurring on the same resources at the same time or if the duration of the research is excessive. In particular, the refuge must consider the potential impacts of non-Service research, in conjunction with any

Service-sponsored research also taking place. However, no cumulative impacts are expected because refuge manager can control the potential for cumulative impacts through SUPs, prohibiting multiple research projects from affecting any given area or species at one time. Managers retain the option to prohibit research on the refuge which does not contribute to the mission of the refuge system or causes undue disturbance or harm.

Managers retain the right to revoke or deny renewal for any SUP if unanticipated short-term, long-term, or cumulative impacts are noted. Plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

General

1. All Refuge regulations will be in force and the Permittee shall be responsible for the actions of all research and support personnel.
2. The failure of the United States to enforce strict performance of the terms, conditions, covenants, agreements, or stipulations of this permit, for access to conduct research activities on national wildlife Refuge lands, shall not constitute a waiver or relinquishment of the right of the United States to strictly enforce thereafter such terms, conditions, covenants, agreements, or stipulations which shall, at all times, continue in full force and effect.
3. The Permittee shall save, hold harmless, defend, and indemnify the United States of America, its agents and employees for loss, damages, or judgments and expenses on account of bodily injury, death or property damage, or claims for bodily injury, death, or property damage of any nature whatsoever, and by whomever made, arising out of the Permittee, their employees, subcontractors or agents with respect to conducting monitoring within the lands administered as a part of the Green River National Wildlife Refuge.
4. All applicable Federal and State regulations apply.
5. Permittee shall provide at least one written update annually that summarizes the permitted research and its current findings. Written reports should be of peer-review quality. A final report, of peer-review quality, will be provided to the Refuge within 12 months of the completion of field work. Copies of all publications related to this permit will be provided to the Refuge free of cost.
6. Publications and presentations should provide appropriate credit to the U.S. Fish and Wildlife Service, Green River National Wildlife Refuge.
7. All individuals utilizing the Refuge are subject to inspection of permit, equipment, vehicles, boats and their contents by federal or state officers upon request.

8. All necessary collection permits must be completed at the Permittee's expense. Copies of these permits shall be provided to the Refuge prior to Special Use Permit issuance.
9. At the time of the official permit request a working proposal covering project name, specific study location, problem being addressed along with specific objectives, research methods and materials, product to be produced, primary investigator, cooperators and key field persons, estimated funding amount and source of funding, and start date and completion date will be provided. Only those activities described within the proposal will be covered under this Special Use Permit. A telephone list shall be provided by the Permittee including names of key contacts in case of questions or emergencies.
10. The Permittee and their agents are required to possess a copy of this Special Use Permit at all times when on the Refuge.

JUSTIFICATION:

The Service encourages research on national wildlife refuges to promote new information which will improve the quality of refuge and other Service management decisions, to expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general, and to provide the opportunity for students and others to learn the principles of field research. In accordance with 50 CFR 26.41, research conducted by non-Service personnel, as described in this compatibility determination, will not materially interfere with, or detract from, the fulfillment of the Refuge System mission or the purposes for which the refuge was established.

MANDATORY 10-YEAR RE-EVALUATION DATE:

LITERATURE CITED:

Arrese, P. 1987. Age, intrusion pressure and defense against floaters by territorial male Song Sparrows. *Animal Behavior* 35:773-784.

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Hammit, W.E., and D.N. Cole. 1998. *Wildlife Recreation: Ecology and Management* (2nd edition). New York: John Wiley & Sons. 361p.

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Spotswood, E.N., K.R. Goodman, J. Carlisle, R.L. Cormier, D.L. Humple, J. Rousseau, S.L. Guers, and G.G. Barton. 2012. How safe is mist netting? Evaluating the risk of injury and mortality to birds. Methods in Ecology and Evolution 3:29-38.

USE:

Wildlife Observation

DESCRIPTION OF USE:

a) What is the use?

The use considered in this Pre-Acquisition Compatibility Determination is Wildlife Observation. Wildlife observation is the practice of noting, documenting, or learning about the occurrence or abundance of a living plant or animal species. This wildlife-dependent recreational use is recognized as priority use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would this use be conducted?

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) When would this use be conducted?

This use are conducted year-round from sunrise to sunset. Fish and Wildlife Service has specific regulations further restricting certain uses. The Refuge annual hunting and fishing permit is defines parameters of public uses on the Refuge. This use may also be subject to regulations established by the State of Kentucky.

(d) How would this use be conducted?

Fish and Wildlife Service has specific regulations restricting certain uses published in 50 CFR. The Refuge annual hunting and fishing permit is defines parameters of public uses on the Refuge. This use may also be subject to regulations established by the State of Kentucky. Brochures and maps depicting the roads and trails open for this use would be available on the refuge's Web site.

Wildlife observation is self-conducted and facilitated through the availability of trails, viewing areas, tours, and informational materials. Wildlife observation programs such as birding field trips, and other nature walks are frequently given. A viewing scope is provided in designated areas.

(e) Why is this use being proposed?

Wildlife observation is a priority public use as defined by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and if compatible, are to receive enhanced consideration over other general public uses.

This use will be conducted to provide compatible educational and recreational opportunities for visitors to enjoy the resource and to gain understanding and appreciation for fish and wildlife, wild lands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. This use will provide opportunities for visitors to observe and learn

about wildlife and wild lands at their own pace in an unstructured environment and to observe wildlife habitats firsthand. This use will enhance the public's understanding of natural resource management programs and ecological concepts to enable the public to better understand the problems facing our wildlife/wild lands resources, to realize what effect the public has on wildlife resources, to learn about the Service's role in conservation, to better understand the biological facts upon which Service management programs are based, and to foster an appreciation for the importance of wildlife and wild lands. It is anticipated that participation in this use will result in a more informed public, with an enhanced stewardship ethic and enhanced support and advocacy for Service programs.

This use will also provide wholesome, safe, outdoor recreation in a scenic setting, with the realization that those who come strictly for recreational enjoyment will be enticed to participate in the more educational facets of the public use program, and can then become informed advocates for the refuge and the Service.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

Facilities or materials needed to support this use include maintaining access roads, parking areas, gates, roadside pull-offs, kiosks, signs, the Visitor Contact Station, observation platforms, and hiking trails; and providing information in refuge publications and the refuge's Web site. Funding for improvements to visitor amenities is lacking in the current budget, however additional funding for visitor services improvements can come from challenge cost share projects, grant funds, and contributions. As funding is available, the refuge will improve projects and facilities.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

A recreational fee may be being implemented, which could offset costs.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985).

Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeal et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at J.N. "Ding"

Darling Refuge, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Ardeids were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and little blue herons were observed to be disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern United States. Klein (1993), in studying waterbird response to human disturbance, found that as intensity of disturbance increased, avoidance response by the birds increased and that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductive functions of song (Arrese 1987). Disturbance, which leads to reduced singing activity, will make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Travel routes can disturb wildlife outside the immediate trail corridor (Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where “generalists” (American robins) were found near trails and “specialist” species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Hammitt and Cole (1998) conclude that the frequent presence of humans in “wildland” areas can dramatically change the normal behavior of wildlife mostly through “unintentional harassment.”

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young.

Long-term Impacts:

Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

Cumulative Impacts:

No cumulative impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

DETERMINATION (CHECK ONE BELOW):

_____ Use is not compatible

 X Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

The refuge will manage this priority public use (wildlife observation) in accordance with Federal and State regulations and review it annually to ensure wildlife and habitat goals are achieved and that these programs are providing safe, high-quality experiences for participants.

To ensure compatibility with refuge purposes and the mission of the Refuge System, wildlife observation can occur on the refuge if the refuge-specific regulations are followed and following stipulations are met:

1. This use must be conducted in accordance with State and Federal regulations (50 CFR), and special refuge specific regulations published in the Public Use Regulations brochure.
2. The public use program will be reviewed annually to ensure that it contributes to refuge objectives in managing quality recreational opportunities and protecting habitats, and is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in unanticipated negative impacts to natural communities, wildlife species, or their habitats. Refuge law enforcement officer(s) will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Refuge law enforcement personnel will monitor all areas and enforce all applicable State and Federal regulations.
3. Areas may be closed on the refuge to protect resources or prevent unwanted disturbance.
4. The activities prohibited are identified in 50 CFR Part 27.

JUSTIFICATION:

Wildlife observation is a priority wildlife-dependent use for the Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57)). The Service's policy is to provide expanded opportunities for wildlife-dependent uses when compatible and

consistent with sound fish and wildlife management and ensure that they receive enhanced attention during planning and management.

Specific refuge regulations address equity and quality of opportunities for visitors and help safeguard refuge habitats. Impacts from this proposal, short-term and long-term, direct, indirect, and cumulative, are expected to be minor and are not expected to diminish the value of the refuge for its stated objectives. Available parking and size of the facilities will typically limit use at any given time, except during special events.

Conflicts between visitors are localized and are addressed through law enforcement, public education, and continuous review and updating to public use regulations. Conflicts are further reduced by the establishment of seasonal area closures.

Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing this use also furthers the mission of the Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on the refuge.

This activity will not materially interfere with, or detract from, the mission of the Refuge System or the purpose for which the refuge was established.

MANDATORY 15-YEAR RE-EVALUATION DATE: _____

LITERATURE CITED:

- Arcese, P. 1987. Age, intrusion pressure and defense against floaters by territorial male Song Sparrows. *Anim. Behav.* 35:773-784.
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Klein, M. L. 1989. Effects of high levels of Human Visitation on Foraging Waterbirds at J.N. "Ding" Darling Refuge, Sanibel, Florida. Final Report to Service. 103pp.

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Williams, G. J., and E. Forbes. 1980. The habitat and dietary preferences of dark-bellied brant geese and widgeon in relation to agricultural management. *Wildfowl*. 31:151-157.

USE:

Wildlife Photography

DESCRIPTION OF USE:

a) What is the use?

The use considered in this Pre-Acquisition Compatibility Determination is Wildlife Photography. Wildlife photography is the practice of documenting various forms of wildlife within their natural habitats. This wildlife-dependent recreational use is recognized as priority use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would this use be conducted?

This use would be conducted on lands owned by the Fish & Wildlife Service and/or managed as a part of Green River NWR and open to the public.

(c) When would this use be conducted?

This use are conducted year-round from sunrise to sunset. Fish and Wildlife Service has specific regulations further restricting certain uses. The Refuge annual hunting and fishing permit is defines parameters of public uses on the Refuge. This use may also be subject to regulations established by the State of Kentucky.

(d) How would this use be conducted?

Fish and Wildlife Service has specific regulations restricting certain uses published in 50 CFR. The Refuge annual hunting and fishing permit is defines parameters of public uses on the Refuge. This use may also be subject to regulations established by the State of Kentucky. Brochures and maps depicting the roads and trails open for this use will be available on the refuge's Web site.

Wildlife photography is self-conducted and facilitated through the availability of trails, viewing areas, tours, and informational materials. Wildlife observation programs such as birding field trips, and other nature walks are frequently given. A viewing scope is provided in designated areas.

(e) Why is this use being proposed?

Wildlife photography is a priority public use as defined by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and if compatible, are to receive enhanced consideration over other general public uses.

This use will be conducted to provide compatible educational and recreational opportunities for visitors to enjoy the resource and to gain understanding and appreciation for fish and wildlife, wild lands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. This use will provide opportunities for visitors to observe and learn

about wildlife and wild lands at their own pace in an unstructured environment and to observe wildlife habitats firsthand. This use will enhance the public's understanding of natural resource management programs and ecological concepts to enable the public to better understand the problems facing our wildlife/wild lands resources, to realize what effect the public has on wildlife resources, to learn about the Service's role in conservation, to better understand the biological facts upon which Service management programs are based, and to foster an appreciation for the importance of wildlife and wild lands. It is anticipated that participation in this use will result in a more informed public, with an enhanced stewardship ethic and enhanced support and advocacy for Service programs.

This use will also provide wholesome, safe, outdoor recreation in a scenic setting, with the realization that those who come strictly for recreational enjoyment will be enticed to participate in the more educational facets of the public use program, and can then become informed advocates for the refuge and the Service.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. We will be able to accommodate a limited amount of this use with the staff from Clarks River NWR, but to expand the use, more staff will be needed in the future. We will re-evaluate staffing levels upon CCP development and implementation of final CDs.

Facilities or materials needed to support this use include maintaining access roads, parking areas, gates, roadside pull-offs, kiosks, signs, the Visitor Contact Station, observation platforms, and hiking trails; and providing information in refuge publications and the refuge's Web site. Funding for improvements to visitor amenities is lacking in the current budget, however additional funding for visitor services improvements can come from challenge cost share projects, grant funds, and contributions. As funding is available, the refuge will improve projects and facilities.

Minimal costs are associated with this use to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

A recreational fee may be being implemented, which could offset costs.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985).

Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of suboptimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeal et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at J.N. "Ding"

Darling Refuge, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Ardeids were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and little blue herons were observed to be disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern United States. Klein (1993), in studying waterbird response to human disturbance, found that as intensity of disturbance increased, avoidance response by the birds increased and that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductive functions of song (Arrese 1987). Disturbance, which leads to reduced singing activity, will make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Travel routes can disturb wildlife outside the immediate trail corridor (Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where “generalists” (American robins) were found near trails and “specialist” species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Hammitt and Cole (1998) conclude that the frequent presence of humans in “wildland” areas can dramatically change the normal behavior of wildlife mostly through “unintentional harassment.”

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young.

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Long-term impacts are not anticipated; however, plants and wildlife will be monitored by Refuge staff to ensure that no significant damage would occur in public use areas.

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DETERMINATION (CHECK ONE BELOW):

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MANDATORY 15-YEAR RE-EVALUATION DATE: _____

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Williams, G. J., and E. Forbes. 1980. The habitat and dietary preferences of dark-bellied brant geese and widgeon in relation to agricultural management. Wildfowl. 31:151-157.

Approval of Compatibility Determinations

The signature of approval is for the compatibility determinations above for Green River NWR. If one of the descriptive uses is considered for compatibility outside of this package, this approval signature becomes part of that determination.

APPROVAL FOR COMPATIBILITY DETERMINATION:

Refuge Manager: _____
(Signature) (Date)

Regional Compatibility
Coordinator: _____
(Signature) (Date)

Refuge Supervisor: _____
(Signature) (Date)

Regional Chief, National
Wildlife Refuge System
Southeast Region: _____
(Signature) (Date)

APPENDIX C. INTRA-SERVICE SECTION 7 ESA CONSULTATION FOR THE PROPOSED GREEN RIVER NWR AND CPA.

REGION 4

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Michael Johnson, Refuge Manager

Telephone Number: (270) 527-5770 ext. 102 **E-Mail:** Michael_Johnson@fws.gov

Date: March 18, 2019

PROJECT NAME (Grant Title/Number): Proposed Green River National Wildlife Refuge (NWR) and Conservation Partnership Area Land Protection Plan (LPP), Environmental Assessment, and Interim Compatibility Determinations

I. Service Program:

☐ **Ecological Services**

☐ **Federal Aid**

☐ **Clean Vessel Act**

☐ **Coastal Wetlands**

☐ **Endangered Species Section 6**

☐ **Partners for Fish and Wildlife**

☐ **Sport Fish Restoration**

☐ **Wildlife Restoration**

☐ **Fisheries**

☒ **Refuges/Wildlife**

II. State/Agency: Kentucky; U.S. Fish and Wildlife Service

III. Station Name: Green River National Wildlife Refuge; Henderson County, Kentucky

IV. Description of Proposed Action (attach additional pages as needed):

Implement the Proposed Alternative associated with the proposed Green River NWR Land Protection Plan, Environmental Assessment, and associated Interim Compatibility Determinations.

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence table:

Complete the following table:

SCIENTIFIC NAME	SPECIES COMMON NAME	FEDERAL STATUS ¹	PREFERRED HABITAT	KNOWN OCCURENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
MUSSELS					
<i>Cyprogenia stegaria</i>	Fanshell	E	Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep	None documented	Yes
<i>Epioblasma obliquata obliquata</i>	Catspaw	E	Inhabits medium to large rivers in riffles, shoals, and/or deep water in swift current	Shells known from nearby Angel Mounds State Historic Site (Angel Mounds), is located roughly 2.25 miles east	Yes
<i>Epioblasma triquetra</i>	Snuffbox	E	Occurs in medium-sized streams to large rivers generally on mud, rocky, gravel, or sand substrates in flowing water	Shells known from near Angel Mounds	Yes
<i>Lampsilis abrupta</i>	Pink mucket	E	Large rivers in habitats ranging from silt to boulders, but apparently more commonly from gravel and cobble. Collected from shallow and deep water with current velocity ranging from zero to swift	Shells known from near Angel Mounds	Yes
<i>Obovaria retusa</i>	Ring pink	E	Large river species that inhabits gravel and sand bars	Shells known from near Angel Mounds	Yes
<i>Plethobasus cyphus</i>	Sheepnose	E	Usually found in large rivers in current on mud, sand, or gravel bottoms at depth of 1-2 meters or more	Shells known from near Angel Mounds and live animals known from Ohio River at river mile 783.4 upstream of confluence with Green River	Yes

SCIENTIFIC NAME	SPECIES COMMON NAME	FEDERAL STATUS ¹	PREFERRED HABITAT	KNOWN OCCURENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Potamilus capax</i>	Fat pocketbook	E	Occurs in medium to large-sized rivers often around island and back channels, and sometimes in ditches, in mud (ooze); mixed sand, mud, and clay; or fine silt and mud in flowing water at depths of a few inches up to eight feet	Known from Ohio River 4.5 miles downstream, and upstream at river mile 782.3	Yes
<i>Cumberlandia monodonta</i>	Spectaclecase	E	Usually found in medium to large rivers where it inhabits substrate ranging from silt to rubble and boulders in slow to swift currents of shallow to deep water. Sometimes found in or near vegetation beds, and in mud between boulders adjacent to swift water. May become established in wing dams	None documented	Yes
<i>Epioblasma Torulosa rangiana</i>	Northern riffleshell	E	Riffles or shoals with current and substrate of sand and/or gravel in small to moderate-size rivers	None documented	Yes
<i>Plethobasus cooperianus</i>	Orangefoot pimpleback	E	Usually found in large rivers in sand and gravel substrates	None documented	Yes
<i>Pleurobema clava</i>	Clubshell	E	This species is an inhabitant of small streams and rivers, although in Kentucky it is known from moderately large rivers	None documented	Yes
<i>Pleurobema plenum</i>	Rough pigtoe	E	Open water (Ohio River) – stable sand, gravel, and mud-cobble substrates	None documented	Yes

SCIENTIFIC NAME	SPECIES COMMON NAME	FEDERAL STATUS ¹	PREFERRED HABITAT	KNOWN OCCURENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Quadrula cylindrica cylindrica</i>	Rabbitsfoot	T	Small to large rivers with sand, gravel, and cobble and moderate to swift current, sometimes in deep water	Shells known from near Angel Mounds and one historic record known from Ohio River between river miles 784.6 and 786.7	Yes
BIRDS					
<i>Sternula antillarum</i>	Least tern	E	Foraging and nesting on sparsely vegetated and infrequently flooded sandbars, wetland scrub- shrub	None documented	No
MAMMALS					
<i>Myotis grisescens</i>	Gray bat	E	Roosts in cave and cave-like habitats, including highway bridges; foraging primarily over open water, but will also forage in uplands, bottomland hardwood forest, wetland scrub-shrub	None documented	Yes
<i>Myotis septentrionalis</i>	Northern long-eared bat	T	Open and cluttered areas in bottomland hardwood forest, mixed deciduous forest, upland scrub-shrub, wetland scrub-shrub; open water (foraging); residential (foraging along edges); hibernates in caves and cave-like structures	Known from nearby records	Yes
<i>Myotis sodalis</i>	Indiana bat	E	Open and uncluttered areas in bottomland hardwood forest, mixed deciduous forest, upland scrub-shrub, wetland scrub-shrub; open water (foraging); agricultural row crops (foraging along edges); hibernates in caves and cave-like structures	Known from nearby records	Yes

STATUS: E=endangered, T=threatened, PE=proposed endangered, PT=proposed threatened, CH=critical habitat, PCH=proposed critical habitat, C=candidate species

VI. Location (attach map): Refuge map attached.

- A. Ecoregion Number and Name:** Lower Tennessee/Upper Cumberland
- B. County and State:** Henderson County, Kentucky
- C. Section, township, and range (or latitude and longitude):**
37.840427, -87.578888
- D. Distance (miles) and direction to nearest town:** Between 0.5-16 miles from Henderson, Kentucky.
- E. Species/habitat occurrence:** See Table V. A. above.

VI.

A. Explanation of effects of the action on species and critical habitats in item V. A:

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Interior Least Tern	Limited occurrence on project area. Proposed management activities would improve habitat overall; foraging areas and potential nesting sites would not likely be impacted by the proposed action.
Mussels Fanshell Catspaw Snuffbox Pink mucket Ring pink Sheepnose Fat pocketbook Spectaclecase Northern riffleshell Orangefoot pimpleback Clubshell Rough pigtoe Rabbitsfoot	Limited to no occurrence in Ohio or Green Rivers. Proposed management activities would improve water quality through forest management, reforestation, and hydrologic restoration; public use, research, and other proposed activities would likely have no impact to the aquatic habitat. In addition, all proposed habitat removal or habitat alteration projects will undergo consultation with the Kentucky Ecological Services Field Office pursuant to section 7(a) (2) of the Endangered Species Act. This will ensure that any potential adverse effects are avoided or adequately addressed. Further, staff will actively coordinate with the Kentucky Ecological Services Field Office if any future proposed or candidate species are located on the refuge in order to ensure that potential adverse effects on those species are adequately addressed.

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Gray bat Northern long-eared bat Indiana bat	Proposed management activities would improve habitat through restoration of geophysical features and hydrology; public use, research, and other proposed activities are low volume and low impact.

B. Explanation of actions to be implemented to reduce adverse effects:

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/ MINIMIZE IMPACTS
Interior Least Tern	Refuge ownership and therefore management and law enforcement would ensure protection of this species and its habitats.
Mussels Fanshell Catspaw Snuffbox Pink mucket Ring pink Sheepnose Fat pocketbook Spectaclecase Northern riffleshell Orangefoot pimpleback Clubshell Rough pigtoe Rabbitsfoot	Refuge ownership and therefore management and law enforcement would ensure protection of these species and its' habitats. All actions will undergo consultation with the Kentucky Ecological Services Field Office pursuant to section 7(a) (2) of the Endangered Species Act. This will ensure that any potential adverse effects are avoided or adequately addressed. Further, CRNWR staff will actively coordinate with the Kentucky Ecological Services Field Office if any future proposed or candidate species are located on the refuge in order to ensure that potential adverse effects on those species are adequately addressed.

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/ MINIMIZE IMPACTS
Gray bat Northern long-eared bat Indiana bat	Refuge ownership and therefore management and law enforcement would ensure protection of this species and its habitats. All actions will undergo consultation with the Kentucky Ecological Services Field Office pursuant to section 7(a) (2) of the Endangered Species Act. This will ensure that any potential adverse effects are avoided or adequately addressed. Further, staff will actively coordinate with the Kentucky Ecological Services Field Office if any future proposed or candidate species are located on the refuge in order to ensure that potential adverse effects on those species are adequately addressed.

VIII. Effect Determination and Response Requested:

SPECIES/ CRITICAL HABITAT	DETERMINATION ¹			RESPONSE ¹ REQUESTED
	NE	NA	AA	
Fanshell	X			Concurrence
Catspaw	X			Concurrence
Snuffbox	X			Concurrence
Pink mucket	X			Concurrence
Ring pink	X			Concurrence
Sheepnose	X			Concurrence
Fat pocketbook	X			Concurrence
Spectaclecase	X			Concurrence
Northern riffleshell	X			Concurrence

SPECIES/ CRITICAL HABITAT	DETERMINATION ¹			RESPONSE ¹ REQUESTED
	NE	NA	AA	
Orangefoot pimpleback	X			Concurrence
Clubshell	X			Concurrence
Rough pigtoe	X			Concurrence
Rabbitsfoot	X			Concurrence
Least Tern	X			Concurrence
Gray bat	X			Concurrence
Northern long- eared bat	X			Concurrence
Indiana bat	X			Concurrence

¹DETERMINATION/RESPONSE REQUESTED:

NE = no effect. This determination is appropriate when the proposed action will not directly, indirectly, or cumulatively impact, either positively or negatively, any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested is optional but a "Concurrence" is recommended for a complete Administrative Record.

NA = not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources. Response Requested is a "Concurrence".

AA = likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested for listed species is "Formal Consultation". Response Requested for proposed or candidate species is "Conference".

APPENDIX D. STATE LISTED AND PRIORITY SPECIES AND COMMUNITIES IN THE PROPOSED GREEN RIVER NWR AND CPA

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
MUSSELS					
<i>Villosa lienosa</i>	Little spectaclecase	Inhabits small to medium-sized rivers, usually in shallow water on a sand/mud/detritus bottom	S	North Fork Canoe Creek at US 41 crossing in Henderson County	Yes
<i>Fusconaia subrotunda</i>	Longsolid	Gravel bars and deep pools in large rivers and large to medium-sized streams	S	Known from confluence of Ohio and Green River; a weathered valve (shell) was found downstream of Central Alternatives 1A and 1B	Yes
<i>Lampsilis ovata</i>	Pocketbook	Considered a large river, but occurs in medium-sized streams in gravel, sand, or even mud. In the Lower Wabash and Ohio Rivers specimens were taken in deep water (6-10 feet or more) in current from sand or gravel	E	Known within CPA from Henderson Island and Angel Mounds	Yes
<i>Pleurobema rubrum</i>	Pyramid pigtoe	Inhabits medium to large rivers and usually occurs in sand or gravel bottoms in deep waters	E	Known within CPA	Yes
FISHES					

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Erimyzon sucetta</i>	Lake chubsucker	Lowland lentic habitats (wetlands and floodplain lakes) with submergent and floating vegetation	T	Known within CPA	Yes
<i>Ictiobus niger</i>	Black Buffalo	Reservoirs and medium to large rivers with moderate to low gradient and sometime swift current	S	Known within CPA	Yes
AMPHIBIANS AND REPTILES					
<i>Nerodia erythrogaster neglecta</i>	Copperbelly water snake	semi-permanent to permanent shallow water including floodplain wetlands, seasonal wetlands, springs, ditches, marshes, and shallow, slow moving streams	S	Yes, between US 41 and Green River Road in Henderson	Yes
<i>Cryptobranchus alleganiensis</i>	Eastern hellbender	Confined to running waters of fairly large streams and rivers, especially in stretches with large flat stones	S	Known in Indiana	Yes
<i>Hyla avivoca</i>	Bird-voiced Treefrog	In Kentucky, the species appears to be restricted to floodplain wetlands, especially those dominated by bald cypress, water tupelo, green ash, and buttonbush	S	Known within CPA	Yes

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Rana areolata circulosa</i>	Northern Crawfish Frog	Breeds in ponds in farmland and edge. Remains underground throughout most of the year, using crayfish burrows in moist grasslands and meadows	S	Known within CPA	Yes
<i>Apalone mutica mutica</i>	Midland Smooth	Open water habitats; Most numerous in open river situations with gravel or sand substrates, but also present in slower rivers and impoundments	S	Known within CPA	Yes
<i>Farancia Abacura reinwardtii</i>	Western Mud Snake	Wetland scrub-shrub, swamps, and small streams with slow velocities and muddy substrates	S	Known within CPA	Yes
<i>Thamnophis sauritus sauritus</i>	Eastern Ribbon Snake	Variety of semi-open habitats, generally in weedy or brushy growth along the margins of sloughs, marshes and other aquatic habitats	S	Known within CPA	Yes
<i>Botaurus lentiginosus</i>	American bittern	Fresh water bogs, swamps, wet fields, cattail and bulrush marshes, brackish and saltwater marshes and meadows	H	Known within CPA	Yes
<i>Haliaeetus leucocephalus</i>	Bald eagle	Primarily associated with larger rivers and lakes although also occurs along medium sized stream floodplains	T	Yes, nest site within CPA	

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Riparia riparia</i>	Bank swallow	Open and partly open situations, frequently near flowing water	S	Known within CPA	
<i>Phalacrocorax auritus</i>	Double-crested cormorant	Lakes, rivers, swamps, and seacoasts	T	None documented, but marked as extirpated within Henderson County	
<i>Corvus ossifragus</i>	Fish crow	Beaches, bays, lagoons, inlets, swamps, near marshes, and, less frequently, deciduous or coniferous woodland, in inland situations primarily in baldcypress swamps and along major watercourses	S	Known within CPA	
<i>Ardea alba</i>	Great egret	Marshes, swampy woods, tidal estuaries, lagoons, mangroves, along streams, lakes, and ponds	T	Known within CPA	Yes
<i>Lophodytes cucullatus</i>	Hooded merganser	Streams, lakes, swamps, marshes, and estuaries; winters mostly in freshwater but also regularly in estuaries and sheltered bays	T	Yes, known from Eagle Slough Natural Area	Yes
<i>Rallus elegans</i>	King rail	Freshwater marshes and swamps, locally in brackish marshes	E	Known within CPA	Yes

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Ixobrychus exilis</i>	Least bittern	Tall vegetation in marshes, primarily freshwater, less commonly in coastal brackish marshes and mangrove swamps	T	Known within CPA	Yes
<i>Certhia americana</i>	Brown Creeper	Forest, woodland, swamps; also scrub and parks in winter and migration	E	Known within CPA	Yes
<i>Gallinula galeata</i>	Common Gallinule	Freshwater marshes, canals, quiet rivers, lakes, ponds, mangroves, primarily in areas of emergent vegetation and grassy border	E	Known within CPA	Yes
<i>Pandion haliaetus</i>	Osprey	Primarily along rivers, lakes, and seacoasts, occurring widely in migration, often crossing land between bodies of water	S	Known nest site within CPA	Yes
<i>Falco peregrinus</i>	Peregrine falcon	Formerly restricted to clifflines for nest sites; now primarily found on large man-made structures	SE	Known within CPA	Yes
<i>Cistothorus platensis</i>	Sedge wren	Grasslands and savanna, especially where wet or boggy, sedge marshes	S	Known within CPA	Yes

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Asio flammeus</i>	Short-eared owl	Prairie, meadows, tundra, moorlands, marshes, savanna, dunes, fields, open woodland	E	Known within CPA	Yes
<i>Actitis macularius</i>	Spotted sandpiper	Seacoasts and shores of lakes, ponds, and streams, sometimes in marshes; prefers shores with rocks, wood, or debris	E	Known within CPA	Yes
<i>Bartramia longicauda</i>	Upland sandpiper	Grasslands, especially prairies, dry meadows, pastures, fields	H	None recently documented	Yes
<i>Rallus limicola</i>	Virginia rail	Old field (wet areas), wetland scrub-shrub	E	Known within CPA	Yes
<i>Nyctanassa violacea</i>	Yellow-crowned night heron	Marshes, swamps, lakes, lagoons, and mangroves	T	Known within CPA	Yes
<i>Nycticeius humeralis</i>	Evening bat	Bottomland hardwood forest, wetland scrub-shrub	S	Known within CPA	Yes

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Sorex cinereus</i>	Masked shrew	Mixed mesophytic forest, bottomland hardwood forest, upland scrub- shrub, wetland scrub- shrub	S	Known within CPA	Yes
<i>Phacelia ranunculacea</i>	Blue scorpion-weed	Alluvial and rich slope forests, often associated with loess soils	S	Known within CPA	Yes
<i>Chelone obliqua</i> var. <i>speciosa</i>	Rose turtlehead	Floodplain and alluvial forests, swamps and sloughs	S	Known within CPA	Yes
<i>Bolboschoenus fluvialis</i>	River Bulrush	Shallow water rivers, streams, ponds, wetland scrub-shrub	E	Known within CPA	Yes
<i>Echinodorus berteroi</i>	Burhead	Swamps, ponds, wetland scrub-shrub	T	Known within CPA	Yes
<i>Hydrocotyle ranunculoides</i>	Floating Pennywort	Mucky shores, ditches, sloughs	E	Known within CPA	Yes

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
<i>Nemophila aphylla</i>	Small-flower baby-blue- eyes	Moist, nutrient-rich floodplain forests; mesic woods on loess soils	T	Known from Audubon Park	Yes
<i>Polymnia laevigata</i>	Tennessee Leafcup	Deep loess or alluvial soils in light to dense shade of rich mesic wooded slopes	E	Known within CPA	Yes
<i>Sparganium eurycarpum</i>	Large Bur-reed	Stream and slough margins; shallow water	E	Known within CPA	Yes
<i>Pontederia cordata</i>	Pickerel-weed	Marshes and shallow water, sloughs, open swamps, and oxbow lakes	T	Known within CPA	Yes
	Bottomland Hardwood Forest		S	Known within CPA	Yes
	Bottomland Marsh		T	Known within CPA	Yes

SCIENTIFIC NAME	SPECIES COMMON NAME	PREFERRED HABITAT	STATUS ¹ KENTUCKY	KNOWN OCCURRENCE WITHIN AOI	HABITAT PRESENT KENTUCKY
	Coastal Plain Slough		T	Known within CPA	Yes
<i>Traverella lewisi</i>	A Leptophlebiid Mayfly	Streams	H	Not Recently Documented	Yes