



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Boqueron Field Office
P.O. Box 491
Boqueron, Puerto Rico 00622
October 22, 2003



Mr. Edwin Muñoz, Chief
U.S. Army Corps of Engineers
Antilles Regulatory Section
400 Fernández Juncos Ave.
San Juan, Puerto Rico 00901

Dear Mr. Muñoz:

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed construction of a tourist/residential resort, known as San Miguel Four Seasons Resort Puerto Rico (Project), in the municipalities of Luquillo and Fajardo, Puerto Rico, and its effects on the endangered leatherback (*Dermochelys coriacea*) and hawksbill (*Eretmochelys imbricata*) sea turtles-under section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.) The Service has determined that the proposed action is not likely to adversely affect the following species and therefore, they will not be discussed further in this opinion: West Indian manatee (*Trichechus manatus*), Puerto Rican plain pigeon (*Columba inornata wetmorei*), Brown pelican (*Pelecanus occidentalis*), Puerto Rican boa (*Epicrates inornatus*), Virgin Islands tree boa, (*Epicrates monensis granti*), green sea turtle (*Chelonia mydas*), and the threatened plants *Schoepfia arenaria* and *Stahlia monosperma*.

This biological opinion is based on information provided in the biological evaluation on the Project (proposed by the Applicant to the Corps) and submitted to the Service by the Corps in March 2003, site visits, letters, meetings, conference calls, and other sources of information. A complete administrative record of this consultation is on file in the Service's Boquerón Field Office, Puerto Rico.

CONSULTATION HISTORY

The following list provides a summary of the correspondence and documentation related to the proposed activities and the consultations between the Corps and the Service that have led to the current opinion.

May 23, 1996: The Service received a request from the Puerto Rico Planning Board (Planning

May 23, 1996 that cumulative impacts around Fajardo should be evaluated and the threatened plant *Schoepfia arenaria* is known from the proposed project area.

June 23, 1998: The Puerto Rico Tourism Company (Tourism) requested the Service's endorsement for the proposed project.

August 3, 1998: The Service indicated to Tourism that the proposed project should not be approved, as proposed, because of potential: adverse effects on nesting sea turtles and their hatchlings; destruction of vegetated areas where listed plants and the Virgin Islands tree boa (*Epicrates monensis granti*) may be found; and filling and destruction of wetland areas. The Service also suggested that a biological assessment be prepared addressing potential impacts of the proposed project on leatherback (*Dermochelys coriacea*) and hawksbill (*Eretmochelys imbricata*) sea turtles, Virgin Islands tree boa, *Schoepfia arenaria* and *Stahlia monosperma*, their habitats, and wetlands.

August 5, 1998: The Corps acknowledged receiving a copy of the Service's letter of August 3, 1998 to Tourism.

August 11, 1998: The Permits and Regulations Administration (ARPE) acknowledged receiving a copy of the Service's letter of August 3, 1998 to Tourism, and indicated that they assumed that listed species and wetlands may be affected by the proposed project.

September 15, 1998: Service letter to the Planning Board, and a copy to the Corps, expressed interest in coordinating a visit to the proposed project site to discuss details concerning the project design, and to determine potential impacts on listed species. The Service also suggested that the Corps should be contacted to determine if riparian areas within the project property were considered jurisdictional wetlands.

November 5, 1998: The Service sent a letter to the Planning Board, and a copy to the Corps, concerning a project revision that would impact twice the amount of acres, and recommended that the San Miguel Luquillo Partners (Applicant) address the Service's concerns of September 15, 1998 and May 23, 1996, before the Planning Board approves the project.

December 1998: The consultant provided the Service a biological report on sea turtle nesting activity within the proposed project area.

January 19, 1999: The Service received a request from Tourism for comments on a Preliminary Environmental Impact Statement (P-EIS) for the proposed project.

February 18, 1999: The Service requested an extension for submission of comments on the P-EIS, because of the short response time for this issue.

April 2, 1999: The Service submitted comments on the P-EIS for the proposed project and

recommended a site visit with personnel from the Corps, Tourism, and Puerto Rico Department of Natural and Environmental Resources (DNER).

April 5, 1999: The Service submitted a letter to the Planning Board concerning the P-EIS for the Dos Mares development project, adjacent to San Miguel Resort, where it indicated that other alternatives to development should be explored for the proposed locations of these projects because of the highly sensitive ecosystems in these areas.

April 20, 1999: The Service provided comments to the Puerto Rico Environmental Quality Board (EQB) on the P-EIS, indicating information needed for the Service to evaluate project impacts on the environment.

October 21, 1999: The Service commented on Public Notice #199707794 (IP-DD) for the proposed construction of the Dos Mares development, and discussed the need for an analysis of cumulative impacts of both projects because of the connection between the natural resources found in both project areas. The Service recommended that a permit for this project not be issued, and informed the Corps about concerns over potential impacts of both projects on aquatic resources of national importance.

February 18, 2000: The Service received a Notification of Resolution from EQB requiring that Tourism prepare a new P-EIS addressing all the necessary information and deficiencies identified by the Board.

February 7, 2001: The Corps held an interagency meeting where the proposed project was presented and discussed with Commonwealth and Federal agencies, as well as the new project consultants (CSA Group, Inc.).

March 2001: CSA provided the Service an addendum to the P-EIS on the golf course irrigation and management for the proposed project

March 21, 2001: CSA provided the Service a revised Federal Emergency Management Authority (FEMA) map for the proposed project property indicating a group of sand dunes outside of the flood plain of the Sabana and Pitahaya rivers.

June 2001: CSA sent the Service a hydrologic impact analysis addendum to the P-EIS

September 28, 2001: Tourism sent the Service a new P-EIS for the proposed project and requested the Service's evaluation of these documents.

October 12, 2001: The Service submitted comments on the new P-EIS to the Planning Board for a project adjacent to San Miguel Resort (Dos Mares), and expressed concern about beachfront developments along beaches for sea turtle nesting.

October 25, 2001: The Service acknowledged to Tourism the receipt of the P-EIS for the proposed project and requested additional time for review.

October 31, 2001: The Planning Board requested comments from the Service on whether or not the proposed project complied with the policies of the Service and the Coastal Zone Management Program (CZMP) of the Planning Board.

November 1, 2001: The National Marine Fisheries Service, DNER, and the Service conducted a field inspection at the proposed project site.

November 13, 2001: representatives from CSA and Dr. C. H. Pritchard (sea turtle consultant for the Applicant), met with the Service to discuss issues related to the Applicant's proposed turtle habitat protection plan.

November 13, 2001: The Service sent comments to Tourism on the new P-EIS for the proposed project, indicating that potential major impacts to fish and wildlife resources were not adequately addressed, alternative site analysis had not been made, lack of specific details did not allow adequate evaluation of impacts to sea turtles, and proposed restoration of wetlands were not reasonable. Given those and other concerns, the Service suggested that the project not be approved as proposed.

December 10, 2001: The applicant sent the Service a copy of their letter to Tourism and a copy of a memo from Dr. Peter Pritchard (sea turtle biologist and consultant for the Applicant) discussing the issues raised by the Service in a letter of November 13, 2001 to Tourism. Both the applicant's letter and memo indicated that with the planning, design, construction, and post-development monitoring, the property could be developed without negative impacts to wildlife and wetlands.

January 23, 2002: The Planning Board referred to the Service a response by the applicant concerning the Service's comments of November 13, 2001, and requested that the Service evaluate and comment on the applicant's response.

January 30, 2002: The Service presented comments on the updated P-EIS in a public hearing conducted by the EQB. The Service stated that the P-EIS underestimated the impacts of the project on resources under the Service's jurisdiction, particularly the consequences for sea turtle nesting activities.

February 26, 2002: The Service responded to the Planning Board letter of January 23, 2002 requesting the Service's evaluation of the project applicant's comments on the Service's concerns. The Service stated that the project, as proposed, may adversely affect trust resources, it did not examine reasonable alternatives to the project, and that it was not compatible with the objectives and public policy of the CZMP.

March 8, 2002: The Service took part in a House of Representatives hearing concerning the beachfront development projects proposed for the northeast part of Puerto Rico, including San Miguel Resort. The Service stated its opposition to the project, as proposed, because, although potential adverse effects on nesting sea turtles could be reduced with lighting techniques, such impacts could not be totally eliminated. The Service also mentioned that, although impacts to wetlands had been greatly reduced from the original project proposal, the Service did not believe that the proposed wetland restoration was necessary or desirable.

April 12, 2002: The Corps issued a Public Notice on Permit Application #199802400(IP-VG) for the discharge of fill material over herbaceous wetlands and waters of the Pitahaya and Juan Martín rivers, as part as the construction activities for the proposed project, and determined that the proposed project was likely to adversely affect sea turtles (therefore, initiating formal consultation with the Service).

May 16, 2002: The Service responded to the Corps Public Notice of April 12, 2002, and stated that it did not concur with the sea turtle protection approach provided in the updated P-EIS because it lacked project specific impact analysis and specific conservation measures to avoid adverse impacts to nesting sea turtles. Also, the Service mentioned that the P-EIS did not adequately address the potential for major impacts to fish and wildlife resources (i.e., listed species), and that the project was proposing high density development within areas currently zoned under highly restrictive classifications to avoid such developments. The Service concurred with the need for formal consultation. Based on the above, the Service suggested that the Corps resolved those concerns and issues before issuing a permit.

May 21, 2002: The Service received copy of a letter of May 8, 2002 from the Planning Board to the applicant indicating that the Planning Board was reconsidering its denial for a Certificate of Consistency with the CZMP, based on additional information, and that it would continue to evaluate information on the proposed project as it developed.

May 23, 2002: The Service met with the Applicant to discuss the Service's comments of May 16, 2002 to the Corps, and to inform the applicant of the need for the preparation of a Biological Evaluation (BE) and a written request for formal consultation prior to initiation of formal consultation with the Corps. The Service also provided the applicant with information required in that request.

May 23, 2002: The Service (Southeast Regional Office) issued a letter to the Corps indicating that the proposed project had substantial and unacceptable impacts on aquatic resources, if permitted without incorporating the Service's recommendations, and encouraged a mutual resolution of the Service's concerns at the field level prior to a decision to issue a permit.

May 28, 2002: The Service notified the Corps of the Planning Board's reconsideration of the April 2002 CZMP application denial, and indicated that the Service had met with the applicant to provide an outline for the preparation of a BE. Once the BE was completed, the Service would

initiate formal consultation on the proposed project.

May 28, 2002: The Service commented on the P-EIS for Dos Mares and discussed the Service's concerns for the potential cumulative impacts of this and other existing or proposed projects in the area (including San Miguel Resort) to threatened and endangered species. The Service recommended that a siting permit not be issued for Dos Mares.

May 31, 2002: DNER provided the Service a copy of their letter to the Corps (and attached Preliminary Conceptual Sub-division and Building Plan for the proposed project) urging the Corps to deny permit for the proposed project, unless the applicant addressed DNER's concerns.

November 2002: CSA provided the Service a copy of the Analysis of Water Demand and Potable Water System for the municipalities of Río Grande, Luquillo, and Fajardo.

November 25, 2002: the Applicant's legal advisors (Pietrantonio, Méndez, & Alvarez) responded to the Corps request for additional information (Corps letter of July 24, 2002), and indicated that CSA expected to complete field studies and corresponding reports on or before March 1, 2003.

March 3, 2003: CSA sent the Service a copy of the BE for the proposed project.

March 3, 2003: The Corps determined that threatened and endangered species were not likely to be adversely affected by the proposed action. The Service concurred with that determination for *Schoepfia arenaria*, the West Indian manatee, and the green sea turtle, because these species occur outside the proposed project action area, but believed that the remaining species may be affected by the action.

March 10, 2003: The Corps requested the Service's review of additional documents to determine if the information adequately addressed concerns under section 404 of the Clean Water Act.

April 9, 2003: The Service took part in a Corps Interagency Meeting where the applicants presented new information concerning changes to the proposed project in response to resource agency concerns, and the biological evaluation submitted to the Corps. During that meeting, the Service requested additional information on details about the illumination measures discussed in the biological evaluation, to prevent impacts to nesting sea turtles. The applicant committed to submit the additional information.

April 24, 2003: The Service responded to the Corps request of March 10, 2003, recommending that: the eastern river mouth not be permanently closed through the deposition of fill material, the main entrance and access road configuration be modified to avoid channelizing the Pitahaya River, the compensatory wetland mitigation plan be discussed between the applicant and the resource agencies to resolve concerns, and alternative and cumulative impact analyses be addressed more appropriately. Since the level of development proposed for the area was the factor determining the magnitude of the environmental impacts, the Service suggested that the

applicant consider, instead of raising dune elevation to minimize light pollution, to reduce residential density by eliminating the first floor of buildings along the coastal area. The Service recommended that the project, as proposed, be denied.

June 19, 2003: The Service requested, during a telephone call with the Applicant's legal advisor and CSA, clarification and additional information on the measures proposed by the Applicant to minimize or eliminate impacts to threatened and endangered species. The Applicant's legal advisor and CSA made a commitment to enquire further about the feasibility of impact minimization measures discussed during the conference call.

June 10-20, 2003: The Applicant submitted to the Corps additional information about revised conservation measures to eliminate the lighting on the western tennis courts, described an educational program aimed at residents to reduce the impact of interior lighting, and raising the walkway to four feet to reduce the impact on nesting hawksbill turtles.

June 19, 2003: Telephone conversation with the Applicant's legal advisor and CSA about the additional information submitted by the Applicant to the COE and concerns over impacts of the proposed project on listed species and their habitats.

June 26, 2003: Letter from the Applicant's legal advisor indicating that they were reviewing the issues raised by the Service during a telephone conversation of June 19, 2003 with the Service and CSA. They expected to complete that process within one week, at which time they would submit their response to the Service.

July 1, 2003: Letter from the Applicant's legal advisor requesting that the Service wait for additional information before issuing a draft BO to the COE.

July 21, 2003: The Applicant's legal advisor notified the Service that additional information was forthcoming on questions raised by the Service during the June 19, 2003 telephone conversation.

July 25, 2003: The Service requested a time extension for submission of the BO, to have additional time to evaluate the information that the Applicant was going to submit to the Service on potential project modifications and impacts to listed species.

July 28, 2003: The Corps concurred with the Service's request to extend the BO due date, and requested that a draft of the BO be provided to the Corps for comments before finalizing the BO. The Corps indicated that the Service could request an additional time extension, if additional time was needed to complete the BO.

July 29, 2003: The Service received from the Applicant's legal advisor a response to the issues raised by the Service during the telephone conversation of June 19, 2003.

August 5, 2003: The Service met with the Applicant's legal advisor and consultants to discuss

measures to protect listed species. The Applicant's legal advisor and consultants suggested that they discuss the alternatives on-site.

August 12, 2003: Personnel from the Service, DNER, and the Applicant's legal advisor and consultants visited the proposed project site and discussed issues pertaining to nesting sea turtle protection measures that the applicant may be willing to include as part of the project design.

August 14, 2003: The Service received a letter from the Applicant's legal advisor requesting that the Service hold the issuance of the draft BO to the Corps for an additional period of not less than ten days to provide time for the Applicant to address pending issues pertaining to potential impacts to sea turtles.

August 15, 2003: The Corps telephoned the Service to discuss the status of the BO and if the deadline needed to be extended. The Service and the Corps agreed that a time extension was warranted to continue discussions with the Applicant. The Corps indicated that they would grant the Service a time extension for submission of the BO until September 19, 2003.

August 15, 2003: The Service sent a letter to the Corps re-stating what the Service and the Corps had discussed on a telephone conversation earlier that day concerning additional time to resolve issues on nesting sea turtles and to set a meeting date with the Applicant to discuss the reasonable and prudent measures (RPM) proposed in the BO.

September 9, 2003: The Service sent a copy of the draft BO to the Corps.

September 10, 2003: The Service met with the Corps and the Applicant to discuss the RPM proposed in the BO. The Applicant's legal advisor indicated that they did not foresee major changes in the BO, other than legal terminology, and requested that the time for completion of the BO be extended. The Corps and the Service agreed to a time extension to October 20, 2003. The Applicant also requested a meeting between the Corps, Service, and the Applicant prior to the BO deadline. The Corps and the Service agreed to a meeting with the Applicant on October 9, 2003. The Applicant's representatives committed to sending to the COE comments on the draft BO before the meeting of October 9, 2003.

October 9, 2003: The Service met with the Applicant's representatives to discuss the RPM proposed in the BO and the suggested terminology. Although the Applicant had sent to the COE comments on the draft BO in a letter of September 26, 2003, the Service did not receive a copy of this letter until the October 9, 2003 meeting. During this meeting, the parties discussed the Applicant's comments on the draft BO (letter of September 26, 2003). Since previously the Applicant's representatives had informed that they did not expect significant changes to the draft BO, the Service expressed concern over the extent of the proposed changes, namely the lighting of tennis courts at night, setback for sea turtle habitat, boa management during the construction phase, and vegetation height along the shoreline. The Applicant's representatives stated that they would discuss with their clients the Service's concerns and would contact the Service promptly

with a response.

October 13, 2003: The Applicant's representatives sent a letter via electronic mail (original by mail received on October 15, 2003) to the Service agreeing to 1) illuminate at night only the tennis courts in the La Paulina area; 2) establish a 50 meter and 60 meter setbacks on the sea front of the hotel and villas, respectively; 3) stop construction at a site where boas were encountered until the animal left the area on its own; and 4) begin operation of facilities once vegetation attained heights specified in the draft BO.

October 14, 2003: The Applicant's legal advisors contacted the Service by phone to discuss the concerns expressed by the Service during the October 9, 2003, and the items of concern outlined by the Applicant in the October 13, 2003 letter. The Service explained reasons for the objection to the lighting of tennis courts at night (because of their potential for affecting sea turtle behavior) and the need to stop activities in areas where boas were found during the construction phase. The Service also explained the need for certain vegetation height and density that served as shield from potential lighting and human activities.

October 16, 2003: The Service received a letter dated October 13, 2003 from the Applicant's legal advisor agreeing to the Service's comments of October 14, 2003 and suggesting language to further clarify the commitments of the Applicant.

October 20, 2003: The Service received a letter from the COE indicating that they did not have concerns with most of the Applicant's comments of September 26, 2003. However, unlike the Applicant, the COE believed that impacts of Dos Mares and other development projects adjacent to the proposed San Miguel Resort on sea turtles and their habitats should be considered in the assessment of cumulative impacts.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed San Miguel Resort would be located on about 511.3 hectares (1,263 acres) in the extreme northeast corner of the municipality of Luquillo, Puerto Rico (bordering the municipality of Fajardo). Five parcels, with 6.9 kilometers (4.23 miles) of beach compose the proposed action area: San Miguel I, San Miguel II, La Paulina, Northwest Parcel, and Sabana Parcel. The Service has described the action area to include lands that lie within the coastal area north of Highway PR-3 and extending from the Sabana River to the west to the eastern La Paulina ridge, for reasons that will be explained and discussed in the "EFFECTS OF THE ACTION" section of this consultation.

The applicant, San Miguel Luquillo Partners, is proposing the development of a tourism/residential community consisting of a 250 room hotel, 175 condo hotel and time share

units, up to 1,025 single-family and multi-family units, 27-hole golf course, golf club, golf maintenance facilities, tennis center, tennis courts, beach club, and water sports center.

A conceptual plan for the proposed project showed the general location and layout of the structures, however, it was not meant to show the precise location or design of structures but rather their general location. Although the plan may change as a result of requirements for the permitting and site-location approval processes, the applicant "represents that any future adjustments to the plan will not enlarge upon nor increases potential impacts to wetlands or any threatened or endangered species in the project site." [sic]

The following measures have been provided by the applicant to eliminate, minimize, or compensate (mitigate) for adverse impacts to listed species:

Sea Turtles

Establishment of a Sea Turtle Conservation Program

1. Appoint a Conservation Program Biologist (CPB) to manage sea turtle issues within the project, with the training and authorization of DNER and the Service. The CPB will be responsible for the following:
 - A. Coordinate any actions related to sea turtle activities within the project site with DNER, the Service, and other parties; such as, research, nest relocation (when nests are in danger of being destroyed by natural events), and law enforcement.
 - B. Ensure and coordinate that sea turtle nesting habitat regulations, including the maritime terrestrial zone and dunes, 50 meter (164 feet) buffer zone from the maritime-terrestrial zone landward, plus 10 meter (32.8 feet) separation area in Parcel A (oceanfront villas), and pet controls are implemented.
 - C. Protect the marine component of the sea turtle habitat adjacent to the project site; ensuring no construction of subtidal structures, appropriate treatment and management of runoff and wastewater, and regulation of anchoring locations, speed limits, beach ramping, and proximity of vessels to the beach.
 - D. Restore and enhance dune vegetation, including the progressive removal of invasive *Casuarina equisetifolia* and its staged replacement with native trees, and planting of native tree species on the 50 meter (164 feet) setback.

- E. Conduct biological research on sea turtles.
- F. Manage sea turtle nests, including nest markings, nest relocation (if necessary), and nesting habitat assessment.
- G. Ensure that artificial illumination reduction plan is implemented.

Reduction of artificial illumination

1. Buildings not higher than two stories would be located adjacent to the 60 meter (196.8 feet) separation zone in Parcel A [50 meter (164 feet) buffer zone from the maritime-terrestrial zone landward (i.e., where the coastal woody vegetation line begins) plus 10 meter (32.8 feet) separation area], and the 50 meter (164 feet) separation zone at the hotel site.
2. No buildings higher than four stories would be located at less than 160 meters (524.8 feet) from the maritime-terrestrial zone.
3. Buildings and other structures will be oriented so that the artificial lighting from these sources are kept below the levels that might disorient adult and hatchling sea turtles.
4. Planting of appropriate vegetation on the sand dunes (such as *Coccoloba uvifera*, *Suriana maritima*, *Chrysobalanus icaco*, *Tournefortia scabra*, *Sesuvium portulacastrum*, *Ipomoea pes-caprae*, *Canavalia maritima*, *Sporobolus virginicus*), the 50 meter (164 feet) buffer zone and 10 meter (32.8 feet) setback (such as *Coccoloba uvifera*, *Conocarpus erectus*, *Bursera simaruba*, *Tabebuia heterophylla*, *Pisonia albida*, *Guapira fragrans*, *Bourreria succulenta*, *Ceiba pentandra*) to shield direct light radiation and glare.
5. Development of an Artificial Illumination Reduction Plan to reduce or eliminate the intensity of lights toward the San Miguel resort sea turtle nesting habitat, in conjunction with the municipality of Luquillo, nearby communities, and nearby developments. Artificial illumination will be reduced within the proposed project (and in the adjacent communities, if adopted) by modifying or replacing existing problem lights so they do not illuminate, and are not visible from, the beach; turning off or reducing the light intensity during the nesting season; and education and public awareness, including liaison and discussion with property owners, developers, tenant associations, etc.
6. Monitoring and management of artificial light, according to the results of the Nocturnal Light Incidence Monitoring Program, will include continuous monitoring (from design to operation phases of the project), through sensitive

light meters, of the artificial illumination within the project, especially at the beaches, and taking corrective actions to reduce or eliminate the artificial light source that is over the set maximum standard.

7. Tennis courts will not be illuminated at night.
8. Interior lights will be reduced through the use of opaque curtains and window tinting with a total inside to outside transmittance of 45 percent or less to be installed in all ocean-view building windows. Restrictive covenants on the installation and replacement of interior lights will be included in the deeds for all apartment/villas facing the oceanfront (i.e., interior lights will only be replaced, not modified, following the original design for indoor lighting).
9. Louvered bollard fixtures will be used to illuminate all walkways. If they are not adequately blocked from the beach by vegetation, then they will be shielded on the seaward side. These bollards will be positioned on the seaward sides of walkways so that, if shielding is necessary due to inadequate vegetation, the light will project towards the walkways. These bollards will be connected to motion detectors so they only turn on when needed.
10. Motion sensor lighting will be used for security lighting and in walkways located in front of the seaward side of beachfront buildings, including the bollard and step lights.
11. Low-pressure sodium vapor (LPS) bulbs and directional fixtures with shields will be used for exterior lighting, not exceeding the appropriate wattage.
12. Step lights (at foot level) will have the minimum necessary luminance, so light reflected from floors and walls is minimized.
13. Low-mounted (not more than one meter (three point twenty eight feet) above ground level), louvered bollard fixtures, and low-mounted step lights will be used to illuminate exterior areas that are closer to sea turtle nesting habitat.
14. Full-cutoff fixtures with low-pressure sodium vapor lamps will be used to illuminate areas more distant from sea turtle nesting habitat.
15. Full-cutoff fixtures will be mounted at an appropriate height and be equipped with appropriate reflectors and/or shields so that light is not visible from the beach and does not illuminate the beach.
16. Step lights (at foot level) will be used to illuminate areas north of the beachfront buildings. In areas where vegetation is not adequate to shield these lights,

louvered bollards shielded on the beach side will be used.

17. All security lights (i.e., lights designed and used solely for the purpose of preventing potential criminal activity) will be shielded, connected to motion detectors, and their luminance will be designed for the minimum necessary for security and to minimize reflectance from buildings.
18. Elevated dune walkways will not have any lighting.
19. No landscape or decorative lighting will be allowed in any beach-facing side through the project.
20. Vacant areas (i.e., any areas that are not subject to development activities, are not being used by humans, or where humans are not expected to access) will remain unlighted.
21. Ceiling-recessed down lighting will be installed on outdoor and indoor ceilings and walls in rooms adjacent to balconies in areas that are visible, or potentially visible, from the beach.
22. Louvered step lighting will be installed on the balconies, and on the outside walls of buildings at foot level.
23. Nesting surveys (night or daytime patrols) will be initiated 75 days prior to initiation of construction activities during the sea turtle nesting season.
 - a. When nighttime patrols on beaches within the action area cannot be conducted, nesting surveys will be conducted daily between sunrise and nine in the morning, during the leatherback and hawksbill sea turtle nesting seasons.
 - b. No beach activities will be initiated above the high water line prior to completion of daily, nighttime, or early morning nesting surveys.
 - c. All nests will be inspected daily during the sea turtle nesting season to ensure that nest markers remain in place and that nests have not been disturbed.
 - d. During the sea turtle nesting and hatching season, all vehicle patrols occurring parallel to the beach shoreline will be seaward of the wrack or debris line (previous high tide) or just above it during high tide conditions, except in emergency situations.

- e. Patrol vehicles traveling on the beach shoreline will use low intensity lights. If conventional headlights are used, they should be used only when the vehicle is moving. Sea turtle compatible (red filtered) hand-held lights and lighting on equipment will be used at night.
 - f. If an adult nesting or hatchling(s) turtle is sighted on the beach, the following measures will be implemented to minimize the potential disruption of nesting or sea-finding behavior caused by a vehicle, equipment, and humans on the beach or at the nest sites.
 - g. Personnel in patrol vehicles on the beach will stop the vehicle (or activity except during an emergency), shut off the engine, switch vehicle lights off if at night, and remain stationary (inside a vehicle if possible) until the adult female turtle completes nesting and returns to the sea, or a hatchling(s) emerges from the nest and enters the sea.
 - h. If an adult or hatchling turtle(s) appear to be in trouble, the Conservation Program Biologist will be contacted for instructions to proceed.
 - i. If a turtle crawl is seen on the beach during day time or night time hours with no associated marked nest, care will be taken not to disturb the crawl and/or nest site and the entire area of the crawl shall be marked.
24. Security lights will be the minimum necessary for safety purposes.
- a. Lights used solely for security purposes will be installed only where needed for safety purposes, such as gates and access doors to buildings. Parking lots shall not have security lights.
 - b. True-neon light bulbs will be selected for security lights.
25. Light inspections will be conducted to detect potential problem lights.
- a. A light inspection will be conducted with Service personnel shortly after the beginning of operation of the resort, and every five years thereafter, to detect potential problem lights. Any lights identified as visible from the beach or with potential adverse effect on nesting sea turtles or hatchlings will be removed or modified in a way that would prevent any effects on sea turtles (e.g., modify shield covers, change its wavelength or brightness).
26. A contingency plan will be submitted to the Service and DNER discussing measures to be implemented in the event that the vegetation shielding effect is

eliminated by natural events (e.g., hurricanes, tropical storms, high tides). This plan will be submitted and approved by both agencies prior to the beginning of project operations.

Beach restoration

1. All beach areas seaward of sea turtle nests will be restored to their original condition (i.e., no tracks or ruts on sand) before hatching begins.
 - a. Track/rut removal procedures will be conducted at nests 10 days prior to the expected date of hatchling emergence (50-80 days after each nest is laid, depending on the species). Track/rut removal will continue at each identified nest until: (1) hatching has occurred and the nest has been excavated to determine hatching and emerging success, or (2) the nest has been washed out or otherwise destroyed by natural causes. Nest success evaluations will only be conducted either 70 days after the eggs were deposited (80 days in the case of a leatherback nest), or 72 hours after the first emergence of hatchlings, whichever occurs first.
 - b. Track/rut removal procedures will be implemented if the following criteria are met: (1) one or more ruts occur within a path about six point one meter (20 foot) wide between the nest and the ocean; (2) at least one of these ruts is greater than one inch deep; (3) any ruts deeper than one inch are at least three feet in length; and (4) ruts deeper than one inch are oriented in a direction other than perpendicular to the shoreline. In the event track/rut removal personnel are not sure whether the above criteria are met, they will be instructed to perform track/rut removal activities by a trained personnel.
 - c. All track/rut removal will be performed in the late afternoon or as soon as the security, emergency, or training activity-related beach access and driving event is completed, but in no case more than 36 hours after the activity. Track/rut removal may be by hand using a heavy-duty "garden" rake that penetrates no more than three inches deep into the sand. The area raked will encompass a path that is at least 15 meters (50 feet) wide, centered in front of the nest, from the nest site to the previous high tide line. Additional hand-raking may be required to fill in very deep tracks/ruts. At no time will raking be conducted inside the nest barrier.

Protection of sand dune habitat

1. Where vegetation is lacking, appropriate dune plant species will be planted 30-60 meters (landward of the maritime-terrestrial zone), including native shrubs, trees,

and vines. The presence of vegetation will increase the effective height of the dune, thereby blocking light sources from the project.

2. *Sporobolus virginicus*, *Paspalum vaginatum*, *Sesuvium portulacastrum*, *Ipomoea pes-caprae*, *Canavalia maritima*, *Tournefortia scabra*, *Dalbergia ecastaphylla*, *Suriana maritima*, and *Coccoloba uvifera* will be planted on the frontal zone of the dunes, while *Cynodon dactylon*, *Dactyloctenium aegyptium*, *Cenchrus* spp., *Sesuvium portulacastrum*, *Ipomoea pes-caprae*, *Canavalia maritima*, *Tournefortia scabra*, *Dalbergia ecastaphylla*, *Suriana maritima*, *Chrysobalanus icaco*, *Coccoloba uvifera*, *Conocarpus erectus*, *Bursera simaruba*, *Tabebuia heterophylla*, *Bourreria succulenta*, *Ceiba pentandra*, *Pisonia alba*, and *Guapira fragrans* will be planted on the backdune areas. A stock of these sand dune plants will be propagated and held at an in-house nursery.
3. Plantings will be incorporated to supplement the existing vegetation, will be approximately two meters (six point fifty six feet) high, and will be positioned so as not to have a detrimental effect on sea turtle nesting activity.
4. Where sand dunes have eroded, appropriate vegetation will be planted and other sand-trapping techniques, recommended by DNER, will be implemented to assist in the sand accumulation process.
5. Until vegetation is established, the restored area will be fenced using posts and wire, and signs will be posted advising of restoration work. These areas will be monitored regularly, and maintenance will be provided as necessary, including the inspection of: plantings to accumulate sand where the dune has degraded, growth of planted vegetation, establishment and dynamics of other species, and physical changes within the restored dune areas. Restoration work will be evaluated during and after the monitoring and maintenance phases, to take corrective actions to keep up with the restoration objective.
6. Human activities within the dune areas will be prohibited, except for the construction and maintenance of the elevated boardwalks and vegetation as is installed pursuant to this BO.
7. Horse riding will not be allowed within the beach, dunes, and 50 meter (164 feet) buffer and 10 meter (32.8 feet) setback areas.
8. No construction of structures will be allowed within the dune areas, except for elevated boardwalks in Parcel A (five -eight residential units) to provide access to the beach. These boardwalks will be two and a half meters wide (eight point two feet), and will not be illuminated except for two, louvered bollard fixtures to mark the entrance of the boardwalk. The clearance of boardwalks will be maintained at

not less than one point twenty two meters (four feet) from the ground.

9. Appropriate fencing will be used in areas to be restored, until vegetation is established.
 - a. Fencing will not impede the movement of nesting sea turtles through the beach and dune areas. Barb wire will not be used, and fence posts will be placed at intervals equal or greater than three meters, and the distance between the ground and the first line of fence wire/rail will be maintained at not less than one point twenty two meters (four feet) from the ground.

Poaching of sea turtle eggs

1. Any future poaching activity will be prevented by conducting year-round beach patrolling.
2. A comprehensive habitat protection plan for sea turtles will be implemented, containing a strong educational component that will educate residents, visitors, employees, and other stakeholders about sea turtles, including implementation of law enforcement, if poaching is detected.
3. Strict enforcement of resort rules by internal project security in coordination with municipal and Commonwealth law enforcement officers.

Protection of nests from natural phenomena

1. No sublittoral, littoral, or supra littoral structures will be constructed, with the exception of the access boardwalks to funnel the movement of beach users without impacting the dune area.
2. On-foot beach patrol personnel will detect events that could potentially impact sea turtle nests (e.g., high tides or swells, beach erosion), and biologists trained on handling sea turtle eggs will relocate threatened nests to safer areas, in coordination with DNER and Service personnel. Nests should be relocated within six hours of being laid. Only if absolutely necessary would they be moved after six hours, and only with extreme care to avoid turning eggs.

Protection from livestock on the beach

1. Livestock will be removed from project area as part of the proposed development of the area.

Prevention of marine debris and garbage deposition on the beach

1. Garbage-generating activities on the beach will be regulated.
2. Garbage/debris within the beach and littoral areas will be hand collected daily, except in exceptional circumstances (hurricanes, storm surge, flooding, or other natural phenomena) when the use of machinery for cleaning the beach may be necessary. To the extent that a conflict exists between the need to clean the beach and the need to protect the turtle nesting habitat or their nests, the latter will be given priority.

Avoidance of sand compaction due to human activities

1. Vehicles and machinery will be prohibited within sea turtle nesting habitat, except in exceptional circumstances (hurricanes, storm surge, flooding, or other natural phenomena) when the use of vehicles and machinery for cleaning the beach may be necessary. To the extent that a conflict exists between the need to clean the beach and the need to protect the turtle nesting habitat or their nests, the latter will be given priority.
2. All beach gear (chairs, towels, beach umbrellas, etc.) will be removed from the beach daily. Beach umbrellas, volleyball poles, etc. will have bases to prevent them from penetrating the sand and possibly damaging nests or eggs.
3. Only controlled activities that have no significant impact will be permitted within the beach and 50 meter (164 feet) buffer and 10 meter (32.8 feet) setback areas (e.g., walks, wildlife watching, sun and beach bathing, light sports).
4. 50 meter (164 feet) buffer and 10 meter (32.8 feet) setback areas will be off-limits to development.
5. No rental concessions will be allowed within beach, dunes, and 50 meter (164 feet) buffer and 10 meter (32.8 feet) setback areas.
6. No activities will be allowed on the dunes.
7. No activities or beach equipment will be allowed within three meters of any sea turtle nest.

Avoidance of accidental trampling of nests and hatchlings

1. Use of vehicles, heavy machinery, and horse back-riding within sea turtle nesting habitat will be prohibited.

2. Movement of people within sea turtle nesting habitat will be regulated and controlled.
3. People will not be allowed to walk on the dune areas.
4. Any structures that may interfere with the ability of hatchlings to move across or toward the beach will be prohibited.
5. Nests will be marked with poles and high-cut fences to protect them and make them more noticeable.
6. Residents and visitors will be educated about sea turtles and their nesting habits.
7. Frequent, on-foot beach patrols will be conducted to detect any unprotected nests or hatchlings on their way to the sea. Security personnel patrolling the beach will travel on the wet sand or below the tide mark to the extent possible.

Minimize predation of sea turtle eggs and hatchlings

1. Preventive watches to detect potential nest predators and protect vulnerable nests will be conducted during the sea turtle nesting season.
2. Instruct residents and visitors about pet restrictions in the beach area, especially during the sea turtle nesting season.
3. Pets will be restricted to private property areas.
4. Free-ranging pets will not be allowed.
5. Pets will be allowed in common areas only if supervised by their owners and restricted by a leash.
6. Pets will comply with veterinary/health regulations.

Puerto Rican plain pigeon

Conservation of potential feeding, roosting, and nesting habitat

1. Approximately 80 percent of potential plain pigeon habitat will be conserved or improved by implementing a large-scale reforestation program, including the largest tract of continuous moist forest located in the easternmost hill of La Paulina, and the gallery forests associated to the Sabana, Pitahaya, and Juan Martín rivers.

2. More than 50 percent of the current pasture lands will be reforested with native and naturalized tree species used by the plain pigeon for food. This reforestation, including the extent and nature of the areas to be reforested, is subject to the requirements and conditions that may be imposed on the project by other agencies in the subsequent permitting process, including the site location approval by the Planning Board and the reforestation plan approved by the DNER.
3. An outreach/education plan will be implemented to inform residents, guests, employees, and the general public about protected species and the project management plans concerning such species.
4. Detailed surveys to detect plain pigeon nesting, roosting, or feeding activities will be conducted prior to any land clearing or construction activities within or adjacent to potential habitat for this species. If feeding or roosting is detected, construction activities shall not begin until the foraging or roosting plain pigeons move out of the area on their own. If nesting is detected, land clearing activities within a 100 meter (330 feet) radius of the nest sites shall not begin until the end of the nesting activities (fledging period).

Brown pelican

Protection of water quality of lagoons, rivers, and artificial ponds

1. A golf course management system will be established to minimize any adverse impacts associated with the use of nutrients, pesticides and irrigation on the golf course; including the scientific application of fertilizers, and integrated management of water, fertilizers, and pesticides.
2. Management and maintenance practices for operation of golf courses will be implemented, following the Florida Department of Environmental Protection guidelines for best management and operation of golf courses.
3. Advanced water control practices, including oil/grease separators, sediment traps, vegetated buffer zones, and swales will be implemented throughout the entire project.

Puerto Rican boa and Virgin Islands tree boa

Habitat protection and restoration

1. Approximately 80 percent of potential Puerto Rican boa habitat will be conserved and improved by implementing a large-scale reforestation program, including the

largest tract of continuous moist forest located in the easternmost hill of La Paulina.

2. More than 50 percent of the current pasture lands will be reforested with native and naturalized tree species, providing additional Puerto Rican boa habitat.

Prevention of boa casualties during construction and operation of project

1. Strict measures will be established to minimize boa casualties by motor vehicles, including the implementation of speed regulations and installation of "boa caution" road signs wherever a road borders potential boa habitat.
2. Prior to any earth movements, the boundaries of the construction area, and any staging areas, will be clearly marked in the field. Project plans, specifications, and construction contracts will clearly indicate the project layout, the boundaries, staging areas, buffer areas, and areas to be protected. These areas will be clearly marked in the field. The Service will be provided with copies of such plans and specifications for review, prior to the beginning of construction. A visit will be made to the site by the Service and the Applicant prior to construction, in order to review fencing, signing, or other mechanisms used to mark limits of such areas, as well as ensuring that staging areas are located away from sensitive areas. The Applicant will contact the Service at least two weeks prior of the projected date for initiation of any earth movement to coordinate the site visit. An agreement between the Service and the Applicant on the location of staging areas and construction boundaries must be reached (*in situ* or thereafter) before earth movement activities begin.
3. Before operating or moving equipment and vehicles in staging areas or near potential boa habitats during the construction phase, these will be thoroughly inspected to ensure that no boas are lodged in the standing equipment or vehicles. If boas are found within vehicles or equipment, the Conservation Program Biologist must be notified immediately for proper handling and relocation. Any relocated boas will be returned to appropriate habitat within the project site.
4. Before activities commence each workday during the construction phase, the Conservation Program Biologist will survey the areas to be cleared that day, to ensure that boas are not found within the construction/work area. If boas are found within the construction area, no earth movement activities will begin at the site where the boas are found until the boas move out of the area on their own. Construction/work at other sites, where no boas have been found after surveying the area, may continue.
5. A complete protocol on actions to be followed by resort personnel, residents, and

visitors to the project site when boas are encountered (including handling, notification procedures, and disposition of specimens), will be submitted to the Service for review and approval.

6. Security personnel will be instructed to be aware of poaching events within the property, and the actions to be followed if poaching is detected. A protocol shall be developed concerning the actions to be followed by security personnel if illegal capture of boas within the project property is detected. This protocol shall be reviewed and approved by the Service.
7. Strict regulations will be enforced concerning domestic animals (pets) in the project property, such as those proposed to protect sea turtles within the project.
8. An outreach/education plan will be implemented to inform residents, guests, employees, and the general public about protected species and the project management plans concerning such species.
9. A research center will be established within the project property to promote research and adequate management of the natural systems within the action area, in coordination with Commonwealth and federal agencies, members of the academia, as well as the general public.

Stahlia monosperma

Protection of potential areas where the species may occur

1. All potential habitat for *Stahlia monosperma* will be protected; essentially the mangrove fringes dominated by *Avicennia germinans* and *Conocarpus erectus*.
2. Detailed surveys of *Stahlia monosperma* will be conducted within lowland forested areas to be impacted by construction activities. Prior to any land clearing activities within or adjacent to potential habitat for *Stahlia monosperma*, the areas will be surveyed to determine if the species is found and may be impacted by land clearing activities. Appropriate measures will be discussed with the Service and DNER concerning possible modifications to the project design, to avoid impacting any specimens of *Stahlia monosperma* that are found.
3. Individuals of *Stahlia monosperma* will be planted at selected locations within the project site, in coordination with DNER and the Service.
4. An outreach/education plan will be implemented to inform residents, guests, employees, and the general public about protected species and the project management plans concerning such species.

5. A research center will be established within the project property to promote research and adequate management of the natural systems within the action area, in coordination with Commonwealth and federal agencies, members of the academia, as well as the general public.

Details of the project proposal are in the biological evaluation provided by the Corps on March 13, 2003. For specific information on the individual components of the proposed project, the biological evaluation should be referenced and it is incorporated here by reference.

STATUS OF THE SPECIES/CRITICAL HABITAT

Leatherback sea turtle

The leatherback sea turtle was listed as endangered in 1970. It is the largest living turtle, and is so distinctive from the other sea turtles that it is placed in a separate family: Dermochelyidae. All other living sea turtles are in the family Cheloniidae. The leatherback is distinguished by the rubber-like texture of the slightly flexible carapace (National Marine Fisheries Service [NMFS] and Service, 1992), and it ranges farther than any other sea turtle species, exhibiting broad thermal tolerances. Although leatherbacks are a long-lived species (greater than 30 years), they are somewhat faster to mature than other sea turtles such as the loggerhead sea turtle (*Caretta caretta*). Age to maturity estimates for female leatherbacks span from as little as 3-6 years (Rhodin, 1985) to 13 -14 years (Zug and Parham, 1996). Leatherback turtles feed primarily on cnidarians (medusae, siphonophores) and tunicates (salps, pyrosomas), and are often found in association with jellyfish. They nest frequently (up to seven nests per year) during a nesting season and nest about every two to three years. During each nesting, they produce 100 eggs or more in each clutch and, thus, can produce 700 eggs or more per nesting season (Schulz, 1975).

Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour, 1972). Adult leatherbacks forage in temperate and subpolar regions from 71° N to 47° S latitude in all oceans, and undergo extensive migrations to and from tropical nesting beaches between 9° N and 20° S latitude. In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland and Labrador, Canada and Norway, and as far south as Uruguay and Argentina and South Africa (NMFS SEFSC, 2001).

Female leatherbacks nest from southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Surinam (NMFS SEFSC, 2001). When they leave the nesting beaches, leatherbacks move offshore but eventually utilize both coastal and pelagic waters. Leatherbacks are deep divers, with recorded dives to depths in excess of 1,000 m (Eckert *et al.*, 1989), but they will come into shallow waters if there is an abundance of jellyfish near shore. Leary (1957) reported a large group of up to 100

leatherbacks just offshore of Port Aransas, Texas associated with a dense aggregation of *Stomolophus*. They also occur in Buzzard's Bay and Nantucket and Vineyard Sounds during the summer and fall, and in Cape Cod Bay and Narragansett Bay, particularly during the fall. Shoop and Kenney (1992) summarized three years of survey effort from the eastern Atlantic out to the 2,000 m isobath, and reported leatherback turtles throughout the study area, both inside and outside the 2,000 m isobath. A summer seasonal peak in sea turtle density was noted throughout the study area (NMFS NEFSC, unpubl. data).

Genetic analyses of leatherbacks to date indicate that within the Atlantic basin significant genetic differences occur among St. Croix, U.S. Virgin Islands, and mainland Caribbean populations (Florida, Costa Rica, Surinam/French Guiana), and between Trinidad and the same mainland populations, (Dutton *et al.*, 1999) leading to the conclusion that there are at least three separate sub-populations of leatherbacks in the Atlantic. Much of the genetic diversity is in the relatively small insular sub-populations. Genetic analyses indicate that female leatherback turtles nesting in St. Croix/Puerto Rico and those nesting in Trinidad differ from each other and from turtles nesting in Florida, French Guiana/Surinam and along the South African Indian Ocean coast. Turtles nesting in Florida, French Guiana/Surinam and South Africa cannot be distinguished at this time with mitochondrial DNA (mtDNA).

The largest known nesting aggregation of the leatherback turtle in the western North Atlantic Ocean occurs in French Guiana, and it may be the largest nesting aggregation of leatherback turtles in the world (NMFS SEFSC, 2001). The analysis of mtDNA indicate that the loss of the nesting populations from the St. Croix region and Trinidad would essentially eliminate most of the detected mtDNA variation throughout the Atlantic (Dutton *et al.*, 1999). To date, no studies have been published on the genetic make-up of pelagic or benthic leatherbacks in the Atlantic. Compared to current knowledge regarding loggerhead sea turtle populations, the genetic distinctness of leatherback populations is less clear and populations or sub-populations of leatherback sea turtles have not been formally recognized based on genetic studies.

The nesting aggregation in French Guiana has been declining at about 15 percent per year since 1987. From the period 1979-1986, the number of nests was increasing at about 15 percent annually. The number of nests in Florida and the U.S. Caribbean has been increasing at about 10.3 percent and 7.5 percent, respectively, per year since the early 1980's, but the magnitude of nesting is much smaller than that along the French Guiana coast (NMFS SEFSC, 2001).

Initial estimates of the worldwide leatherback population were between 29,000 and 40,000 breeding females (Pritchard, 1971), later refined to approximately 115,000 adult females globally (Pritchard, 1982). An estimate of 34,500 females (26,200 -42,900) was made by Spotila *et al.* (1996), along with a claim that the species as a whole was declining and local populations were in danger of extinction (NMFS SEFSC, 2001). They attribute this to fishery-related mortality, but at least historically, it was due primarily to intense exploitation of the eggs (Ross, 1979). On some beaches in the Pacific, nearly 100 percent of the eggs laid have been harvested (Eckert, 1996). Eckert (1993) and Spotila *et al.* (1996) record that adult mortality has also

increased significantly, particularly as a result of drift net and long-line fisheries. The Pacific population is in a critical state of decline, now estimated to number less than 3,000 total adult and subadult animals (Spotila *et al.*, 1996). The status of the Atlantic population is less clear. In 1996, it was reported to be stable, at best (Spotila *et al.*, 1996), but numbers in the Western Atlantic at that writing were reported to be on the order of 18,800 nesting females.

According to Spotila (pers. comm.), the Western Atlantic population currently numbers about 15,000 nesting females, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic (*i.e.*, off Africa, numbering about 4,700) have remained consistent with numbers reported in 1996 by Spotila *et al.* (1996). Spotila *et al.* (2000) indicate that between 1989 and 1995, marked leatherback returns to the nesting beach at St. Croix averaged only 48.5 percent, but that the overall nesting population grew. This is in contrast to a Pacific nesting beach at Playa Grande, Costa Rica, where only 11.9 percent of turtles tagged in 1993-94 and 19.0 percent of turtles tagged in 1994-95 returned to nest over the next 5 years. Characterizations of the Pacific population suggest that it has a very low likelihood of survival and recovery in the wild under current conditions. However, NMFS SEFSC (2001) note that while all these authors have noted dramatic declines in Pacific nesting beaches, they have suggested apparently stable or increasing nesting populations in the Atlantic.

Nest counts are the only reliable population information available for leatherback turtles. Recent declines have been seen in the number of leatherbacks nesting worldwide (NMFS and Service, 1995). Natural fluctuations such as an annual cycle or the fact that females may shift their nesting efforts in places like Suriname due to erosion at French Guiana, for example, complicate analysis of trends based on that data. Another important factor is that nesting trends reflect trends in adult females, a small proportion of the population, and may not be valid for the rest of the population (NMFS SEFSC, 2001). The status of the leatherback population in the Atlantic is difficult to assess since major nesting beaches occur over broad areas within tropical waters outside the United States. Although leatherbacks occur in all U.S. Atlantic, Gulf, and Caribbean waters, it is estimated that about 250 females now visit nesting sites in the U.S. (*i.e.*, Florida, Puerto Rico, and the U.S. Virgin Islands) (NMFS SEFSC, 2001).

The primary leatherback nesting beaches occur in French Guiana, Surinam, and Costa Rica in the western Atlantic, and in Mexico in the eastern Pacific. Although increased observer effort on some nesting beaches has resulted in increased reports of leatherback nesting, declines in nest abundance have been reported from the beaches of greatest nesting densities. The major western Atlantic nesting area for leatherbacks is located in the Surinam-French Guiana trans-boundary region. Chevalier and Girondot (1998) report that combined nesting in the two countries has been declining since 1992. Nesting also occurs on Florida's east coast. In 1998 the Florida Department of Environmental Protection reported 351 nests and 146 false crawls on the east coast of Florida. In the eastern Caribbean, nesting occurs primarily in the Dominican Republic, the Virgin Islands, and on islands near Puerto Rico. Sandy Point, on the western edge of St. Croix, Virgin Islands, has been designated by the U.S. Fish and Wildlife Service as critical habitat for nesting leatherback turtles. The current status of nesting populations in French

Guiana and Surinam is difficult to interpret because these beaches are so dynamic geologically. Schulz (1975) described a ten-year cycle of beach accretion and erosion in Guiana that could explain part of the cycle observed in nesting over the last 30 years.

Chevalier *et al.* (in press) state that since the mid-1970s leatherback nesting has declined (1987-1992 average= 40,950 nests and 1993-1998 average= 18,100 nests). They state that there is very little shifting in nesting from French Guiana and Surinam to other Caribbean sites (there has only been 1 tag recapture elsewhere). Numbers are decreasing in Surinam, too. Chevalier *et al.* (in press) claim that there is no human-induced mortality on the beach in French Guiana, and natural mortality of adults should be low. There has been very low hatchling success on beaches used for the last 25 years. Zug and Parham (1996) pointed out that the combination of the loss of long-lived adults in fishery related mortality, and the lack of recruitment stemming from elimination of annual influxes of hatchlings because of intense egg harvesting, has caused the sharp decline in leatherback populations. The author stated that "the relatively short maturation time of leatherbacks offers some hope for their survival if we can greatly reduce the harvest of their eggs and the accidental and intentional capture and killing of large juveniles and adults."

The U.S. Caribbean supports nesting by 150 to 200 adult females per year, representing a major nesting aggregation of this species within the United States. The largest concentration of nesting leatherbacks in the U.S. Caribbean has been documented at Sandy Point National Wildlife Refuge in St. Croix, and Playa Brava and Playa Resaca on Culebra Island, Puerto Rico (Eckert and Eckert, 1985; Howel and Tallevast, 1994). Nesting females prefer high-energy beaches with deep and unobstructed access. Leatherback nesting in Florida was once considered rare, but today the species is known to nest regularly (35 females/year) on the south Atlantic coast of Florida (Schroeder, 1994; Florida Marine Research Institute 1996, 1997, 1998b).

In Puerto Rico, leatherback nesting activities have been reported on beaches in Añasco, Arecibo, Barceloneta, Cabo Rojo, Culebra, Dorado, Fajardo, Guánica, Humacao, Isabela, Luquillo, Maunabo, Mayagüez, Mona, Piñones, Rincón, and Vieques. Nesting begins in February and extends through July, but the peak of nesting occurs in May (NMFS and Service, 1992). Nesting females appear to prefer high-energy beaches with deep, unobstructed access. Females renest, on the average, every nine to ten and may lay from five to seven clutches per year. Clutch size averages 116 eggs, which incubate for 55 to 75 days. Hatching success has been reported to be 65 percent on Sandy Point, St. Croix, and 75 percent on the island of Culebra (Eckert and Eckert, 1985; Howel and Tallevast, 1994; McDonald-Dutton, 1997). The temperature of nest incubation influences the sex of hatchlings, for example, high temperatures result in female hatchlings and low temperatures result in male hatchlings.

In summary, the conflicting information regarding the status of Atlantic leatherbacks makes it difficult to conclude whether or not the population is currently in decline. Numbers at some nesting sites are up, while at others they are down. Data collected in southeast Florida clearly indicate increasing numbers of nests for the past twenty years (9.1-11.5 percent increase), although it is critical to note that there was also an increase in the survey area in Florida over

time (NMFS SEFSC, 2001). At one site (St. Croix), population growth has been documented despite large apparent mortality of nesting females; in 1979 the number of nests is estimated to be increasing at 7.5 percent per year (NMFS SEFSC, 2001). However, the largest leatherback rookery in the western North Atlantic remains along the northern coast of South America in French Guiana and Surinam. While Spotila *et al.* (1996) indicated that leatherback turtles may have been shifting their nesting from French Guiana to Suriname due to beach erosion, analyses show that the overall area trend in number of nests has been negative since 1987 at a rate of 15.0 -17.3 percent per year (NMFS SEFSC, 2001, Appendix 1). If leatherback turtles are not nesting elsewhere, it appears that the Western Atlantic portion of the population is being subjected to mortality beyond sustainable levels, resulting in a continued decline in numbers of nesting females. The leatherback sea turtle is threatened by poaching, beach erosion, elimination of suitable nesting habitat by activities associated with development such as artificial lighting, beach cleaning, recreational equipment, vehicles, and predation (NMFS and Service, 1992). Boulon (pers. comm.) has suggested that the presence of pet scents (feces, urine) on a sea turtle nesting beach may deter turtles from nesting, as they perceive the presence of a predator.

Hawksbill sea turtle

The hawksbill sea turtle (*Eretmochelys imbricata*) was listed as endangered in 1970. This turtle is found throughout the world's tropical waters, however, it is relatively uncommon in the waters of the continental United States, preferring coral reefs, such as those found in the Caribbean and Central America. Hawksbills feed primarily on a wide variety of sponges, but also consume bryozoans, coelenterates, and mollusks. In the northern Gulf of Mexico, a surprising number of small hawksbills are encountered off Texas. Most of the Texas records are probably in the 1-2 year class range. Many of the individuals captured or stranded are unhealthy or injured (Hildebrand, 1987). The lack of sponge-covered reefs and the cold winters in the northern Gulf of Mexico probably prevent hawksbills from establishing a strong presence in that area.

Hawksbill nesting activity within the United States territory occurs in Puerto Rico, the U.S. Virgin Islands and very infrequently in Florida (NMFS and Service, 1993; Meylan *et al.*, 1995). Two important known nesting areas in the U.S. Caribbean are Mona Island, in Puerto Rico, and Buck Island, in the U.S. Virgin Islands (Hillis, 1990; Van Dam and Sarti, 1990). However, the species nests on beaches all around the coast of Puerto Rico. In Puerto Rico, the area that receives the highest number of nesting activities per year is Mona Island. From July, 1996, to January, 1997, a total of 354 hawksbill nests were recorded (Diez and Van Dam, 1997).

Hawksbill sea turtles are solitary nesters that usually nest on beaches with woody plant cover (NMFS and Service, 1993). A preferred nesting habitat is a low energy sandy beach with woody vegetation such as sea grape (*Coccoloba uvifera*) or saltshrub (*Suriana maritima*) located within a few meters of the water line (NMFS and Service, 1993). Nevertheless, suitable nesting habitat can be extremely variable, and range from high energy ocean beaches to tiny pocket beaches only a few meters in width. Hawksbill sea turtles may climb up sand dunes and wander up to 70 m (231 ft) inland or more in search of nesting sites (Horta, pers. comm.). Some hawksbill nests

may have as little as 10 centimeters (3.94 inches) of sand covering the eggs (Boulon, pers. comm.).

Although some nesting may occur throughout the year, the most important nesting months for hawksbills in Puerto Rico are from June through November. Hawksbills average from four to five nests per season, at intervals averaging 14 days. Incubation is approximately two months (60 days), but there is quite a bit of variation from nest to nest and site to site. Mean hatching success for non-depredated nests on most beaches appears to be near 80 percent (Van Dam and Sarti, 1990; Hillis, 1990).

Threats to the hawksbill sea turtle include their slaughter for food or the use of the shell in jewelry, poaching of eggs, degradation of coral reefs (used by the hawksbill for shelter and food), the reduction of suitable nesting habitat as a result of unregulated coastal development, entanglement in fishing nets and lines at sea, depredation, and ingestion of ocean debris (NMFS and Service, 1993). Boulon (pers. comm.) has suggested that the presence of pet scents (feces, urine) on a sea turtle nesting beach may deter turtles from nesting, as they perceive the presence of a predator. Sediment compaction from vehicular and pedestrian traffic could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson, 1987; Nelson, 1988), thus resulting in lower hatching and emergence success, and contributing to false crawls. In the wider Caribbean, hawksbill populations are reported to be declining or depleted in 22 of the 26 geopolitical units for which some status and trend information is available. The only populations considered to be increasing in size are those of Mexico and Mona Island, Puerto Rico (Meylan, 1999).

ENVIRONMENTAL BASELINE

The action area is an approximately 511.3 hectares (1,263 acres) parcel, with 6.9 km (4.23 mi) of beaches, that lies within the coastal area north of Highway PR-3 in the extreme northeast corner of the municipality of Luquillo, Puerto Rico (bordering the municipality of Fajardo); extending from the Sabana River to the west to the eastern La Paulina ridge, Convento beach, and forms part of the narrow northeastern coastal valley of Puerto Rico. The hills of volcanic origin and the small alluvial valleys that lie between hills are characteristic of the northeastern corner of the island. These valleys open into the coast and are generally bordered by sand dunes, beaches, and other coastal formations. Additionally, these valleys contain large herbaceous wetlands and swamps near the river mouths.

Secondary forests, pastureland, marshland, scrubland, freshwater swamps, three rivers and associated estuaries and flood plains, mangrove forests, and coastal dunes cover over 90 percent of the action area. High-energy beaches are found along the entire north coast of the action area. Two valleys associated with the Sabana, Pitahaya, and Juan Martín rivers are found in the action area. A small hill that reaches the coast and the eastern border of the action area to two neighboring properties: Convento Norte and Convento Sur. The Sabana River forms the western border.

The parcel within the action area is composed of the following properties: San Miguel I, San Miguel II, the northwest portion of La Paulina, the Sabana parcel (east of the Sabana River), and two parcels collectively known as the Northwest parcel (north of San Miguel I). The land at San Miguel I and San Miguel II was used for the cultivation of sugarcane and livestock grazing, and currently is used for cattle grazing. The land at La Paulina was used for cultivation of fruits, vegetables, and sugarcane, and cattle grazing. Currently, La Paulina is vacant and it is owned by the Puerto Rico Industrial Development Company.

Of the about 505.2 hectares (1,263 acres) in the action area, about 154.4 hectares (386 acres) will be impacted by the proposed project. The ecological associations that will be most impacted by the proposed action will be 79.2 hectares (198 acres) of pastureland, 14 hectares (35 acres) of coastal scrubland, 14 hectares (35 acres) of coastal moist forest, and 9 hectares (22.5 acres) of gallery forests. The remaining 350.8 hectares (877 acres) will be conserved.

Status of the species within the action area

Leatherback sea turtle

La Paulina and San Miguel beaches (the two beaches within the action area), along with El Convento beach to the east of the proposed project site supported 825 nests between 1993 and 2001 (Horta, pers. comm.). DNER has recorded over 100 nests annually, with a record of 346 nests in 2001. Segments of the San Miguel dune system are deteriorated as a result of historical sand mining activities, and there is some evidence that nesting frequency of leatherback sea turtles is reduced in front of these areas (Horta, pers. comm.). The presence of DNER personnel patrolling the beaches during the leatherback nesting season has reduced poaching to a minimum (Horta, pers. comm.). The negative impact of cattle presence on leatherback nesting activities in the beaches, however, has not been measured (Horta, pers. comm.). Leatherback clutches deposited late in the nesting season are occasionally destroyed when large swells erode the beach (Horta, pers. comm.).

Hawksbill sea turtle

It is known that hawksbill sea turtles nest, but due to logistical limitations their nesting habits have not been studied (Horta, pers. comm.). Hawksbill nest attempts have been observed within the sand dune habitat of the project site (Horta, pers. comm.). It is possible that hawksbill sea turtles nest along the entire length of the coastal limit of the action area, but no nesting has been reported for the beach area where the project hotel would be located (San Miguel).

EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed action on the species and critical habitat and its interrelated and interdependent activities. To determine whether the proposed action is likely to jeopardize the continued existence of threatened or

endangered species in the action area, we have evaluated the consequences of the proposed action that affect sea turtles on their habitats.

Sea Turtles

The following activities within the action area may adversely affect sea turtles: artificial lighting; construction activities within or near the beach; predation on eggs and hatchlings by domestic and wild animals; presence of vehicles, machinery, and beach equipment on the beach; poaching of sea turtle eggs or hatchlings; and increase in pedestrian and vehicular traffic that might result in sand compaction and collapsing/trampling of nests or hatchlings, altering adult nesting behavior, or killing adult sea turtles.

Lighting

Extensive research has demonstrated that artificial lighting may result in the deterrence and alteration of nesting behavior of adult female sea turtles and, as well, result in the misdirection of emerging hatchlings. Artificial lighting has been implicated in the selection or avoidance of the nesting beach. Adult female turtles have been shown to avoid nesting on intensely lighted stretches of beach (Witherington and Martin, 1996).

Sea-finding behavior by adult female turtles may also be disrupted by artificial lighting. Observations of orientation in nesting leatherback sea turtles indicate that sea-finding depends on visual cues, similar to that which has been studied for emerging hatchlings. Misdirection may result in turtles moving towards areas such as roads and parking lots, where they may be killed, or fall into unprotected construction pits (Service, 1996b).

One of the most documented adverse effects of artificial lighting is on the sea-finding behavior of sea turtle hatchlings. The emergence of sea turtle hatchlings occurs primarily at night, and under natural conditions hatchlings will head directly to the sea. Sea-finding behavior involves an orientation decision based on the assessment of light cues such as brightness, shape and in some species color. However, problems with sea-finding accuracy occur in the presence of artificial lighting. On beaches where light pollution is a problem, hatchling sea turtles may become misdirected, are unable to find the water, and may suffer high rates of mortality from predation, vehicles, and dehydration (NMFS and Service 1992, 1993; and Witherington and Martin, 1996).

The construction of buildings, recreational facilities, walkways, and parking spaces near the coastline may result in light being cast directly, indirectly, or cumulatively onto sea turtle nesting habitat (beach and dune areas). Cuts through the dune vegetation to provide beach access for residents and visitors may worsen the situation given that light from point sources (buildings, roads, walkways, and other facilities) could be visible from the beach and cause turtle misdirection or abandoning nesting attempts.

Presence of vehicles, machinery, human tracks on sand, and beach equipment on the beach

Equipment left at a sea turtle nesting beach and vehicular or human tracks on sand can be a physical obstacle that may hamper or deter nesting attempts, and interfere with incubating egg clutches and the seaward movement of hatchlings. Vehicular ruts left in the sand may create an obstacle for hatchlings traversing from the nest to the sea. Upon encountering a vehicle rut, hatchlings may be misdirected along the vehicle track, rather than crossing over it to reach the water. Apparently, hatchlings become diverted not because they cannot physically climb out of the rut (Hughes and Caine, 1994), but because the sides of the track cast a shadow and the hatchlings lose their line of sight to the ocean horizon (Mann, 1977). If hatchlings are detoured along the vehicle ruts, they are at greater risk to predators, fatigue, and desiccation.

Two studies have confirmed hatchling misdirection by vehicular ruts (Cox *et al.*, 1994 and Hosier *et al.*, 1981). In one study, tire ruts were found to cause nearly 21 percent of hatchling turtles to turn onto their backs and dehydrate before they could upright themselves. Live and desiccated turtles have also been observed in deep vehicle ruts (LeBuff, pers. obs., Patrick, pers. obs.).

Pedestrian traffic may alter adult nesting behavior, while vehicular traffic might result in sand compaction and collapsing/trampling of nests or hatchlings, altering adult nesting behavior, or killing or injuring adult sea turtles

Nesting can be considered to include: emerging from the sea; and approaching the beach to nest; selecting a nest site; constructing a nest; egg deposition; covering and camouflaging the nest; and returning to sea. The number of recreational users will increase in the same areas used by nesting leatherback sea turtles. Sea turtles are most prone to human disturbance during the initial phases of nesting (emergence from the sea through egg-cavity excavation) (Hirth and Samson, 1987 as cited in Witherington and Martin, 1996). Witherington and Martin (1996) also noted that the presence of people moving within the field of view of a turtle crawling up a beach may cause abandonment. Although sea turtles are less prone to abandon nesting attempts once egg deposition has begun, the normal post-egg laying behavior of covering and camouflaging the nest site may be inadequate for egg and hatchling protection, if a turtle is disturbed.

One of the most critical acts a sea turtle must perform takes place immediately after it emerges from the nest. Under natural conditions, hatchlings that have just emerged from the sand crawl in a frenzy directly from nest to the sea. They usually do it as a mass, 100 or more hatchlings at a time (depending on the turtle species). The zeal is justified given the consequences of delay--death. Hatchlings that are physically kept from reaching the sea or that have their sea-finding disrupted by unnatural stimuli often die from internal injuries, exhaustion, dehydration, predation, and other causes.

The potential for vehicles to run over hatchlings is even greater than with adult turtles because of the small size of and multiple number of hatchlings on the beach. Ernest and Martin (1993) (as cited in Service, 1996b) found that 50 percent of nest emergences occurred before midnight on the east coast of Florida. Watson (1996) found that 87 percent of nests emerged between sunset

and midnight and 6.5 percent emerged between midnight and dawn during a five-year period on Panama City Beach. Over 90 percent of observed leatherback sea turtle nests at Sandy Point NWR, St. Croix (U.S. Virgin Islands), emerge before midnight (McDonald-Dutton, 1997).

Activities which involve the use of equipment on sea turtle nesting beaches may result in the collapsing, compaction, or direct destruction of nests (Nelson and Dickerson, 1987; Nelson, 1988). Continuous and heavy pedestrian traffic may destroy nests or nesting habitat (vegetation). Sediment compaction could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson, 1987; Nelson, 1988). Thus, sediment compaction could contribute to false crawls (lower nesting success) and reduced nest hatching and emerging success. Impacts from vehicles running over sea turtle nests are reported in the literature. Mann (1977) reported that driving directly over incubating egg clutches can cause sand compaction which may decrease nest success and directly kill pre-emergent hatchlings. Injury and/or death of pre-emergent hatchling and eggs may be caused by physical crushing or collapse of the nest chamber.

No quantitative studies are available to indicate what factors would influence mortality rates from vehicles driving over nests. Many factors; including vehicle speed, pounds per square inch of tire surface, the timing of the event relative to incubation or hatching, the depth of the eggs/hatchlings in the nest at the time of impact, and the physical characteristics of the nest itself (dimensions of the nest cavity, soil structure and properties); will ultimately influence whether or not, and the extent to which, mortality/injury occurs. There is no established relationship between the cumulative number of times an individual nest has been driven over and the extent and duration of a mortality/injury event.

Although the applicant proposes to conduct daily nesting sea turtle patrols to detect the location of new nests, and all nests would be visibly marked, studies have shown that even under the best conditions, about six to eight percent of nests can be missed because of natural events (rainfall or windblown sand) or are misidentified as false crawls (Martin, 1992, and Ernest and Martin, 1993, as cited in Service, 1996b; Schroeder, 1994). Missed nests are usually identified during emergence of hatchlings in areas where no nests have been previously documented. In order to minimize the possibility of vehicles killing young, all nests must be marked, and vehicles used for patrolling must drive slowly and below the wrack or debris line. If a turtle is observed nesting, additional measures would include stopping the vehicle, switching off the lights, and all people remaining inside the vehicle.

Predation on eggs and hatchlings by domestic animals

Residents and visitors' pets could impact sea turtle nesting activity by harassing nesting females, preying upon eggs and hatchlings, and interfering with the ability of hatchlings to reach the sea. The increased human presence may also attract predators such as mongoose (*Herpestes auropunctatus*) and feral dogs, which dig up and eat sea turtle eggs (NMFS and Service, 1993).

Poaching of sea turtle eggs or hatchlings

Although poaching of sea turtle eggs is more likely to occur at remote, isolated beaches rather than at a resort beach, some people consider sea turtle eggs as aphrodisiac, whereas other people collect them for food or novelty food item.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Endangered Species Act. The Service anticipates that any future activities within the action area will require section 7 consultation. No activities by State, local, or private individuals that may effect the species are anticipated to occur in the action area. Therefore, no cumulative impacts will result in an impact to these species.

CONCLUSION

After reviewing the current status of the leatherback sea turtle and hawksbill sea turtle and the environmental baseline for the action area, the project description and the Corps proposed conservation measures, the effects of the proposed activities and the cumulative effects, it is the Service's biological opinion that this project, as proposed, is not likely to jeopardize the continued existence of the above listed species, and is not likely to destroy or adversely modify designated critical habitat.

INCIDENTAL TAKE STATEMENT

Sections 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the San Miguel Luquillo

Partners S. E. , as appropriate, for the exemption in section 7(o)(2) to apply: The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require San Miguel Luquillo Partners S. E., to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of the incidental take, the Corps or San Miguel Luquillo Partners, S. E must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(I)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

The Service anticipates the following take of sea turtles within the action area:

Sea Turtles

Adults

- A. One adult leatherback or one hawksbill sea turtle could be taken as a result of artificial lighting that may reach the beach and dune area. Take is anticipated in the form of harassment by disorientation (e.g., adult or hatchling sea turtles moving inland towards light sources from the proposed project), or nest abandonment from lights, noise, or shadows (e.g., erratic behavior and subsequent abandonment of nesting attempt) within any five-year period.
- B. One adult of leatherback or one hawksbill sea turtle in the form of nest deterrence (turtle approaching beach to nest but returning upon disturbance), destruction of nesting habitat (removal/trampling of dune vegetation), behavioral modifications (interruption of nest digging, egg deposition, nest covering, and return to sea), harm, or mortality (trampling or colliding with turtle), as a result of operating vehicles, human traffic, or beach equipment within any five-year period.

Nests

- A. The contents of one nest of leatherback or hawksbill sea turtle may be taken in the form of mortality (collapse of nest chamber, sand compaction, predation) as a result of vehicle driving or human traffic over nests that are not marked (misidentification of nests as false crawls, nests that have lost markings due to weather, nests missed when night patrols cannot take place), destruction of nests by pedestrians or beach users, trampling or egg predation by unattended domestic animals, or mongoose predation within any five-year period.

Hatchlings

- A. The Service anticipates that hatchlings emerging from one nest of leatherback and hawksbill sea turtles may be taken in the form of harassment and/or mortality as a result of misdirection from artificial illumination, vehicle and human tracks on sand, trampling or predation by unattended domestic animals, mongoose predation, or being run over by patrolling vehicles within any five-year period.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of sea turtles. These are in addition to those presented as part of the project description.

Sea Turtles

1. Vegetation that serves as barrier from the project lighting will be sufficiently tall (i.e., not less than three meters [about 10 feet] high north of the villas and five meters [about 16 feet] north of the hotel complex), and provide proper cover, to shield the beach from light sources from the project.
2. Security lights will be the minimum necessary for safety purposes (i.e., lights located at the back entrances of buildings).
3. Proper fencing will be used around areas to be restored to native vegetation until that vegetation is capable of survival under natural conditions.
4. Activities at the beach that are not directly controlled, but are indirectly related to, the operation of the proposed project will be directed to the proper regulatory agencies for action.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Vegetation that serves as barrier from the project lighting will be sufficiently tall (i.e., not

less than three meters [about 10 feet] high north of the villas and five meters [about 16 feet] north of the hotel complex), and provide proper cover, to shield the beach from light sources from the project.

- a. Vegetation will be measured (including vegetation height and light penetration through foliage) before beginning operation of the resort, to make sure that no illumination from the project filters into the dune and beach areas. If areas within the vegetation do not adequately block illumination from the project, corrective measures will be taken (re-planting) to provide adequate shielding.
 - b. Beachfront areas that will be re-vegetated and must be monitored to make sure that vegetation growth in these areas is proper to shield illumination from the project. Re-vegetated areas will show adequate height and growth for shielding before beginning operation of the resort.
 - c. An illumination control plan will be developed that will be carried out in the event that the vegetation barrier is affected by natural (defoliation or uprooting of vegetation due to high tides, strong winds, hurricanes, drought) or manmade (brush fire) events. The shielding effect of the vegetation will be monitored during drought events to make sure that vegetation continues to act as an effective illumination barrier. The illumination control plan will be evaluated and approved by the Service.
2. Security lights will be the minimum necessary for safety purposes (i.e., lights located at the back entrances of buildings).
 - a. Security lights will be installed only where needed for safety purposes, such as gates and access doors to buildings.
 - b. True-neon light bulbs will be selected for security lights.
3. Proper fencing will be used around areas to be restored to native vegetation until that vegetation is capable of survival under natural conditions.
 - a. Fencing will not impede the movement of nesting sea turtles through the beach and dune areas. Barbed wire will not be used, and fence posts will be placed at intervals equal or greater than three meters (about 10 feet), and the distance between the ground and the first line of fence wire/rail will be greater than one point five meters (about 5 feet).
4. Activities at the beach that are not directly controlled, but are indirectly related to, the operation of the proposed project, will be directed to the proper regulatory agencies for action.
 - a. Inadequate treatment and management of runoff and wastewater and regulation of

anchoring locations, speed limits, beach ramping, and proximity of vessels to the beach, will be reported to the proper Commonwealth agencies for corrective action.

Rescue and Reporting Requirements

1. Any listed species injured, killed, or otherwise taken as a result of the construction or operation of the proposed project will be immediately recovered and transported to the Center for Marine Conservation, or other approved facility at the expense of the project owners, and the incident immediately reported to the jurisdictional government agencies.
 - a. If any listed species is injured, killed, or otherwise taken as a result of construction or operation of the proposed project, the incident will be reported immediately to the Service's Boquerón Field Office Supervisor (telephone number 787-851-7297).
 - b. Care must be taken in handling sick or injured specimens to make sure effective treatment and care, and in handling dead specimens, to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder must be responsible to make sure that evidence intrinsic to the specimen is not unnecessarily disturbed.
2. Results of monitoring programs for species covered under this biological opinion will be reported to the Service on an annual basis.
 - a. An annual report describing the actions taken to implement the terms and conditions of this incidental take statement will be submitted to the Service's Boquerón Field Office. In addition to other required information, this report will include the results of species/habitat monitoring programs and any actions taken to improve or modify such monitoring programs, as appropriate. The date for the annual reports will be specified once the project construction begins.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. The Service believes that the above stated level of incidental take for sea turtles will not be exceeded. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modifications of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the

purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop

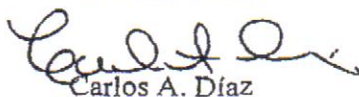
1. Signs should be posted at beach access points on the east and west ends of the beach to increase public awareness about nesting sea turtles. The signs should describe the importance of the beach to the species and their conservation.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects, or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request for formal consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Corps involvement or control over the action has been retained (or is authorized by law) and if: (1) new information reveals effects of the Corps' action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (2) the Corps' action is subsequently modified in a manner that causes an effect to listed species or critical habitat not considered in this opinion; (3) a new species is listed or critical habitat designated that may be affected by the action; or (4) the amount or extent of incidental take authorized under this opinion [one adult leatherback or one hawksbill sea turtle taken as a result of artificial lighting that may reach the beach and dune area within any five-year period; one adult of leatherback or one hawksbill sea turtle as a result of operating vehicles, human traffic, or beach equipment within any five-year period; the contents of one nest of leatherback or hawksbill sea turtle as a result of vehicle driving or human traffic over nests that are not marked (misidentification of nests as false crawls, nests that have lost markings due to weather, nests missed when night patrols cannot take place), destruction of nests by pedestrians or beach users, trampling or egg predation by unattended domestic animals, or mongoose predation within any five-year period; and the hatchlings emerging from one nest of leatherback or hawksbill sea turtles as a result of misdirection from artificial illumination, vehicle and human tracks on sand, trampling or predation by unattended domestic animals, mongoose predation, or being run over by patrolling vehicles within any five-year period] is exceeded. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation of consultation.

Sincerely yours,



Carlos A. Díaz

Assistant Field Supervisor

cc: ARD-ES, FWS Region 4, Atlanta
NMFS, St. Petersburg
NMFS, Boquerón
DNER, San Juan
EQB, San Juan
EPA, San Juan
EPA, New York
PRPB, San Juan

LITERATURE CITED

- Boulon, R. 2003. Personal communication. Chief Resource Management. National Park Service, St. John, U.S. Virgin Islands.
- Chevalier, J. and M. Girondot. 1998. Nesting dynamics of marine turtles in French Guiana during the 1997 nesting season. *Bull. Soc. Herp. Fr.*, 85-86: 5-19.
- Cox, J. H., H. F. Percival, and S. V. Colwell. 1994. Impact of vehicular traffic on beach habitat and wildlife at Cape San Blas, Florida. Cooperative Fish and Wildlife Research Unit. Tech. Rep. No. 50.
- Diez, C. E. and R. Van Dam. 1997. Mona and Monito Island Hawksbill Research Project. Research Report for 1996.
- Dutton, P. H., B. W. Bowen, D. W. Owens, A. Barragan, and S. K. Davis. 1999. Global phylogeography of the leatherback turtles (*Dermochelys coriacea*). *J. Zool. Lond.* 248: 397-409.
- Eckert, K. L. 1993. The biology and population status of marine turtles in the North Pacific Ocean. NOAA Tech. Mem. NOAA-TM-NMFS-SWFSC-186: 156.
- Eckert, K. L. and S. A. Eckert. 1985. Tagging and nesting research of leatherback sea turtles *Dermochelys coriacea* on Sandy Point, St. Croix, 1985. Annual Report U.S.V.I. Div. of Fish and Wildlife. Ref. Serv. MIN 54-8680431.
- Eckert, S. A., K. L. Eckert, P. Ponganis, and G. L. Kooyman. 1989. Diving and foraging behavior of leatherback sea turtles *Dermochelys coriacea*. *Can. J. Zool.* 67: 2834-2840.
- Ernst, L. H. and R. W. Barbour. 1972. Turtles of the United States. Univ. Kentucky Press, Lexington, Kentucky.
- Ernest, R. G. and R. E. Martin. 1993. Sea turtle protection program performed in support of velocity cap repairs, Florida Power & Light Company St. Lucie Plant. Applied Biology, Inc. Jensen Beach, FL.
- Florida Marine Research Institute. 1996. 1995 Florida statewide nesting beach survey data for *Caretta caretta*, *Chelonia mydas*, and *Dermochelys coriacea*. Department of Environmental Protection. St. Petersburg, Florida. August 28.
- Florida Marine Research Institute. 1997. 1996 Florida statewide nesting beach survey data for *Caretta caretta*, *Chelonia mydas*, and *Dermochelys coriacea*. Department of Environmental Protection. St. Petersburg, Florida. August 1.

- Florida Marine Research Institute. 1998b. 1997 Florida statewide nesting beach survey data for *Caretta caretta*, *Chelonia mydas*, and *Dermochelys coriacea*. Department of Environmental Protection. St. Petersburg, Florida. September 8.
- Hildebrand, H. 1987. A reconnaissance of beaches and coastal waters from the border of Belize to the Mississippi River as habitats for marine turtles. Report to NOAA/NMFS/SEFC Panama City Laboratory, purchase order NA-84-CF-A-134.
- Hillis, Z. 1990. Buck Island Reef National Sea Turtle Research Program: 1989-the year of the hawksbills and hurricanes. Pages 15-17. In T.H. Richardson, J.I. Richardson, and M. Donnelly (compilers), Proceedings of the Tenth Annual Workshop on sea Turtle Biology and Conservation. NOAA Tech. Memo. NMFS/SEFC-278.
- Hirth, H. F. and D. A. Samson. 1987. Nesting behavior of green turtles (*Chelonia mydas*) at Tortuguero, Costa Rica. Caribbean Journal of Science 23:374-379.
- Hosier, P. E., M. Kochhar, and V. Thayer. 1981. Off-road vehicle and pedestrian track effects on the sea-approach of hatchling loggerhead turtles. Environ. Conserv. 8:158-161.
- Horta, H. 2003. Personal communication. Biologist. Puerto Rico Department of Natural and Environmental Resources, Fajardo, Puerto Rico.
- Horta, H., R. Ramos, M. Ramos, H. Horta-Cruz and K. Ocasio. 2002. 17 years of monitoring and management of leatherback sea turtle population in the northeast coast of Puerto Rico.
- Howel, J. and T. Tallevast. 1994. Leatherback nesting on Culebra Island, Puerto Rico. Final Report submitted to the Puerto Rico Conservation Foundation and the Fish and Wildlife Service.
- Hughes, A. L. and E. A. Caine. 1994. The effects of beach features on hatchling loggerhead sea turtles. In: Proceedings of the 14th Annual Symposium on Sea turtle biology and conservation, March 1-5, 1994, Hilton Head, South Carolina. NOAA, Tech. Memo. NMFS-SEFSC-351.
- LeBuff, C. R., Jr. 1990. The loggerhead turtle in the eastern Gulf of Mexico. Caretta Research, Inc., Sanibel Island, FL.
- LeBuff, C. R. 1990. Personal observation. St. Joseph Aquatic Preserve Manager, Misty Nabors, Florida.
- Mann, T. M. 1977. Impact of developed coastline on nesting and hatchling sea turtles in southeastern Florida. Unpubl. M.S. thesis. Florida Atlantic University, Boca Raton, FL.

- Martin, R. E. 1992. Turtle nest relocation on Jupiter Island, Florida: an evaluation. Presentation to the Fifth Annual National Conference on beach Preservation Technology, Feb. 12-14, 1992, St. Petersburg, FL.
- McDonald-Dutton, D. 1997. Management plan for leatherback turtles on the Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, with reference to green and hawksbill turtles. Service, Contract No. 40181-6-5351.
- Meylan, A. B. 1999. Status of the hawksbill turtle (*Eretmochelys imbricata*) in the Caribbean region. *Chelonian Conservation and Biology*; 1999, 3: 172-184.
- Meylan, A. B., B. Schroeder, and A. Mosier. 1995. Sea turtle nesting activity in the State of Florida 1979-1992. Florida Marine Research Publications Number 52, St. Petersburg, FL.
- National Marine Fisheries Service Southeast Fisheries Science Center. 2001. Stock assessment of loggerhead and leatherback sea turtles, and an assessment of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U. S. Department of Commerce, National Marine Fisheries Service, Miami, Florida, SEFSC Contribution PRD-00/01-08; Parts I-III and Appendices I-VI.
- National Marine Fisheries Service and the U.S. Fish and Wildlife Service. 1992. Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic Ocean and Gulf of Mexico. Washington, D.C.
- National Marine Fisheries Service and the U.S. Fish and Wildlife Service. 1993. Recovery Plan for Hawksbill Turtles in the U.S. Caribbean, Atlantic Ocean and Gulf of Mexico. St. Petersburg, Florida.
- National Marine Fisheries Service and the U.S. Fish and Wildlife Service. 1995. Status review of sea turtles listed under the Endangered Species Act of 1973. National Marine Fisheries Service, Silver Springs, Maryland.
- Nelson, D. A. 1988. Life history and environmental requirements of loggerhead turtles. U.S. Fish and Wildlife Service Biological Report 88 (23). U.S. Army Corps of Engineers TR EL-86-2 (Rev.).
- Nelson, D. A. and D. D. Dickerson. 1987. Correlation of loggerhead turtle nest digging times with beach sand consistency. Abstract of the 7th Annual Workshop on Sea Turtle Conservation and Biology.
- Patrick, L. 1998. Personal observation. Wildlife Biologist. Ecological Services Panama City Field Office, U.S. Fish and Wildlife Service, Panama City, Florida.

- Pritchard, P. C. H. 1971. The leatherback or leathery turtle, *Dermochelys coriacea*. IUCN Monogr. 1: 1-39. Morges, Switzerland.
- Pritchard, P. C. H. 1982. Nesting of the leatherback turtle, *Dermochelys coriacea*, in Pacific Mexico, with a new estimate of the world population status. *Copeia* 1982: 742-747.
- Rhodin, A. G. J. 1985. Comparative chondro-osseous development and growth in marine turtles. *Copeia* 1985: 752-771.
- Ross, J. P. 1979. Historical decline of loggerhead, ridley, and leatherback sea turtles. In: Bjorndal, K. A. (editor), *Biology and Conservation of Sea Turtles*, Smithsonian Institution Press, Washington, D. C., pp. 373-383.
- Shoop, C. R. and R. D. Kenney. 1992. Seasonal distribution and abundance of loggerhead and leatherback sea turtles in the waters of the northeastern United States. *Herpetol. Monogr.* 5: 43-67.
- Schroeder, B. A. 1994. Florida index nesting beach surveys: Are we on the right track? Pages 132-133 in Bjorndal, K.A., A.B. Bolten, D.A. Johnson, and P.J. Eliazar (compilers). *Proceedings of the 14th Annual Symposium on Sea Turtle Biology and Conservation*. NOAA Technical Memorandum NMFS-SEFSC-351.
- Schulz, J. 1975. Sea turtle nesting in Surinam. *Zool. Verh. (Leiden)* No. 143.
- Spotila, J. R. 2003. Personal communication. Biologist. Drexel University, Pennsylvania.
- Spotila, J. R., A. E. Dunham, A. J. Leslie, A. C. Steyermark, P. T. Plotkin, and F. V. Paladino. 1996. Worldwide population decline of *Dermochelys coriacea*: Are leatherback turtles going extinct? *Chelonian Conservation and Biology* 2: 209-222.
- U.S. Fish and Wildlife Service. 1996b. Administrative record for issuance of a Section 10(a)(1)(B) incidental take permit to Volusia County, Florida in association with implementation of controlled beach driving and light management. Atlanta, GA.
- Van Dam, R. and L. Sarti. 1990. Sea Turtle biology and conservation on Mona Island, Puerto Rico. Report for 1989. Chelonia, Sociedad Herpetológica de Puerto Rico.
- Watson, K. 1996. Sea turtle nesting activity on Panama City Beach, 1991-1995. St. Andrew Bay Resource Management Assoc. Panama City, FL.
- Witherington, B. E. and M. R. Erik. 1996. Understanding, Assessing and Resolving Light-Pollution Problems on Sea Turtle Nesting Beaches, Florida Marine Research Institute, Technical Reports.

Zug, G. R. and J. F. Parham 1996. Age and growth in leatherback turtles, *Dermochelys coriacea* (Testudines: Dermochelyidae): a skeletochronological analysis. *Chelonian Conservation and Biology*; 1996, 2: 244-249.