# Draft Compatibility Determination

## for Cooperative Farming, Green River National Wildlife Refuge

## Refuge Use Category

Agriculture, Aquaculture, and Silviculture

## Refuge Use Type

Farming (Cooperative)

## Refuge

Green River National Wildlife Refuge, Established November 19, 2019

## Refuge Purposes and Establishing and Acquisition Authorities

Managed by the U.S. Fish and Wildlife Service (USFWS, Service), Green River National Wildlife Refuge (NWR, refuge) was authorized on September 27, 2019. The first parcels of land were acquired in November 2019, under the NWRS Administration Act of 1966 (NWRSAA), as amended by the NWRS Improvement Act of 1997 (NWRSIA).

The purposes for which Green River NWR was established are listed.

- "... 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) (NWRSAA of 1966, as amended by the NWRSIA of 1997)

Since the Green River NWR was established in 2019, the Service has been actively pursuing the acquisition of additional property for the refuge as outlined in the Land Protection Plan and Environmental Assessment for Green River NWR and Conservation Partnership Area (USFWS 2019). The proposed acquisition areas are outlined in Figure 1. For additional information regarding acquisitions and acquisition priorities, please consult the Land Protection Plan (LPP/CMP, USFWS 2019) and the Refuge Manager. Acquisition of additional properties can occur through various legislative and administrative authorities, creating related secondary purposes for Green River NWR. As additional properties are acquired over time for the refuge, additional secondary purposes would apply to the properties acquired, depending on the authorities used and any special conditions of the acquisition.
Potential secondary purposes for the refuge are listed.

- "…to conserve (A) fish or wildlife which are listed as endangered species or threatened species…or (B) plants…" 16 United States Code (USC) §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 USC §3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)
- "…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds…." 16 USC §715d (Migratory Bird Conservation Act)
- "…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 USC §742f(b)(1) "…for the development, advancement, management, conservation, and protection of fish and wildlife resources…." 16 USC §742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956)
- "…suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 USC §460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" 16 USC §460k-2 (Refuge Recreation Act of 1962)

## National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System, otherwise known as 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 (Public Law 105-57; 111 Statute 1252).

## Description of Use

### Is this an existing use?

Yes

This use has been analyzed and approved through an interim CD during the LPP (USFWS 2019b), but has not been implemented. Upon approval, this compatibility determination (CD) reviews and replaces the 2019 Interim CD for the cooperative farming for Green River NWR (USFWS 2019b). The use was analyzed and approved in

the Environmental Assessment (EA, USFWS 2019a) and the Finding of No Significant Impact (FONSI, USFWS 2019a) for the refuge's Land Protection Plan (LPP/CMP, USFWS 2019b). Tiering a Categorical Exclusion (CatEx) / Environmental Action Statement (EAS) from the 2019 EA (USFWS 2019a) and the 2020 Programmatic Environmental Assessment for Use of Genetically Engineered Agricultural Crops (GECs) for Natural Resource Management on National Wildlife Refuges in the Southeastern United States (GEC PEA) and FONSI (USFWS 2020), the current action would replace the existing Green River NWR Cooperative Farming CD with this CD, once finalized.

The use was evaluated in conjunction with the Service's GEC/PEA/FONSI (USFWS 2020). Under this 2020 decision (USFWS 2020), the Service has the flexibility to consider the use of GECs and non-GECs in rotation, as appropriate and guided by the overall Refuge System purposes; refuge goals and objectives; and other policy, guidance, and decision documents.

## What is the use?

Farming is a habitat management tool used on NWRs in the Southeast Region to provide high-energy food sources for millions of wintering ducks, geese, cranes, swans, and other migratory bird species, to serve landscape-level goals and objectives (e.g., outlined in the North American Waterfowl Management Plan [NAWMP; USFWS and Canadian Wildlife Service 1986], U.S. Department of the Interior [US DOI], Environment Canada [EC], and Environment and Natural Resources Mexico [ENRM] 2018) and refuge management purposes, goals, and objectives (USFWS 2019b). Farming is the practice of agriculture, especially mechanically disturbing the soil and artificially introducing seeds or other plant parts periodically to produce stands of plants, for use primarily as food for wildlife, domestic animals, or humans. This includes water delivery, irrigation, drainage, and mechanical and chemical management to promote desired vegetation and planting of row crops to provide high levels of metabolizable energy (USFWS 2019b).

Cooperative farming on NWRs is a tool whereby agricultural practices are employed with substantial involvement of the Service to supplement natural ecosystem processes to meet Service-desired biological outcomes. Cooperative farming is used on NWRs in situations where the Service cannot otherwise meet its resource management objectives (e.g., through the maintenance, management, or mimicry of natural ecosystems processes or functions). More specifically, cooperative farming is a refuge management economic activity whereby a farmer, under a Cooperative Agriculture Agreement (CAA) with the Service, produces crops (e.g., corn, rice, winter wheat, and milo) on a refuge and, in lieu of a rental payment, leaves an unharvested share of the planted crop for wintering waterfowl and other wildlife species, thereby supporting refuge purposes, goals, and objectives.

The cooperative farmer (Cooperator) is responsible for all equipment, fuel, seed,

fertilizer, approved pesticides, and labor necessary to produce a crop on the NWR. The refuge is responsible for identifying the type(s) and location(s) of crops to be planted, providing the farmer with an approved list of pesticides for use, and identifying the refuge's crop share, which will contribute to refuge management goals and objectives. The amount of crop planted by cooperative farmers varies somewhat from year to year relative to the effects of rainfall and flooding, thus the NWR's share varies from year to year. The unharvested share of the planted crop is often flooded to make it more attractive for wintering waterfowl. As part of the cooperative farming contract, the refuge retains the crops on 25% of the acreage. As Green River NWR expands through land acquisition, cooperative farming would be used to provide food resources for resident and migratory wildlife, primarily waterfowl.

### Is the use a priority public use?

No

### Where would the use be conducted?

The Service established a Conservation Partnership Area (CPA) of approximately 53,000 acres, 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. The 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. Lands would be added to the Refuge System dependent 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. Farmland purchased through future refuge land acquisitions could be added to the cooperative farming program to serve refuge purposes, goals, and objectives. Additionally, the Service may decide to farm less than the total acreage available for cooperative farming within the refuge in any given year due to weather conditions, public recreation purposes, permanent habitat restoration, or to serve other specific refuge management objectives.

### When would the use be conducted?

Cooperative farming activities (e.g., preparing fields, planting crops, harvesting, and planting cover crops) generally occur between April 1 and November 15. Farming

activities on the refuge would depend upon flooding from local rivers, including the Ohio River and Green River. Potential management techniques would include drawdowns, disking, mowing, and planting, which could begin as early as mid-March to as late as the end of July. Preferred seeding dates for the refuge's share of crops are listed.

- Corn: April 15 - June 1
- Soybeans: April 25 - July 1
- Millet: May 1 - August 15
- Milo: May 1 - June 15
- Buckwheat: May 1 - August 15
- Wheat: September 15 – October 30
- Sunflower: April 1 – May 15

The harvest of crops normally begins in September and extends into early November. These dates fit well within the refuge's waterfowl sanctuary period that extends from November 1 to March 31. Providing inviolate sanctuary is a purpose for the refuge. Waterfowl sanctuary, as defined by the Gulf Coast Joint Venture (GCJV) and Lower Mississippi Valley Joint Venture (LMVJV), is "any geographic area that provides at least the minimally required components of waterfowl habitat (i.e., water and a compatible land cover type) that is totally free from hunting and mostly free from other anthropogenic disturbance during the entire conservation planning period" (GCJV and LMVJV 2018); it applies to the sanctuary conditions that occur on the refuge. However, there are times when limited cooperative farming activities occur within the sanctuary period. An example is the occasional delay in harvest due to weather that results in harvesting occurring past the preferred November 1 deadline.

## How would the use be conducted?

The cooperative farming program is a component of the refuge's annual habitat management program, and activities conducted by the cooperative farmers support the accomplishment of refuge goals and objectives as described in the Green River NWR LPP/CMP (USFWS 2019b), as stepped down from NAWMP (USDOI EC ENRM 2018, Hagy et al. 2020), and in accordance Cooperative Agriculture Agreements (CAAs) and Annual Work Plans.

The CAAs can be issued for up to five years; therefore, Annual Work Plans are established with each Cooperator prior to each planting season. The CAAs outline the general farming plan for the length of the agreement with the details to be determined in the Annual Work Plans. These details include any area needed to be withheld from farming for management actions (e.g., for invasive species management, restoration, or levee repair), as well as rent share, crops to be planted, location and acres of each crop, location of moist-soil and emergent marsh areas, and approved pesticides. The Service takes its shares as corn or winter wheat or specifically designates a crop, such as milo, millet, and/or other crop, and acres to be

taken as rent shares. Cooperators must comply with the CAAs and Annual Work Plans. The terms of the agreement ensure that all current Service and refuge-specific guidelines and restrictions are followed. Cooperator selection and associated determination of cost or shares follow relevant national Service policy, notably 620 FW 2 Cooperative Agricultural Use (USFWS 2017), and Southeast Region-specific guidance for farming, as well as other applicable laws and policies.
Cooperators are responsible for all equipment, fuel, seed, fertilizer, chemicals, and labor necessary to produce the crop. They are required to perform soil tests to determine nutrient needs (fertilizer and lime applications) according to the local agriculture extension service. Cooperators may use a variety of farming and conservation practices (e.g., till, no-till, and organic) recommended by the North University of Kentucky Cooperative Extension Service and Natural Resources Conservation Service, U.S. Department of Agriculture, as they pertain to land use and the culture of the various crops being grown on the refuge. These practices will be approved in advance by the Service during the development of the Annual Work Plan.

Inputs typically associated with crop production include fertilizer (e.g., synthetic fertilizers, and composts containing nitrogen, phosphorus, and potassium), pesticides (e.g., insecticides, herbicides, fungicides; Olson and Sander 1988, Hoeft et al. 2000, McLeod and Studebaker 2006), and irrigation or water management. Pesticide use for habitat management and invasive and nuisance species control is part of the Green River NWR EA (USFWS 2019a) and LPP/CMP/FONSI (USFWS 2019b).

Pesticide use by the refuge's cooperative farmers generally include pre-planting burndown in conservation tillage operations, pre-emergence treatments to prevent dormant pests from becoming established, and post-emergence treatments to control existing pests that exceed economic threshold levels.

Recently, the Service clarified four tiers of analysis to support NEPA compliance related to the use of pesticides on units of the Refuge System to support refuge purposes, goals, and objectives, as listed.

- Pesticide-specific analysis by the U.S. Environmental Protection Agency (EPA)
- Pesticide-specific analysis through the Service's Pesticide Use Proposal (PUP) System
- General pesticide analysis for a specific refuge, group of refuges, or refuge complex through an EA/FONSI or Environmental Impact Statement/Record of Decision (ROD)
- General pesticide analysis through a periodic EAS that documents the pesticide use/treatment planned for a specific refuge, group of refuges, or refuge complex

The Service only permits the use of EPA-registered pesticides to control crop pests, in conjunction with other control measures as needed, to protect crops and enhance production to meet economic thresholds for cooperative farmers. All pesticides

distributed or sold in the United States must be registered (licensed) by EPA. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 7 USC §136 et seq.) provides for federal regulation of pesticide distribution, sale, and use. Application of pesticides must follow the Department of Interior's Pesticide Use Policy (517 DM 1, US DOI 2007) and the Service's Integrated Pest Management Policy (569 FW 1, USFWS 2010). The Service also conducts annual analysis of pesticide usage through the Service's PUP System and approves only those PUPs that will not have undue negative impacts to non-target plants, fish, and wildlife resources under the proposed application methods. Intra-Service Section 7 Endangered Species Act Biological Evaluations are also completed on the application of all pesticides in coordination with preparing and submitting the PUPs. Best Management Practices (BMPs) are also used, in addition to label restrictions imposed by EPA, to reduce the chances of any negative effects to non-target species, including to bats, pollinators, and threatened and endangered species. Example BMPs include a minimum buffer distance to water and restriction of a pesticide to one application per field. Pesticides are generally used on Service farmland due to expected pest densities and/or when pest densities reach economic threshold levels. A list of pesticides and associated BMPs approved for use through the PUP process for that calendar year must be attached to the Annual Work Plan for Green River NWR. In almost all cases, Service pesticide use restrictions are more restrictive than the EPA-registered pesticide label restrictions. Any Service use of pesticides is to help the Service support refuge purposes, goals, and objectives. A list of pesticides approved by the Service for use on the refuge through the PUP System will be provided each year to the cooperative farmers. The above-listed tiers related to pesticide analysis and use have been satisfied at Green River NWR.

In June 2020, the Service issued a decision to allow the use of GECs on NWRs in Department of the Interior Regions 2 and 4 for natural resource management in agricultural practices to cultivate supplemental foods for wildlife, manage invasive species, and provide opportunities for wildlife-dependent public recreation, such as wildlife observation (USFWS 2020). The use of GECs will be part of an Integrated Pest Management (IPM) approach to manage pests, weeds, and invasive species that combines biological, cultural, physical/mechanical, and chemical tools in a way that minimizes economic, health, and environmental risks (USFWS 2020). Integrated Pest Management combines pest, weed, and invasive species biology, environmental information, and available technology to prevent unacceptable levels of damage through the most economical means, while posing the least possible risk to people, property, resources, and the environment. The underlying philosophy of IPM is that pest, weed, and invasive species control is most effective when a range of measures is deployed in a manner that diminishes the likelihood that the pest, weed or invasive species will become resistant to the measures. Integrated Pest Management allows the use of a system to combat weeds and pests that minimizes the use of pesticides; increases conservation practices; and strives to decrease any effects to air, water, or soil quality. The integration and use of GECs with other IPM practices allow the

Service to be more effective in supporting refuge purposes, goals, and objectives. Genetically Engineered Crops and non-GECs could be used in rotation, as appropriate and guided by the overall NWR purposes; refuge management goals and objectives; and other policies, guidance, and decision documents.

The Southeast Region uses a tiered analysis to determine whether a GEC can be used on an NWR based on the following:

1. U.S. Department of Agriculture, Animal and Plant Health Inspection Service's specific NEPA analysis and de-regulation or exemption of the GEC;
2. The Southeast Region's programmatic NEPA analysis of GEC use (GEC PEA, USFWS 2020);
3. NEPA analysis of farming on the Green River NWR through the CCP and HMP (USFWS 2011b and 2013) and GEC use (see the CatEx/EAS for this CD); and
4. Analysis of related essentialness of GEC use is currently be evaluated for Green River NWR. (601 FW 3, USFWS 2006).

The GEC/PEA/FONSI concluded that the use of GECs, as analyzed, presented no significant impacts to the physical, biological, and socio-cultural environments (USFWS 2020). Including the use of GECs to help support refuge purposes, goals, and objectives, this Cooperative Farming CD/CatEx/EAS (third tier above) tiers from the GEC/PEA/FONSI (USFWS 2020, second tier above), the EA (USFWS 2019a) and LPP/CMP/FONSI (USFWS 2019b, third tier above) for Green River NWR. The fourth tier of analysis from above will only occur for GEC use on a NWR that has met the first three tiers. The fourth tier of analysis related to GEC use is concurrently being evaluated in conjunction with this CD at Green River NWR.

## Why is this use being proposed or reevaluated?

The cooperative farming use has not occurred on Green River NWR. The Service requires the re-evaluation of uses of NWRs to ensure that they continue to meet compatibility requirements [see 603 FW 2] when new information becomes available. As outlined above, the use was evaluated and determined compatible in the 2019 EA (USFWS 2019a) and LPP/CMP/FONSI (USFWS 2019b. In light of the Service's 2020 decision to provide refuges the flexibility to use both non-GEC and GEC crops to support refuge purposes, goals, and objectives (USFWS 2020), the Service is conducting a re-evaluation of the use on Green River NWR in 2022.

At Green River NWR, the cooperative farming use will support refuge purposes, refuge management goals and objectives expressed in the LPP/CMP (USFWS 2019b), and landscape-level goals and objectives (particularly the NAWMP, USDOI EC ENRM 2018, LMVJV 2015, Hagy et al. 2020). The key refuge management goals and objectives supported by the use are LPP/CMP Goal 1. Protect, Restore, and Manage Habitats for Fish and Wildlife: The Green River NWR would restore, manage, and conserve bottomland hardwoods, adjacent upland habitats, and plant and animal species associated with these communities. The 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. (USFWS 2019b).

Cooperative farming is used on NWRs is to ensure that waterfowl can satisfy 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 Green 1998). Thus, availability of high-quality foraging habitat on the wintering grounds, especially in disturbance-free areas (i.e., sanctuaries), is positively related to the reproductive output of waterfowl during breeding season. The use of agricultural crops as a waterfowl habitat management technique is well documented (Bellrose 1980; Baldassarre and Bolen 1984; Delnicki and Reinecke 1986; Reinecke et al. 1989; Ringelman 1990; Combs and Fredrickson 1996; Heitmeyer 2006).

Concern over waterfowl population declines in the 1980s resulted in the establishment of NAWMP, which focused the attention of federal, state, and private conservation groups on important wintering and breeding areas. Waterfowl habitat in the southeastern United States is of paramount importance since 50% of the continental waterfowl population annually winters in this region (unpublished data, Mark Koenff, USFWS). During Midwinter Waterfowl Surveys in the southeastern United States, approximately 68% of waterfowl counted are in southern portions of the Mississippi and Atlantic flyways, totaling almost 9 million individuals annually (unpublished date, Heath Hagy, Wildlife Biologist, USFWS).

Waterfowl habitats are ranked with a value that describes the amount of energy they provide in food resources, known as waterfowl-energy days (WEDs). The Service has recently revised waterfowl objectives for all refuges in the Southeast where migrating and wintering waterfowl are priority resources of concern, using a method developed by Hagy et al. (2020) to step down NAWMP continental waterfowl population goals to the refuge level (see Table 2) which were further refined by in 2022 (personal communication, Heath Hagy, Waterfowl Ecologist, USFWS Southeast Region). These objectives will be incorporated, as appropriate, into waterfowl management on Green River NWR.

Table 2. Green River National Wildlife Refuge Revised Waterfowl Objectives

| | Dabbling Duck | Diving Duck | Goose | Swan | Crane | Total Revised Objective |
|---|---|---|---|---|---|---|
| Population Objectives | 50,274 | 3,451 | 8,458 | 23 | 8 | 62,214 |
| Waterfowl Energy Days | 3,604,409 | 183,845 | 1,428,491 | 0 | 0 | 5,216,746 |

Complying with applicable laws and policies, this use is a long-standing practice on NWRs, is defined by the Service's Cooperative Agricultural Use policy (620 FW 2, USFWS 2017), and aligns with 50 CFR §§29.1-29.2 (2000) which addresses economic uses and cooperative land management. Other key policies include 601 FW 3 Service Biological Integrity, Diversity, and Environmental Health (USFWS 2006); 569 FW 1 Service Integrated Pest Management (USFWS 2010); and 517 DM 1 DOI Pesticide Use Policy (US DOI 2007).

The refuge is unable to meet the stepped down NAWMP landscape waterfowl objectives solely on native plant communities due to an insufficient land base and the lack of suitable moist-soil conditions. The refuge would need a minimum of 2,400 acres of high quality moist-soil to provide the minimum amount of WEDs, whereas only 168 acres of corn could provide the minimum amount of WEDs. For context, unharvested corn typically provides 16 times more energy than managed moist-soil wetlands, and 142 times more energy than bottomland hardwood forest (LMVJV 2015; personal communication, 2022, Heath Hagy, Waterfowl Ecologist, USFWS Southeast Region). In addition, current waterfowl populations could not be sustained throughout the winter on the limited amount of native foods the refuge would be able to produce in a given year, therefore supplemental agriculture grains are necessary to meet established objectives. Achieving this additional 2,400 acres would necessitate acquiring suitable habitat off the refuge, a substantial increase in infrastructure, additional personnel, companion control of invasive species, and additional funding for pumping to manage water levels.

In summary, the refuge does not have sufficient staff, equipment, or land area necessary to manage and maintain the acreage needed to meet its waterfowl WED objectives without the assistance of the cooperative farming program. From a practical standpoint, as past management has shown and current research and professional judgement support, the optimum means to achieve refuge and landscape goals and objectives related to migratory bird support is through cooperative farming along with moist-soil unit production. The use of cooperative farming on the refuge is the most cost-effective and nutritionally effective strategy per area to attempt to meet waterfowl WED objectives under NAWMP. It is a necessary component of the overall managed wintering waterfowl habitats on the refuge in order to contribute to the nutritional needs of waterfowl during a period of physiologic and metabolic stress.

The primary method used on the refuge to attempt to produce sufficient food resources for wintering waterfowl is cooperative farming; however, other habitat management practices are important to complement the energy-rich foods produced through cooperative farming. Other practices used on the refuge to meet step-down wintering waterfowl habitat objectives under the NAWMP include silvicultural management of bottomland hardwood forests to produce a variety and abundance of suitable hard mast in forests subject to flooding; moist-soil management, which yields abundant natural plants that provide protein-rich seeds, vegetative forage, and hosts

of invertebrates upon which waterfowl feed; and refuge-planted crops that remain unharvested (e.g., millets and milo). Hundreds of acres of naturally occurring and managed moist-soil and forested wetlands, as well as open water, are present on the refuge. These acres of natural food and open water, in conjunction with crops produced by cooperative farming, allow the refuge to best mimic the preferred composition of habitats for wintering waterfowl. In order to provide these WEDs and fulfill refuge purposes, goals, and objectives, cooperative farming operations will be conducted as described above, following all relevant U.S. Department of the Interior and Service policies and stipulations to ensure compatibility. Furthermore, any lands acquired in the future will be evaluated regarding the suitability and feasibility of being incorporated into the cooperative farming program on the refuge.

## Availability of Resources

The analysis of cost for administering and managing the use will only include the incremental increase above general operational costs that we can show as being directly caused by the proposed use. The staff time needed for the development and administration of the cooperative farming program is already committed and available to support the program under current staffing. Most of the needed work to prepare for this use would continue to be done as part of routine habitat management duties of existing staff. Details regarding staff duties and time requirements were specified in the refuge's LPP/CMP and are summarized below.

Refuge staff is responsible for drafting each CAA, Annual Work Plan, and necessary PUPs and Pesticide Use Reports. Administration of the cooperative farming program consists of approximately 75 staff days or approximately 5 to 10 percent of refuge staff time devoted to administering this activity. Table 3 outlines the Service's costs to administer and manage the cooperative farming use at Green River NWR; the cooperative farmers' costs are not included in this analysis or in Table 3.

**Table 3. Costs to Administer and Manage Cooperative Farming at Green River National Wildlife Refuge**

| Category and Itemization | One-time Cost | Recurring Annual Expenses |
|---|---|---|
| Develop and update plan/CD/NEPA/PUPs documents | $2,970 | -- |
| Staff time (LE, administration and management) | -- | $9,440 |
| Monitoring | -- | $5,945 |
| **Total one-time expenses** | **$2,970** | **--** |

| Category and Itemization | One-time Cost | Recurring Annual Expenses |
|---|---|---|
| Total recurring annual expenses | | $15,385 |
| Total expenses | $2,970 | $15,385 |

The bulk of the annual costs associated with the use support law enforcement, administration and management, and monitoring. While no offsetting revenues are associated with the use, in accordance with the CAA, the cooperative farmer leaves an unharvested share of the crops for the benefit of wildlife to serve refuge purposes, goals, and objectives. Existing refuge resources are adequate to administer the use properly and safely.

## Anticipated Impacts of the Use

### Potential impacts of a proposed use on the refuge's purposes and the Refuge System mission

Multiple NEPA analysis and decision documents address the direct, indirect, short-term, long-term, and cumulative impacts associated with cooperative farming on Green River NWR, as listed.

- 201p Green River NWR EA and LPP/CMP/FONSI/Endangered Species Act Section 7 Biological Evaluation (USFWS 2019a, 2019b)
- The Service's GEC/PEA/FONSI (USFWS 2020) described and analyzed the use of GECs on refuges within U.S. Department of the Interior (Interior) Unified Regions 2 and 4 (IR2&4), which included Green River NWR.
    - The GEC PEA provides a thorough evaluation and analysis of the use of GECs on stated NWRs in IR2&4 in order to meet wildlife management objectives and achieve the specific goals and objectives outlined in a NWR's CCP and/or HMP and other national and international conservation initiatives, including the NAWMP (USDOI EC ENRM 2018, Hagy et al. 2020).
    - In addition, the GEC PEA also evaluates policies governing these uses on NWRs, such as the Service's Biological Integrity, Diversity, and Environmental Health Policy (601 FW 3, USFWS 2006), Interior's Pesticide Use Policy (517 DM 1, US DOI 2007), and the Service's Integrated Pest Management Policy (569 FW 1, USFWS 2010).
- The NAWMP provides continental waterfowl population objectives (USDOI EC ENRM 2018), which have been stepped down to NWRs in IR2&4 and expressed as waterfowl energy day (WED) objectives (Hagy et al. 2020).
- Annual Green River NWR PUPs and Endangered Species Act Section 7s

- Regular pesticide NEPA tiers of analysis

The analyses of impacts associated with the cooperative farming use from these documents are incorporated herein by reference; only summary impacts are provided here. As outlined above, the use was previously analyzed, found to not have significant impacts, and found compatible. Environmental conditions and the use have not changed substantially since the use was evaluated and approved.

The effects and impacts of cooperative farming on refuge resources, whether adverse or beneficial, are those that are reasonably foreseeable and have a reasonably close causal relationship to the use. Adapting to changing conditions, the Refuge Manager may, at any time, modify or eliminate the use to address resource concerns, unacceptable impacts, or public safety needs.

## Short-term impacts

As outlined above, previous analyses found no significant beneficial or adverse short-term impacts of the use.

### *Physical and Biological Resources*

Potential physical and biological resource impacts include geology and soils, air quality, water quality, floodplains, wildlife and aquatic species, threatened and endangered species, and habitat and vegetation (including vegetation of special management concern).

Short-term impacts from cooperative farming operations include soil disturbance by disking and the loss of standing cover of weed species by mowing, disking, and herbicide application. Loss of residual cover can cause soil run-off and soil compaction (USFWS 2020). Other short-term impacts are temporary disturbance from traffic and mortality to small animals and birds from machinery (Erb and Jones 2011, Tewes et al. 2013, Deak et al. 2021). Sown crops quickly cover the soil disturbed by tillage, and the crops produced supplement natural habitats. Winter wheat is often sown into harvested soybean fields, which minimizes soil disturbance. Cooperators will be encouraged to consider all farming conservation practices (e.g., rotating crops, cover crops, no-till, and organic) as practical and in consultation with the University of Kentucky Cooperative Extension Service. Other farming practices include applications of nutrients and pesticides that enhance crop production but could cause nonpoint source pollution if BMPs are not used. Cooperators work with University of Kentucky Cooperative Extension Service to implement nutrient management practices to prevent run-off or percolation.

Field preparation and planting by their very natures cause both beneficial and adverse short-term wildlife impacts. Spring disking alters the wildlife use pattern by temporarily displacing small fauna until vegetative covers regenerate. Wildlife observation is affected negatively by the absence of wildlife early in the farming season but is positively impacted as the season progresses by attracting deer, Canada

geese, and other wildlife as crops germinate and mature. Productive row crops improve hunting opportunities by providing feeding areas for deer and turkey.

Possible negative impacts of concern are those associated with the use of pesticides in farming operations. If used outside the guidelines prescribed by EPA and pesticide manufacturers and DOI and Service policies, pesticide use in crop production could have a variety of direct or indirect effects on wild plants and animals. Cooperative farmers follow the EPA label, Integrated Pest Management Plan, and BMPs. Pest species economic threshold levels, as determined by the Agriculture Extension Service, must be achieved prior to pesticide applications. During application, care must be taken to apply the product only in the target area. Pesticides need to be applied when wind conditions do not facilitate drift to non-target plants or animals. Pesticides need to be applied in the quantities and under weather conditions that do not promote runoff. To prevent pesticide runoff from entering surface waters, a minimum of a 50-foot buffer is required around standing water. Virtually all unintended plant impacts are short term.

Pesticide use is regulated to reduce the chances of any negative effects on non-target species, including pollinators and threatened and endangered species. A list of pesticides, approved through the Service's PUP System, are supplied to the Cooperators along with BMPs, such as no-tillage, crop rotations, pesticide spraying rotations, and establishing pesticide no spray buffer distances to surface water are used in all farming practices (above and beyond EPA required buffer distances). Cooperators will be encouraged to first assess pest problems and consider mechanical and cultural techniques prior to the application of chemical techniques to control pests. The minimum effective volume of pesticide will be applied, in accordance with label directions and BMPs to minimize drift, runoff, and percolation of pesticides into the environment.

Green River NWR also completes Intra—Service Section 7 Biological Evaluations. Currently the federally-listed species on which the refuge consults include 3 species of bats, 15 species of mussels, monarch butterfly (*Danaus plexippus*), Price's Potato-bean (*Apios priceana*), and alligator snapping turtle (*Macrochelys temminckii*). Northern long-eared bat (*Myotis septentrionalis*), Gray Myotis (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*) have not been documented to occur on Green River NWR, however as land acquisition continues, these species are expected to be documented on the refuge. With respect to potential contact injury, there is little potential for direct or indirect harm to Indiana bats, Northern long-eared bats, or gray bats, as a result of treatment, since these species do not actively forage on crops. Additionally, all label restrictions will be followed; therefore, these species are not expected to come into contact with these GECs in an indirect manner, such as through their prey insects. Since these species are not expected to be actively foraging during daylight hours when pesticide spraying would occur, there is little direct or indirect harm from contact injury. Additionally, these species are not expected to come into contact with these chemicals in an indirect manner, such as

through their prey, night-flying insects. Pesticides will not be applied when these insects are most active. None of the listed mussel species have been documented to occur on the refuge. However, they have been documented downstream of the of Green River NWR and in the Ohio River. As land acquisition continues, the refuge would anticipate reforesting many acres which are currently in agriculture, therefore, the impacts from the application of GECs, pesticides, insecticides and/or fungicides would be expected to decrease for threatened and endangered mussels.

The alligator snapping turtle has not been documented in Henderson County, KY where Green River NWR is located, according to the Kentucky Department of Fish and Wildlife Resources County observation lists. Price's Potato-bean has not been documented on the refuge. Monarch butterflies are present on Green River NWR. With respect to potential contact injury, there is little potential for direct or indirect harm. Monarch butterflies primarily use wildflower nectar for food and lay eggs exclusively on milkweed. Applications restrictions for buffers and wind reduce the chance for pesticide/herbicides to drift into habitat used by monarch butterflies. When used in areas where monarchs could potentially be affected, the arrival of monarchs and their lifecycle are considered in the timing of application. Additionally, chemical applications in these areas will be to promote plants favored by monarchs. Given that all treatments and pesticides would continue to follow EPA and Service reviews, requirements, and restrictions and would include extensive buffers and other BMPs to minimize any adverse impacts, the use of GECs and pesticides will continue to not likely have an adverse effect on these species.

Cooperative farming does have beneficial impacts. Cooperative farming can help control invasive species, maintain early succession vegetation communities, support local economies, maintain conditions suitable for planned future restoration activities and demonstrate good land stewardship practices.

Croplands will provide enhanced opportunities for other priority public uses such as hunting and wildlife observation. The waterfowl management units and moist soil units, once developed, will provide energy dense foods and habitat for wintering and migrating waterfowl and shorebirds. Additionally, as water is removed from the waterfowl management units, many fish are trapped, providing additional food sources for wading birds, raptors, and even resident predators such as the raccoon (*Procyon lotor*). Numerous raptors, including bald eagles *(Haliaeetus leucocephalus*), soar over fields hunting for small mammals as they feed on residual crops. Both residual crops and newly planted crops would provide food/browse for local wildlife species. Field edges and buffer strips would provide shelter and nesting areas for songbirds and small mammals.

### *Socioeconomic and Cultural Resources*

As outlined above, previous analyses found no significant beneficial or adverse short-term impacts of the use, including to socioeconomic and cultural resources, including Environmental Justice.

Maintaining cooperative farming partnerships is an economical way in which the refuge can achieve wildlife and habitat objectives. The refuge's purposes, goals, and objectives must be the priority over any concern for economic gain; however, profitability is essential to the sustainability of cooperative farming as a management tool. Advancements in seed technology and pesticide use have resulted in a more sustainable agriculture system that is producing greater yields per unit area. This growth in yield is essential with the ever-increasing demands influencing land uses. For cooperative farming to remain a profitable and viable management tool on NWRs, we must use the best available tools and technology, while at the same time protecting and prioritizing environmental resources.

### *Other Impacts*

As outlined above, previous analyses found no significant beneficial or adverse short-term impacts of the use, including to other impact topics, including visitor use and experience and refuge management and operations.

## Long-term impacts

As outlined above, previous analyses found no significant beneficial or adverse long-term or cumulative impacts of the use.

### *Physical and Biological Resources*

Farming practices on NWRs that could potentially impact soil, water quality, air quality, and climate change are tillage, agricultural inputs (fertilizers and pesticides), and irrigation. As part of an IPM approach, GECs would reduce the quantity and types of pesticides needed and increase the use of conservation tillage. Positive impacts of GEC use to help control weeds and invasive species include stabilizing conservation tillage practices, which would enhance biodiversity due to decreases in runoff and erosion (Carpenter 2011). Furthermore, the use of associated BMPs with GECs could protect water resources and protect biodiversity.

Both current and proposed management actions provide the benefit of supplemental forage for migratory waterfowl within the Mississippi and Atlantic flyways. Refuge farming practices are designed for the predominant benefit of waterfowl (ducks, cranes, and geese). However, many other species benefit directly or indirectly from refuge crops, including shorebirds, songbirds, raptors, other migratory birds, resident wildlife, and invertebrates. 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 have learned to capitalize on the abundant foods produced by agriculture (Bellrose 1980). 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). Foods that are high in

carbohydrates, such as corn, millet, and milo, provide energy wintering ducks need to arrive on the breeding grounds in good condition (Ringelman 1990; Petrie et al. 1998; Checkett et al. 2002; Kaminski et al. 2003).

### *Socioeconomic and Cultural Resources*

The use of GECs on NWRs allows for sustained partnerships with local cooperative farmers, which in turn bolster local economies, provide an economically efficient means of natural resource management, and enable refuges to accomplish a broad assortment of wildlife management objectives. GEC use also gives cooperative farmers greater latitude in addressing pest issues in accordance with the Service's IPM Policy through reductions in chemical applications, labor and machinery costs, and carbon footprints (T. Smith, personal communication). The use of GECs also optimizes crop yields that increase and sustain the economic feasibility of cooperative farming. Economic impacts are a particularly sensitive issue in that cooperative farming must be economically feasible to the Cooperator. Restrictions on farming tools, such as restricting the use of GECs, discourage local farmers from entering cooperative agreements with refuges. Klumper and Qaim (2014) consolidated the evidence of the economic impacts of GEC use through a meta-analysis of 147 studies and found a reduction of pesticide cost by 39%, an increase in crop yields by 21%, and an increase in farmers' overall economic gain by 69% compared to non-GEC use. As outlined above, previous analyses found no significant long-term or cumulative impacts of the use, including to socioeconomic and cultural resources, including Environmental Justice.

### *Other Impacts*

From a "wildlife first" perspective as well as in conjunction with an IPM system, cooperative farming would allow Green River NWR to maximize yields to meet objectives for waterfowl stepped down from NAWMP and other planning documents, minimize chemical use on refuge lands and exposure to species using these lands, and minimize staff time associated with pest scouting in agricultural practices. Plant and wildlife diversity would remain a top priority in establishing BMPs for refuges. As outlined above, previous analyses found no significant long-term or cumulative impacts of the use, including to other impact topics, including visitor use and experience and refuge management and operations.

## Public Review and Comment

Robust public outreach and coordination with Native American Tribes and other Federal agencies, state agencies, and local governments was conducted during the development of the refuge EA and LPP/CMP/FONSI, which included cooperative farming (USFWS 2019a, 2019b). For more information regarding public involvement for the LPP/CMP, please see the final LPP/CMP (USFWS 2019b). The Service also conducted public involvement for the GEC/PEA; for more information regarding

consultation and coordination for this process, see Appendix F in the GEC PEA (USFWS 2020).

Building on the previous efforts to a refuge in this area and outreach, the draft LPP/CMP/EA/CD was made available for public review and comment for 38 days. The public was made aware of this comment opportunity through newspapers, radio, postings at local libraries and post office, and public meetings. A hard copy of this document was made available for review at the Greens River NWR Headquarters, 91 US HWY 641 N, Benton, KY 42025. Building on the previous outreach, an additional public comment period will be conducted for this specific draft CD. The draft CD will be made available for public review and comment for 30 days. The public will be made aware of this comment opportunity through newspapers, radio, postings at local libraries and post office, the refuge's website (https://www.fws.gov/refuge/Greens-river), and the Greens River NWR Facebook page (https://www.facebook.com/Greens.river). A hard copy of this document will be made available for review at the Clarks River NWR Headquarters, 91 US HWY 641 N, Benton, KY 42025. Please let us know if you need the documents in an alternative format. All comments submitted during the public review and comment period will be reviewed. Substantive concerns expressed during the public review and comment period will be considered in the development of the final CD.

## Determination

### Is the use compatible?

Yes

## Stipulations Necessary to Ensure Compatibility

Beyond the laws, policies, and processes referenced above, the cooperative farming program is regulated through cooperative farming agreements and addendums that specify the fields, crops to be grown, acceptable farming practices, approved pesticides and use procedures, and other conditions and restrictions. Failure of the Cooperator to comply with the terms and provisions of the CAA, Annual Work Plan or any addendums can result in the termination of the CAA, Annual Work Plan and/or addendums. In order to ensure that the use continues to remain compatible and serve refuge management goals and objectives at Green River NWR, the listed conditions must be followed.

1. The Cooperator (cooperative farmer) has agreed to a 75%/25% share-split farming agreement. The cooperative farmer has agreed that no advance Farm Service Agency (FSA) subsidy payments for refuge lands can be accepted until the Refuge Manager and/or his designee has signed/dated and released this payment to the Cooperator. The refuge is responsible for notifying the local FSA offices that they will be releasing the subsidy payments, not the

Cooperator. The release of payments will not be allowed by the refuge until after the official annual renewal of the refuge farming agreement is approved by the refuge. However, if no problems arise, the refuge will release the subsidy payments prior to the FSA official deadline. The refuge cannot accept FSA subsidy payments and are to instruct the FSA offices to return the refuge portion of the payments back to the FSA Farm Bill Treasury. The refuge is to provide the local FSA offices with a copy of the annual farming agreements/addendums for each crop year. The refuge will be responsible for reporting all crops acreages to FSA for determining base acres.

2. The cooperative farmer may begin farming operations on April 1. Farm field access after October 15 will be limited to that necessary to remove equipment or other necessary trips. The cooperative farmer must obtain prior approval before accessing refuge property for farming operations after this deadline.
3. The Cooperator will participate in FSA programs to extent possible to protect crop bases. Final certification and submission to FSA will be by the Refuge Manager.
4. Post emergent pesticides will not be used unless crop scouting indicates pest density is at or beyond the economic threshold level.
5. The Cooperator(s) will not be permitted to use any herbicide or insecticide that is not on the Green River NWR list of approved pesticides.
6. The Cooperator(s) shall notify Green River NWR at least thirty-six (36) hours in advance of any proposed application of fertilizer, herbicide, or insecticide should refuge staff want to conduct a site visit.
7. The Cooperator(s) shall comply with all product label instructions on all pesticides and fertilizers used.
8. Land alterations including but not limited to, ditching, land leveling, filling, clearing and mowing will be done only upon written approval by the Refuge Manager.
9. The refuge's share of the crop will be left in the field. The refuge will receive ¼ of the total acres planted by the Cooperator on refuge lands. The location of the government's share identified above can be changed at any time prior to harvest should the refuge's priorities change or like treatment of crops appear not to have occurred. It is the Cooperators responsibility to make contact with the refuge prior to harvest so the final location of refuge crops identified to the Cooperator. The Cooperator will keep accurate records of pesticide applications and furnish a written copy to the Refuge Manager by December 1.
10. The Cooperator(s) must meet Kentucky Department of Agriculture requirements for Pesticide Applicator Certification.
11. All Pesticide use will be documented (chemical, application dates, number of

applications, quantities per application per acre) and reported in writing to the Refuge Manager by December 1.

12. All refuge share crop fields and Cooperator harvested fields will be left standing and not manipulated in any way, unless specifically directed to do so by the Refuge Manager.
13. Firearms are not permitted on the refuge and will not be used as a scare device. All refuge-specific regulations within the current year hunting and fishing brochure also apply.
14. Cooperator(s) will not permit the draining or dumping of any materials on Green River NWR and will remove such materials from the refuge at the end of the day.
15. The acreage figures in the contract are estimates and it is the Cooperators responsibility to verify field acreage and report accurate field acreage to FSA. The Refuge Manager will also verify field acreage and report to FSA.
16. No fall disking is allowed without prior approval from Refuge Manager. Any acreage disked in the fall will require a winter cover crop.
17. No burning is allowed on refuge property.
18. No ground will be tilled within 150 feet of the River. Filter Strips will be created in maintained by the Cooperator along all drainages. A minimum of 75' will remain untilled (after filter strips are established) along any "blue line" ditch, creek or major drainage. These can be mowed at the discretion of the Cooperator (every other year is recommended) after July 15th. Along any minor field drainage, a width of 30' from the drainage will remain untilled and can be mowed at the discretion of the Cooperator after July 15th. Only mowing of filter strips will be permitted without prior approval of the Refuge Manager.
19. Soil tests will be conducted on a routine basis (3 years recommended). It is the Cooperators responsibility to provide the Refuge Manager with soil test results for each field farmed and apply the necessary nutrients as recommended. Restoring soil deficiencies is a part of our land stewardship responsibilities and is a good farm practice that should be maintained.
20. The Service reserves the right to cease farming on any land owned or managed by the Service after the expiration of the permit due to changes in management objectives or failure of the Cooperator to comply with the conditions outlined in the permit or discussed during annual operations.
21. Cooperative farmer will work with Refuge Manager to ensure specific seed types, seed treatments, and pesticides are coordinated prior to planting. Seeds treated with neonicotinoids are prohibited from use.
22. Failure to comply with these special conditions will result in the Cooperator's loss of farming privileges for the next farming season.

## Justification

While the cooperative farming use is not a priority public use as outlined in the Refuge System Improvement Act of 1997, it is an important wildlife habitat management tool and a long-standing proven resource management tool that serves refuge purposes and supports landscape-level and refuge management goals and objectives. Based on past and current research, long time management of Green River NWR, and best professional judgement, cooperative farming is the most feasible option for meeting revised refuge management goals and objectives. Further, through the concentration of wildlife on and around the cooperative farming areas, the use supports priority public uses on the refuge, including hunting, wildlife observation, and photography. The use was previously analyzed and approved in the refuge's EA and LPP/CMP/FONSI (USFWS 2019a, 2019b).

Cooperative farming is an effective, cost-efficient habitat management method for the refuge to support wintering waterfowl populations in fulfillment of refuge purposes. Moreover, an abundance of wintering waterfowl on the refuge provides opportunities for hunting, wildlife observation, and photography.

As outlined in this CD and in accordance with the stipulations outlined above, based on best professional judgement and available science, the Service has determined that continuation of the cooperative farming use at Green River NWR will not materially detract from or interfere with the fulfillment of the National Wildlife Refuge System mission or the purposes of the refuge; will contribute to the National Wildlife Refuge System mission and refuge purposes, meeting the standard or threshold established in 50 CFR §29.1 (2000) for economic uses of NWRs; satisfies the four tiers of analysis for the use of pesticides; satisfies the four tiers of analysis for the use of GECs; and will not conflict with the national policy to maintain the biological integrity, diversity, and environmental health of the refuge.

## Signature of Determination

Refuge Manager Signature and Date

## Signature of Concurrence

Assistant Regional Director Signature and Date

## Mandatory Reevaluation Date

Delete this text and insert year for reevaluation

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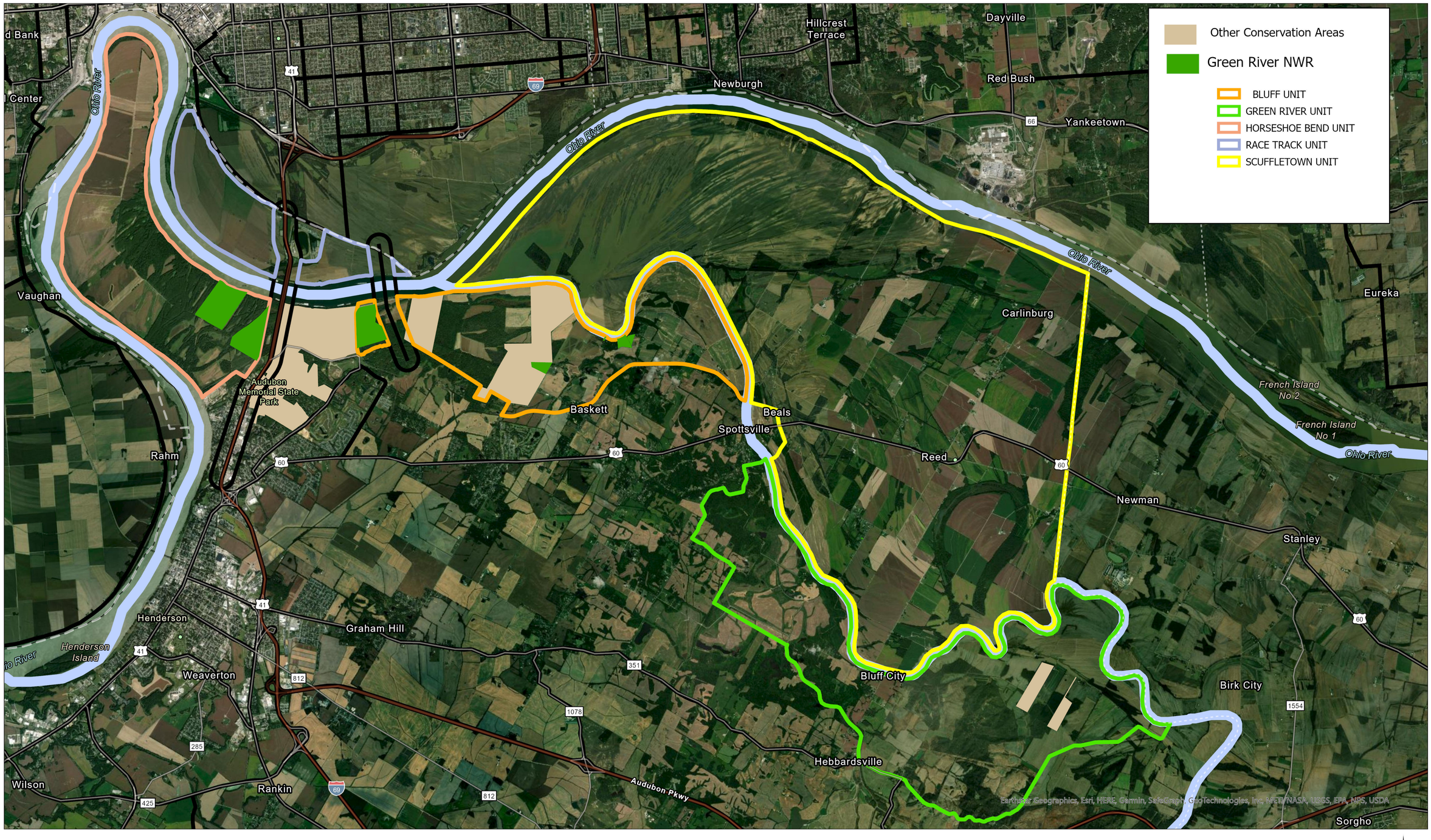
# Figure(s)

U.S. Fish & Wildlife Service

# Green River National Wildlife Refuge




Produced by Kimberly Sykes
Green River NWR
Produced: August 10, 2022
Basemap: ESRI World Topographic Map
File: C-Size_Landscape_HunUnits.aprx

1:75,000
0 2 Miles
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