Draft Compatibility Determination

For Environmental Education and Interpretation at Red River NWR

Refuge Use Category

Environmental Education and Interpretation

Refuge Use Type(s)

Environmental Education and Interpretation

Refuge

Red River National Wildlife Refuge (NWR or refuge)

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

"The purposes of Red River NWR are the following: (1) To provide for the restoration and conservation of native plants and animal communities on suitable sites in the Red River basin, including restoration of extirpated species. (2) To provide habitat for migratory birds. (3) To provide technical assistance to private landowners in the restoration of their lands for the benefit of fish and wildlife." The Red River National Wildlife Refuge Act (Public Law 106-300)

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 (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

Yes

What is the use?

Environmental education and interpretation are non-consumptive, wildlife-dependent recreational activities defined as priority public uses of the Refuge System as established in the Refuge System Improvement Act of 1997. Environmental education is an on-refuge activity conducted by NWRs staff or authorized agents that use a planned process to foster awareness, knowledge, understanding, and appreciation in students about fish, wildlife, plants, ecology, natural sciences (such as astronomy) and refuge management. Interpretation is an on-refuge activity for refuge visitors conducted by NWRS staff or authorized agents that are designed to foster an understanding and appreciation for natural and cultural resources and associated management.

These are existing uses on the refuge included in the Comprehensive Conservation Plan (USFWS 2008) and found compatible in associated compatibility determinations during the CCP process. Conditions and level of use have not substantially changed since that determination. This reevaluation is based on Service Policy 603 FW2.

Is the use a priority public use?

Yes

Where would the use be conducted?

Red River NWR is open to environmental education and interpretation on refuge lands, except those areas specifically closed according to the annual Public Use Regulations brochure (https://www.fws.gov/southeast/pdf/regulations/darbonne-national-wildlife-refuge-hunt-fish.pdf). Zoning of the refuge is used to minimize conflicts between user groups. These zones are modified when needed for biological, administrative or safety reasons. Currently, environmental education and interpretation are open on most lands of the refuge. This determination applies to the entire refuge and the impacts analysis reflects anticipated impacts to all of the refuge. Parking lots, gravel roads and boat ramps are located throughout the refuge, as designated in the Public Use Regulations brochure. Designated hiking trails exist on portions of the refuge.

When would the use be conducted?

Environmental education and interpretation would be permitted during daylight hours year-round on the refuge, with special staff and volunteer led events occurring at any time of day or night. The refuge could temporarily be closed to these uses for biological, administrative or safety reasons. In the case of this occurring, the refuge would notify the public with signs, Facebook posts, and closure of gates.

How would the use be conducted?

Environmental education and interpretation are organized programs conducted by refuge staff or volunteers. Program are scheduled and advertised for visitors to drop in to participate or events are specifically scheduled with groups such clubs or organizations. Programs are typically conducted on foot but vehicles or boats may be used for some events. Some areas of the refuge are seasonally closed to motorboat traffic due to waterfowl sanctuary needs. Parking lots and boat ramps are scattered about the refuge along with gravel roads. Designated hiking trails, gas lines, dirt roads and ATV trails can be used by visitors for these uses. Walking, hiking, bicycling, boat use and ATV use have been found to be compatible with refuge purposes (USFWS 2016). Group size for these activities can be no greater than 20 without a Special Use Permit.

Why is this use being proposed or reevaluated?

Environmental education and interpretation are priority, wildlife-dependent public uses on national wildlife refuges as identified in the Refuge System Improvement act of 1997. These uses have been occurring on the refuge since it was established in 2002. The Improvement Act of 1997 defines the described uses as priority public uses, and if compatible, they are to receive enhanced consideration over other general public uses in refuge planning. Managing for these activities fulfills the Public Use Goal in the Refuge Comprehensive Conservation Plan (2008) to “promote environmental education and interpretation opportunities and enhance wildlife-dependent public uses, including hunting, fishing, wildlife observation, and wildlife photography on the refuge”. These activities were analyzed in the refuge’s CCP, associated Environmental Assessment, and Finding of No Significant Impact (CCP/EA/FONSI 2008 and 2008a) and found compatible. These activities enhance the users’ appreciation of the refuge, the Refuge System, wildlife, their habitats, and the human environment and encourage stewardship of our natural resources.

Availability of Resources

The use requires 75% of visitor service ranger's (GS11) time, approximately $80,000 per year. Equipment including printed materials and support supplies is estimated at

$3,000 er year. Maintainence of kiosks, trails, parking lots, etc require approximately $1,000 per year, which is reported as a partial expenditure because maintenance is conducted for other public uses as well. There are no off-setting revenues.

Table 1. Costs to Administer and Manage Environmental education (NWRS staff and authorized agents),Interpretation (NWRS staff and authorized agents) on Red River National Wildlife Refuge.

Category and Itemization	One-time Cost	Recurring Annual Expenses
Develop signage and brochures	0	$3,000
Staff time (LE, administration and management)	0	$65,000
Maintenance	0	$1,000
Total one-time expenses	**0**	
Total recurring annual expenses	**0**	**$69,000**
Offsetting revenues	**0**	**000**

Anticipated Impacts of the Use

Potential impacts of a proposed use on the refuge's purpose(s) and the Refuge System mission

Environmental education and interpretation can result in varying impacts to wildlife resources, both positive and negative. Two of the big six priority public uses, these wildlife-dependent uses promote public understanding and appreciation of the National Wildlife Refuge System. Recreational visitation and associated economic contributions made to local and state economies provide a powerful catalyst for conserving public lands (Marion 2019). Recreation including environmental education and interpretation, enhances stewardship values.

The environmental education and interpretation use is an existing use of the refuge that was previously analyzed and approved in the 2008 Red River NWR CCP/EA/FONSI was previously found not to have significant impacts; was previously determined not to materially interfere with or detract from the purposes of the refuge or the Refuge System mission; and was previously found not to conflict with maintaining the biological integrity, diversity, or environmental health of the refuge

(USFWS 2008 and 2008a).

The CCP/EA/FONSI (USFWS 2008 and 2008a) addressed the direct, indirect, short-term, long-term, and cumulative impacts of the uses on the refuge. The uses and environmental conditions have not changed substantially since that analysis. The impacts analysis from the Red River NWR CCP/EA/FONSI (USFWS 2008 and 2008a) associated with the uses are incorporated herein by reference; only summary and updated impacts are provided in this CD. No significant beneficial or adverse short-term, long-term, or cumulative impacts are associated with continuing environmental education and interpretation on the refuge as outlined in this CD.

The effects and impacts of environmental education and interpretation to refuge resources, whether adverse or beneficial, are those that are reasonably foreseeable and have a reasonably close causal relationship to the proposed use of environmental education and interpretation. This CD includes the written analyses of the environmental consequences on a resource only when the impacts on that resource could be more than negligible and therefore considered an "affected resource." Resources that will not be more than negligibly impacted by the action have been dismissed from further analyses.

As designed and implemented to serve refuge purposes and meet refuge management goals and objectives, the refuge's environmental education and interpretation programs minimize impacts to natural resources while providing opportunities for increased awareness and understanding of natural resources and processes, the role of the refuge in the landscape, and the role of the Refuge System in conservation. Formal and informal monitoring help ensure that the use remains compatible. If unacceptable impacts are found, the Refuge Manager may modify or eliminate the use, as needed.

Short-term impacts

As referenced above, no significant beneficial or adverse short-term impacts are associated with the continuation of the environmental education and interpretation use on Red River NWR.

Wildlife

Human presence alone can negatively affect wildlife by causing animals to alter behaviors necessary for survival. The adverse impacts associated with environmental education and interpretation depend on the species; the time of year; the activities occurring; and the activities' frequency, size, and duration. Species' ability to tolerate

humans varies based on multiple factors, such as adaptation to urbanization and body mass (Samia et al. 2015).

Birds exhibit various behavioral and physiological responses to human disturbance and may avoid areas with high levels of human activity (Burger 1981). Physiological responses include the release of stress hormones (Müllner et al. 2004, Thiel et al. 2008) and increased heart rate (Weimerskirch et al. 2002). Behavioral responses include increased vigilance (Frid and Dill 2002), altered singing behavior (Gutzwiller et al. 1994), and flushing (Ikuta and Blumstein 2003, Beale and Monaghan 2004a, Pease et al. 2005, Livezey et al. 2016). Human disturbance can also cause birds to discontinue or avoid foraging (Burger and Gochfield 1998, Thomas et al. 2003, Yasue 2005, Martín et al. 2015) and instead spend more time displaying avoidance behaviors. Further, McNeil et al. (1992) suggested that some waterfowl and shorebird species may forage at night instead of during the day to avoid humans. These physiological and behavioral responses to human activity cause birds to expend energy (Bélanger and Bédard 1990, Weimerskirch et al. 2002) that would otherwise be used for survival, migration, and reproduction.

Mammals also exhibit avoidance behaviors in response to human activity (Hammitt and Cole 1998). Similar to birds, bats expend more energy when disturbed by humans (Speakman et al. 1991), and mammalian species across the globe are becoming more nocturnal to avoid people (Gaynor et al. 2018). Mammals likely to experience adverse impacts from human disturbance are those with limited available habitat; these animals are forced to remain in the disturbed habitat due to a lack of suitable alternatives and suffer the consequences of human disturbance.

The noise produced by environmental education and interpretation activities may impact fish and other aquatic species by altering their behavior. For example, during noisy events, smallmouth bass (*Micropterus dolomieu*), freshwater largemouth bass (*Micropterus salmoides*), and black bullhead (*Ameiurus melas*) fish spend less time guarding nests, exposing eggs and young to potential predators (Maxwell et al. 2018, Mickle et al. 2019).

Consistent with other species, reptiles, amphibians, and arthropods engage in avoidance behaviors when encountering human disturbance (Frid and Dill 2002, Huang et al. 2011, Selman et al. 2013). However, the short-term impacts of human disturbance on these species are not well-studied.

The Service does not expect adverse impacts to wildlife or their habitats that are more than negligible based on the frequency, size, and duration of environmental

education and interpretation events. The Service would implement minimization strategies should unexpected adverse impacts be discovered, which could include modifying the use, moving the use, or eliminating the use. The negative impacts of disturbance become more severe with decreasing distance between humans and animals (Skagen et al. 2001, Beale and Monaghan 2005, Pease et al. 2005, Trulio and White 2017). If adverse impacts occur, the Service would create buffers around sensitive species, which can minimize the effects of human disturbance (Ikuta and Blumstein 2003). Impact severity can also vary depending on the number of people present, with increasing numbers associated with greater disturbance (Burger and Gochfield 1998, Thomas et al. 2003, Beale and Monaghan 2004b, Yasue 2005, Pearce-Higgins et al. 2007). Thus, the Service may limit group sizes to protect wildlife. Finally, the Service may temporarily or permanently close areas if minimization measures are insufficient to protect wildlife or habitats.

Vegetation and Soil

Refuge visitors can trample vegetation on- and off-trail. A plant's response to trampling is heavily influenced by its morphological characteristics (Pescott and Stewart 2014, Marion et al. 2016). The brittle woody stems of shrubs and small trees and rigid stems of tall forbs are susceptible to trampling, which damages buds and flowers and reduces seed production (Cole 1995, Cole and Monz 2002, Marion et al. 2016). Grasses, sedges, and low-growing herbs are more resistant due to flexible stems and underground perennating buds (Hill and Pickering 2009, Striker et al. 2011, Marion et al. 2016). The Service would restrict the use of sensitive habitats and regularly monitor vegetation for unexpected adverse impacts, closing areas if necessary.

Recreationists can also be vectors for invasive plants. Seeds or other propagules can be transferred from one area to another via clothing or personal belongings and spread to nearby areas through self-propagation (Pickering and Hill 2007). Once established, invasive plants can out-compete native plants, altering habitats and indirectly impacting wildlife. The Service would monitor for invasive plants and educate the visiting public about this issue. If visitors were found to be introducing or spreading invasive species, the Service would work to minimize this through activities such as education, signage, and off-refuge washdown and/or decontamination requirements.

Visitor Experience

Quantitative research documenting the impacts of environmental education and

interpretation on other user groups, such as hunters and anglers, is scant. Crowding may deter some recreationists (Manning and Valliere 2001). However, appropriate management can minimize conflicts by separating competitive user groups (Marcouiller et al. 2009) by area. Potential positive impacts of environmental education and interpretation include a deepened sense of place, heightened appreciation for the refuge's habitat and wildlife, and inspired increased engagement in conservation efforts (Ardoin 2006, Kudryavtsev et al. 2012).

Long-term impacts

As referenced above, no significant beneficial or adverse long-term or cumulative impacts are associated with the continuation of the environmental education and interpretation use on Red River NWR.

Wildlife

Environmental education and interpretation activities can have long-term impacts on wildlife and habitats. However, some species can habituate to human disturbance (Samia et al. 2015). In addition, appropriate minimization strategies and continuous monitoring can ensure that environmental education and interpretation can occur without causing more than negligible long-term impacts on the refuge's resources.

Animals experience various long-term effects due to disturbance. For example, male birds that respond to human intrusion by altering their singing behavior can suffer from lower reproductive fitness due to impaired territory defense and mate acquisition (Gutzwiller et al. 1994). Disrupted foraging behavior can cause decreased body mass (Gibson et al. 2018), increasing a bird's susceptibility to disease. Further, a literature review on the effects of nature-based recreation on birds reported that 28 out of 33 papers observed changes in abundance and reproductive success (Steven et al. 2011). Long-term disturbance also negatively impacts reptiles, with freshwater turtles at disturbed sites having poorer shell conditions than undisturbed sites (Selman et al. 2013). Mammals also suffer long-term consequences from human disturbance. Reed and Merenlender (2008) reported that human activity decreases carnivore density and shifts community composition from native to non-native species.

Although long-term impacts could be possible, the Service does not expect the proposed use to cause adverse long-term impacts due to the limited frequency and duration of environmental education and interpretation events at any one location

and due to the small group sizes on interpretive trails. The Service would regularly monitor for adverse impacts and implement minimization measures, such as buffers, group size limitations, and closures when appropriate.

Vegetation and Soil

Visitors can introduce invasive plants, animals, and pathogens (Marion et al. 2006, Davies and Sheley 2007, Anderson et al. 2015) during environmental educational and interpretation activities. Once present, invasive species can out-compete native plants and animals, thereby altering habitats (Marion et al. 2006, Anderson et al. 2015). Invasive species can alter animal and plant composition, diversity, and abundance (Eiswerth et al. 2005, Davies and Sheley 2007). These changes may reduce native forage, cover, and water sources (Eiswerth et al. 2005). Certain invasive species may even impede access to environmental education and interpretation sites, such as hydrilla, which blocks waterways. The Service would include educational information about invasives in environmental education and interpretive materials. If visitors were found to be introducing or spreading invasive species, the Service would work to minimize this through activities such as education, signage, and off-refuge washdown and/or decontamination requirements.

Once vegetation and organic litter are lost, exposed soils are subject to compaction, leading to increased erosion and wetland sedimentation (Cooke and Xia 2020). The consequences of compacted soil include increased temperatures, reduced moisture (Marion et al. 2016), reduced soil biota (Liddle 1997), and resistance to seed germination and penetration by plant roots (Alessa and Earnhart 2000).

Public Review and Comment

The draft compatibility determination will be available for public review and comment for 14 days. The public will be made aware of this comment opportunity through posting at the refuge headquarters and on the refuge website. A hard copy of this document will be posted at the Red River Headquarters at 150 Eagle Bend Point, Bossier City, LA 71112. It will be made available electronically on the refuge website *https://www.fws.gov/refuge/redriver.* Please contact the Refuge Manager if you need the documents made available in an alternative format. Concerns expressed during the public comment period will be addressed in the final document.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

1. Activities will occur during open hours of the refuge or under supervision by refuge staff.

2. Activities will occur in areas open to the public or in closed areas only under direct supervision of refuge staff.

3. Areas may be closed by the Refuge Managers during times sensitive to wildlife such as breeding and nesting or for safety or administrative reasons.

4. Activities involving groups larger than 20 will require a Special Use Permit issued by the Refuge Manager.

Justification

The stipulations outlined above would help ensure that the use is compatible at Red River NWR. Environmental education and interpretation, as outlined in this compatibility determination, would not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the refuge. Based on available science and best professional judgement, the Service has determined that environmental education and interpretation at Red River NWR, in accordance with the stipulations provided here, would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose of the Red River NWR. Rather, appropriate and compatible environmental education and interpretation would be a use of Red River NWR through which the public can develop an appreciation for wildlife and wild lands.

Signature of Determination

Refuge Manager Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

2038

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