**[COMPATIBLE USE DETERMINATION](https://www.fws.gov/policy/603fw2.html" \l "(a)%20%20%20-%20(g))**

**Use:** *Re-lighting the Historic Cedar Keys Light Station*

**Refuge Name:** Cedar Keys National Wildlife Refuge

**Location:** Cedar Key, Levy County, Florida

**Date Established:** July 16, 1929

**Establishing and Acquisition Authority:**

* Executive Order 5158 established Cedar Keys NWR on July 16, 1929 with a second Executive Order, dated 6 November 1939, added Seahorse Key to the refuge.
* Congressional Legislative Mandate No. 92-364, dated August 7, 1972, designated portions of the Cedar Keys NWR as National Wilderness Areas under the Wilderness Act of September 3, 1964 (Public Law 88-577).
* Migratory Bird Conservation Act -- (February 18, 1929) [16 U.S.C. 667b]
* Real Property Transfer Act, PL 80-537 -- (May 19, 1948) [16 U.S.C. 742]
* Fish and Wildlife Act of 1956 -- (August 8, 1956) [16 U.S.C. 1131-1136]
* Refuge Recreation Act, and amendments -- (September 28, 1962) and PL 93-205 (December Public Law 93-632, January 3, 1975

**Refuge Purposes:**

These purposes and the mission of the National Wildlife Refuge System are fundamental to determining the compatibility of proposed uses for the Cedar Keys NWR.

The purposes of Cedar Keys NWR are:

* "…as a refuge and breeding ground for birds and wild animals, subject to valid existing rights...." Executive Order 5168, July 16, 1929
* “*...* 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, and
* "...the Secretary...may accept and use...real...property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors...."

16 U.S.C. § 460k-2, as amended.

**National Wildlife Refuge System Mission:**

"The mission of the National Wildlife 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 r sources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended) [16 U.S.C. §668dd-668ee].

**(a) Description of Use:**

The use under consideration is the re-lighting of the replica Fresnel lens in the historic Cedar Keys Light Station on the Cedar Keys National Wildlife Refuge (Refuge). The lighting of the beacon light would be ceremonious and episodic, for short periods of time in the evening before dark, using a single 220-watt bulb. Measures to minimize impacts on wildlife are listed below.

The Cedar Keys Light Station (Light Station) was completed and lit in 1854. Extinguished during the Civil War, the light was put back into service at the end of the war through 1915, when it was de-commissioned. Seahorse Key, including the lighthouse, became part of the Cedar Keys National Wildlife Refuge, established in 1929. The Cedar Keys Light Station remains as the oldest standing lighthouse on the west coast of Florida. Since 1952, the University of Florida (UF or University) has leased 3.2 acres of this particular wildlife refuge island, including the Light Station, for use as a marine laboratory for education and research. The actual Light Station is now primarily used as a dormitory for visiting scientists, teachers, and students. Open houses are held several times a year that allow the public to come to the island and tour the Light Station, lab, and property. The local community is excited that the beacon would be ceremoniously re-lit during special events, open houses, and holidays throughout the year.

Relighting of the replica lens in the Light Station is a non-wildlife-dependent use and is not a priority public use of the Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997. However, re-lighting of the replica lenses in the Cedar Keys Light Station supports the priority uses of photography and interpretation, would enhance the visitor experience to the Refuge, and has potential to increase public visitation, education about historical resources, use, and recognition of the Refuge. The Cedar Keys light beacon would be a non-navigational light and is not important for mariner safety. The light has significant cultural heritage and historic importance to the local community and refuge visitors.

**(b) Where would the use be conducted?**

The Cedar Keys Light Station is located on Seahorse Key three miles Gulf-ward from the town of Cedar Key, Florida. The light would be wired in the replica 4th order Fresnel lens installed in the historic platform in the lantern rooms of the Light Station. The lantern room is not publicly accessible as a visitor safety measure.

**(c) When would the use be conducted?**

The Cedar Keys light would be turned on for a short time, ceremoniously and episodically, before astronomical nighttime, by trained Refuge or University staff for special events throughout the year. As of this document, we do not have an estimate of how many times per year this would be lit for special events.

**(d) How would the use be conducted?** The approved light instrument would be designed specifically for the spectrum, intensity, direction and duration necessary to recreate the historic light parameters at the Cedar Keys Light Station. Refuge and UF staff would be trained on the appropriate use and maintenance of the light. The lighting instrument, including Fresnel lenses and associated equipment, would be regularly inspected with maintenance and repair conducted as needed.

**(e) Why is the use being proposed?**

The Service supports cultural interpretation and education on Refuge lands. Re-lighting the historic light would enhance the visitor experience by supporting photography (including wildlife photography) and interpretation of the historic sites in relation to the location, ecosystem, and cultural history.

**Availability of Resources:**

The cost of allowing this use on the Refuge is absorbed within the Refuge’s operating budget as this use lies mainly with the University. This use does not require additional staff for enforcement or other purposes. Within the operating budget, personnel time associated with administration and law enforcement, maintenance, and monitoring of site for impacts of public use are included.

*Resources involved in the administration and management of the use:*

Personnel time associated with administration and law enforcement are involved. Existing staffing and funding are currently adequate to support these activities. Refuge staff would direct maintenance, administration, and management of the light in the Light Station tower.

*Special equipment, facilities, or improvements necessary to support the use:*

Once the lens and associated lighting equipment are installed, the University would provide power and maintenance to the light with Refuge assistance as needed. Existing infrastructure. Including the Light Station, are sufficient to support the use.

*Maintenance costs:* Per Agreement Number 1448-40181-02-K-005, the University of Florida agrees to maintain the historic Cedar Keys Light Station at Seahorse Key and is responsible for cleaning, painting, repairs, and other maintenance of the structure and attendant historic facilities (oil storage house and water tanks). Maintenance costs are expected to be minimal from this use on the Cedar Keys Light Station. There are no expected increased costs to maintain Refuge infrastructure outside of other Light Station uses.

*Monitoring costs:* UF staff and volunteers, and Refuge staff, would monitor costs and other impacts of the Cedar Keys light on Seahorse Key. Wildlife, including birds, would be monitored to determine negative effects as a result of this use after each lighting event. Monitoring and compliance requirements would be handled within existing resources, programs, and staff time.

*Offsetting revenues*: None

**Anticipated Impacts of Use:**

*Short-term Impacts:* The effect of lighthouses on birds has been long documented (Allen 1880) and effects on amphibians, insects, and pollinators more recently studied (Brown et al. 2007, Buchanan 2002, Eisenbeis et al. 2009, Frank 1998). Migrating birds and fledglings may become disoriented or attracted to and “trapped in” artificial lights, particularly petrels and shearwaters (Aubrecht et al. 2010) and other procellariform birds (Reed et al. 1985). Birds in the beam of light are more vulnerable to collision with other birds or structures, exhaustion, and a secondary threat of predation (Eisenbeis et al. 2009).

Other studies found lighthouses today to be a negligible source of avian mortality (Avery 1979). Inconsistencies in avian responses to lighting structures may be related to characteristics of individual lamps, such as wavelength, or intensity (Gauthreaux and Belser 2006). Light signature can have dramatic effects on migrating nocturnal birds. In one study in Ontario, a narrower and dimmer light reduced avian mortality and a going from a revolving beam to a strobe greatly reduced bird kills in England (Jones and Francis 2003). Floodlit structures such as towers, buildings, or lighthouses show higher bird strikes than unlit structures (Banks 1979). Steady-burning lights, fixed and rotating beams are consistently (although not exclusively) associated with higher avian mortality in comparison studies (Jones and Francis 2003, Longcore and Gauthreaux 2008, Verheijen 1985) and colored lights are associated with lower mortality than white lights (Longcore et al. 2018, Muster et al. 2009). While reddish-tinted or bluish lights are shown to be less attractive to migrating birds, the Federal Aviation Authority does report there are more bird strikes on the left (red light) side of planes (Dolbeer and Barnes 2017). Additionally, the geographic location of lights and proximity to bird routes, along with their height, light beam projection, their lighting schemes (intensity, duration, timing, angle of display, etc.), proximity to other lights in urbanized areas, all contribute to negative effects on nocturnally migrating birds.

Van Doren et al. (2017) quantified the harmful bird responses to the powerful, ground-based light that shine up into the sky, of the September 11 memorial in heavily urbanized and light-polluted New York City. By extreme contrast the Cedar Keys light is a single, 220-watt light bulb inside a Plexiglas replica Fresnel lens 75 feet above sea level, shining a relatively weak, single beacon, horizontally, located on an offshore island three miles from the town of Cedar Key, Florida, population less than 800. A comparatively similar light house (but different in certain aspects) to Cedar Keys Light Station is the Egmont Key Light House, on Egmont Key, an offshore island at the mouth of highly urbanized and photo polluted Tampa Bay. Egmont’s light is an active, year-round, flashing, navigational light 87 feet above sea level, on a NWR island that also hosts a prolific shorebird-nesting colony. The island and area around the light are well monitored by Florida Parks and Refuge staff. The island park manager, the Refuge’s biologist, and the Refuge’s public use specialist have a combined set of experience of over 50 years; they have affirmed that there have never been negative bird interaction issues with this light (Personal Communication 1, 2019).

The Cedar Keys light on Seahorse Key has not been an Aid to Navigation since 1915, but has had a lit light bulb in the tower on and off for special events, marine lab occupancy of the Light Station, including the streetlight outside the historic building for staff and student use and safety. Since the Seahorse Key Marine Lab was founded in 1952 and up until 2016, Seahorse Key was the largest wading bird rookery on the Gulf of Mexico. Since 1952 there have been full-time and part-time residents living at the Light Station who have used various lighting effects for the different domestic, scientific, and educationally-related uses of the property and buildings. The Seahorse Key Marine Lab’s nighttime activities in the historic Light Station, including a bright streetlight by the Light Station, has been operational for years. No effects to wildlife by the lighting schemes on Seahorse Key were noted during or following these diverse and varied activities and events (Personal Communication 2, 2019). Once the Cedar Keys Light Station beacon is re-lit, UF staff, Refuge staff, and volunteers would monitor around the Light Station for short-term impacts to wildlife by evaluating any bird or other animal mortality after each lighting event. Additionally, monitoring of disturbance to bird nesting colonies would occur as per the condition below.

*Long-term Impacts:* Repeated short-term effects of attraction or disorientation of fledglings or migrating birds are unlikely to affect a species at a population level, but could result in increased mortality leading to reduced breeding success and recruitment. Refuge or USFWS staff would monitor for long-term impacts to wildlife, with a focus on the time of year when fledging in nesting colonies occur and at peak fall and spring migrations.

*Cumulative Impacts:* No cumulative impacts (reasonably certain to occur but occurring later in time) are anticipated from this use; however, monitoring of animals and their habitats would take place and re-evaluation of this use would take place if negative impacts were noted.

**Public Review Comment:**

A 14-day public review and comment period will being began on 27 November 2019 and will end on 16 December 2019. Copies of the document are displayed in the Lower Suwannee and Cedar Keys National Wildlife Refuges office. The document is available on the Cedar Keys National Wildlife Refuges website and the Friends of the Lower Suwannee and Cedar Keys National Wildlife Refuges website as well as other websites.

**Determination:**

*X* Use is Compatible with Following Stipulations

\_\_\_ Use is Not Compatible

**Stipulations Necessary to Ensure Compatibility:**

A combination of the following mitigation measures would be considered to reduce the duration, intensity, or extent of the potential negative effects of the light on bird interactions at the Cedar Keys Light Station’s light. Additionally, as issues may arise with the light we intend to adapt and modify our measures to accommodate any means necessary to avoid negative effects on wildlife by the lighting events.

1. These measures would be evaluated and if necessary, modified and improved after one year on 5 July 2020 and every year thereafter based on information gathered as a result of monitoring.
2. Height of the light room: the Cedar Keys light is 75 feet ASL and sits just above a very dense tree line. Literature states only 1-15% of migrants fly below 300’ during clear weather.
3. Based on literature referenced below, we intend to minimize the color spectrum of the lights. Yellow (570 nanometers) is preferred to bright white. Red, amber, or bluish lights are less attractive to migrating birds.
4. The light intensity would be at the lowest level needed; currently the light is a single 220-watt bulb.
5. Cedar Keys Light Station’s light would be lit ephemerally and occasionally for ceremonial purposes between sunset and dark for short periods of time.
6. The light can lit be after sunset through the ["blue hour"](https://www.timeanddate.com/astronomy/blue-hour.html), into ["astronomical twilight"](https://www.timeanddate.com/astronomy/astronomical-twilight.html) ending just after ["astronomical dusk"](https://www.timeanddate.com/astronomy/astronomical-twilight.html), but not extending beyond astronomical dusk which is the beginning of night time, when the last shimmer of natural daylight disappears. These times are referenced off the [U.S. Naval Observatory Astronomical Applications Department website](https://aa.usno.navy.mil/data/docs/RS_OneYear.php). This allows calculation of when the phases of twilight occur throughout the year.
7. Flashing or rotating lights are less likely to attract wildlife. The Cedar Keys Light Station is a Fresnel lens-type that rotates a beam and is not a steady light. As the beam rotates, it would not be strong enough to shine conspicuously at sensitive wildlife habitats.
8. The [BirdCast website](http://birdcast.info/live-migration-maps/) would serve as a monitoring of bird activity resource.
9. If the light is even lit during stormy weather and high migratory activity it would be for a much shorter time and it would end in astronomical twilight, well before astronomical dusk as determined by the [U.S. Naval Observatory Astronomical Applications Department website](https://aa.usno.navy.mil/data/docs/RS_OneYear.php)’s tables. Astronomical twilight is when there is still light in the sky and fixed objects of potential harm to birds are still visible to the naked eye.
10. Monitoring of bird nesting colonies on nearby islands would occur for at least one year. On Seahorse Key, should nesting wading birds return, a re-evaluation of the lighting scheme would occur.
11. Monitoring for bird strikes would occur during and after any lighting event. The area around the Cedar Keys Light Station would be consistently monitored when the light has been lit. If bird strikes occur, these would be documented and reported to the Cedar Keys NWR manager ([Andrew\_Gude@fws.gov](file:///\\Ifw4fo-fllsw\Users\agude\My%20Documents\LSNWR\CD%20and%20Compatibility\CK%20Light%20Station%20Lighting\Cedar%20Keys%20Light%20Only\Andrew_Gude@fws.gov)).

**Justification**:

There is no documentation of bird strikes at the Cedar Keys Light Station. As a historic light beacon, there is strong public support to re-light it. The Cedar Keys Light Station’s light would only be used for ceremonial lightings – special events, open houses, and holidays and would not be considered for the Private Aid to Navigation status. It has been coordinated with the U.S. Coast Guard and with the Federal Aviation Administration. Monitoring would be conducted to ensure this use remains compatible. If negative effects to wildlife are noted, a re-evaluation would be conducted and actions implemented to avoid or minimize these effects.

After fully considering the impacts of this activity, it is the Refuge’s determination that this use would not materially interfere with or detract from the purposes of the Refuge(s) or the mission of the Refuge System. These activities would remain compatible with the implementation of the listed stipulations.

This Compatibility Determination is based on sound professional judgement and the best available science.

This use complies with Department of the Interior policy as follows:

* Department of the Interior Policy 516 DM 8.5 B (7) Categorical Exclusions: Minor changes in the amounts or types of public use on Service or State-managed lands, in accordance with existing regulations, management plans, and procedures.

**NEPA Compliance for Refuge Use Description:**

**X**  Categorical Exclusion without Environmental Action Statement

\_\_\_\_\_\_\_ Categorical Exclusion and Environmental Action Statement

\_\_\_\_\_\_\_ Environmental Assessment and Finding of No Significant Impact

\_\_\_\_\_\_\_ Environmental Impact Statement and Record of Decision

**Mandatory 10-year Re-evaluation Date:** August 2029

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Personal Communication 1, with Andrew Gude, Cedar Keys NWR Manager: 1) Joyce Kleen, Refuge biologist. email and phone call, June 2019; 2) Stan Garner, former law enforcement officer/regional chief/zone officer, now public use specialist; email and phone call, June 2019; 3) Tom Watson, Egmont Key resident State Park ranger; email 20 June 2019.

Personal Communication 2, with Andrew Gude, Cedar Keys NWR Manager: Kenny McCain, former Cedar Keys NWR law enforcement officer, life-long Cedar Key resident, and current Seahorse Key Marine Lab operations manager; July 2019.

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