

## **FLORIDA BEACHES HCP ISSUE ANALYSIS**

**TITLE OF DOCUMENT:** Assessing and Addressing Lighting Impacts

**DRAFT VERSION:** Draft 1.0 (RGE)

**STEERING COMMITTEE MEETING DATE:** 06/13/12

**HCP OBJECTIVE:** Allow the FDEP to fulfill its CCCL permitting responsibilities in compliance with the Federal Endangered Species Act (ESA) by obtaining a Section 10 Incidental Take Permit (ITP) from the U.S. Fish and Wildlife Service. The FDEP's Bureau of Beaches and Coastal Systems is developing the Florida Beaches Habitat Conservation Plan (FBHCP) to support the ITP application. One of the principal components of the FBHCP is an estimate of the amount of take likely to result from CCCL permitted activities over the 25-year term of the ITP.

**ISSUE UNDER CONSIDERATION:** To ensure that incidental take of covered species is adequately quantified, as well as minimized and mitigated to the maximum extent practical, sufficient data must be acquired to conduct a reliable impact assessment. How should lighting be addressed in the HCP to ensure that lighting-related impacts are adequately addressed?

**DESCRIPTION OF ISSUE:** A large number of activities are permitted each year under the CCCL Program, each with its own set of potential direct and indirect impacts. Direct impacts are those that occur at the time the activity is undertaken (e.g., during construction of a condominium), while indirect impacts are those that occur later in time or are spatially removed (e.g., lighting from a newly constructed condominium affecting sea turtle hatchlings on beaches fronting adjacent properties). As discussed below, the Working Group has developed an approach to estimating take that considers the collective impacts, both direct and indirect, associated with various categories of CCCL activities, as opposed to assessing each direct and indirect impact separately. Yet given the large number of hatchlings disoriented by artificial lighting on Florida's beaches each year, it has been argued that impacts associated with lighting should be assessed independently of other impacts.

### **BACKGROUND INFORMATION:**

- Complexity of Impact Assessment – The impact assessment for the FBHCP is extremely complex: (a) the Plan Area is very large in geographic scale; (b) there are a large number of covered species (at least 12 and as many as 19), each with different spatial and temporal distributions, behaviors, and habitat requirements; (c) the term of the ITP is relatively long, with conditions in the Plan Area likely to vary appreciably over that period, and (d) as mentioned above, there are a large number of activities permitted under the CCCL Program, each with its own set of potential direct and indirect impacts.

- Approach to Impact Assessment – Given this complexity and the large number of possible impact scenarios (combinations of location, species, activity, and time of occurrence), the approach being taken is to simplify the assessment whenever possible. Thus, CCCL activities have been grouped into eight broad categories, species have been lumped into five groups (sea turtles, beach mice, nesting shorebirds, non-nesting shorebirds, and the gopher tortoise), and take is being estimated for each CCCL activity category and species group. The amount of occupied habitat (either acreage or linear feet of shoreline) affected for each species group is being used as a surrogate for the number of individuals impacted, as the latter would be extremely difficult to estimate with existing data. The primary underpinning of this approach is that the take estimate encompasses all direct and indirect impacts associated with each CCCL activity category, which are described in detail for each species group in Chapter 7 of the FBHCP.
- Data Needed to Conduct Impact Assessment – The impact assessment relies on data maintained by the FDEP, namely permitting records. Those data can be used to both document baseline conditions and project future permitting activity. However, the data are not readily extractable from the existing FDEP database in a format that facilitates the take analysis (i.e. there are no simple database queries that can be generated to place requisite metrics at our fingertips). Consequently, studies were undertaken to extract the permitting data for four of the eight CCCL activity categories, those where impacts were projected to be greatest: upland development, armoring, dune walkovers, and beach cleaning. These data were then subject to laborious desktop analyses, which necessarily incorporated a variety of assumptions. Again, the approach used in the take assessment narrowly focused on the amount of habitat of each species group likely to be affected by each activity, rather than on the numbers of individuals of each species likely to be affected by every direct and indirect impact associated with that activity.
- Scope of Lighting Impacts – The FWC maintains data on the number of documented sea turtles disoriented each year. These data are collected by sea turtle monitoring groups throughout the state and are reported on standardized forms; such reporting is voluntary and thus represents a significant underestimate of the actual extent of impact from upland lights to nesting sea turtles and their hatchlings. Monitors estimate the number of hatchling tracks that substantially deviate from a direct path to the Gulf or Atlantic and search for live and dead hatchlings on the beach. Reports are also submitted for nesting females whose tracks indicate a path towards upland development and away from the water after nesting or during a non-nesting emergence. For the four-year period ending in 2010, the FWC received an average of 1,312 disorientation reports per year, involving an estimated 50,575 hatchlings. An average of 668 dead hatchlings per year were reported for these events, although many more deaths are likely to have occurred (disoriented hatchlings often crawl into vegetation or onto upland properties where the carcasses are not found, some are consumed by predators/ scavengers, and the survivorship of those eventually reaching the water is likely reduced). These numbers clearly identify artificial lighting as causing take of sea turtles.
- Effectiveness of Available Methods for Ameliorating Lighting Impacts – Over the last two decades, many communities have implemented and enforced ordinances to protect

sea turtles from errant beachfront lighting. Concurrently, the FWC and the USFWS have collaboratively established lighting standards and best management practices for addressing lighting problems. The cumulative effect of these measures has been to darken beaches around the state and reduce overall disorientation rates. However, relatively little quantitative data has been generated to establish site-specific correlations between light management efforts and disorientation rates. The Sea Turtle Conservancy recently implemented a voluntary program to retrofit lighting at 35 existing facilities around the state with known lighting problems. Using state-of-the-art light management techniques, the Conservancy was able to significantly reduce, and in some cases eliminate, disorientations at these facilities. For example, on Anna Maria Island in Manatee County, Florida, seven facilities were retrofitted. On average, these facilities were reported to have collectively disoriented over 1,000 hatchlings each year from 2006 through 2010. In 2011, the year after the retrofits, no disorientations were reported. Similar results were obtained from other regions of the state. These data clearly indicate that application of appropriate light management techniques can effectively ameliorate lighting impacts.

- Current FDEP Practices for Addressing Lighting Impacts – CCCL permit applications for projects containing lighted structures require a FDEP review of lighting plans. These plans show the number, type, and location of all exterior fixtures to be used in the project. The FWC has developed guidelines for use by FDEP when reviewing lighting plans to minimize the potential for impacts to sea turtles, with the goal of take avoidance. Additionally, the Department consults with FWC on lighting requirements for all multi-family projects (MFR), and at the discretion of the FDEP permit processor, may also consult on single-family projects (SFR) with problematic lighting issues. The FWC has also developed recommendations for CCCL permit terms regarding site lighting, although these recommendations are not always incorporated. Finally, FDEP conducts a close-out inspection at CCCL-permitted projects. Permits for MFR involving lighted structures also require the permittee to contact FWC for an evaluation of site lighting, although there are instances where FWC is not contacted and/or is unable to perform a site visit. There are no similar conditions for SFR, although FDEP inspectors should assess site lighting during the close-out. All CCCL permits have a relatively short expiration date after the project is completed, and there are no requirements for maintenance of approved lighting plans after the permit expires.

**OPTION 1:** Do not treat lighting as a stand alone impact, but rather elaborate on the amount of take associated with lighting in the threats analysis (Chapter 7), and address lighting impacts through appropriate minimization and mitigation measures.

**Rationale for Selecting Option 1:**

- This approach is consistent with the analyses used for all other direct and indirect impacts.
- FDEP does not permit lighting independent of other CCCL activities, and thus, FDEP is not requesting take specifically for lighting in its ITP application. Rather, it is requesting take for each of the activities it permits under the CCCL Program, and that

- take, expressed as the amount of habitat affected, encompasses all direct and indirect impacts associated with those activities.
- The USFWS has historically refrained from authorizing take for lighting impacts, because it believes technologies exist to effectively ameliorate those impacts. Thus, there is no need to calculate take specifically associated with lighting, as those impacts can be avoided by implementing appropriate minimization measures. Mitigation can be used to offset lighting impacts resulting from CCCL projects permitted prior to issuance of the ITP and/or for lighting emanating from facilities built prior to the current CCCL Program or outside the Program’s jurisdiction.
  - It would be very difficult to come up with a reliable estimate of take resulting specifically from lighting associated with CCCL-permitted activities (see Rationale Against Selecting Option 2). While a considerable amount of disorientation data exist for sea turtles, there are virtually no datasets that would permit assessment of lighting impacts on shorebirds, beach mice, and gopher tortoises.

**Rationale Against Selecting Option 1:** This option does not assess the efficacy of the current CCCL Program in ameliorating lighting impacts associated with CCCL-permitted activities (see Option 2).

**OPTION 2:** Conduct an assessment to determine the effectiveness of FDEP-approved lighting plans.

**Rationale for Selecting Option 2:** The FDEP currently reviews lighting plans as part of its CCCL permitting process. Although procedures are in place to minimize lighting impacts associated with CCCL projects, no data are readily available to demonstrate that approved lighting plans: (a) effectively eliminate lighting impacts, (b) are consistently installed in accordance with approved specifications, and/or (c) are maintained over the life of the facility. Thus, an assessment would be helpful in determining if procedural changes to the current program are needed.

**Rationale Against Selecting Option 2:** This type of assessment would likely involve a considerable amount of time and fiscal resources, because:

- Data are not readily extracted from FDEP records. Individual lighting plans would likely have to be examined.
- There is considerable variability in the complexity of lighting plans, including: the type of lights used (e.g., LED, incandescent lighting, low-pressure sodium), their “brightness” (i.e. wattage, lumens), the number and type of lighting fixtures, and the location of fixtures (mounting height and orientation) relative to the beach. Each variable will affect the likelihood of disorientations at a facility. These likelihood effects are confounded by a facility’s proximity to the beach and presence of dune buffers or other barriers that could shield light from beach, information that may not be easily discernable from lighting plans.
- To determine if existing lighting at a facility conforms with approved plans, site visits would be required, and this would be a labor intensive effort. (No field effort was involved in other studies to assess impacts.) Permission would be required to access

each private property included in the assessment. This would take considerable coordination, and the permissions might not be forthcoming from those property owners whose lights are non-compliant with local ordinances and/or deviate from approved lighting plans.

- If existing lighting at a facility is found to differ from that specified in approved plans, it would be difficult to ascertain if the installation deviated from plan specifications or if the lighting was subsequently retrofitted (replaced during maintenance, changed following storm damage, new ownership, etc.).
- Applicable site-specific disorientation data would be difficult to obtain. Often times it is not possible to attribute a disorientation event to specific lights on a property, as transient lighting (flashlights, lanterns, vehicle headlights on adjacent upland properties), skyglow, and lighting from adjacent properties, sometimes a considerable distance away, may be responsible. This would require close examination of individual disorientation reports to identify causative light sources and then cross-reference those light sources to corresponding lighting plans.
- Lighting plans only prescribe specifications for exterior lights. Interior lighting can be as, or more, impactful than exterior lights. Often times it is not possible to discern whether a disorientation event has been caused by interior or exterior lights or a combination thereof.

**OPTION 3:** Treat lighting as a stand-alone threat and quantify impacts through additional studies.

**Rationale for Selecting Option 3:** This analysis would provide definitive information on the amount of take of sea turtles caused by lighting approved through the CCCL permitting process, and would thus serve as the basis for prescribing minimization and mitigation measures in the FBHCP.

**Rationale Against Selecting Option 3:**

- The analysis would be inconsistent with the general approach being used for estimating take. It would be looking at the number of individual sea turtles affected by a specific indirect impact rather than the amount of habitat affected by the permitted activity.
- FDEP does not permit lighting independent of other CCCL activities, and thus, FDEP is not requesting take specifically for lighting in its ITP application. Thus, there is no need to calculate take specifically resulting from lighting impacts.
- To determine the amount of take associated with lighting emanating from activities permitted through the CCCL Program, the following information would be required: (a) the names and locations of facilities with FDEP-approved lighting plans, (b) a determination as to whether existing lighting conforms to lighting plans approved by the Department, and (c) site-specific disorientation data before and after CCCL permit issuance. The applicability of, and difficulty in obtaining, this data would be the same as described above for Option 2.
- Other impact assessments consisted entirely of desktop studies. This analysis would require considerable field effort with corresponding effects on the schedule and

- budget for developing the FBHCP. The time and money required for a reliable study would likely be prohibitive.
- The analysis prescribed under this option is not necessary to develop effective minimization and mitigation measures for lighting impacts. It is clear that lighting causes considerable take of sea turtles, particularly hatchlings, and may constitute harm and harassment for other species groups as well. Undertaking extensive studies to determine the exact extent of lighting impacts (especially when there are no comparable studies for other indirect effects) isn't going to change the fact that a critical evaluation of current methods for minimizing lighting impacts associated with CCCL-permitted activities is needed. The scope and magnitude of lighting impacts will be comprehensively addressed in the FBHCP, and any needed changes to current practices, including close-out inspections, permit terms and conditions, and enforcement, will be among recommendations provided by the Working Group.

**ANALYSIS REVIEWED BY SCIENTIFIC COMMITTEE:** No.

**RECOMMENDATION:** The Work Group recommends Option 1 above. Although it would be helpful to assess the efficacy of the existing CCCL Program in ameliorating lighting impacts (Option 2), as the basis for prescribing changes to existing procedures, that analysis is not a prerequisite to implementation of appropriate, and reasonable, minimization and mitigation measures.

**ATTACHMENTS:** None.