

COMPATIBILITY DETERMINATION

USE: Wildlife Observation, Photography, Environmental Education, and Interpretation

REFUGE NAME: Great Thicket National Wildlife Refuge, Northern Housatonic Focus Area, Nellie Hill Tract, Dover, New York

DATE ESTABLISHED: December 15, 2016

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

Great Thicket National Wildlife Refuge (NWR) was established under the following statutory authorities:

- Endangered Species Act of 1973 (16 U.S.C. 1534), as amended; and
- Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j), as amended.

REFUGE PURPOSE(S):

The refuge contributes toward achieving:

- Population goals for declining high-priority migratory bird species dependent upon shrublands.
- Habitat and population goals identified in the rangewide New England Cottontail Conservation Strategy.
- Recovery goals for several federally threatened or endangered species that have overlapping shrubland habitat needs.
- Population goals for numerous shrubland-dependent Species of Greatest Conservation Need (SGCN).

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the National Wildlife Refuge System (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.

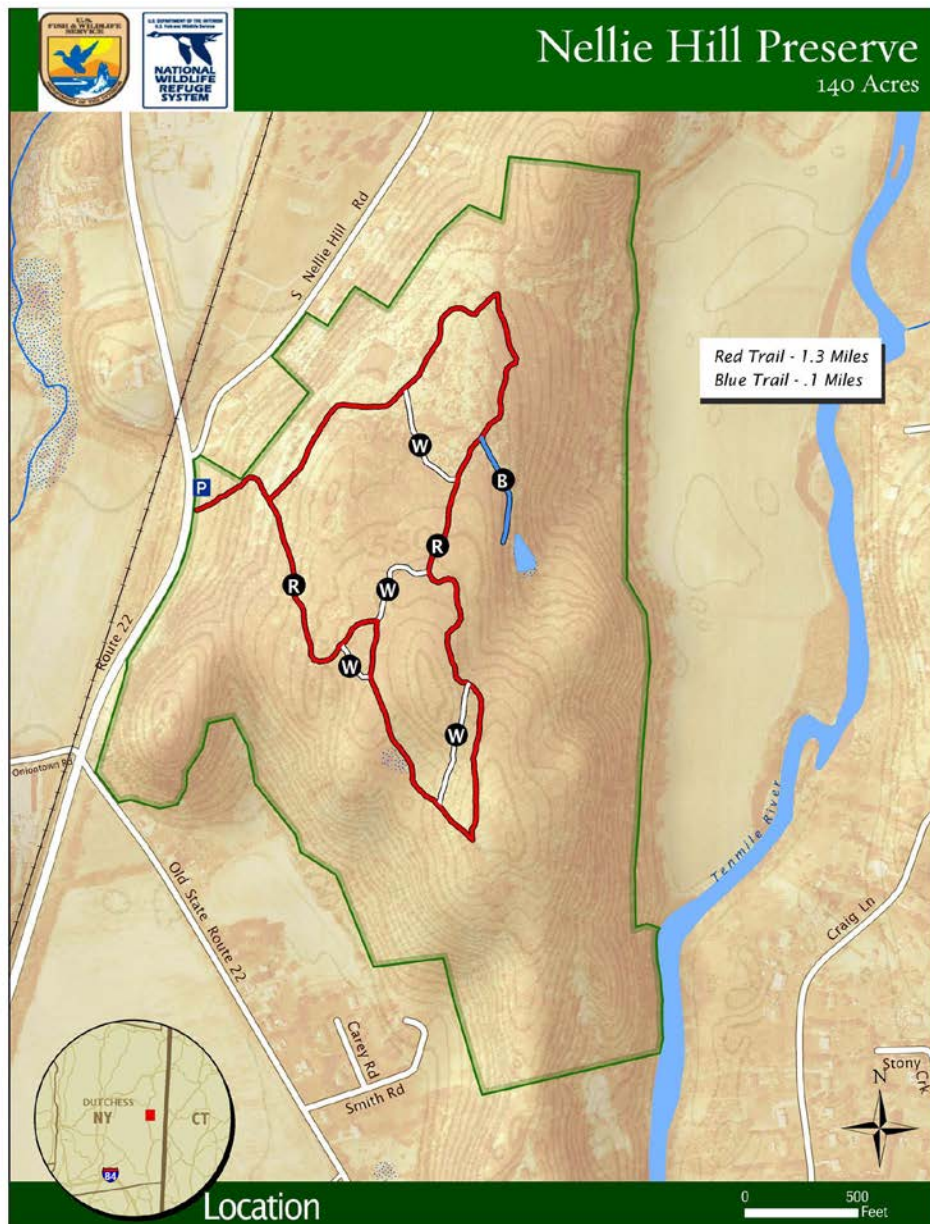
DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The uses are wildlife observation, photography, environmental education, and interpretation at the Great Thicket NWR, Nellie Hill Tract, in Dover, New York. Wildlife observation, photography, environmental education, and interpretation are priority public uses of the Refuge System under the Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the Refuge System Improvement Act of 1997 (Refuge Improvement Act; Public Law 105-57), when found to be compatible.

(b) Where would the use be conducted?

Wildlife observation, photography, environmental education, and interpretation would be allowed on designated trails and overlooks on the Nellie Hill Tract according to the following map. Off trail access would not be allowed.



(c) When would the use be conducted?

Self-directed wildlife observation, photography, environmental education, and interpretation will be allowed on the refuge, year-round, during the refuge's normal open hours (one half-hour before official sunrise to one half-hour after sunset) unless a conflict with a management activity or an extenuating circumstance necessitates deviating from this. Examples of potential temporary closures include closures for public safety (e.g., snow and ice or other storm events) and closures during sensitive wildlife seasons (e.g., bird nesting season).

Refuge programs on such topics as bats, bugs, or owls, may be conducted outside of normal hours by Special Use Permit (SUP). These would be conducted by refuge staff or in cooperation with a refuge partner.

(d) How would the use be conducted?

Visitors engaged in these uses generally drive to the refuge, then either walk or hike in designated areas and along designated roads and trails. Visitors generally walk the trails independently, in small groups, or as part of a guided program.

Refuge staff would be responsible for:

- 1) Onsite evaluations to resolve public use issues.
- 2) Monitoring and evaluating impacts.
- 3) Maintaining boundaries and signs.
- 4) Meeting with adjacent landowners and interested public.
- 5) Recruiting volunteers.
- 6) Preparing and presenting interpretive programs.
- 7) Maintaining self-guided interpretive materials.
- 8) Maintaining existing trails, overlooks, and observation blinds.
- 9) Revising outreach materials and developing new ones.
- 10) Installing kiosks and updating kiosk information.
- 11) Developing needed signs.
- 12) Organizing and conducting refuge events and other environmental education programs for the public.
- 13) Displaying off-site exhibits at local events.
- 14) Developing relationships with media.
- 15) Providing law enforcement.
- 16) Responding to public inquiries.

(e) Why is this use being proposed?

Wildlife observation, photography, environmental education, and interpretation will be popular uses at the refuge, and uses that were offered by the tracts previous owner, The Nature Conservancy (TNC). TNC donated the Nellie Hill Tract as the first and establishing parcel for the Great Thicket NWR. The approved refuge is a landscape conservation effort intended to protect and manage shrublands and shrubland-dependent wildlife across six northeastern states from New York to Maine.

In addition, these uses are four of the six appropriate, wildlife-dependent, priority public uses defined by the Refuge System Improvement Act. If compatible, the Refuge Improvement Act requires us to facilitate these priority uses on refuges. These uses would be conducted to provide educational and recreational opportunities for visitors to enjoy the refuge’s resources and to increase their understanding of and appreciation for fish and wildlife, wildland ecology, the relationships of plant and animal populations within the ecosystem, and wildlife habitat management. These uses enhance the public’s knowledge of natural resource management programs and ecological concepts, allowing for better understanding of the problems facing our natural resources, the effect the public has on wildlife resources, and about the U.S. Fish and Wildlife Service’s (Service) role in conservation. Additionally, the public will be aware of biological facts upon which Service management programs are based, consequently fostering an appreciation as to why wildlife and wildlands are important to them. The authorization of these uses will produce a more informed public and advocates for Service programs. Likewise, these uses will provide opportunities for visitors to observe and learn about wildlife and wildlands at their own pace, in an unstructured environment, and to observe wildlife habitats firsthand.

Specifically, professional and amateur photographers will be provided opportunities to photograph wildlife in their natural habitats. Photographic opportunities will result in increased publicity and advocacy for Service programs.

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

AVAILABILITY OF RESOURCES:

The following table lists the estimated costs to the refuge to administer and manage for wildlife observation, wildlife photography, environmental education, and interpretation.

Table 1

Identifier	Cost
Trail/Road Maintenance*	\$1,000
Maintain Kiosks	\$ 500
News releases, brochures, fact sheets	\$1,000
Program development and implementation	\$1,000
Routine Maintenance and Staff Days	\$2,000
Law Enforcement	\$2,000
Total Estimated Cost	\$7,500

*Refuge trails and roads are maintained for a variety of activities. Costs shown are a percentage of total costs for trail/road maintenance on the refuge and are reflective of the percentage of trail/road use for this activity. Volunteers account for some maintenance hours and help to reduce overall cost of the program.

ANTICIPATED IMPACTS OF USE:

Wildlife observation, photography, environmental education, and interpretation can have positive and negative impacts to the refuge's wildlife and habitats. A positive effect of public involvement in these priority public uses will be a better appreciation and more complete understanding of the wildlife and habitats associated with Great Thicket NWR. These uses would help build stronger support from the public for the refuge, the Refuge System, the Service, and for wildlife conservation efforts.

Negative effects of these uses could include impacts to vegetation and soils, wildlife, hydrology, visitors, and the economy from visitors walking and hiking on the refuge and from refuge staff developing and maintaining public use facilities.

Vegetation and Soil: Visitors participating in these activities could directly impact the plants and soils on the refuge. Knight and Gutzwiller (1995) found that the main effect on vegetation and soil is human trampling caused by walking on- and off-trail. Excessive travel by foot can crush, bruise, shear off, and uproot vegetation (Cole and Landres 1995). Vegetation in trampled areas may be reduced in height, stem length, leaf area, flower and seed production, and carbohydrate reserves (Liddle 1975 as cited in Cole and Landres 1995). Plants growing in wet or moist soils are the most sensitive to disturbance from trampling effects (Kuss 1986). The refuge will monitor these areas to ensure that impacts from trail access do not expand outside of the existing trail footprint and may close this area if conditions warrant.

Visitors can be vectors for invasive plants when seeds or other parts of the plant are moved from one area to another. Once established, invasive species can out-compete native plants, thereby altering habitats and indirectly affecting wildlife. The threat of invasive plant establishment will always be an issue requiring annual monitoring and, when necessary, treatment. Staff will work to educate the visiting public to reduce introductions and will also monitor and control invasive species.

Soils may also be affected by foot travel. Kuss (1986) found that foot travel can compact soils and diminish soil porosity, aeration, and nutrient availability. This can in turn affect plant growth and survival. Pedestrians may also affect soils by decreasing organic surface material, compacting mineral soil, reducing infiltration, increasing soil erosion, and increasing fluctuation in soil moisture content (Knight and Gutzwiller 1995). Hammitt and Cole (1998) note that soil compaction limits the ability of plants to revegetate affected areas.

Visitor use would primarily occur on designated trails which have been in use for many years. Public use trails and wildlife observation areas are designed and maintained to minimize impacts on vegetation. Therefore, we anticipate additional impacts to soils and vegetation would be negligible and localized. Refuge staff would continue to monitor trails and other areas of the refuge. If impacts are identified, staff would take appropriate action to protect, and restore if necessary, any affected areas. Protective measures include, but are not limited to: closing or limiting public access to affected areas permanently, temporarily, or seasonally.

Hydrology: Roads and trails can affect the hydrology of an area, primarily through alteration of drainage patterns. It is anticipated that trails would continue to influence hydrology regardless of pedestrian travel. Maintenance would be required to maintain adequate and proper drainage to avoid hydrologic impacts. Trail improvements may also cause erosion. Overall, trail erosion is expected to be minimal since trail routes are already somewhat developed.

Since refuge trails are generally contoured across slopes, flat, or and/or stabilized, erosion is not a large problem. Properly sited, designed, and maintained trails minimize this impact. Refuge trails are located in areas that avoid sensitive soils and habitats. Refuge staff has observed only negligible or minor problems with erosion during site visits, to date. Therefore, current and projected participation in these uses are not expected to increase these minor issues. Therefore, no additional hydrologic impacts are anticipated from this use.

Wildlife: Disturbance to wildlife from these uses varies based on species and the type, level, frequency, duration, and the time of year that these uses occur. The responses of wildlife to human activities includes: avoidance or departure from the site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al. 1985, Henson and Grant 1991, Kahl 1991, Klein 1993, Whittaker and Knight 1998), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior or habituation to human disturbance (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), attraction (Whittaker and Knight 1998), and an increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). Trail use can disturb wildlife outside the immediate trail corridor (Trails and Wildlife Task Force, 1998; Miller, Knight, and Miller, 2001). Miller, Knight, and Miller (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Knight and Cole (1991) suggest recreational activities occurring simultaneously may have a combined negative impact on wildlife. Hammitt and Cole (1998) conclude that the frequent presence of humans in wildland areas can dramatically change the normal behavior of wildlife mostly through “unintentional harassment.” These responses can have negative impacts to wildlife such as mammals becoming habituated to humans making them easier targets for hunters. Human induced avoidance by wildlife can prevent animals from using otherwise suitable habitat. Visitors could flush and follow various species, leading to more frequent and longer disturbance to wildlife (Boyle and Samson 1985). Over time, energetic losses from flight and dispersal can decrease foraging time or affect the amount of energy resources needed for individuals’ survival, growth, and reproduction (Geist 1978 as cited in Taylor and Knight, 2003).

Humans walking off-trail have been shown to cause greater disturbance (greater area of influence, flush distance, and distance moved) to wildlife than walking within trail corridors (Miller et al., 2001). Predictability of disturbance (on-trail versus off-trail) has been cited as a major factor in impacts to wildlife. Walking off trail is considered less predictable to wildlife and typically more disruptive (Knight and Cole, 1991; Trails and Wildlife Task Force, 1998; Miller et al., 2001). By requiring that hikers use only designated trails, we can avoid off-trail impacts to wildlife.

In addition to the disturbance caused by the presence of visitors, there are also impacts associated with noise disturbance. Documented responses of wildlife to noise include increased heart rate, startle responses, flight, disruption of behavior, and separation of mothers and young (Selye 1956, Clough 1982, Anderssen et al. 1993). Noise can mask sounds that wildlife rely on such as finding desirable habitat and mates, avoiding predators, detecting prey, and protecting young. As the background ambient sound levels increase from visitor activity, the area in which wildlife can hear these biologically significant sounds can decrease (National Park Service, 2012).

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Some uses, such as bird observation, are directly focused on viewing certain wildlife species and can cause more significant impacts during the breeding season and winter months.

Birds

Gill (2007) noted that potential human impacts to birds can result in change in distribution, population size, behavior, and demography. Individuals, populations, and communities may be affected (Miller et al. 1998). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where “generalists” (e.g., American robins (*Turdus migratorius*)) were found near trails and “specialist” species (e.g., grasshopper sparrows (*Ammodramus savannarum*)) were found farther from trails. Nest predation was also found to be greater near trails (Miller et al. 1998).

Some studies have found that some songbird species habituate to repeated intrusion. Frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Gutzwiller et al. (1994) found that singing behavior of some song birds was altered by low levels of human intrusion. Disturbance may affect the reproductive fitness of males by hampering territory defense, mate attraction, and other reproductive functions of song (Arcese 1987). Disturbance that leads to reduced singing activity can make males rely more heavily on physical deterrents in defending territories. Employing physical deterrents consumes more of the males’ time and energy than singing (Ewald and Carpenter 1978), increasing the physical demands on mating males.

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads in the eastern United States (Burger 1981, Burger 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1995, 1997, Burger and Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities always have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, 1986, Klein 1993, Burger et al. 1995, Klein et al. 1995, Rodgers and Smith 1997, Burger & Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

- Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981, Klein et al. 1995, Burger and Gochfeld 1998).
- Distance: Disturbance increased with decreased distance between visitors and species (Burger 1986), though exact measurements were not reported.
- Approach Angle: Visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993). Direct approaches may also cause greater disturbance than tangential approaches to birds (Burger and Gochfeld 1981, Burger et al. 1995, Knight and Cole 1995, Rodgers and Smith 1995, 1997).
- Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986, Klein 1993, Burger and Gochfeld 1998), though noise was not correlated with visitor group size (Burger and Gochfeld 1998).

Overall adverse impacts on birds associated with these uses are expected to be minimal. These are ongoing uses of the property which have been in place for many years. In addition, this use is concentrated along trails, leaving much of the refuge relatively undisturbed. Lastly, most visitors participating in these activities are alone, or in small groups (less than 10 people) which we expect to cause fewer disturbances than larger groups. Projected increases in these uses would be monitored by Service staff to ensure impacts to wildlife are minimal.

Organized environmental education or interpretation activities (e.g., nature walks) are more likely to involve larger groups. Because larger groups are more likely to disturb habitats and wildlife, we will require program leaders to obtain a SUP prior to conducting the event. This will allow us to collect specific information on the number of people involved, the type of event or program, limit locations for the activity (if needed), and include any other stipulations that may be warranted to protect refuge resources.

Federally Listed Species

Bog turtles may occur on small wetland areas known on the site, however, the habitat present is not optimal and the species has not been documented there.

Visitors: Wildlife observation, photography, environmental education, and interpretation activities conducted on the Nellie Hill Tract would positively contribute to appreciation and protection of migratory birds and their habitats, both on and off the refuge. The beneficial impacts of providing these wildlife-dependent activities, with some modest increases, include helping meet the existing and future demands for outdoor recreation and education. For example, birders and photographers would find high quality opportunities to engage their preferred pastimes. Visitor use may also increase over time as local residents and visitors become more aware of refuge opportunities, and as we progress in managing habitats, creating new opportunities and programs.

Eventually, the level and means of use resulting from an increase in visitation could change the nature of the experience for many visitors. Some may choose either to forgo these recreational opportunities due to issues of crowding or behavior, or to go elsewhere. If an increase in visitation does occur, it could put additional strains on other public lands, or diminish the refuge's contribution to the mission of the Refuge System. We would work to avoid that by continuing to distribute our programs and facilities to minimize conflicts among users.

As public use levels expand across time, unanticipated conflicts between user groups may occur. The refuge's visitor use programs would be adjusted as needed to eliminate or minimize each conflict and provide quality wildlife-dependent recreational opportunities.

Economic: According to the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, approximately 4,239,000 residents and nonresidents participated in wildlife-watching activities in New York State contributing \$4,151,790,000 to local economies in 2011 (USFWS and U.S. Census Bureau, 2014). While we have no estimates of the numbers of visitors that will engage in these activities on the newly established refuge, visitors will likely provide some economic benefit to the local economies by purchasing goods and services (e.g., food, gas) in and around the refuge.

PUBLIC REVIEW AND COMMENT:

As part of the evaluation of public use opportunities at the Great Thicket NWR, Nellie Hill Tract, this compatibility determination will be available for public comment for at least 14 days.

DETERMINATION (CHECK ONE BELOW):

Use is not compatible

Use is compatible, with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

Refuge staff would continue to monitor the refuge for any effects of these uses on threatened or endangered species to ensure that they are not adversely impacted. If conditions dictate, all or any part of the refuge may be permanently or temporarily closed. Any closures would be posted.

Periodic law enforcement would ensure compliance with regulations and area closures, and would discourage prohibited activities and vandalism.

Outside individuals, groups, or organizations wishing to visit the refuge to provide environmental education or interpretation activities would be required to obtain a SUP if the group number exceeds 10 participants. This will allow the refuge staff to provide important information about access, resources, and specific stipulations to reduce disturbances that may be

caused by groups compared to individuals. It will also help the refuge quantify and monitor these uses on the refuge.

Refuge visitors must stay on designated trails.

JUSTIFICATION:

Wildlife observation, wildlife photography, environmental education, and interpretation are priority public uses for the Refuge System through which the public can develop an appreciation for fish and wildlife resources. The Service's policy is to provide opportunities for these uses when compatible and consistent with sound fish and wildlife management and ensure that they receive enhanced attention during planning and management. Allowing wildlife observation, photography, environmental education, and interpretation on the Nellie Hill Tract will not materially interfere with or detract from the mission of the Refuge System or the purposes for which the refuge was established as evidenced by the impact analysis that shows these uses will not compromise our ability to achieve the goals and objectives set forth under the Great Thicket NWR Environmental Assessment. In fact, allowing these uses supports those goals and objectives and the Service's mission.

Signature: Refuge Manager: _____
(Signature and Date)

Concurrence: Regional Chief: _____
(Signature and Date)

Mandatory 15-Year Re-Evaluation Date: _____
(Date)

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