

Draft Compatibility Determination

Title

Compatibility Determination for Environmental Education and Interpretation, Eastern Shore of Virginia National Wildlife Refuge.

Refuge Use Category

Environmental Education and Interpretation

Refuge Use Type(s)

Environmental Education (National Wildlife Refuge System staff and authorized agents), Interpretation (NWRS staff and authorized agents)

Refuge

Eastern Shore of Virginia National Wildlife Refuge

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

... particular value in carrying out the national migratory bird management program. 16 U.S.C. 667b-667d (An Act Authorizing the Transfer of Certain Real Property for Wildlife, or Other Purposes).

... 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 U.S.C. 460K-1 (Refuge Recreation Act)

... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds. 16 U.S.C. § 715d (Migratory Bird Conservation Act)

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

The uses are environmental education and interpretation which are priority public uses, as identified in the National Wildlife Refuge System Improvement Act (USFWS1997).

What is the use?

The uses under this Compatibility Determination (CD) are environmental education and interpretation conducted by Refuge System staff, interns, and volunteers, and authorized agents which may include state and non-governmental organization partners. These are priority public uses identified by Executive Order 12996 (March 25, 1996) and legislatively mandated by the Refuge System Administration Act of 1966 (16 U.S.C. sections 668dd-668ee), as amended by the Refuge System Improvement Act of 1997 (Public Law 105-57).

These uses entail a variety of programs and activities including summer day camp, self guided interpretation (informational kiosks), and partnership programs with schools. Refuge staff conduct environmental education programs for small groups, but also for organized groups, including school, scout, youth, and nature-based groups. Programs may include birding field trips, and guided tours about the refuge's management practices. Refuge staff coordinate all on- and off-site environmental education programs with refuge volunteers and partners, and programs are delivered as time and volunteer availability allow.

Refuge staff, volunteers, teachers, and other youth group leaders conduct interpretive programs by way of personal presentations and guided tours; and at special events and displays both on and off the refuge.

Refuge staff provide educational and interpretive information via signage, kiosks, printed information, exhibits, websites, social media, and other methods to reach targeted audiences.

Is the use a priority public use?

Yes

Where would the use be conducted?

All uses are conducted on the Eastern Shore of Virginia NWR. The Visitor Center offers interpretive displays and space for environmental education. A 1.5-mile trail system from the Visitor Center to the Winslow Bunker offers year-round opportunities for observing Neotropical migratory species such as birds and butterflies. Two overlooks along the trail, one on top of the Winslow Bunker and another at the edge of a salt marsh, provide opportunities for viewing migrating birds

overhead and wading birds such as herons and egrets at the marsh's edge. The Bull Tract offers a 1.25-mile walking trail that travels through forest and salt marsh habitat. The Southern Tip Bike Trail begins at the Visitor Center and travels north paralleling Hwy 13 and offers 5-miles of paved trail (2.5-miles are on refuge property). Outreach and interpretation may also be offered at the Wise Point Boat Ramp, educating visitors on the Virginia barrier islands and their importance to beach nesting shorebirds. Additional areas for interpretation and environmental education include Habitat Management Units for prescribed fire, mechanical treatment, and invasive species management.

When would the use be conducted?

The use for environmental education and interpretation will occur year-round within regular refuge hours, which are a half-hour before sunrise to a half-hour after sunset.

How would the use be conducted?

Environmental education and interpretation would be conducted for the general public, as well as for organized groups, including school and youth groups. Brochures and maps depicting the roads, trails, and kiosks/information related to these uses are available in the administrative office, visitor center, and the refuge's website.

Interpretation may be conducted by way of personal presentations by staff, volunteers, interns, contracted and guest presenters, teachers and other youth group leaders, and at special events and displays both on and off the refuge. Educational and interpretive information will also be provided via signage, kiosks, printed information, exhibits, audiovisual presentations, web-based information, podcasts, radio messages, and lecture programs. Wildlife observation programs such as birding field trips and other nature walks are frequently given.

Refuge staff are responsible for on-site evaluations to resolve visitor use issues; monitor and evaluate impacts; maintain boundaries and signs; meet with interested public; recruit volunteers; prepare and present interpretive and educational programs; maintain existing trails and viewing areas; revise brochures and develop new information materials, install and/or update kiosks; develop needed signage; organize and conduct refuge events; conduct regularly scheduled programs for the public; display off-site exhibits at local events; develop relationships with media; provide law enforcement and security; and respond to public inquiries.

Public use areas will be monitored at various times of the year to assess wildlife disturbance. Information about proper etiquette and the effects of human impacts on habitat and wildlife resources will be included in refuge publications, on kiosks, and in interpretative programs. Periodic law enforcement will ensure compliance with regulations and area closures and will discourage vandalism.

Access to closed areas or use during the refuge's closed hours requires a special use permit, which is subject to the refuge manager's approval, unless the activity is in

conjunction with a refuge staff or volunteer led program.

Why is this use being proposed or reevaluated?

Environmental education and 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 is being re-evaluated pursuant to policy (603 FW 2.11 H.) in accordance with the goals of the refuge's Comprehensive Conservation Plan (CCP; USFWS 2004).

These uses will provide experiences for visitors to observe and learn about wildlife and wildlands and to observe wildlife habitats firsthand, enhancing visitors' understanding of natural resource management programs and ecological concepts, fostering a better understanding of the problems facing our wildlife/wildlands resources including the effects the public has on wildlife resources. Environmental education and interpretation opportunities allow visitors to learn about the U.S. Fish and Wildlife Service role in conservation, to better understand the biological facts upon which USFWS management programs are based and foster an appreciation for the importance of wildlife and wildlands. We anticipate that participation in these uses will result in a more informed public, with an enhanced stewardship ethic and enhanced support and advocacy for wildlife conservation.

Furthermore, Department of the Interior Secretarial Order 3356 directs the Service to enhance and expand public access to lands and waters on national wildlife refuges for hunting, fishing, recreational shooting, and other forms of outdoor recreation. The proposed action promotes two of the priority public uses of the Refuge System and provides opportunities to promote stewardship of our natural resources and increase public appreciation and support for the refuge.

Availability of Resources

Environmental education and interpretation of natural and cultural resources occur through the use of existing staff, resources, and facilities. Existing resources such as interpretive kiosks/displays, and programs to the public, are made possible through extensive help of staff, volunteers, and partners. The amount of environmental education and interpretive programming provided to the public will be a direct reflection of the refuge's staff and funding levels and/or volunteer and partner capabilities.

The Refuge Manager or Project Leader will use sound professional judgement to determine the staffing needed to perform the functions necessary to ensure compatibility. Refuge staff are needed to administer activities such as visitor programs, maintaining trails and signage, issuing special use permits, and monitoring

impacts related to environmental education and interpretation uses. The funding resources needed to provide this use are available under the current refuge budget. However, adequate levels of refuge staffing, funding, and facilities are necessary to administer this use in a manner that ensures continued compatibility (603 FW2 2.11(A.2)). Therefore, if staffing levels or budgets decrease and alternate resources cannot be found to facilitate environmental education and interpretation activities, the Refuge Manager or Project Leader may need to re-evaluate whether these uses are still compatible with refuge purposes and the Service's mission.

Anticipated Impacts of the Use

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

The effects and impacts of the proposed use 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, including geology, hydrology, air and water quality, threatened and endangered species, cultural resources, and socioeconomics have been dismissed from further analyses.

Environmental education and interpretation can result in varying impacts to wildlife resources, both positive and negative. These uses represent two of the six priority public uses designated in the National Wildlife Refuge Improvement Act of 1997 (hunting, fishing, environmental education, interpretation, wildlife observation and photography). 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).

Damage to ecosystems is known to occur when informal trails are created and used by the public (Barros and Pickering 2017). Visitors engaging in interpretation and environmental education activities will be expected to use and stay on designated trails or roads and are not allowed to touch or remove wildlife from the refuge without the appropriate permit or license. Disturbances associated with these two public uses vary with the wildlife species present and the type, level, frequency, duration, and the time of year such activities occur.

There are many recommendations for reducing impacts to wildlife: provide visitor education, require staying on trails, closing areas during sensitive periods such as nesting, require minimum set back distances for approach to areas such as rookeries, etc. (Boyle et al. 1985, Erwin 1989, Haverra et al. 1992, Klein 1993, Miller et al. 2001,

Morton et al. 1989, Rodgers et al. 1995, Taylor and Knight 2003).

Short-term impacts

Located on the Delmarva Peninsula, Eastern Shore of Virginia NWR hosts a wide diversity of both resident and migratory wildlife. The refuges are important stopover sites in the Atlantic flyway and provide important habitat for resident species in an area with rising development trends. Avian Priority Refuge Resources of Concern identified in the Habitat Management Plan (HMP) occurring on the Eastern Shore of Virginia NWR include fall migrating landbirds, American Woodcock, Prairie Warbler, Seaside sparrow, Saltmarsh sparrow, American black duck, Clapper rail, and Eastern Meadowlark.

Short-term impacts resulting from anthropogenic disturbance from visitors engaging in environmental education and interpretation activities may include changes in wildlife behavior, distribution, or abundance (Leblond et al. 2013). Trails used to facilitate environmental education and interpretation can disturb wildlife outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). Noise caused by visitors engaging in environmental education and interpretation activities can result in increased levels of disturbance, though noise is not always correlated with visitor group size (Burger 1986, Klein 1993, Burger and Gochfeld 1998).

Extensive research has been conducted on the impacts of human disturbance on birds. Gutzwiller et al. (1994) found that the singing behavior of some species of songbirds was altered by low levels of human intrusion. Pedestrian travel has the potential to impact shorebirds, waterfowl, and other migratory birds feeding and resting near the trails and on beaches, especially during the nesting and migration seasons. Birds may avoid places where people are present and when visitor activity is high (Burger 1981, 1986; Klein et al. 1995). 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. Nest predation was also found to be greater near trails (Miller et al. 1998).

Wildlife interpretation and environmental education programming has the potential to impact fish and other aquatic species if activities generate noise in the water, increase turbidity, or result in other physical disturbance in the aquatic environment. For example, when exposed to noise events, bass and bull head fish spent less time guarding nests and fry exposing eggs and young to potential predators (MacLean et al. 2020, Maxwell et al. 2018, Mickle et al. 2018).

Human disturbance from environmental education and interpretation uses on the refuge also has potential short-term impacts on mammals. There is evidence to suggest that the mammal species most likely to be adversely affected by human disturbance are those for which available habitat is limited, constraining them to stay in disturbed areas and suffer the costs of reduced survival or reproductive success (Gill et al. 2001). For example, disturbances causing mammals to flee during winter

months could consume stored fat reserves that are necessary to get through the winter. Additionally, George and Crooks (2006) found that bobcats and coyotes were more active at sites with less human use and less active at sites with high levels of human recreation. This study also found that bobcats were detected less frequently in high human use areas, and even temporarily shifted their activity patterns to become more nocturnal.

In addition to direct impacts on wildlife, environmental education and interpretation can also have indirect impacts on wildlife by altering vegetation and habitat on a short-term basis. Immediate effects can include soil compaction from trampling, changes to vegetation structure, and accumulating waste from litter. By altering these habitat characteristics, visitors can modify the food supply or availability of shelter for wildlife (Cole and Landres 1995). Modes of transportation along roads and foot traffic on trails and at established environmental education and interpretation sites can compact soil leading to increased erosion and sedimentation (Cooke and Xia 2020), resulting in degraded habitat for wildlife.

Quantitative research documenting the impacts of environmental education and wildlife interpretation uses on other user groups such as hunters and anglers is scant. Crowding from these uses may deter some recreationists; these individuals may alter their time or location of visitation or develop other coping mechanisms, such as rationalization or shifting their understanding of the activity or place (Manning and Valliere 2001, Marcouiller 2008). 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 engagement in conservation efforts (Ardoin 2006, Kudryavtsev et al. 2012).

Many shorebirds that nest, migrate, or overwinter in the United States are in decline and are of conservation concern due to threats and pressures they experience throughout their annual cycle. Since 1970, shorebird abundance across North America has declined by 37% (Rosenberg et al. 2019) and those declines are accelerating over time (Smith et al. 2023). Human disturbance has been identified as a major threat and a key mortality source for shorebirds, especially in the Northeastern U.S. (AFSI 2015, NABCI 2022). Disturbance can be defined as "a human activity that causes an individual or group of shorebirds to alter their normal behavior, leading to an additional energy expenditure by the birds. It disrupts or prevents shorebirds from effectively using important habitats and from conducting the activities of their annual cycle that would occur in the absence of humans. Productivity and survival rates may also be reduced" (Mengak and Dayer 2020). Human disturbance can be caused by both intentional and unintentional actions, including Environmental Education and Interpretation activities. Unfortunately, the impacts of disturbance will likely increase in the future as the human population in coastal areas is projected to grow (NOAA 2013) and as shorebird habitats decrease due to coastal development and sea-level rise driven by climate change (Galbraith et al. 2002).

Disturbance can impact shorebirds throughout the entire annual cycle. During the breeding season, disturbance can affect how shorebirds use habitat, as well as their reproductive success and survival. Human disturbance has been found to exclude shorebirds from habitat they would otherwise use for nesting and to cause adults to incubate or attend their nests less frequently, which can result in reproductive failure when nests are left unprotected from temperature fluctuations or predators (Lafferty et al. 2006, Sabine et al. 2008). Additionally, human activity can cause direct mortality of adults, chicks and eggs, such as trampling (Melvin et al. 1994, Ruhlen et al. 2003, Schulte and Simons 2015).

Disturbance during the non-breeding season, which involves a period of migration, can also have significant impacts on the survival and fitness of shorebirds. Migration is an energetically demanding activity that requires sufficient food resources and stopover sites where birds can rest and forage, and many such stopover sites occur in the Northeastern U.S. (Colwell 2010, Linscott and Senner 2021). Disturbance can cause shorebirds to fly away, displace them from important habitats, and reduce their foraging time and feeding rates (Burger and Gochfeld 1991, Burger and Niles 2014, Burger et al. 2004, Navedo et al. 2019, Pfister et al. 1992). The cumulative result of these impacts can be a severe energetic cost for individual birds, such as reduced body mass, and can lead to lower annual survival rates of individuals at disturbed sites (Gibson et al. 2018, Rogers et al. 2006). When extrinsic factors, such as disturbance, are experienced by shorebirds during the non-breeding season, their ability to reproduce during the breeding season can be influenced (Weithman et al. 2017).

Overall, disturbance to Priority Refuge Resources of Concern and other species is expected to be minimal due to these uses. The refuge trail system is 5.25 miles in total which is a small proportion of the refuge land base. The majority of interpretation and educational programming will occur in and around the refuge Visitor Center which concentrates the activity to an even smaller area of the refuge that is already developed.

Thirty-four mammal species are recorded on the Lower Delmarva Peninsula and 9 species of bats may be found on or around the refuge. The Eastern red bat is listed as a Priority Refuge Resource of Concern in the HMP and can be found on the refuge during migration and winter seasons. Environmental education and interpretation are not expected to adversely affect the Eastern red bat as they mostly roost in dense foliage, tree hollows, and under loose bark of dead trees during the day.

Long-term impacts

The long-term effects of Environmental Education and Interpretation activities on species will vary depending on their biology and life history. For example, the same education programming offered during different seasons—for example, during breeding, migration, or wintering for migratory birds—may differ greatly in its impact. Examples include education and interpretation programs causing birds to flush during nesting (Carney and Sydeman 1999) or causing mammals to flee during winter

months, thereby consuming large amounts of stored fat reserves necessary for survival (Lovegrove 2005).

The presence of humans participating in environmental education and interpretation could also lead to human-induced avoidance by wildlife, which can prevent animals from using otherwise suitable habitat. Frequent disturbance may cause shifts in habitat use, abandonment of habitat, and increased energy demands on affected wildlife as reviewed in Kerlinger et al. 2013. 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” such as wildlife becoming habituated to humans.

Additional potential long-term impacts from environmental education and interpretation uses include changes at the community and ecosystem scale. Frequent use of areas or trails for environmental education and interpretation activities could alter species composition in the immediate areas utilized for these activities. For example, generalist bird species are typically more abundant near trails, whereas specialist species are less common (Miller et al. 1998).

There is a large amount of research available for the long-term impacts of human disturbance on bird species. Environmental education and interpretation programs that incorporate activities such as bird watching should consider and monitor the duration and proximity of the encounters. Some birds will tolerate the presence of people, but there is a distance beyond which closer interactions will cause disturbance or disruption, and may lower reproductive success, decrease foraging efficiency, or force birds to abandon suitable habitats (Burger et al. 1995). Each situation requires observation, continued monitoring and mitigation by refuge staff to avoid undue stress and long-term impacts. In many refuges, paths or boardwalks are used to direct the flow of birdwatchers or others observing wildlife. In others, some of the habitats may need to be closed during a sensitive part of the year (e.g., beach closure for piping plovers or closed areas around bald eagle nests), with sensitive areas fenced to prevent human access. Negative impacts of environmental education and interpretation activities and other ecotourism can be curtailed with careful management and consideration of the needs of both the wildlife and the visitors (Burger et al. 1995).

Long-term impacts from environmental education and interpretation could also have impacts on mammals present on the refuge. With respect to mammalian carnivores, Baker and Leberg (2018) found that coyotes and bobcats had higher occupancy in protected areas with more human disturbance (i.e., trails) but overall, protected areas with less human disturbance had greater carnivore community diversity. Their results varied among species, however, the general trend showed that human activity can have long-term impacts on carnivores. Reed and Merenlender (2008) found that human activity decreased carnivore density and shifted community composition significantly from native species to non-native species.

In addition to direct long-term wildlife impacts, environmental education and interpretation can also have long-term indirect impacts by altering wildlife habitats. Habitat fragmentation caused by physical barriers necessary to facilitate environmental education and interpretation, such as roads or trails, may reduce potential habitat for dispersal, as well as decrease the availability of water and food, and ultimately reduce biodiversity (Haddad et al. 2015). Fragmentation may ultimately lead to smaller population sizes within each fragment, and increased vulnerability to population decline and extinction (Fahrig and Merriam 1994). Reducing the survival of vegetation could have cascading impacts for herbivores and possibly higher trophic levels (Haddad et al. 2015).

Visitors can unintentionally introduce invasive plants, animals, and pathogens to habitats (Anderson et al. 2015, Brock and Green 2003, Davies and Sheley 2007, Marion et al. 2006). Once present, invasive species can outcompete native plants and animals, thereby altering habitats (Anderson et al. 2015, Marion et al. 2006). Invasive species can alter native animal and plant species composition, diversity, and abundance (Davies and Sheley 2007, Eischer et al. 2005). These changes may reduce native forage, cover, and water sources (Brock and Green 2003, Eischer et al. 2005). Certain invasive species may even impede access to interpretation and environmental education sites such as hydrilla blocking waterways.

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 refuge headquarters, posting on the refuge website, and social media. State and Tribes have been asked to review and comment on the compatibility determination. A hard copy of this document was posted at the Refuge Headquarters or Visitor Center located at 5003 Hallett Circle Cape Charles, VA 23310. It was also made available electronically on the refuge website https://www.fws.gov/refuge/eastern_shore_of_virginia/. 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.

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

1. Some areas of the refuge will be closed to this use during nesting season to minimize disturbance to beach nesting birds. Refuge staff will install symbolic

fencing to restrict access and maintain a buffer of space in these areas to minimize disturbance to beach nesting birds.

2. Refuge staff will conduct biological inventories, including physical condition of the beachfront, dunes, and trail system, and routine monitoring, to measure change in use of the habitat by beach nesting or migrating shorebirds. If monitoring, evaluation, or observations indicate a change or negative impact on beach nesting birds, shorebirds resting during migration, or their habitat, the refuge manager will take appropriate action to modify or discontinue the use.

Justification

The stipulations outlined above would help ensure that the use is compatible at Eastern Shore of VA 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 U.S. Fish and Wildlife Service has determined that the environmental education and interpretation at Eastern Shore of VA NWR, in accordance with the stipulations provided here, would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System (NWRS) mission or the purpose of the Eastern Shore of VA NWR.

Rather, appropriate and compatible environmental education and interpretation would be the use of the Eastern Shore of VA NWR through which the public can develop an appreciation for fish, wildlife, and wild lands. These priority public uses identified by Executive Order 12996 (March 25, 1996) and legislatively mandated by the Refuge System Administration Act of 1966 (16 U.S.C. sections 668dd-668ee), as amended by the Refuge System Improvement Act of 1997 (Public Law 105-57), have been found appropriate and compatible, and will provide opportunities through which the American public can develop an appreciation for fish and wildlife and contribute to achieving the mission of the NWRS.

Signature of Determination

Refuge Manager Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

2040

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