

### Finding of Appropriateness of a Refuge Use

Refuge Name: Edwin B. Forsythe National Wildlife Refuge

Use: Geocaching (no physical cache)

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, Tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use [“no” to (a)], there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe [“no” to (b), (c), or (d)] may not be found appropriate. If the answer is “no” to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes X No \_\_\_\_\_.

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

**Not Appropriate** \_\_\_\_\_

**Appropriate** X

Refuge Manager: \_\_\_\_\_ Date: \_\_\_\_\_

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.

If found to be **Appropriate**, the refuge supervisor must sign concurrence:

Refuge Supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

**A compatibility determination is required before the use may be allowed.**

## JUSTIFICATION FOR A FINDING OF APPROPRIATENESS OF A REFUGE USE

**Refuge Name:** Edwin B. Forsythe National Wildlife Refuge

**Use:** Geocaching

### **Narrative:**

The U.S. Fish and Wildlife Service (Service) policy on Appropriate Refuge Uses (603 FW 1) states, “General public uses that are not wildlife-dependent recreational uses, as defined by the National Wildlife Refuge System Improvement Act and do not contribute to the fulfillment of refuge purposes or goals or objectives as described in current refuge management plans are the lowest priorities for refuge managers to consider. These uses are likely to divert refuge management resources from priority general public uses or away from our responsibilities to protect and manage fish, wildlife, and plants, and their habitats. Therefore, both law and policy have a general presumption against allowing such uses within the National Wildlife Refuge System.”

Priority public uses for national wildlife refuges—particularly wildlife observation and interpretation—can be facilitated by geocaching programs, in which visitors search for a location on the refuge using Global Positioning Satellites and learn about habitat, wildlife or history (as examples) when they reach the site. Only non-physical caches are considered in this review. These activities can bring nontraditional visitors to the refuge, providing the opportunity to inform them about the mission of the Service and the National Wildlife Refuge System (Refuge System) in a safe and unique manner. Geocaching involves walking or biking in designated areas of the refuge. This opportunity, advertised on appropriate publicly accessible websites, will build awareness of the Refuge System and will attract new visitors, many of whom might engage in other wildlife-dependent activities while at the refuge. Additionally, this use would encourage geocachers to stop at the visitor information center to obtain refuge or wildlife viewing information. The use can be maintained with current funding and staffing levels and will enhance, and not conflict, with existing uses.

These uses are anticipated to have similar impacts as other priority public uses such as interpretation and wildlife observation. Impacts of these uses will likely be minimal if conducted in accordance with refuge regulations.

For the reasons above, geocaching (no physical cache) program participation is an appropriate use on Edwin B. Forsythe National Wildlife Refuge.

The compatibility determination for this use will be distributed for public comment for 14 days.

## **COMPATIBILITY DETERMINATION**

**USE:**

Geocaching (no physical cache)

**REFUGE NAME:**

Edwin B. Forsythe National Wildlife Refuge

**ESTABLISHNG AND ACQUISITION AUTHORITY(IES):**

The Edwin B. Forsythe National Wildlife Refuge (Forsythe Refuge) was created on May 22, 1984 by combining the former Brigantine and Barnegat National Wildlife Refuges (98 Stat. 207). The Brigantine National Wildlife Refuge was established on January 24, 1939 by the Migratory Bird Conservation Commission, under the authority of the Migratory Bird Conservation Act (16 U.S.C. section 715d) to preserve estuarine habitats important to the Atlantic brant (*Branta bernicla*) and to provide nesting habitats for black ducks (*Anas rubripes*) and rails (*Rallidae*). The Barnegat National Wildlife Refuge was established on June 21, 1967, under the authority of the Migratory Bird Conservation Act (16 U.S.C. section 715d) to preserve estuarine feeding and resting habitat for ducks and brant. Forsythe Refuge is managed by the U.S. Fish and Wildlife Service (Service).

**REFUGE PURPOSES:**

For lands acquired under the Migratory Bird Conservation Act (16 U.S.C. section 715-715r) as amended, "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." (16 U.S.C. section 715d)

For lands acquired under the Fish and Wildlife Act of 1956 (16 U.S.C. section 742(a)-754) as amended, "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." (16 U.S.C. section 742 (a) (4)) "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." (16 U.S.C. section 742f (b) (1))

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

For lands designated as parts of the National Wilderness Preservation System under P. L. 93-632, "...to secure for the American people of the present and future generations the benefits of an enduring resource of wilderness." (78 Stat. 890, 16 U.S.C. 1121 (note), 1131-1136)

**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." (National Wildlife Refuge System

Improvement Act of 1997, Public Law 105-57)

**DESCRIPTION OF ACTION:**

- a) **What is the use? Is the use a priority public use?** The use is geocaching (no physical cache).

Geocaching is an outdoor activity in which the participants use a Global Positioning Satellite (GPS) receiver, mobile device, or other navigational technique to find, hide, and/or seek containers called “geocaches” or “caches.” A typical cache is a small, waterproof container containing a logbook where the geocacher enters the date in which it was found and signs the book. Larger containers such as plastic storage containers or ammunition boxes can also contain items for trading, usually toys or trinkets of little value. Geocaching of physical caches is not appropriate and not compatible on national wildlife refuges as it does not comply with Federal regulations or Service policy and guidance because it involves leaving behind objects (50 CFR §27.93) and may involve digging which could disturb sensitive natural and cultural resources (50 CFR § 27.62).

Geocaching with no physical caches does not involve leaving or removing any items on the refuge. There are several web sites that support this activity, including [www.geosociety.org/earthcache](http://www.geosociety.org/earthcache), [www.geocaching.com/railstotrails](http://www.geocaching.com/railstotrails), and [www.waymarking.com](http://www.waymarking.com). While this is not a complete list, these forms of caching focus on the use of a GPS or other means to locate places of interest such as a landmark or a scenic vista rather than a hidden box with items to trade. These forms of caching are allowed on national wildlife refuges if found appropriate and compatible.

Geocaching is not a priority public use. However, it can be used to facilitate priority public uses of the Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), such as education and interpretation, wildlife observation and photography. These priority uses can be facilitated by using the caching activity to lead visitors to areas of interest, to create a virtual tour that interprets different parts of the refuge, and by leading visitors into visitor centers where they can partake in other interpretation and education events. To ensure geocaching supports priority public uses, we would only allow activities on the refuge that are designed or approved by the refuge manager.

- b) **Where would the use be conducted?** Geocaching activities will only be allowed in areas of the refuge open to the public. These areas could include the Wildlife Drive, Songbird Trail, Leeds Eco-trail, deCamp Wildlife Trail, the Barnegat Overlook area, Holgate Beach and the Service-owned portion of Eno’s Pond County Park. Once opened to the public, the trails at Cedar Bonnet Island and Good Luck Point would also be available for this use. Geocaching activities will avoid areas sensitive to disturbance (e.g., sensitive vegetation areas, sensitive breeding areas, areas with endangered, threatened, or rare animals and plants) or degradation (e.g., soil compaction), and will be designed to avoid or minimize impacts to endangered species, nesting birds, or other breeding, feeding, or resting wildlife. Certain areas of the Forsythe Refuge are seasonally closed to this use at the refuge manager’s discretion to protect sensitive habitats or species of concern, minimize conflicts with other refuge activities, or due to human health and safety concerns.
- c) **When would the use be conducted?** Forsythe Refuge is open to the public from 1/2-hour before sunrise to 1/2-hour after sunset. Geocaching would occur during regular refuge hours throughout the year in any areas open to public access. Use of the refuge for these activities is likely to be highest in spring and fall.

- d) **How would the use be conducted?** The use is primarily facilitated by walking and biking access. Interpretive materials associated with geocaching give the general public an opportunity to learn about Forsythe Refuge, the Refuge System, and the Service. The use is self-regulating, with geocaching coordinates and clues designed to keep visitors on designated trails or within open public areas. Designated wildlife observation trails on the refuge are described and interpreted in brochures and on the refuge's Web site. As new, authorized trails are made, refuge brochures and kiosks will be updated to show all designated trails. Some areas may not be available to geocaching year-round, depending on staffing and seasonal wildlife-related closures. The refuge manager will approve all cache locations and all areas where geocaching would be permitted. Geocaching can occur on an individual or group basis. To accommodate other users and promote a positive wildlife observation experience, we encourage smaller group sizes (less than 10 members).

Geocaching opportunities advertised on appropriate public web sites would build awareness of the Refuge System and would attract new visitors, many of whom would partake in wildlife-dependent activities while at the refuge. Additionally, people partaking in geocaching would be encouraged to stop at refuge informational kiosks and the visitor information center to obtain refuge or wildlife viewing information, or to partake in a wildlife-dependent activity.

- e) **Why is this use being proposed?** Geocaching is not a priority public use; however, it can facilitate priority public uses on the refuge – particularly wildlife observation and interpretation – and engage a part of the public that may not traditionally visit the refuge. When designed carefully, this activity can be used as a form of interpretation to educate the public about refuge management challenges and goals, refuge missions, and priority public uses. It will allow visitors to experience more of the wildlands on the refuge, although it will be restricted to designated trails or open areas in the Wilderness area. Geocaching opportunities, advertised on appropriate public websites, will build awareness of the Refuge System and attract new visitors, who will partake in wildlife-dependent activities while at the refuge.

#### **AVAILABILITY OF RESOURCES:**

The estimated cost of allowing geocaching within areas open to the public are fairly low because little infrastructure is needed. The majority of costs relate to staff time to develop programming around the activity and for promotion.

Program Oversight (visitor services manager-40 hours):	\$1,350
Monitoring Resource Impacts (fish and wildlife officer-40 hours):	\$1,300
Materials	\$500
Total annual recurring costs:	\$3,150

The financial and staff resources necessary to provide and administer these uses at their current levels are currently available. We expect the resources to continue in the future, subject to availability of appropriated funds.

## **Anticipated Impacts of the Use**

The proposed use is anticipated to have the same level of impacts as other refuge uses, such as walking or biking because the access and activities are very similar. Because these activities will be supervised by refuge staff, impacts of geocaching will likely be minimal if conducted in accordance with refuge regulations. Following are descriptions of potential adverse effects on natural resources from geocaching accessed by walking and biking in authorized areas within the refuge.

Approximately 170,000 people visit the refuge each year to engage in non-consumptive priority public uses (wildlife observation, photography, environmental education and interpretation). We do not expect an increase of more than about 3% visitation due to geocaching. In general, we expect impacts to refuge resources to be negligible or minor because the projected level of use is low, geocache routes must be approved by refuge staff, and the use will occur in areas of the refuge already open to public use. We will consider each proposed geocache route for its potential to impact refuge resources, and will not approve any that will lead to adverse impacts to soils, wildlife, vegetation, water quality, or hydrology. For example, we would not approve a route or site that would encourage visitors to walk through sensitive wetlands or through important breeding habitat. If, after approved, a particular route causes any negative impacts on refuge resources, we will relocate or discontinue that route.

Geocaching will generally occur on designated roads, trails, pull-outs, overlooks, and the visitor information center that are on Service-owned areas. Refuge staff will routinely monitor roads, trails, and boardwalks for damage and remediate problem areas as needed. Although some unauthorized off-trail use may occur, the majority of users are expected to stay on trails and roads, as visitors do now. Off-trail use would be dispersed and likely be minimal. However, off-trail foot traffic could cause some vegetation loss, increased tree root exposure and trampling effects. Unmanaged geocaching has the potential to damage or kill plants adjacent to designated trails and can lead to new unwanted “informal” trails on the refuge that become short-cuts through more ecologically sensitive sites. Heavy use of designated, managed, or unmanaged pedestrian travel routes can ultimately lead to areas void of vegetation and changes to the ecosystem (Barros and Pickering 2017; McDonnell 1981). We will direct users to remain on existing trails and roads through signage and refuge brochures. Refuge staff will monitor all trails, identify problem areas, close areas as warranted, and conduct appropriate restoration and protection efforts.

People can be vectors for invasive plants when seeds or other propagules are moved from one area to another. The threat of invasive plant establishment would always be an issue requiring annual monitoring, and when necessary, treatment. Staff would work to educate the visiting public to reduce introductions and would also monitor and control invasive species. This threat is considered to be minimal and no more likely than what could occur along trails by walkers.

Short-term, minor disturbances are to be expected for wildlife by geocachers. However, we do not anticipate any major, long-term impacts on wildlife from allowing the use as the trails are already in regular use with little impact to wildlife.

Several studies have examined the effects of recreation on birds using habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States. Overall, the existing research demonstrates that disturbance from recreational activities has at least temporary effects on the behavior and movement of birds and other animals within a habitat or localized area. The findings that were reported in some studies are summarized below regarding visitor activity and 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). Birds developed more slowly during periods of increased public use (Remacha et al. 2016). Mammalian use of trails in eastern forests was not impacted by hikers (Kays et al. 2017).

**Trail Density:** Bird nesting density decreased with increased trail density within a forested patch (Thompson 2015).

**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 (such as along trails) (Burger and Gochfeld 1981, Burger et al. 1995, Knight and Cole 1991, Rodgers and Smith 1995, Rodgers and Smith 1997, Smith-Castro and Rodewalk 2010).

**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).

We will take all necessary measures to minimize impacts by geocachers. We will evaluate the sites and programs periodically to assess whether they are meeting the objectives, are manageable under current staffing and funding levels, and to prevent site degradation. If evidence of unacceptable adverse impacts appears, we will rotate the activities to secondary sites, or curtail or discontinue them. We will close areas seasonally around active bird nesting sites and avoid recreational use of areas where federally listed species occur to minimize or eliminate human disturbance, as needed. We will post and enforce refuge regulations, and establish, post, and enforce closed areas. We anticipate that the minor increase in use of the refuge due to geocaching can be managed with existing funding and staffing levels.

#### **PUBLIC REVIEW AND COMMENT:**

This Compatibility Determination will be available for a 14-day public review and comment period. Notification will be posted at the refuge headquarters and visitor information center, on the refuge website (<http://www.fws.gov/northeast/forsythe>), and the refuge Facebook page. Comments can be sent to the refuge at [forsythe@fws.gov](mailto:forsythe@fws.gov) or PO Box 72, Oceanville, NJ 08231.

#### **DETERMINATION (check one below):**

- Action is Not Compatible  
 Action is Compatible with Following Stipulations

#### **STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:**

- No geocache shall be created or posted on public websites without the permission of appropriate refuge staff.
- No physical item shall be placed or left on the refuge.
- Geocaches will only be created in areas open to the public where there is a designated trail.

- All individuals partaking in geocaching must adhere to area closures and understand that certain caches may not be available year-round.
- Appropriate notification must be listed on public web sites when a geocache is not available as a result of area closures.
- Should monitoring and evaluation of the use(s) indicate that the compatibility criteria are or will be exceeded, appropriate action will be taken to ensure continued compatibility, including modifying or discontinuing the use.

**JUSTIFICATION:**

The Service and the Refuge System maintain the goal of providing opportunities to view wildlife and to engage in interpretation. Allowing geocaching on refuge areas that are already open to the public supports this goal. Geocaching would provide visitors the opportunity to view wildlife and learn about the refuge; hence, promoting public appreciation of the conservation of wildlife and habitats. Geocaching is not a priority public use; however, it facilitates priority public uses on the refuge, such as interpretation and wildlife observation.

In general, we expect impacts to refuge resources to be negligible or minor because the projected level of use is low, geocache routes must be approved by refuge staff, and the use will occur in areas of the refuge already open to public use. We will consider each proposed route for its potential to impact refuge resources, and will not approve any that will lead to adverse impacts to soils, wildlife, vegetation, water quality, or hydrology. If, after approved, a particular geocache route causes negative impacts to refuge resources, we will relocate or discontinue that route. For these reasons, we believe that geocaching activities would not materially interfere with or detract from the fulfillment of the Refuge System mission or the refuge's purposes.

**Signature - Refuge Manager:** \_\_\_\_\_  
 (Signature and Date)

**Concurrence - Regional Chief:** \_\_\_\_\_  
 (Signature and Date)

**Mandatory 10-year Reevaluation Date:** \_\_\_\_\_

**LITERATURE CITED:**

- Barros, A. and C.M. Pickering. 2017. How networks of informal trails cause landscape level damage to vegetation. Environmental Management 60:57-68.
- Burger, J. 1981. Effect of human activity on birds at a coastal bay. Biological Conservation. 21: 231-241.
- Burger, J. 1986. The effect of human activity on shorebirds in two coastal bays in northeastern United States. Biological Conservation 13: 123-130.

- Burger, J. and M. Gochfeld. 1981. Discrimination of the threat of direct versus tangential approach to the nest by incubating herring and great black-backed gulls. *Journal of Comparative Physiological Psychology*. 95: 676-684.
- Burger, J., M. Gochfeld, and L.J. Niles. 1995. Ecotourism and birds in coastal New Jersey: Contrasting responses of birds, tourists, and managers. *Environmental Conservation* 22: 56-65.
- Burger, J. and M. Gochfeld. 1998. Effects of ecotourists on bird behavior at Loxahatchee National Wildlife Refuge, Florida. *Environmental Conservation* 25: 13-21.
- Cole, D.N., and P.B. Landres. 1995. Indirect effect of recreation on wildlife in Knight, R.L, and K.J. Gutzwiller, eds. 1995. *Wildlife and Recreationists—Coexistence through Management and Research*. Washington, DC, Island Press.
- Kays, R., Parsons, A. W., Baker, M. C., Kalies, E. L., Forrester, T., Costello, R., Rota, C. T., Millspaugh, J. J. and McShea, W. J. 2017. Does hunting or hiking affect wildlife communities in protected areas? *J Appl Ecol*, 54: 242–252.
- Klein, M.L. 1993. Waterbird behavioral responses to human disturbance. *Wildlife Society Bulletin* 21:31-39.
- Klein, M.L., S.R. Humphrey, and H. F. Percival. 1995. Effects of ecotourism on distribution of waterbirds in a wildlife refuge. *Conservation Biology* 9: 1454-1465.
- Knight, R.L., and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. *Transactions of the 56th North American Wildlife and Natural Resources Conference* pp.238-247.
- McDonnell, M.J. 1981. Trampling effects on coastal dune vegetation in the Parker River National Wildlife Refuge, Massachusetts, USA. *Biological Conservation* 21(4): 289-301.
- Remacha, C., J.A. Delgado, M. Bulaic, and J. Pérez-Tris. 2016. Human disturbance during early life impairs nestling growth in birds inhabiting a nature recreation area. *PLoS One*, 11 <http://dx.doi.org/10.1371/journal.pone.0166748>
- Rodgers, J.A. and H.T. Smith. 1995. Set-back distances to protect nesting bird colonies from human disturbance in Florida. *Conservation Biology* 9: 89-99.
- Rodgers, J.A. and H.T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. *Wildlife Society Bulletin* 25: 139-145.
- Roovers, P., K. Verheyen, M. Hermy, and H. Gulinck. 2004. Experimental trampling and vegetation recovery in some forest and heathland communities. *Applied Vegetation Science* 7:111-118.
- Smith-Castro, J.R. and A.D. Rodewald. 2010. Behavioral responses of nesting birds to human disturbance along recreational trails. *Journal of Field Ornithology* 81:130-138.
- Thompson, B. 2015. Recreational trails reduce the density of ground-dwelling birds in protected area. *Environmental Management* 55:1181-1190.