Biological Opinion for Issuance of an Incidental Take Permit Section 10 (a)(1)(B) The Villages at Seagrove and Camp Creek St. Joe Company Walton County, Florida

Prepared by:
U.S. Fish and Wildlife Service
Panama City Field Office, Florida
March 23, 2000

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R4/FWS/GARD-III

Memorandum

To: Deputy Regional Director, FWS, Atlanta, GA (DRD)

From: Geographic Assistant Regional Director, Area III, FWS, Atlanta, GA

Through: Assistant Regional Director, Ecological Services, FWS, Atlanta, GA

Subject: Biological Opinion: Incidental Take Permit for the Choctawhatchee Beach Mouse (*Peromyscus polionotus allophrys*) for the St. Joe Company's The Villages at Seagrove (a.k.a. WaterColor) and Camp Creek Developments in Walton County, Florida

This document represents the Fish and Wildlife Service's (Service) biological opinion furnished in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act), regarding an incidental take permit (ITP) for the subject project. The Service's approval of an ITP is a Federal action subject to consultation under section 7(a)(2) of the Act. The action to which this biological opinion applies is the Service's issuance of an ITP to the St. Joe Company (Applicant) based on submittal of a habitat conservation plan (HCP) for construction and use of two beach resort and private residential/commercial developments and their subsequent effects on the Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*) (CBM), loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*), and the leatherback turtle (*Dermochelys coriacea*).

This biological opinion is based on information from the HCP provided by the Applicant and numerous site inspections, telephone conversations, and the Development of Regional Impact application for development approval (DRI/ADA) (with sufficiency responses, revisions and updates) required by the State of Florida. However, the majority of the information used comes from data collected in the field by Auburn University and funded primarily by the Service between 1987 and present-day. This biological opinion is also based on the experience of Service biologists and an extensive literature search on beach mice and other *Peromyscus* species

and other small mammals. A complete administrative record is on file in the Panama City Field Office, Florida.

CONSULTATION HISTORY

June 8, 1998 — Roger Anderson, Post Buckley, Schuh, & Jernigan, Inc. (PBS&J), requests information regarding federally protected species on a parcel of land between Grayton Beach State Recreation Area (SRA) and the development known as Seaside.

June 26, 1998 — The Service transmits a letter in response to Mr. Anderson's (PBS&J) request concerning federally protected species and options for a non-Federal entity landowner.

August 20, 1998 — The Service met with the Applicant to discuss The Villages at Seagrove and Camp Creek projects.

August 24, 1998 — The Service participates in an onsite interagency meeting of The Villages at Seagrove and Camp Creek properties owned by the St. Joe Company. Participants: Steve Shea, St. Joe Company; Jim Moyers, Auburn University; Gary Anderson, PBS&J; and Todd Wilkinson and Adam Hoyle of Environmental Services Inc. (ESI).

December 14, 1998 — The Service faxes CBM trapping survey data for Grayton Beach SRA, provided by Jim Moyers, Auburn University, to Gary Anderson, PBS&J, as requested by telephone.

February 8, 1999 — The Service participates in an onsite meeting at The Villages at Seagrove project site with Jake Ingram, landscape architect, ARVIDA, and John Bente, Florida Park Service (FPS), District 1 Office, and Pam Murfey, FPS, Choctaw GeoPark.

February 17, 1999 — The Service transmits a letter to Jake Ingram, landscape architect, ARVIDA, regarding the landscaping design at The Villages at Seagrove and other ARVIDA/St. Joe Company developments.

March 17, 1999 — The Service meets with the Applicant to discuss The Villages at Seagrove and Camp Creek developments.

April 9, 1999 — The Service participates in an onsite interagency meeting of the Camp Creek property. Participants: Roger Anderson, PBS&J, Steve Shea, St. Joe Company; Jim Moyers, Auburn University; Gary Anderson,

PBS&J; and Todd Wilkinson and Adam Hoyle of Environmental Services Inc. (ESI).

May 8, 1999 — Pam Latham, PBS&J, on behalf of the Applicant transmits a draft HCP for The Villages at Seagrove and Camp Creek developments.

May 15, 1999 — The Service distributes the draft HCP for review and comment to: John Bente, Florida Park Service; George Wallace, Florida Game and Fresh Water Fish Commission (now Florida Fish and Wildlife Conservation Commission); Jim Moyers, Auburn University; Daphne Field Office, Alabama; and the Section 10(a)(1)(B) permit coordinator, Atlanta, Georgia.

May 24, 1999 — The Florida Game and Fresh Water Fish Commission (now Florida Fish and Wildlife Conservation Commission) provides verbal comments on their review of the draft HCP.

May 24, 1999 — The Service faxes and discusses our comments on the draft HCP with Roger Anderson, PBS&J.

May 28, 1999 — The Service provides written confirmation of our comments on the draft HCP to Roger Anderson, PBS&J.

June 9, 1999 — Jim Moyers, Auburn University, submits comments to the Service (PCFL) about the draft HCP for the Seaside (sic)/Camp Creek developments.

June 22, 1999 — The Service discusses by telephone and faxes additional information regarding the Service providing incidental take for sea turtles concerning beachfront lighting and The Villages at Seagrove and Camp Creek projects with and to David Powell, Hopping, Green, Sams, & Smith, P.A. (The Applicant's legal representative) and Roger Anderson, PBS&J

July 2, 1999 — PBS&J, on behalf of the Applicant, submits an application for an incidental take permit and final HCP (package completion sent on July 6, 1999)

August 5, 1999 — PBS&J, on behalf of the Applicant, verbally requests the Service's review and concurrence with the construction and placement of the Sales Center for The Villages at Seagrove project on the abandoned gravel road

August 6, 1999 — A Service biologist conducts an onsite inspection of The Villages at Seagrove property relative to the proposed Sales Center location.

August 6, 1999	The Service provides written concurrence on the construction and placement of the Sales Center facility to be located on the abandoned gravel road on The Villages at Seagrove property
August 16, 1999	The Service receives written confirmation from the Applicant regarding the proposed location of the Sales Center for The Villages at Seagrove development (dated August 11, 1999)
August 16, 1999	A Service biologist faxes a request to PBS&J, the Applicant's consultant, for clarification of the legal description of The Villages at Seagrove property
August 17, 1999	A Service biologist faxes a request to PBS&J, the Applicant's consultant, for clarification of development acreage, Walton County boardwalk, other boardwalks, native vegetation and temporary versus permanent habitat impacts for The Villages at Seagrove and Camp Creek developments.
August 18, 1999	The Service receives telephone confirmation from the Applicant regarding the relocation of the Sales Center to the north side of highway 30A.
August 30, 1999	A Service biologist faxes a request to PBS&J, the Applicant's consultant, for clarification of the dune restoration, conservation easements, turtle lighting, and financial assurances for The Villages at Seagrove and Camp Creek developments
September 1, 1999	A Service biologist faxes a request to PBS&J, the Applicant's consultant, for clarification of Table 2-4 from the HCP for The Villages at Seagrove property
September 3, 1999	A Service biologist conducts an onsite inspection of The Villages at Seagrove property regarding the proposed development and CBM habitat impacts
September 9, 1999	The Service receives responses to clarification of information pertaining to the HCP for The Villages at Seagrove and Camp Creek developments from PBS&J, the Applicant's consultant (dated September 8, 1999)
September 20, 1999	The Service receives revised exhibit 2 for the HCP for The Villages at Seagrove development from PBS&J, the Applicant's consultant (dated September 17, 1999).

September 27, 1999	The draft biological opinion was distributed for review to the Service's Daphne Field Office, Alabama, Jackson Field Office, Mississippi, Jacksonville Field Office, Florida, the South Florida Ecosystem Office, and the Southeast Regional Office.
October 19, 1999	The Service meets with PBS&J, the Applicant's consultant, to discuss information regarding trapping surveys on the project site and other information needs.
November 1, 1999	The Service meets with PBS&J, the Applicant's consultant, to discuss proposed reasonable and prudent measures and terms and conditions.
November 15, 1999	The Service transmits the draft biological opinion to the Applicant.
November 18, 1999	The Service discusses by telephone with PBS&J, the Applicant's consultant, the draft biological opinion.
November 18, 1999	The Service transmits the draft Environmental Assessment (EA) to the Applicant.
November 30, 1999	The Service meets with Britt Greene, ARVIDA, Roger Anderson, PBS&J, the Applicant's consultant, and David Powell, Hopping, Green, Sams, & Smith, P.A., St. Joe's legal representative, to discuss the draft biological opinion.
December 14, 1999	The Service finalizes a draft of the biological opinion for technical review distribution.
February 16, 2000	A Notice of Availability of the Environmental Assessment for the proposed action is published in the federal register (65 FR 7883).
February 18, 2000	A package containing the federal register notice, Environmental Assessment, HCP, and draft biological opinion is distributed to Federal, State, and local agencies, beach mouse technical experts, and organizations.
March 15, 2000	A letter is submitted to the Service from Beach to Bay Connection concerning the proposed action. The organization recommends Alternative A for The Villages of Seagrove development and Alternative C for the Camp Creek development.
March 17, 2000	The comment period for providing information or comments on the Environmental Assessment, HCP, and draft biological opinion closes.

March 20, 2000 The South Walton Turtle Watch submits an undated letter concerning the proposed action. Concern is indicated for beachfront development because of the effects of artificial lighting on sea turtles. However, the group is willing to work with the applicant in their education program.

BIOLOGICAL OPINION

Description of the proposed action

The Applicant seeks an incidental take permit (permit or ITP) from the Service pursuant to Section 10(a)(1)(B) of the Act, as amended. The permit would authorize take of the Choctawhatchee beach mouse (CBM) in Walton County, Florida. The proposed take would be incidental to the construction and human occupancy of The Villages at Seagrove and Camp Creek development. The Villages at Seagrove is located on the south and north sides of highway 30A and the Camp Creek project is located on the south side of highway 30A in the southern part of Walton County, Florida. Both projects have beachfront on the Gulf of Mexico. The effect of both the proposed developments on the loggerhead, green, and leatherback sea turtles will be evaluated.

The Villages at Seagrove (a.k.a. Watercolor)

The Villages at Seagrove is a 499-acre (202-hectare) development. Although the ITP will cover the entire development, the ITP will directly pertain to the 23.94 acres (9.7 hectares) of the development located on the south side of highway 30A in Section 15, Township 3 South, Range 19 West. This parcel (herein referred to as the south parcel) is located along 1,400 feet (427 m) of Gulf of Mexico beachfront between the development known as Seaside on the east and Grayton Beach State Recreation Area (SRA) on the west (Appendix A, HCP and Appendix B, Figure 1).

The south parcel is considered the beach recreational facility for the total The Villages at Seagrove development. The project will include a 60-room inn, beach club and 10 single-family residences, 50 condominium units, and 15 beach cottages on a total of 23.94 acres (9.7 hectares), at a density of approximately 2.51 units per acre (6.2 units per hectare). The condominiums and cottages will be located on the western portion of the project site. The beach club is to be centrally located on the site and will include a recreation facility with beach lockers, bathroom facilities, snack bar, retail space, swimming pool, and sun deck. The beach club will also provide day-use facilities including beach chairs, cabanas, umbrellas, and beach recreational equipment for use by residents and guests of The Villages at Seagrove development. An elevated boardwalk (0.05 acres/0.02 hectares) will provide access to the beach. Landward of the beach club will be office and retail facilities located along highway 30A. The inn will be located in the eastern portion of the south parcel and will have associated parking and include meeting

space, a restaurant, lounge, and recreational amenities such as a swimming pool, spa, sun deck, and beach-access dune walkover. The 10 single-family residential units and 50 condominium units are planned for the eastern portion of the project site. Another elevated dune walkover (0.05 acres/0.02 hectares) will be constructed for these residences. A 20-foot (6.1 m) public access easement has been dedicated to Walton County within the eastern portion of the project site. This will be a public beach access and will accommodate a fourth boardwalk (0.05 acres/0.02 hectares) to be installed and maintained by Walton County. The total area of The Villages at Seagrove development on the south side of highway 30A is 23.94 acres (9.7 hectares) of which 16.32 acres (6.6 hectares) is within CBM critical habitat.

Camp Creek

The Camp Creek project is a 256-acre (104 hectares) development. The development is located on the south side of highway 30A in Sections 19, 20, 21, 28, and 29, Township 3 South, Range 18 West. The Camp Creek project is located approximately 4 miles (6.4 km) east of The Villages at Seagrove development (Appendix A, HCP and Appendix B, Figure 1).

The Camp Creek project is currently in the conceptual planning stages. The development intent is a mix of residential, resort hotel, commercial, and recreational land uses. The project is located along 6,000 feet (1,829 meters) of Gulf of Mexico beachfront between Camp Creek Lake and the development known as Camp Creek Pointe on the east and Deer Lake and Deer Lake State Park (SP) on the west. All development except beach access dune walkovers and connector boardwalks covering a total area of 5.0 acres (2.0 hectares) will be located landward of the primary and secondary dune field. The beach and dune field encompasses approximately 80.4 acres (32.5 hectares).

The Camp Creek project site consists of open beach, frontal dune, and a large expansive dune field consisting of primary and secondary dunes ranging from 500 to 1,500 feet (152 to 457 m) in width landward of the mean high water line. Some of the dunes reach 36 feet (11 m) in height (mean sea level [M.S.L.]). The closest historical trapping that documents presence or absence of CBM was at Eastern Lake approximately 1 mile (1.6 km) west of the western boundary of Camp Creek. In 1979, Humphrey and Barbour (1981) failed to capture any CBM at Eastern Lake. In addition, surveys conducted by the Applicant in 1998 and 1999 and under Service-funded contracts on adjacent State lands between 1995 and 1998 have not resulted in capture of any CBM on the Camp Creek site. None of the project area is designated critical habitat for the CBM. Residential and commercial (resort hotel, residences, and office/retail space) structures and facilities will be located outside habitat suitable for the CBM. Only the dune walkovers (8 to 10) and interconnecting boardwalks will “cover” approximately 5.0 acres (2.0 hectares) of currently unoccupied CBM habitat consisting of frontal, primary and secondary dunes. However, because reintroduction of the CBM onto the Camp Creek site is also proposed as off-site mitigation for the development of the south parcel, we will evaluate the Camp Creek development as occupied by CBM.

Conservation Measures

Measures to minimize and mitigate for the direct and indirect impacts of the south parcel and Camp Creek site were presented in the HCP, as well as additional information dated September 8 and 17, 1999, and subsequent DRI sufficiency documentation. The cost estimates have been provided by the Applicant.

1. Restoration of 1.28 acres (0.52 hectares) of dune habitats at the site. Damage and erosion to the dune system at the south parcel has been a result of heavy unauthorized pedestrian use and Hurricanes Opal (1995), Earl (1998), and Georges (1998). To restore the dunes: a) sand will be brought in and placed along the base of the primary dunes; b) sand fence will be installed; c) sea oats and panic grass will be planted in the primary dune restoration area; d) the historic grade will be re-established and sea oats and palmetto-oak scrub plant species will be planted as appropriate; e) restoration areas will be protected from pedestrian traffic; and f) the restoration work will be maintained under a prescriptive management program. Detail regarding the restoration is provided in Appendix C of the HCP (Appendix A). Estimated cost is $250,000.

2. Protection, management, and maintenance of 7.23 acres (2.93 hectares) and the restoration of 1.28 acres (0.52 hectares) for a total of 8.51 acres (3.44 hectares) of remaining beach mouse habitat onsite of the south parcel.

3. Covenants and restrictions will be placed on both the entire developments of The Villages at Seagrove and Camp Creek.

4. Protection, management, and maintenance of 80.4 acres (32.5 hectares) of beach mouse habitat at the Camp Creek site.

5. Installation of 400 feet (122 meters) split rail or similar fence between the Camp Creek site and Deer Lake State Park to control unauthorized pedestrian access to dune habitats at both areas.

6. Use of native plant species for all landscaping within CBM critical habitat at the south parcel. No invasive or exotic species will be planted and removed when found at the south parcel and Camp Creek site (Appendix A, HCP).

7. Consent for future reintroduction of the CBM into the 80.4 acres (32.5 hectares) along 6,000 feet (1,829 meters) of CBM habitat at Camp Creek by the Service or Florida Department of Environmental Protection (FDEP). Based on comparable sales, the total sales on this acreage is estimated to be $24,300,000.

8. Sea turtle compatible lighting will be included in the project design for the south parcel and Camp Creek site and implemented during construction. Estimated additional cost of

implementing the lighting plan at the south parcel is $650,000 over and above normal lighting (the cost estimate for Camp Creek will be determined in the future as plans are finalized) for the development (includes planning and design, coordination between architect and builder, purchase of fixtures, and installation).

9. Control of litter and trash including the use of wildlife-proof trash receptacles will be installed and maintained at the south parcel and Camp Creek site. Estimated cost of implementing control is $20,000 annually for 30 years.

10. Control of non-native predator species such as coyote, red fox, house mice, and feral and free-ranging domestic pets (cats and dogs) will be implemented at the south parcel and Camp Creek sites. The use of pesticides will be limited to those that will not impact CBM. Estimated cost of the predator control is $5,000 annually for 30 years.

11. All domestic pets will be required to be on a leash when outside at the south parcel and Camp Creek sites.

12. During construction impacts will be avoided or minimized at the south parcel and Camp Creek sites by: a) habitat protected by placing sediment barriers and flagging to restrict access and avoid impacts; b) top-down construction of dune walkovers and boardwalks over primary, secondary, and scrub dune habitats; c) storage of materials at appropriate staging sites and outside or adjacent to sensitive habitats; d) construction site to be kept clean and free of debris in areas of sensitive habitats; e) limits of disturbance from construction grading will be indicated on all building plans and a buffer established and revegetated with native species after construction, if needed; f) signs indicating the habitat protection and prohibition of disturbance including penalty for violation will be posted at 100-foot intervals; g) periodic inspections will be performed to verify that the protection is being implemented correctly; and h) these requirements will be in the general contractor's contract.

13. Recreation and beach equipment (beach chairs, umbrellas, and surfboards, etc.) will be removed from the beach and stored in a centralized location at night during the sea turtle nesting season (May 1 through October 31) at the south parcel and Camp Creek sites.

14. Access to the beach from the inn, beach club, residences, and public access point at the south parcel site and development on the Camp Creek site will be controlled and directed on the dune walkovers. Fence, signs, and information kiosks will be used to direct pedestrian traffic along the walkovers and provide information on the sensitivity of the dune habitat and associated coastal plants and animals at the south parcel and Camp Creek sites.

15. An environmental education program will be developed for the residents and visitors of the development at the south parcel and Camp Creek sites. The program will emphasize

the coastal area and the listed species that occur there. The program will include the development of a brochure, kiosk, and appropriate signs and is estimated to cost $60,000.

16. Enforcement of construction boundary violations (bulldozer activity through a fence, indirect damage, such as slope failure in the construction area across the construction boundary, erosion, or unauthorized vehicle activity) at the south parcel and Camp Creek site by: a) notification of the Service or Florida Fish and Wildlife Conservation Commission (FWC); b) termination of work; c) preparation and submission of a damage report; d) restoration of damaged area; and e) return to work once these steps have been completed. Enforcement action will be taken against a property owner regardless of the actual agent of the damage in order to accelerate abatement and remediation, and because there is a direct link between the property owner and the ITP.

17. A monitoring program for CBM on the south parcel site will be implemented for the duration of the ITP (30 years). The work will include conducting trapping surveys on a quarterly basis. Estimated cost is $16,000 annually for 30 years.

18. Annual reports to the Fish and Wildlife Service as required under the ITP will be prepared and submitted. Estimated cost of meeting reporting requirements to the Service is $7,500 annually for 30 years.

19. Assurance for legal, financial, and future management responsibilities for implementing the HCP and ITP are to be met by property assessments on individual property owners. The homeowner's association will administer the program. After the issuance of the ITP the Applicant will produce legally binding covenants and restrictions to implement the HCP and ITP. The Applicant will cover the cost of the monitoring program and the annual reports until the homeowner's association is established and assumes the administrative and funding responsibilities of the program.

20. To address the possibility of unforeseen circumstances, the Applicant will work with the Service to determine and resolve issues or concerns as appropriate. If either the Applicant or the Service becomes aware of situations that could cause unforeseen incidental take, they will contact the other to address issues as needed.

Although the snowy plover and least tern are not federally protected species in the Florida panhandle, their nesting areas will be identified and "fenced" with appropriate signs each nesting season at the south parcel and Camp Creek site. Unauthorized entry will be prohibited during the nesting season.

Additional Conservation Measures to be Required in the ITP

1. The Applicant shall be responsible for conducting or funding monitoring of the CBM population at the south parcel for the life of the ITP (30 years) unless approved otherwise

by the Service. *Rationale: Depending on the final build-out of the development, it will take approximately 5 to 10 years to ascertain impacts to beach mice.*

2. At least 1 week prior to the land clearing on the south parcel, trapping within the 4.65 acres (1.88 hectares) will be conducted by the Applicant to capture CBM. The CBM will be relocated to the Grayton Beach SRA main unit. The ITP will require the Applicant to conduct the trapping and relocation of the CBM under authority of 50 CFR 17.22(b)(3). The Applicant's St. Joe Timberland Company (Stephen M. Shea permit #TE004399-1) is currently authorized under section 10(a)(1)(A) to conduct trapping surveys and will conduct the trapping and relocation of CBM from the construction site to Grayton Beach SRA. Although Mr. Shea's current permit is only for trapping, his receipt of TE004399-1, indicates he has met the requirements for experience and technical expertise needed for conducting the trapping and moving of the CBM to Grayton Beach SRA. The Applicant will be responsible for obtaining all applicable State and/or local permission or permits to conduct this activity. *Rationale: This is to attempt to save beach mice that may have home ranges within the areas of permanent habitat destruction and relocate them far enough away that they would not return to the site before land clearing commences.*

3. The Applicant will conduct or fund reintroduction of the Camp Creek project site within 1 year of issuance of the plan provided by the Service. CBM from Topsail Hill State Preserve will be the source of CBM for the reintroduction provided adequate numbers exist. Monitoring of the reintroduced population shall be completed by the Applicant for 5 years with consent for the Service, FDEP, or FWC to continue the population supplementation and monitoring for the life of the ITP. The ITP will require the Applicant to conduct the trapping and relocation of the CBM under authority of 50 CFR 17.22(b)(3). The Applicant's St. Joe Timberland Company (Stephen M. Shea permit #TE004399-1) is currently authorized under section 10(a)(1)(A) to conduct trapping surveys and will conduct the trapping, relocation, and monitoring of the re-established CBM population for the proposed project. Although Mr. Shea's current permit is only for trapping, his receipt of TE004399-1, indicates he has met the requirements for experience and technical expertise needed for translocation and monitoring of the re-established CBM population. The Applicant will be responsible for obtaining all applicable State and/or local permission or permits to conduct this activity. *Rationale: To provide a net conservation benefit, the reintroduction to Camp Creek must be assured in a timely manner. Monitoring of the reintroduced population is needed to determine the status of the reintroduced population.*

4. The following changes or additions to the dune restoration plan will be made: a) all vegetation planting shall be completed by May 1; b) irrigation of planted dune vegetation will be by backpack only; c) all dune restoration material will meet State of Florida requirements for beach quality material; and d) all fence will be installed according to State of Florida sea turtle compatible requirements. *Rationale: These conservation measures are typically required during other dune restoration activities and assure*

protection of nesting sea turtles, their nests or developing embryos, and emerging hatchlings.

5. The Walton County beach access shall consist at a minimum of one dune walkover constructed to allow natural formation of the primary, secondary, and scrub dunes. The walkover shall be completed by the time the south parcel is also completed. *Rationale: This is to assure that the dune walkover will be constructed properly and available for public use concurrent with the opening of the beach portion of The Villages at Seagrove development.*

6. All landscaping within designated critical habitat of the CBM on the south parcel shall be in accordance with the Walton County Coastal Dune Vegetation list to be included in the ITP. *Rationale: Since coastal native vegetation varies across the panhandle, only plant species that are native to Walton County should be used.*

7. All trash receptacles on the south parcel (including the Walton County beach access) and Camp Creek shall be permanent, with secure lids, and predator proof. *Rationale: To assure the containers do not attract predators and house mice the trash containers must meet the specifications used in other areas where beach mice occur*.

8. No lights shall be permitted seaward of the Coastal Construction Control Line (CCCL). *Rationale: This is a standard requirement by the State of Florida in their CCCL permit program. This is the area of greatest sea turtle nesting and could affect the number of sea turtles coming ashore to nest and hatchlings emerging from the nest and crawling to the sea.*

9. All structure and associated facility lighting on the seaward and western portion of the south parcel and Camp Creek site shall be kept to a minimum for security and safety purposes only and be sea turtle compatible. No lighting in these areas shall be used for decorative landscaping purposes. This will be handled under an adaptive management approach with the Service and the Applicant working together to finalize the lighting plans. *Rationale: Because of the lack of scientific data on the effects of sea turtle compatible lighting on beach mice, additional assurances are needed to reduce lighting to protect beach mice from predators.*

10. All construction on the beach shall be conducted outside the turtle nesting season (May 1 through October 31) or in accordance with a CCCL permit issued by the State of Florida. *Rationale: This is a standard requirement by the State of Florida in their CCCL permit program. This is the area of greatest sea turtle nesting and could affect the number of sea turtles coming ashore to nest and hatchlings emerging from the nest and crawling to the sea.*

11. All covenants and restrictions shall be further stipulated that no changes shall be made that would cause noncompliance with the requirements of the ITP. *Rationale: Since covenants and restrictions can be changed (vs. Third party protection through a conservation easement) these additional requirements are needed to assure that the ITP requirements are met.*

12. Upon location of dead, injured, or sick individuals of an endangered or threatened species, initial notification must be made to the Fish and Wildlife Service Law Enforcement Office, St. Petersburg, Florida (727/570-5398). Additional notification must be made to the Fish and Wildlife Service Ecological Services Field Office, Panama City, Florida (850/769-0552). Care should be taken in handling sick or injured individuals and in preservation of specimens in the best possible State for later analysis of the cause of death or injury. *Rationale: This is a standard permit requirement issued by the Service in all incidental take permits and provides for possible rehabilitation of an injured species and confirmation of the problem or injury.*

Action Area

The Action Area under this consultation includes two areas: the Grayton Beach CBM population and the Deer Lake CBM "population." The Grayton Beach CBM population consists of two units currently connected by a narrow band of primary dunes. The two units are: 1) Grayton Beach State Recreation Area (SRA) main unit and private lands consisting of the south parcels of The Villages at Seagrove and Seaside, and 2) Grayton Beach SRA western units, State owned lands between Little Redfish and Big Redfish lakes. Total acreage of the State lands is 2,236 acres (905 hectares) with 182.6 acres (73.90 hectares) of available habitat for the CBM, but only 101.4 acres (41.04 hectares) are presently occupied (Auburn unpublished data 1999). All occupied habitats on the State lands occur on the main unit of Grayton Beach SRA the western units provide suitable habitat but are unoccupied (Jim Moyers, Environmental Services Inc. (ESI) formerly Auburn University, personal communication, 1999). Total acreage of the private lands (south parcel and Seaside) is approximately 39 acres (23.94 acres/9.7 hectares - south parcel and 15.06 acres/6.1 hectares - Seaside south parcel) of which 32 acres/13 hectares (16.4 acres/6.6 hectares - south parcel and 15.06 acres/6.1 hectares - Seaside south parcel) are designated critical habitat. Only 2.92 acres (1.2 hectares) of habitat on Seaside are considered suitable for CBM; however, no trapping surveys have been conducted. The development has been in existence for over 10 years. CBM have been documented on approximately 1.2 acres (0.49 hectares) of the south parcel site.

The Deer Lake "population" is currently considered to consist of Deer Lake State Park, the proposed Camp Creek development site, and the Applicant's Camp Creek Pointe development on the east side of the proposed development. Total acreage of the State Park is 2,167 acres (878 hectares) with 49 acres (19.8 hectares) of available habitat for the CBM. However, the area is currently unoccupied. The total lands of the Camp Creek development are 256 acres (104

hectares) with 80.4 acres of available habitat for the CBM, however, they are currently unoccupied.

Biological Goal of Issuing the Incidental Take Permit

The biological goal for issuing the ITP is to provide a net conservation benefit for the Choctawhatchee beach mouse. We have determined this can be accomplished in three ways.

- Minimize onsite impacts by siting of structures and implementation of conservation measures;

- Maintain a continuum of critical habitat (primary dune, oak scrub, and palmetto scrub) within and contiguous with the adjacent Grayton Beach State Recreation Area to the west and the Seaside development to the east; and

- Increase the number of Choctawhatchee beach mice.

<u>Status of the species/critical habitat (range-wide)</u>

Choctawhatchee beach mouse

The Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*) (CBM) was listed along with the Perdido Key (PKBM) and Alabama beach mice (ABM) as an endangered species under the Federal Endangered Species Act in 1985 (50 FR 23872, June 6, 1985). It is also listed as an endangered species by the State of Florida. Loss of habitat from coastal development is considered to be the main factor for the decline of beach mice. Critical habitat was designated for the CBM at the time of listing (50 CFR § 17.95).

<u>Species/critical habitat description</u>

The CBM is one of five subspecies of the oldfield mouse that inhabit coastal dune communities along the northern Gulf coast of Florida and Alabama. All beach mice are differentiated from the eight inland subspecies because of polymorphic pelage patterns on the head, shoulders, and rump. The overall dorsal pigmentation is more reduced in coastal subspecies, is lighter in color, and is less extensive than on those of the inland subspecies (Sumner 1926, Bowen 1968).

The CBM is distinctly more orange-brown to yellow-brown than the other Gulf coast beach mouse subspecies (Bowen 1968). Pigmentation on the head either extends along the dorsal surface of the nose to the tip, or ends posterior to the eyes leaving the cheeks white. A dorsal tail stripe is either present or absent. Head and body length ranges from 70 to 89 mm (2.7 to 3.5 in.) (Holler 1992a).

CBM like other beach mice are nocturnal and forage for food throughout the dune system. They feed primarily on seeds and fruits of bluestem *Schizachrium maritimum*, sea oats *Uniola paniculata*, and evening primrose *Oenothera humifusa*; however, insects are also an important component of their diet (Moyers 1996).

Historic distribution

The historic range of the Choctawhatchee beach mouse extended from the East Pass of Choctawhatchee Bay in Okaloosa County east through Walton County to Shell Island in Bay County. The type locality is listed by Bowen (1968) as the coastal dunes near "Morrison" lake (correct name is Morris Lake), 16.1 km (10 mi) east of Destin, Walton County, Florida. The type locality is now contained within Topsail Hill State Preserve, Florida (Appendix B, Figure 2).

As early as 1935, CBM were collected near Destin, Florida (Humphrey and Barbour 1981). As late as 1950, the CBM was widespread and abundant along the barrier beach within its historic range. However, Bowen (1968) stated that by 1962 more than two-thirds of the beach mouse's habitat had been lost since 1950 as a result of the coastal real estate boom. By 1974, only sparse, intermittent populations remained (Ehrhart 1978). In 1979, Humphrey and Barbour (1981) found that the CBM had been extirpated from seven of its nine historical localities (Destin, Dune Allen, Blue Mountain Beach, Grayton Beach, Eastern Lake, Panama City Beach and St. Andrew State Recreation Area - mainland unit), being restricted to the Topsail Hill area in Walton County. They also documented the presence of CBM on Shell Island in Bay County. In 1982, Meyers (1983) reconfirmed Humphrey and Barbour's findings when he also trapped CBM on Shell Island. In 1985, when the CBM became federally protected, CBM were only known to occur in the Topsail Hill area and Shell Island consisting of about 10 miles (15.9 km) of coastline (50 FR 23872).

From 1991 to 1992, Bates (1992) conducted trapping surveys for CBM on Henderson Beach SRA, Grayton Beach SRA, and St. Andrew SRA (including Shell Island). Shell Island (Tyndall AFB) was trapped from 1993 to 1994 by Novak (1997). CBM were reintroduced in 1988 and trapping was completed at that time (Holler and Mason 1987, Holler 1992a). Topsail Hill State Preserve was private land until purchased by the State of Florida in 1994. The Applicant owned the majority of the Topsail Hill property prior to 1994. The Applicant funded a year long trapping study on 910 acres (368 hectares) to determine the presence and distribution of CBM in various habitats (Brown 1994). Brown captured 70 CBM in four trapping sessions from April 1993 to January 1994. All the captures were in primary and secondary dune habitats. Gore (unpublished data) estimated that in 1995 before the passage of Hurricane Opal in October, there were approximately 800 to 1,200 CBM on Shell Island.

In 1994, the Service contracted with Auburn University to conduct status surveys for beach mice along the Florida panhandle on public and private (with property owner permission) lands that appeared to have suitable habitat. Surveys were conducted until 1999 (Moyers *et al.* 1996,

1999). Surveys for CBM were conducted on Shell Island, Topsail Hill State Preserve, Grayton Beach SRA, Camp Helen (prior to State acquisition), and Deer Lake State Park.

Habitat description

Optimal CBM habitat is currently thought to be comprised of heterogeneous mix of interconnected habitats including primary, secondary, scrub dunes and interdunal areas. Beach mice dig burrows mainly in the primary dunes and in other secondary and interior scrub dunes where the vegetation provides suitable cover. Most CBM surveys conducted prior to Novak's (1997) 1993 to 1994 work were in primary and secondary dunes that were typically thought to be the preferred habitat of beach mice. The distribution and relative abundance of CBM and other beach mice in scrub dunes and in other interior habitat were less well known due to a limited number of surveys. In coastal environments, the term "scrub" and "scrub dune" refer to habitat or vegetation types where scrub oaks are dominants of a community adjacent to and landward of secondary and primary dunes. Interior habitat can include vegetation types such as grassy forbs. There is substantial variation in scrub oak density and cover within and among scrub dunes throughout ranges of beach mice. The variation, resembling an ecological gradient, is represented by scrub oak woodland with a relatively closed canopy at one end of the continuum. At the other extreme of the gradient, scrub dunes are relatively open with patchy scrub ridges and intervening swales or interdunal flats dominated by herbaceous plants.

Designated critical habitat for the CBM consists of four separate areas in Walton and Bay counties, Florida, totaling 819 acres (340 hectares) along 13.2 miles (21.2 km) of Gulf of Mexico shoreline. These areas are: 1) Shell Island in Bay County, consisting of 332 acres (134.4 hectares) along 7.7 miles (12.4 km) and is jointly managed by the Florida Department of Environmental Protection, Florida Park Service as part of St. Andrews State Recreation Area (SRA) (205 acres/83 hectares - includes private inholdings), and by the U.S. Air Force, Tyndall Air Force Base (127 acres/51.4 hectares); 2) St. Andrews SRA, mainland, west of the St. Andrew Bay inlet, 60 acres (24.37 hectares) along 1.1 miles (1.8 km); 3) Grayton Beach State Recreation Area (SRA) main unit, managed by FDEP, Florida Park Service in Walton County consisting of 67 acres (27 hectares) along 1.7 miles (2.7 km); and 4) Topsail Hill State Preserve managed by FDEP, Florida Park Service in Walton County, Florida, has 200 acres (81 hectares) along 2.7 miles (4.4 km). Critical habitat extends onto private lands on the eastern boundary of Grayton Beach SRA, 31.4 acres (12.7 hectares) - St. Joe Company, south parcel and development of Seaside); on Topsail Hill State Preserve, west boundary, 24 acres (9.7 hectares) - Four-Mile Village/Sierra Club/Coffeen Preserve); and on the east boundary, 9.63 acres (3.9 hectares) - Stallworth Preserve and Hazelton property. Critical habitat in all areas extends 500 feet (152 meters) landward from the mean high tide line. Public lands account for 91 percent of designated critical habitat. There are three areas of critical habitat known to be occupied by CBM: Shell Island (public and private), Grayton Beach area (public and private), and Topsail State Preserve (public and private).

The major constituent elements within the designated critical habitat requiring special management considerations or protection include dunes and interdunal areas, and associated grasses and shrubs that provide food and cover (50 CFR Ch. 1 §17.95).

Data since listing confirm importance of these constituent elements for CBM (Bates 1992, Gore and Schaefer. 1992, Moyers 1996, Novak 1997). At the time of designation, in order to include all the constituent elements, critical habitat for the CBM encompassed the area 500 feet (152 m) landward of mean high water line. This general designation includes some habitats that are without constituent elements and are not occupied by CBM. In addition, coastal erosion results in the critical habitat being moved periodically, sometimes into habitat without any constituent elements.

Recent information indicates that additional habitat may be important for survival and recovery of beach mice following catastrophic weather events such as hurricanes (Swilling 1996, Swilling *et al.* 1998). Scrub dunes as well as other interior habitats landward of the designated critical habitat may be important to reduce the risk of extirpation after a hurricane. These areas may not be the primary habitats of beach mice, but become occupied when the primary habitats are under stress or lost. Therefore, for the remainder of this biological opinion, we will include designated critical habitat, known occupied habitats, and shelter habitat as available habitat for the CBM. We will also exclude from available habitat those portions of critical habitat that do not meet the definition of constituent elements and are known not to be used by CBM (e.g. dense pine scrub).

Species recovery

The Recovery Plan for the three Gulf coast beach mouse subspecies (Choctawhatchee, Perdido Key, and Alabama beach mice) identifies the primary recovery objectives to be the stabilization of present populations by preventing further habitat deterioration and the re-establishment of populations in areas where they were extirpated. For each of the subspecies to be considered for down listing to threatened, a minimum of three distinct, self-sustaining populations in critical habitat areas, and a minimum of 50 percent of the critical habitat needed to be protected and occupied by beach mice (U.S. Fish and Wildlife Service 1987).

For the CBM, three "populations" are currently in existence: Topsail Hill State Preserve (and adjacent eastern and western private lands), Shell Island (includes Tyndall Air Force Base and St. Andrew SRA-with private inholdings), and Grayton Beach SRA, main unit (adjacent eastern private lands). Approximately 99.8 percent of the lands known to be occupied by CBM are public lands. In addition, approximately 92 percent of habitat "available" (large enough to support a population or adjacent to a population) for the CBM are public lands. A current conservative total population estimate would be in the range of 500 to 700 CBM.

Private lands within or adjacent to designated critical habitat provide support for the recovery of the CBM. These lands are available for population dispersal and food source during and after severe weather events. No single large expanse of public or private coastal dune habitat remains

that could support an additional viable population of CBM. However, re-establishment of a fourth self-sustaining population would be possible in the Deer Lake area if both the Deer Lake State Park and the adjacent private land of the Applicant's Camp Creek property were managed for the recovery of the CBM.

The Topsail Hill State Preserve consists of a total 1,637 acres (662 hectares) of which 438.6 acres (177.5 hectares) are considered available CBM habitat, and 311.69 acres (126.14 hectares) are considered occupied. Topsail Hill State Preserve contains approximately 28 percent of the overall critical habitat, 33 percent of habitat currently occupied by CBM, and 29 percent of available CBM habitat.

The most recent post-Hurricane Opal (pre-hurricanes Earl and Georges 1998) highest population estimate for Topsail Hill State Preserve is 80 CBM in April of 1998 (Auburn unpublished data 1999). The FDEP, Florida Park Service (FPS) prepared a unit land use management for Topsail Hill State Preserve that explicitly plans for conservation and protection of CBM habitats (draft plan dated September 23, 1999). Private lands on the east side are within critical habitat and consist of approximately 9.63 acres (3.90 hectares). Of that, seven acres (2.83 hectares) are part of the Stallworth Preserve that was issued an ITP for CBM in 1995 and modified in 1998. The other approximately 2.63 acres (1.06 hectares) is currently undeveloped and for sale. Private lands on the west side of the Preserve are within critical habitat (24 acres/9.7 hectares) consist of Four-Mile Village, a low density single family development and the Coffeen Nature Preserve managed by the Sierra Club.

Shell Island (Tyndall AFB and St. Andrew SRA) and the mainland of the SRA consists of 1,323 acres (536 hectares) of which 790 acres (320 hectares) are considered available CBM habitat. At this time, 534 acres (216 hectares) are considered occupied (all on Shell Island) by CBM. Shell Island and the mainland contain approximately 54 percent of the overall critical habitat, 57 percent of habitat currently occupied by CBM, and 50 percent of available CBM habitat.

The most recent post-Hurricane Opal (pre-hurricanes Earl and Georges 1998) highest population estimate for the island is approximately 385 CBM in June of 1998 (Auburn unpublished data 1999). Shell Island is jointly owned and managed by the State of Florida (western two-thirds - St. Andrew SRA) and Tyndall Air Force Base (AFB) (eastern one-third). There is one private in holding (with a house) in the central portion of the island within CBM critical habitat. Other in holdings are located on the Bay side of the island (Harold Mitchell, FDEP, FPS, personal communication, 1999). The FDEP, FPS current unit land use management plan for the St. Andrew SRA is under revision. The original plan identified the need for protection and management of the CBM. The FDEP, FPS have requested and received from the Service, funding since 1995 to protect and restore CBM habitats on Shell Island.

The mainland dune habitats of St. Andrew SRA compose approximately 123.3 acres (49.9 hectares) along 1 mile (1.6 km) of beachfront. This area is within designated critical habitat for the CBM. Several tracking efforts for CBM on the units were made between 1995 and 1998, but

no track evidence was present to indicate beach mice were occupying available habitat in this area (Jim Moyers, Auburn University, personal communication, 1999). This absence is probably a result of the small size of the area and its isolation to occupied areas because of development (Auburn unpublished data, 1999). Natural recolonization of this area is not feasible because of the distance or barrier (water) from occupied areas. Further, because of its small size this area would not support a CBM population in the long term but could provide recovery support by being a source for CBM in case of a catastrophic event or for genetic viability. Reintroduction of this area is considered an action to support recovery of CBM.

An additional concern for Shell Island is the accretion of the island at its eastern end and connection to the Tyndall AFB mainland habitats. The construction of the St. Andrew Pass navigation inlet in the early 1930s severed Shell Island from the mainland on its western end. Since then, the original pass, East Pass (not to be confused with East Pass at Destin, Florida), has been closing. After passage of Hurricane Opal, East Pass temporarily closed and reopened; however, as of late 1998 after passage of hurricanes Earl and Georges, the pass has closed. This has resulted in a concern for predator access to the island from the mainland and expansion of the CBM into the western historic range (although currently unoccupied) of the St. Andrew beach mouse. Cursory trapping by FWC, Tyndall AFB, and the Service in February 2000, captured two CBM within this area (subspecies verification by Auburn University). Local efforts are underway to reopen and maintain the East Pass (Coastal Tech 1999, Middlemas 1999). Therefore, this expansion of the Shell Island population is not being considered in this biological opinion.

The third area is the Grayton Beach population. The Grayton Beach population consists of two units currently connected by a narrow band of primary dunes. The two parcels are: 1) Grayton Beach SRA main unit, includes the south parcel and Seaside private lands), and 2) Western Grayton Beach SRA between Little Redfish and Big Redfish lakes. The western area, although providing available habitat, has not currently been documented to be occupied by CBM (Jim Moyers, ESI Inc., formerly Auburn University, personal communication, 1999). Total acreage of the State lands is 2,236 acres (905 hectares) with 166.9 acres (67.5 hectares) of available habitat for the CBM, of that 85.6 acres (34.6 hectares) are presently occupied (Auburn unpublished data 1999). Grayton Beach SRA contains approximately 9.2 percent of the overall critical habitat, 9.1 percent of habitat currently occupied by CBM, and 10.6 percent of available CBM habitat.

The most recent post-hurricane Opal highest population estimate for Grayton Beach SRA main unit is 116 CBM in January of 1999 (Jeff Van Zant, Auburn University, personal communication 1999). Private lands adjacent to the SRA are the south parcel and Seaside (both within critical habitat) on the east and the Town of Grayton Beach and the Gulf Trace subdivision (not within critical habitat) on the west. The FDEP, FPS prepared a land unit management plan for the SRA and identified the protection of the CBM as an important component. The FDEP, FPS have requested and received funds from the Service to implement CBM habitat restoration and protection.

Life history (growth, life span, survivorship, and mortality)

Mean monthly probability of survival for Alabama beach mice, estimated from monthly capture data for one year, was 0.68 (indicates that a mean of 68 percent of mice alive in month one will survive to the next month). Actual survival rates indicated that 87 percent of individuals survived no more than four months. Rave and Holler (1992), using a larger data set, found that 63 percent of the mice captured survived four months or less beyond first capture, and 21 individual mice lived between 12 and 20 months. Blair (1951) reported 18.5 percent of mice captured in January survived four months. Holler *et al.* (1997) reported mean seasonal survival rates pooled for Alabama and Perdido Key beach mice on four areas (Perdue and Ft. Morgan Units, BSNWR; Gulf Islands National Seashore (GINS) and FPPK, Perdido Key). Mean survival rates from one season to the next were: 0.474 (SD 0.190) for summer to autumn; 0.615 (SD 0.227) for autumn to winter; 0.591 (SD 0.137) for winter to spring; 0.612 (SD 0.234) for spring to summer. Mean survival rate for mice captured for the first time to the next season was 44.26 percent. However, the mean survival rate for mice captured for a second time to subsequent capture was higher (53.90 percent). More than 10 percent of mice at each area survived three seasons after first capture, and 4 to 8 percent survived more than 1 year after initial capture. Mice held in captivity by Blair (1951) and at Auburn University (Holler unpublished data) have lived 3 years or more.

Male beach mice are capable of breeding at an age of 25 days. Female beach mice are able to begin breeding at an age of 35 days. Gestation averages 24 days and litter sizes average three to four with extremes of one and eight individuals. Littering intervals may be as short as 26 days. Peak breeding season for beach subspecies is in autumn and winter, declining in spring, falling to low levels in summer. However, pregnant and lactating CBM have been caught during summer trapping periods (Auburn unpublished data 1999).

Weights of wild-captured adult male CBM have a mean mass of 0.43 ounces (12.2 grams) (range 0.32 to 0.55 oz/9 to 15.5 g), adult females (0.43 oz) 12.3 g (range 0.35 to 0.53 oz/10 to 15 g), and pregnant females 0.58 oz (16.4 g) (range 0.42 to 0.74 oz/12 to 21 g) (Auburn unpublished data 1999).

Population dynamics

Density

Generally, population density of beach mice reaches peak numbers in the late autumn into spring (Rave and Holler 1992, Holler *et al.* 1997). Peak breeding period occurs in fall and winter and appear to coincide with increased availability of seeds and fruits from the previous growing season. Seasonal and annual variation in size of individual populations may be great (Rave and Holler 1992, Holler *et al.,* 1997). Food supplementation studies showed that *P. polionotus*

mouse populations increased when foods were abundant; thus, populations of *P. polionotus* and beach mice appear to be food-limited (Galindo-Leal and Krebs 1998, Smith 1971).

Blair's (1951) study of Santa Rosa beach mice yielded population densities of 0.85 to 1.4 mice/acres (2.1 to 3.5 mice/hectare). Gore and Schaefer (1992) found similar results for the Santa Rosa beach mouse, reporting mean population densities of 1.17 mice/acres (2.9 mice/hectares). Densities of Southeastern beach mice in a 3.9-acres (1.44-hectares) area ranged from 5.5 to 26.3 mice/acres (13.7 to 65.1 mice/hectares) on Merritt Island NWR during a 13-month period (Extine and Stout 1987). Densities of Alabama beach mice in an ongoing study at Bon Secour NWR range from 0.16 to 10.5 mice per acre (0.4 to 25.9 mice/hectares) in grids placed in frontal, primary, and secondary dune habitat. Densities of mice in a grid placed in transition scrub habitat only, range from 0.0 to 9.0 mice per acre (0 to 22.2 mice/hectares) (Swilling, unpublished data).

Novak (1997) reported winter and early spring densities of 5.95 to 14.25 mice/acres (14.7 to 35.2 mice/hectares) for CBM on Shell Island, Tyndall Air Force Base (AFB) in 1993 and 1994, prior to Hurricane Opal. Three years following the hurricane in 1998, based on Auburn (unpublished data 1999) data, densities of CBM were 0.72 mice/acre (1.78 mice/hectare) on Shell Island. Densities for CBM on Grayton Beach SRA main unit from 1995 to 1999 (includes pre and post-Hurricane Opal) ranged from 0.29 to 1.36 mice/acre (0.72 to 3.4 mice/hectare), based on Auburn unpublished data (1999), densities at Topsail Hill State Preserve from 1995 (post Hurricane Opal) to 1999, yield densities from 0.018 to 0.18 mice/acre (0.045 to 0.45 mice/hectare).

Movement and home ranges

Determining movements and home ranges of beach mice has not been completed. *Peromyscus leucopus* (Wegner and Merriam 1990) was tracked at a distance of 1,000 m (3,280 feet) in a mosaic of agricultural habitat. Swilling *et al.*, (1998) found ABM to move at least 100 meters (328 feet). Moyers and Shea trapped a male and female CBM on the south parcel property that had been previously caught on Grayton Beach SRA. The CBM moved approximately 636.5 feet (194 m) and 2,720 feet (829 m), respectively (Appendix A, HCP, Trapping Surveys). Novak's (1997) study of the home range of the CBM on Shell Island indicated males had a home range of 1.0 $\pm$ 4.1 acres (0.4 $\pm$ 1.66 hectares) and females had a mean home range of 0.81 $\pm$ 2.18 acres (0.32 $\pm$ 0.88 hectares).

Population estimates

In 1979 Humphrey and Barbour (1981) estimated about 515 CBM existed on Topsail Hill and Shell Island. That estimate was used during the Federal listing of the CBM in 1985. CBM population size (or for an area trapped) at Topsail Hill State Preserve, Shell Island, and Grayton Beach SRA main unit have been estimated using CAPTURE. Population estimates on Shell Island from February 1993 to March 1994, ranged from 105 to 338 CBM on a 23-acre (9.3-hectare) study area (Novak 1997). A population estimate extrapolated for the entire island at that

time could have ranged from 3,000 to 13,000 CBM (670 to 926 acres of available habitat, 80 percent occupied). However, just prior to Hurricane Opal in 1995 it was estimated that Shell Island supported 800 to 1,200 CBM (Jeff Gore, Florida Fish and Wildlife Conservation Commission, personal communication, 1999). Three years following Hurricane Opal in June 1998, one trapping effort at six different sites on Shell Island resulted in a cumulative population estimate of 195 CBM (164 CBM captured) (Appendix B, Auburn unpublished data 1999). A population estimate extrapolated for the entire island would be approximately 380 mice. At Topsail Hill State Preserve, trapping conducted from February 1995 through July 1999 yielded a population estimate ranging from 8 to 80 CBM. Population estimates from trapping at Grayton Beach SRA main unit from February 1995 to June 1999, ranged from 25 to 116 CBM (Appendix B, Auburn unpublished data 1999). The population estimates for the south parcel site ranged from 3 to 7 CBM (Shea unpublished data). A current estimated total population of CBM would be a high of 600 to 700 beach mice (extrapolated from Auburn unpublished data 1999).

Number of CBM captured per 100 trap-nights

Barbour and Humphrey (1981) in their 1979 CBM trapping efforts found 8.6 mice per 100 trap-nights on Shell Island. However, in 1982, Meyers' work showed a reduction to 3.8 mice per 100 nights on Shell Island. CBM captures per 100 trap-nights from Topsail Hill State Preserve from 1995 to 1998, had a mean of 0.68 (range 0.23 to 2.21). At Shell Island from six sites during one trapping episode in June 1996, the mean number of CBM captured per 100 trap-nights was 9.11 (range 5.33 to 15.33). At Grayton Beach SRA from 1995 to 1998 the mean number of CBM captured for 100 trap-nights was 1.87 (range 0.67 to 2.13) (Appendix B, Auburn unpublished data 1999).

Population viability and persistence

Population viability analysis (PVA) is essentially a demographic modeling exercise to predict the likelihood a population will continue to persist over time (Groom and Pascual 1997). A specific PVA has not been conducted for the CBM because necessary life history data or adequate long-term data is not available. Even without a specific PVA for the CBM, the Service is cognizant of the potential for the species to go extinct. Reasons for extinction could include habitat loss, fragmentation, or degradation from natural (hurricanes) or human (development and recreation) causes, genetic viability, and native and non-native depredation.

Appendix C provides a summary discussion on CAPTURE and PVA analyses conducted for other beach mouse subspecies.

Status and distribution (rangewide)

Reasons for Federal listing as an endangered species

The CBM was listed as an endangered species primarily because of the amount, fragmentation, and adverse alteration of the species habitat loss to coastal development and the threat of that loss continuing to increase. Other contributing factors included low population numbers or habitat loss from a variety of reasons including hurricanes, predation or competition by animals related to human development (cats and house mice), and the existing strength or lack of regulations regarding coastal development.

Coastal development

Habitat loss and fragmentation associated with residential and commercial real estate development is the single most important factor contributing to the endangered status of beach mice (Holler 1992a, 1992b, Humphrey 1992a, James 1992, Stout 1992). This factor, along with the influx of development-related predation by the domestic cat and competition with house mice, probably caused the extinction of the Pallid beach mouse (Humphrey 1992c).

Beachfront development along the Gulf coast of Florida began in the 1950s. The CBM was widespread and abundant at that time according to Bowen (1968). By 1979, Humphrey and Barbour (1981) only 40 percent of the original habitat remained undeveloped in non-contiguous areas. They also documented that the CBM had been extirpated from seven of its nine historical localities (Destin, Dune Allen, Blue Mountain Beach, Grayton Beach, Eastern Lake, Panama City Beach and St. Andrew State Recreation Area - mainland unit), being restricted to the Topsail Hill area in Walton County and Shell Island in Bay County. In 1982, Meyers (1983) reconfirmed Humphrey and Barbour's findings when he also trapped CBM on Shell Island. In 1985 when the CBM became federally protected, CBM were still only known from the Topsail Hill area and Shell Island consisting of about 10 miles (15.9 km) of coastline (50 FR 23872). In 1989, a cooperative effort between the Florida Fish and Wildlife Conservation Commission (FWC, formerly Florida Game and Fresh Water Fish Commission), Auburn University, and the Service reintroduced CBM onto the main unit of Grayton Beach SRA increasing the occupied coastline by another mile (0.62 km).

In Bay and Okaloosa counties, privately owned parcels containing suitable beach mouse habitat were developed for commercial and/or residential use. The majority of development, whether high or low density, was constructed close to the sea. Most if not all of the dunes were destroyed or altered. The State of Florida Coastal Construction Control Line (CCCL) was designated in the 1960s. Amendments to the Endangered Species Act in 1982 provided private landowners a legal means to develop their property and incidentally take federally protected species. However, by this time, most of the Gulf beachfront in Bay and Okaloosa counties was developed. In Walton County, coastal development boomed in the 1980's, then slumped and resurged again in the early 1990's. The Service has been able to work cooperatively with Walton County and private landowners to implement CBM conservation measures. The Service participates on the County Technical Review Board for beachfront developments.

Because little undeveloped property in private ownership remains in Bay, Okaloosa, and Walton counties, the remaining parcels are extremely valuable to developers. The development of parcels adjacent to public lands has increased pressure on the public areas to support both recovery of endangered species and recreational use by humans. Protection, management, and recovery of beach mice on public areas has been complicated by increased recreational use by humans.

Available habitat suitable for CBM is now fragmented by residential and commercial developments which may act as partial or complete barriers between existing CBM beach mouse populations. Whether beach mouse populations are isolated by development depends on several factors, including the density and size of the development, the siting of the development in beach mouse habitat, the amount and type of beach mouse habitat affected by development, and the distance between tracts of undeveloped land containing beach mouse habitat. Beach mice have been found in dune habitat interspersed within single-family residential developments on the Ft. Morgan peninsula (Alabama beach mouse), on the St. Joseph Peninsula south of St. Joseph State Park (St. Andrew beach mouse), and Four-Mile Village near Topsail Hill (CM). There are no data indicating the instability of these populations and/or the degree of isolation of these populations from larger populations on undeveloped blocks of habitat occupied by beach mice. These populations are probably connected to other populations through corridors of suitable habitat. Additionally, small numbers of Alabama beach mice have been documented in undeveloped blocks and single-family developments surrounded by high-density developments. Although beach mice may persist in these small parcels surrounded by high-density developments, they probably are more effectively isolated than those separated by low-density developments and are probably subjected to more problems associated with isolation. High-density developments require larger amounts of space for associated structures such as recreational facilities and parking lots which result in greater amounts of beach mouse habitat destroyed and/or altered. The larger scale of habitat loss or alteration probably increases the degree of isolation for beach mice surrounded by such developments.

Isolation of small populations of beach mice or any species greatly reduces or precludes gene flow between populations and results in loss of genetic diversity (due to inbreeding and reduced genetic heterozygosity) and/or long-term genetic drift. Demographic factors such as predation (most notably domestic cats), diseases, and competition with house mice, are intensified in small, isolated populations which may be rapidly extirpated by these pressures. When coupled with stochastic events such as tropical storms, reduced food availability, and/or reduced reproductive success, isolated populations may experience severe declines or extirpation (Caughley and Gunn 1996). The intensity of these factors on separated populations or individuals probably is dependent on the degree of isolation.

Coastal development within the historic range of the CBM has fragmented the subspecies into isolated populations. The CBM currently persists on three isolated areas along 12.1 miles (19.5 km) of Gulf of Mexico beachfront. These areas are spread out along 53 miles (85 km) of its historic range (60 miles/97 km). Additional available but unoccupied habitat exists on 2.9 miles

(4.7 km). A portion of this is designated critical habitat and located at the western end of St. Andrew SRA mainland. Other areas include Deer Lake State Park, western units of Grayton Beach SRA and property owned by the Applicant. Any remaining small parcels of dune and interdunal habitat would be considered unavailable habitat as they would not be large enough to sustain a population of CBM. There are no other known isolated populations of CBM.

Residential and commercial development are located adjacent to all the State lands that support or could support CBM. At Topsail Hill State Preserve, a restricted single-family home development (Four-Mile Village) and Coffeen Preserve managed by the Sierra Club occurs on the west side. Four-Mile Village was conceived by a previous landowner who subdivided the property with very restrictive covenants. These covenants and restrictions are still in effect today. Unless the current property owners change, the covenants and restrictions, the density or type of building on the development is not expected to change. Generally, the majority of the native vegetation has been preserved and landscaping around the homes is minimal. Although not actively managed for CBM, the Sierra Club has kept their Coffeen Preserve in natural condition. Those lands were severely impacted by Hurricane Opal in 1995, and habitat restoration is needed. On the east side of Topsail Hill State Preserve, approximately 2.63 acres (1.06 hectares) along 0.15 mile (2.4 km) of beachfront of habitat available for CBM (designated critical habitat) remain undeveloped and for sale. That property is being advertised for 2.63 million ($1 million an acre or $3,300 per linear foot $2.4 million a hectare or $10,800 per m) and only 25 percent of the property is considered developable by Walton County. Stallworth Preserve is adjacent to this property and one-third of the property is in CBM critical habitat. An ITP was issued to the developer in 1995 and an administrative amendment was issued in 1999. Typical Gulf front lots are advertised for $850,000 (Homes & Land of the Emerald Coast 1999, Vol. 6, No. 8). Two lots were recently sold at Stallworth for $825,000 (80 feet Gulf front @$10,312 per foot) (24.4 meters Gulf front @$33,800 per m) and $787,500 (70 feet Gulf front @ $11,250 per foot) (21.3 meters @$36,900 per meter) (Willee Skibbe, Century 21 Beach Realty, personal communication 1999).

Other Gulf of Mexico beachfront property ranges in asking price from $1,200 to $8,000 per foot ($3,900 to $26,200 per m) for undeveloped property. In adjacent Destin, Gulf front property is advertised as high as $14,000 per foot ($45,900 per m) (Homes & Land of the Emerald Coast, 1999, Vol. 6, No. 8; Prudential Premier Properties, Destin, Florida, personal communication 1999).

All private land that has habitat known to be occupied by CBM has been developed except for 2.63 acres (1.06 hectares) adjacent to Topsail Hill State Preserve on the east. The development of five units on the property has been considered (Alicelyn Hudson, realtor/investment counselor, Destin, Florida, personal communication 1999). We anticipate the need for an ITP for this property if developed. We have notified the property owner and realtor about their responsibilities under the Endangered Species Act.

Hurricanes

A predominant threat to the CBM is tropical storms and hurricanes. Hurricanes can impact beach mice either directly (e.g., drowning) or indirectly (loss of habitat). Additionally, hurricanes can affect beach mice on either a short-term basis (temporary loss of habitat) or long term (loss of food, which in turn may lead to increased juvenile mortality, which can lead to a depressed breeding season). How a hurricane affects beach mice depends primarily on its characteristics (winds, storm surge, rainfall), the time of year, and where the eye crosses land (side of hurricane-clockwise or counterclockwise).

The frequency between severe weather events could compromise the ability of the CBM to survive and recover. Hurricanes are a natural environmental phenomenon affecting the Atlantic and Gulf coasts and beach mice have evolved and persisted in coastal dune habitats since the Pleistocene. Hurricanes were probably responsible for maintaining coastal dune habitat upon which beach mice depend through repeated cycles of destruction, alteration, and recovery of dune habitat. The extensive amount of pre-development coastal dune habitat along the Gulf coast allowed beach mice to survive even the most severe hurricane events to repopulate dune habitat as it recovered. It is only within the last 20 to 30 years that the combination of habitat loss to beachfront development, isolation of remaining habitat blocks and beach mouse populations, and destruction of remaining habitat by hurricanes have increased the threat of extinction of several subspecies of beach mice.

Since records on hurricane intensity began in 1885, 32 hurricanes have struck northwest Florida within the historic ranges of the four Gulf coast beach mouse subspecies (Williams and Duedall 1997, Doehring *et al.* 1994, Neumann *et al.* 1993). In recent years, the most destructive hurricanes in terms of coastal dune habitat damage and impacts on these subspecies of beach mice were Hurricanes Eloise (1975), Frederic (1979), Elena and Kate (1985), and Erin and Opal (1995). Recent Hurricanes Allison (1995), Danny (1997), Earl (1998), and Georges (1998) had lesser habitat damage.

Hurricanes generally produce damaging winds, storm tides and surges, and rain that erodes beaches and dunes on barrier islands and peninsulas and mainland beaches, and flood inland coastal areas. Following hurricanes, the dune system begins a slow natural repair process that may take 3 to 20 years depending on the magnitude of dune loss (Salmon *et al.* 1982). During this period sea oats and pioneer dune vegetation become established collecting sand and building dunes. As the dune becomes stable, other successional dune vegetation colonize the area (Gibson and Looney 1994). As the dunes grow and become stable, beach mouse food sources and habitats are re-established.

Depending on their intensity, size, and passage time, hurricanes making landfall in the western panhandle of Florida can cause widespread destruction significantly impacting several, if not all, remaining populations of beach mice. For example, all subspecies of beach mice along the Gulf coast of Florida and Alabama were impacted by Hurricane Opal in 1995 because the storm was over 100 miles (161 km) in width. Extensive damage to dune habitat, primarily from storm

surge, occurred at areas supporting all five Gulf coast subspecies between Ft. Morgan, Baldwin County, Alabama to the St. Joseph Peninsula in Gulf County, Florida. Areas on barrier islands such as the Perdido Key Unit of GINS, the Ft. Pickens and Santa Rosa Units of GINS, and Shell Island off Panama City were overwashed by storm surge. Because of the narrow width of these islands, damage was extensive with an estimated 80 to 90 percent loss of dune habitat. In some cases (e.g., Ft. Pickens Unit on Santa Rosa Island and Shell Island), all dune structure and vegetation between the beach and the bayside of the area were completely overwashed, leaving long sections of denuded sand flats and blowouts. At areas with high primary dunes (e.g., Topsail Hill State Preserve, Grayton Beach SRA, St. Joseph State Park), the frontal dunes along the beach and the foreslope of the high primary dunes were washed away leaving 16.5 to 26.5 feet (5 to 8 meters) high escarpments. Loss of frontal dune habitat in these areas ranged between 33 to 100 feet (10 to 30 meters) deep. Some blowouts in the high primary dunes resulted in inundation of the secondary and scrub dune habitat north of the primary dunes (Leadon 1996).

With active intervention (vegetation planting and/or fence installation) to stabilize and accelerate dune restoration, and the passage of other hurricanes since 1995, each of these areas has varying amounts of food and cover available to beach mice. Assessment of various types of experimental dune restoration techniques conducted on Eglin AFB, Okaloosa/Santa Rosa Island after Hurricane Opal showed that a minimum of 4 years is needed between catastrophic events like hurricanes for dunes to become re-established (Miller 1998). Additional work by Auburn University has indicated that at Bon Secour NWR in Alabama, 6 years is needed for dunes to be re-established. (Note: re-established does not mean to pre-event size or height but stable and growing). Because of the passage of Hurricanes Danny in 1997, and Earl and Georges in 1998, dunes that were rebuilding were again destroyed (Debbie Miller, University of Florida, personal communication 1999, Jim Moyers, Auburn University, personal communication 1998, John Bente, FDEP/FPS, personal communication, Celeste South, FWS, personal communication 1999, Lorna Patrick, FWS, personal observation 1998). In areas where dunes are left to naturally rebuild, restoration may be delayed a year or so until pioneer plants begin to establish themselves.

Hurricanes may result in beach mice being drowned in their burrows, surviving the storm in place, or seeking refugia via a flight response (during or after the storm). Primary dune habitat sustains the heaviest damage during tropical storms leaving little or no habitat for beach mice. Populations without secondary dunes and/or scrub habitat are susceptible to catastrophic loss during tropical storms and hurricanes.

Holliman (1983) first introduced the theory that higher, interior scrub habitats may provide a refuge for the population occupying primary and secondary dunes during a storm event. In this sense, the refugia would be temporary and short-term (during and immediately following). Hurricane Opal provided the best data to date on the use and the length of time a refugia may be used. Swilling *et al.* (1996) reported that the higher scrub habitat continued to provide a refugia for ABM on Bon Secour NWR months after landfall. Two months after the hurricane's passage, Swilling *et al.* (1998) found that 47 percent of ABM recaptures on a grid placed in scrub habitat

had been originally marked on grids in the primary and secondary dunes prior to Hurricane Opal. Six months later, the primary and secondary dunes had been reoccupied as the vegetation began to recover, indicating the use of the interior habitats as a refuge was waning.

Auburn (unpublished data 1999) found similar results for CBM at Grayton Beach SRA. When frontal and primary dunes sustained extensive damage during Hurricane Opal, beach mice were captured behind what remained of primary dune habitat. By 1998 however, primary dunes and the immediate habitat behind them appeared to support higher numbers of beach mice.

Auburn (unpublished data 1999) trapping at Grayton Beach SRA also showed a decreased capacity to support beach mice after a hurricane where scrub habitats did not exist. This was noted on the west half of Grayton Beach SRA main unit after Hurricane Opal. The western half of the main unit is narrower and dominated by low secondary dunes and swales behind the primary dunes, and is more fragmented by human use. The access road for the SRA bisects the western half of the main unit. Additionally, picnic tables and lake access facilities fragment CBM habitat on the north side of the road. Further, the west boundary of the main unit is associated with the inlet to Western Lake which meanders inland to form the northern extent of suitable beach mouse habitat. The west half of the area was severely impacted by storm surge associated with Hurricane Opal that channeled up the inlet into Western Lake. Much of the west half was inundated by sea water which pooled in the low secondary flats. Damage in this area was more severe than on the east half of the unit reducing habitat quality and suitability for CBM. This difference in habitat damage was reflected in trap results.

In addition to the overall change in post Hurricane Opal distribution of ABM, Swilling *et al.* (1998) found the mean percent of newly marked individuals increased from 14 percent for the three trapping periods before the storm to an average of 26.7 percent for the same interval post hurricane. The average for the three trapping periods immediately following was even higher, at 42.7 percent of the individuals captured. Swilling *et al.* (1998) concluded that this increased presence of new individuals reflected increased reproduction. A statistical analysis of the data indicated that the number of females exhibiting signs of reproductivity was significantly higher than normal (18.9 percent higher). Auburn (unpublished data 1999) also found similar results at Topsail Hill State Preserve. Four to five months following Hurricane Opal, all female CBM captured were pregnant or lactating. Trapping six months after the hurricane, Auburn (unpublished data 1999) noted that 51.5 percent of captured CBM were new unmarked beach mice.

The five subspecies of beach mice along the Gulf coast of Florida and Alabama responded in some similar and different ways to Hurricane Opal and hurricanes that passed subsequently. It appears from tracking or trapping studies that population(s) of all the subspecies survived recent hurricanes (1995 to 1999) and are either recovering or are low but stable in numbers (Auburn unpublished data 1999, Celeste South, FWS, personal communication, 1999).

In summary, the CBM, as are other beach mice, are affected by the passage of hurricanes along the northwest Florida and Alabama Gulf coast. The specific impact depends on a number of factors that include storm intensity, the storm track, time of year, CBM population size, and storm impacts to CBM habitat and food sources.

1. CBM and other beach mice have existed in an environment subject to recurring hurricanes.

2. CBM and other beach mice are affected by hurricanes either by: 1) drowning, 2) surviving in place, and 3) fleeing to interior areas that are not drastically affected by the storm.

3. Some CBM and other beach mice move from primary and secondary dune areas to interior habitats coincidental to a storm or post-storm taking place.

4. The scrub dunes and interior dunes and related access corridors may be essential habitats for CBM and other beach mice following survival of a hurricane.

5. Different CBM populations respond differently to hurricanes and post hurricane conditions.

6. The impact of a hurricane on CBM and other beach mice populations differ depending upon the season, with mid-summer storms causing the greatest stress to a population.

7. The rate of recovery of food supplies for the CBM and other beach mice is variable with some areas adversely affected for an extended period of time by a hurricane and post hurricane conditions.

8. CBM populations reflect some natural resilience to hurricanes, with demonstrated recovery to historical population levels over time in the absence of storms at greater than historical frequencies.

Genetic viability

Selander *et al.* (1971) conducted an electrophoretic study that included 30 populations of *P. polionotus*, including populations of beach subspecies. Based on 30 allozyme loci, they estimated that the level of allozyme variation found in beach mouse populations was at least 40 percent lower than the level of variation in nearby inland populations. These works indicate that beach mouse populations already have lower genetic variability before inbreeding, bottle-neck events, or founder effects that may occur in a reintroduced population. Relationships between average heterozygosity, behavior, body size, and reproduction have also been demonstrated in *P. polionotus* (Smith *et al.* 1972, Garten 1975). The results of these studies suggested a positive correlation between increasing heterozygosity and body size of individuals. Heavier, more heterozygous males also exhibited higher levels of exploratory behavior and social dominance.

Weights of 579 CBM captured at Shell Island, Topsail Hill State Preserve, and Grayton Beach SRA by Auburn (unpublished data 1999) from 1995 to 1999 appear to be within the general

range of other beach mouse subspecies along the Gulf coast. However, significant differences between mean weights of adult males, adult non-pregnant females, and sub-adult females from Grayton Beach SRA were found. Adult males and non-pregnant females were heavier and sub-adult females weighed less than mice of the same classes from Shell Island or Topsail Hill State Preserve. The small sample size of Grayton Beach SRA captures and a majority of these captures occurring in autumn and winter were probably factors contributing to these differences. Weights of mice captured at Topsail Hill State Preserve reflect captures in all seasons and weights of mice captured at Shell Island are representative of mice under summer (stressed) conditions. Rave and Holler (1992) found that weights of adult beach mice were heavier in winter than in spring. Thus, we should expect that weights of CBM captured during these seasons (as were mice at Grayton Beach SRA) would be heavier on average than mice captured in warmer seasons. Lower mean weights of sub-adults at Grayton Beach SRA also may be attributable to small sample size and season of capture. Sub-adults captured during autumn and winter are probably captured when they are just becoming active after weaning and would be of smaller size. Sub-adult mice captured in the spring and summer most often are closer to adult age (as indicated by molting from sub-adult to adult pelage) and would be closer in weight to that of adults.

In 1995, the Service contracted with Auburn to conduct genetic analysis of: 1) post-re-establishment gene structure in PKBM and CBM; 2) microgeographic patterning and its relevance to alternate management approaches for ABM on the Bon Secour NWR; and 3) if feasible, the historical relationship of SABM from Crooked Island relative to CBM from Shell Island and SABM from St. Joseph Peninsula.

Results of the work for CBM found: 1) founder effects were observed in the Grayton Beach SRA population (fixation of alleles common to the donor population and allele frequency shifts); 2) incongruity in number and size of several alleles was observed between Grayton Beach SRA and Shell Island; 3) overall genetic divergence between the donor and re-established population was moderate; 4) genetic differences between Topsail Hill State Preserve and other CBM sites were higher than expected given the spatial proximity; 5) Topsail Hill State Preserve appears to be a reservoir for unique variation within the remaining populations of CBM; and 6) the overall relatedness estimated for Grayton Beach SRA suggested that any mating would involve close relatives (Wooten and Holler 1999).

Wooten and Holler (1999) recommendations for management of CBM based on genetics was: 1) management of the Grayton Beach SRA population for genetic characteristics appears to be needed; however, additional genetic analyses are needed; 2) translocation of CBM to Grayton Beach SRA from Shell Island should be continued; 3) habitat quality at Topsail Hill State Preserve needs improvement to help stabilize the densities of CBM; and 4) a second population of CBM from Topsail Hill State Preserve should be established.

Predation

Beach mice have a number of natural predators including coachwhip, corn, and pygmy and diamondback rattlesnakes, short-eared owls, great-horned owls, great blue heron, harrier, fox, skunk, weasels, and racoon (Novak 1997, Blair 1951, Bowen 1968, Holler 1992a, Jim Moyers and Jeff Van Zant, Auburn University, personal communications, 1999). Predation in beach mouse populations that have sufficient recruitment and habitat availability is natural and not a concern. However, predation pressure from natural and non-native predators may result in the extirpation of small, local populations of beach mice.

A significant predation concern for beach mice is free-roaming and feral domestic cats. The damage inflicted on birds, small mammals, reptiles, and amphibians from cats is in the hundreds of millions each year (American Bird Conservancy 1999). Cat tracks have been observed in areas of low trapping success for beach mice. For example, while trapping on Eglin AFB for Santa Rosa beach mice (SRBM) (Jim Moyers, Auburn University, personal communication, 1999), cat tracks were noticed near the vicinity of the security guard house. Few SRBM were captured in the vicinity. Investigation of the concern led to the discovery that some of the guards were feeding cats.

Other incidents include groups or individuals that allow their pet cats to roam freely or provide food for feral cats by placing food in dune habitats. Pet cats are sometimes left behind by vacationers or lost after being allowed to roam freely in unfamiliar places. These activities have been considered to contribute to the low populations and possible extirpation of beach mouse populations. For example, cats roaming or ranging within dune habitats may have contributed to the loss of the PKBM population at Florida Point, Gulf State Park in Alabama after the population became stressed by Hurricane Opal (Frank Bower, USDA-Wildlife Services, personal communication to Will McDearman and Celeste South, FWS, personal communication, 1999). A program to educate the public about the potential negative effects of cat colonies will be initiated in the near future and should help to reduce this threat.

Other non-native predators such as the red fox (*Vulpes vulpes*) and coyote (*Canis latrans*) are also of concern. Red fox are not native to the coastal habitats of the Florida panhandle and have been introduced to the area by fox hunters. They not only compete with the native gray fox (*Urocyon cineroargenteus*) for habitat, but appear to be a predator of beach mice based on the fact that they have been the only fox captured during predator control efforts in the Florida panhandle coastal environment conducted by U.S. Department of Agriculture - Wildlife Services (USDA). Recently tracks of coyote and fox have been observed around marked (for identification) sea turtle nests at Topsail Hill State Preserve and Grayton Beach SRA (Dale Shingler, Grayton Dunes GeoPark, personal communication 1998 and 1999). Although not documented around sea turtle nests, coyote numbers were increasing on the St. Andrew SRA mainland and reports of lost pets and reduction of small mammals such as rabbits were noted (Cecil Dykes, St. Andrew SRA, personal communication 1998). Sea turtle nest survey groups have observed fox waiting at sea turtle nests picking up hatchling turtles as they emerged from the nest (Sharon Maxwell, South Walton Turtle Watch, personal communication, 1998).

In response to increasing depredation of sea turtle nests by coyote, fox, and raccoon, a multi-agency cooperative effort was initiated in 1996. Ten Federal and State agencies have provided funding and/or inkind services to Wildlife Services to implement a control program on coastal public lands across the Florida panhandle. The program is ongoing, and a permanent USDA position was established in the panhandle to conduct the control work. The program has been successful and in the first year, predation losses on one sea turtle nesting beach was reduced to 6.3 percent, an 88 percent reduction of losses from the previous year (Leland 1997). Continued low predation rates of sea turtle nests throughout the panhandle have been documented. The benefits of this predator control program is also believed to benefit beach mouse populations.

Competition

Beach mice are the only small mammal that live exclusively within the coastal dune environment containing primary, secondary, and scrub dunes and associated interdunal and interior habitats. Other small mammals such as the cotton rat and cotton mice are commonly found in the forested portions of coastal habitats. The house mouse (*Mus musculus*) and other exotic rodent species such as the Norway and black rats occur in areas associated with humans. The following synopsis is taken from Frank and Humphrey (1996). Generally research has shown that house mice exhibit overlapping food habitats (Gentry 1966) with beach mice and commonly occupy the same habitat. It is thought the house mice may compete with beach mice for food resources. However, other work has shown an inverse relationship between population densities of beach mice and house mice (Caldwell 1964, Caldwell and Gentry 1968, Gentry 1966, Meyers 1983). These studies concluded that house mice are poor competitors with beach mice and under conditions optimal for beach mice, may be capable of coexisting with beach mice through non-resident behavior. Briese and Smith (1973) concluded that house mice primarily invade disturbed areas or areas where human structures provide suitable places to live, but that the species seldom coexist in undisturbed natural habitats. Humphrey and Barbour (1981) documented mutually exclusive distribution patterns of Gulf coast beach mice and house mice and suggested that these patterns were a result of competitive exclusion of beach mice by house mice following habitat degradation and introduction of exotic predators. King (1957) studied aggressive behavior of house mice and *Peromyscus leucopus* and suggested that these species might aggressively compete in nature. However, Caldwell (1964) found no evidence of direct aggressive competition between house mice and beach mice under field or laboratory conditions, and even observed these species to share common nests under laboratory conditions.

Frank and Humphrey (1996) concluded from their work on the Anastasia Island beach mouse that house mice could coexist in dune habitats with beach mice and not be a serious threat to their persistence under conditions favorable for beach mice. The presence of house mice may be an indicator of poor habitat conditions for beach mice.

Few if any house mice have been caught during trapping at any of the CBM population areas (Auburn unpublished data 1999). The greatest concern for invasion of house mice would be areas of accretion on Shell Island and the connection to Tyndall AFB mainland. Auburn

(unpublished data 1999) captured house mice on the mainland connection, and although Tyndall AFB has implemented remedial measures (trash pickup and maintenance) they are still considered a concern.

Analysis of the species/critical habitat likely to be affected

The Grayton Beach population and the future reintroduced Deer Lake population of the CBM will be affected by the proposed action. The effect of this impact on the overall CBM survival and recovery will be considered in this biological opinion. Affects to CBM are expected to be a result of direct and indirect impacts from loss of occupied habitat from project construction and/or permanent infrastructure and associated effects including lighting, the presence of humans on, and their inhabitation and recreational use of, the property (beach access and use, landscaping, exotic plants, trash and refuse, beach mouse predators and competitors). Since the proposed action will reduce available and occupied CBM habitat, a habitat-based analysis is the best approach to determine the significance of effects on the CBM and whether critical habitat will be adversely modified.

Sea Turtles
Loggerhead Sea Turtle
Green Sea Turtle
Leatherback Sea Turtle

The U.S. Fish and Wildlife Service has responsibility for implementing recovery of sea turtles when they come ashore to nest. The National Marine Fisheries Service has jurisdiction over sea turtles in the marine environment.

Species/critical habitat description

Three species of sea turtles, the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), and the leatherback sea turtle (*Dermochelys coriacea*) are considered in this biological opinion. The Kemp's Ridley turtle (*Lepidochelys kempi*) occurs in nearshore Gulf waters, but no nests have been documented in the Florida panhandle.

Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) was federally listed as a threatened species on July 28, 1978 (43 FR 32800). This species inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian oceans. Loggerhead sea turtles nest within the continental U.S. from Louisiana to Virginia (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a). Critical habitat has not been designated for loggerhead turtles along the Gulf coast of Florida.

From a global perspective, the southeastern U.S. loggerhead turtle nesting aggregation is important to the survival of the species and is second in size only to the nesting on islands in the Arabian Sea (Ross 1982, Ehrhart 1989, National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a). Nesting has been documented in all panhandle counties from Franklin County through Escambia County (Florida Marine Research Institute (FMRI 1999a).

Green Sea Turtle

The green sea turtle (*Chelonia mydas*) was federally listed on July 28, 1978 (43 FR 32808). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green turtle is a circumglobal species in tropical and subtropical waters. Within the U.S., green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida. Nesting also has been documented along the northwest and southwest Gulf coasts of Florida and as far north as North Carolina (Meylan *et al*. 1995). Critical habitat has not been designated for green turtles along the Gulf coast of Florida.

Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*), federally listed as an endangered species on June 2, 1970 (35 FR 8495), nests onshore of the Atlantic, Pacific and Indian oceans. Nesting grounds are distributed circumglobally, with the Pacific Coast of Mexico supporting the world's largest known concentration of nesting leatherbacks (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992, National Research Council 1990). Critical habitat has not been designated for leatherback turtles along the Gulf coast of Florida.

The leatherback regularly nests in the U.S. in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992). Sporadic leatherback nesting also has been documented in the Florida panhandle and North Carolina (LeBuff 1976, FMRI unpublished data, Longieliere *et al*. 1997, R. Boettcher, North Carolina Wildlife Resources Commission, personal communication to Sandy MacPherson, FWS National Sea Turtle Coordinator, 1998).

<u>Life history (growth, life span, survivorship, and mortality)</u>

Extensive research has been conducted on sea turtles. The recovery plans for the loggerhead, green, and leatherback turtles (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a, 1991b, 1992) provide a summary and references for detailed information on the species. In brief, the greatest portion of a sea turtle's life is spent in ocean and estuarine waters where it breeds, feeds, migrates, and hibernates. The remainder of the female's life is spent on the beaches where she digs a nest and lays her eggs. The eggs then hatch and the hatchlings crawl to the sea to become part of the marine ecosystem again (Nelson 1988).

The reproductive strategy of sea turtles involves producing many offspring to compensate for the high natural mortality through their first several years of life. Some mortality factors include disease, predation of the nest by raccoons and ghost crabs, loss of the nest from inundation or erosion due to wave action, storms, beach erosion or rain, predation of hatchlings on the beach by birds, fox, and ghost crabs, and predation in the aquatic environment by fish or marine species. However, increased unnatural mortality is now occurring due to increased human-caused pressures on sea turtle populations. One such pressure is the loss and degradation of nesting habitat because of coastal development. Therefore, activities that affect the behavior and/or survivability of turtles on their remaining nesting beaches could significantly reduce our ability to conserve sea turtles.

Loggerhead turtle

The loggerhead sea turtle nesting and hatching season for the Florida panhandle beaches extends from about May 1 through October 31. Nest incubation ranges from about 55 to 95 days. Average sea turtle nest density for the panhandle counties (Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia), ranged from 0.49 nests to 4.04 nests per mi (0.79 to 6.5 nests per km) from 1995 to 1997 (FMRI 1999a). Documented annual average number of nests for all the counties during the same time ranged 8.7 to 388.0 nests (FMRI 1999a).

Green Turtle

Green turtle nesting has been documented on all beaches in the Florida panhandle except in Franklin and Bay counties. The green sea turtle nesting and hatching season for the Florida panhandle beaches extends from May 1 through October 31. Nest incubation ranges from about 60 to 90 days. Nesting in the panhandle has been consistently documented every other year since 1990. Average green sea turtle nest density in the panhandle counties, ranged from 0.02 to 0.38 nests per mi (0.11 to 0.58 nests per km) for the 1998 nesting season (FMRI 1999a). Documented number of nests for each county except Bay and Franklin counties, during the 1998 nesting season, ranged from two to 15 nests (FMRI 1999a).

Leatherback Turtle

Leatherback nesting has only been verified in Franklin and Gulf counties in the Florida panhandle. The leatherback sea turtle nesting and hatching season for the Florida panhandle extends from May 1 through September 30. Nest incubation ranges from about 60 to 75 days (FMRI unpubl. data, Longieliere *et al.* 1997, FMRI 1998).

<u>Population dynamics (population size, population variability, population stability)</u>

Loggerhead turtle

It is not possible, at present, to estimate the size of the loggerhead population in U.S. territorial waters if one includes subadults. There is general agreement with Meylan (1982) that enumeration of nesting females provides a useful index to population size and stability. Through aerial and ground surveys it is estimated that approximately 50,000 to 70,000 nests are laid per year on southeast U.S. beaches. In 1998, there were over 80,000 nests laid in Florida alone. The FMRI, through their monitoring permit program and index beach surveys, estimate that Florida panhandle beaches account for 800 to 1,200 loggerhead nests per year.

Recent genetic analyses have been employed to resolve management units among loggerhead nesting cohorts of the southeastern U.S. (Bowen *et al*. 1993; Encalada *et al*. 1998). Three genetically distinct nesting sub-populations have been identified: (1) northern nesting sub-population - Hatteras, North Carolina, to Cape Canaveral, Florida; (2) South Florida nesting sub-population - Cape Canaveral to Naples, Florida; and (3) Florida panhandle nesting sub-population - Eglin Air Force Base and the beaches around Panama City, Florida. These data indicate that gene flow among the three regions is very low. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting sub-population (Bowen *et al*. 1993, Encalada *et al*. 1998).

Green Turtle

No population estimates of green turtles are available. The status of green turtle populations is difficult to determine because of the long generation time and inaccessibility of the early life stages. Green turtle nesting in the southeast U.S. is regionally significant, with approximately 2,800 nests per year in Florida. Small numbers of greens nest in the U.S. Virgin Islands and Puerto Rico. Occasional green nesting is reported from Alabama, Georgia, South and North Carolina. Green turtle nests in the Florida panhandle account for approximately 30 of the total nests. At least half of those nests are usually laid on Santa Rosa Island on Eglin AFB (FMRI 1999a).

Leatherback Turtle

Pritchard (1982) estimated that 115,000 adult female leatherbacks remained worldwide. The largest U.S. nesting assemblages of leatherback turtles occur in the U.S. Virgin Islands and Puerto Rico. Small numbers (300 nests) of leatherback turtles nest in the southeast U.S., primarily along the Florida Atlantic Coast. In any one year, only four leatherback nests have been documented in the Florida panhandle (FMRI 1999a). The U.S. Atlantic and Caribbean nesting population appears to be increasing.

<u>Status and distribution (reasons for listing, rangewide trend, new threats)</u>

Sea turtles are threatened by many factors when onshore or in the aquatic environment. Threats in nesting environment include beach erosion, beach armoring, beach nourishment, artificial lighting, beach cleaning, increased human presence, recreational beach equipment, beach driving, exotic beach and dune vegetation, nest depredation, inundation, sand accretion over incubating nests, and poaching. Threats in the aquatic environment include oil and gas exploration and development, dredging, marina and dock development, pollution, seagrass bed degradation, trawl fisheries, purse seine fisheries, hook and line fisheries, gill net fisheries, pound net fisheries, longline fisheries, trap fisheries, boat collisions, power plant entrapment, underwater explosions, offshore artificial lighting, marine debris (ingestion and entanglement), poaching, predation, disease and parasites (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a, 1991b, 1992).

Hurricanes Erin, Opal, Earl, and Georges

Similar to beach mice, sea turtles are impacted by loss of habitat from natural and human causes, beachfront lighting, and predation. Hurricane Erin's and Opal's (1995) storm surge and wave energy inflicted severe erosion along the beaches and dunes of Walton County. Substantial beach scraping in most developed areas created relatively flat and narrow beaches compared to pre-storm conditions. In these areas recovery has been impaired and was anticipated to take longer.

In 1995 and 1996, 82 and 81 percent of the turtle nests were lost. The lost nests were attributed to the direct and indirect effects of both hurricanes in 1995. Directly, nests were either totally washed out and destroyed or were inundated for long periods of time during critical development periods. Indirectly, the beaches of Walton County did not fully recover from the loss of sand due to Opal. The beaches remained narrow and it was estimated approximately 2 feet lower than normal. Some recovery of the beach and dunes was beginning in 1997 to 1998 until hurricanes Earl and Georges hit in September of 1998. Thus, in 1997 the South Walton Turtle Watch Group (SWTWG) requested and received permission from the State of Florida to relocate nests to higher beaches. Approximately 30 percent of the nests were relocated in 1998 and 1999 on non-State land beaches (Sharon Maxwell, SWTWG, personal communication 1999).

Beachfront Lighting

After loss of habitat or direct nest loss from hurricanes, lighting disorientation has had the greatest impact on turtles that nest on Walton County beaches. After hurricanes Erin and Opal, much of the high dunes were lost and coastal construction accelerated to either rebuild or build new structures. The dunes used to block most of the beachfront lighting before both hurricanes, now more lighting reaches the beach and causes disorientation. Approximately 5 to 10 percent

of the nests in Walton County are disoriented by beachfront lighting each nesting season (Sharon Maxwell, SWTWG, personal communication 1999).

Predation

Along with coastal development, predation is increasing. Red fox have been observed standing alongside nests that are hatching, taking hatchling turtles. SWTWG volunteers, watching nests at night because of lighting disorientation concerns, have been approached by red fox. Fire ants have recently become a concern. Hay bales placed on the beach for dune restoration or stabilization provides an organic medium for the ant to colonize. The ants will invade turtle nests, and hatchlings ready to emerge from the nest have been killed.

Sea Turtle Strandings

No specific information is available concerning strandings of sea turtles on Walton County beaches. For 1997 and 1998 fifteen turtles were reported stranded on Walton County beaches. Of those, 12 were loggerhead turtles, one was a green turtle, one was a leatherback, and one was a Kemp's Ridley (FMRI 1998, 1999b). Usually the turtles are in a condition (too decomposed) where the cause of death cannot be determined.

Another "stranding" commonly occurring in Walton County are the loggerhead turtles used for turtle excluder device (TED) testing conducted offshore Bay County to the east. The turtles used in the testing are hatchery reared and are used to humans. Although they are flipper tagged and released approximately 20 miles (32 km) offshore after the testing ceases, the turtles are commonly seen swimming in the nearshore area, sometimes crawling ashore. Residents and visitors "play" with these small turtles (18 inches/ 45.7 cm). Turtle Watch volunteers have received up to ten calls a day during a 2-week period after the testing is completed (Sharon Maxwell, SWTWG, personal communication 1999).

Nesting

The responsibility of the turtle nest surveying is shared by the FDEP, FPS, Grayton Dunes Geo Park and Choctaw Geo Park and the South Walton Turtle Watch group (SWTWG). FDEP monitors all State lands (Deer Lake State Park, Grayton Beach SRA, and Topsail Hill State Preserve). The SWTWG conducts their surveys under State of Florida marine turtle permit 120 and monitors non-State lands. Salvage and stranding response is also shared in the same manner.

Loggerhead Turtle

Approximately 305 loggerhead turtle nests have been documented along Walton County beaches from 1993 to 1999. Nesting density from 1993 to 1999 ranges between 0.61 to 2.6 nests per mile (0.38 to 1.59 nests per km). At Grayton Beach SRA approximately one to seven nests are documented each year. On the south parcel and adjacent Seaside, approximately zero to three

nests have been documented during a loggerhead nesting season. At Camp Creek, one to nine nests have been documented in any one nesting season (FMRI 1999a, Dale Shingler, FDEP, Grayton Beach SRA, personal communication 1999 and Sharon Maxwell, SWTWG, personal communication 1999).

Green Turtle

Nine green turtle nests have been documented along Walton County beaches from 1993 to 1999. Nesting appears to occur on a cycle of every other year in Walton County. Four nests were documented in 1998 and five nests in 1996. Average nesting density for those 2 years was 0.16 nest per mile (0.1 nest per km). At Grayton Beach SRA a few nests have only been documented. No green nests have been located on the south parcel and adjacent Seaside property. One green turtle nest has been documented in the vicinity of the Camp Creek property (FMRI 1999a, Dale Shingler, FDEP, Grayton Beach SRA, personal communication 1999 and Sharon Maxwell, SWTWG, personal communication 1999).

Leatherback Turtles

No leatherback nests have been documented on Walton County beaches (FMRI 1999a).

Analysis of the species/critical habitat likely to be affected

The proposed action could have the potential to adversely affect nesting and hatchling sea turtles at and adjacent to the project areas. The Applicant has committed to implement all the necessary actions for sea turtle protection and conservation at both the south parcel and Camp Creek project sites. Actions include sea turtle compatible lighting, protection and restoration of dune and beach habitats, predator control, nightly removal of control of recreational equipment (chairs, umbrellas, etc.) from the beach during turtle season, coordination with Grayton Beach SRA and South Walton Turtle Watch, and education of visitors and residents. Therefore, we have determined that the project as proposed will not likely adversely affect (NLAA) sea turtles. Thus, no further analysis is needed.

Environmental Baseline

This section describes the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem, within the Action Area. The environmental baseline is a “snapshot” of a species health at a specified point in time. It does not include the effects of the action under review in the consultation.

Choctawhatchee beach mouse

Status of the species within the action area

Grayton Beach population

The Grayton Beach population contains Grayton Beach SRA (main and west units), south parcel, and Seaside. The lands within the "population" contain approximately 14 percent of the overall critical habitat, 9 percent of habitat currently occupied by CBM, and 12 percent of available CBM habitat. CBM were reintroduced to the Grayton Beach SRA main unit in 1987 and 1988 using CBM from Shell Island and captive reared individuals from a Service-funded colony at Auburn University (Holler and Mason 1987). The effort has been considered successful because CBM continue to exist at the site. Ten CBM from Shell Island were translocated to the main unit in 1999 as part of graduate degree research (Jeff Van Zant, Auburn University, personal communication, 1999).

Auburn (unpublished data 1999) captured 83 CBM over 4,560 trap-nights between February 1995 and October 1998 on the main unit of Grayton Beach SRA (Appendix B, Auburn unpublished data 1999). CBM were captured in all available dune habitats. Probability of capture was adequate (0.25-0.34) for all trap periods for which CAPTURE statistics were run. Captures per 100 trap-nights ranged from 2.05 to 2.13 for trap periods greater than three nights. Average of mice per meter of transect trapped (0.0061) were in between capture rates of Topsail Hill State Preserve and Shell Island. Program CAPTURE estimates for trap efforts indicate that the population is small (116) and indicates recovery from Hurricane Opal in 1995 and Hurricane Earl in 1998, and Hurricane Georges in 1998 (Appendix B, Auburn unpublished data 1999).

Most captures of CBM prior to Hurricane Opal occurred within the frontal (foredune) and primary dune habitats rather than scrub habitats (25 individuals vs. 15 individuals). Post Opal captures in the scrub four months after (February) were more numerous (10 individuals vs. 6 individuals). Capture trends had switched by October 1998 with captures more numerous in recovering primary dune habitat. In addition, before Hurricane Opal, captures were higher on the western portion of the SRA main unit (24 individuals west vs. 15 individuals east). After the hurricane, the eastern half of the SRA main unit yielded higher numbers of captures (12 individuals west vs.34 individuals east) (Appendix B, Auburn unpublished data 1999).

CBM have not dispersed into the western Grayton Beach SRA unit. Several tracking efforts for CBM on the western units of Grayton Beach were made between 1995 and 1998, but no track evidence was present to indicate beach mice were occupying available habitat in these areas (Jim Moyers, Auburn University, personal communication 1999).

CBM occupy the south parcel. During an onsite interagency meeting with the Applicant and their consultants in August of 1998, tracks of what appeared to be from beach mice were observed. Quarterly surveys conducted by the Applicant during December 1998, February 1999, May 1999, and September 1999 confirmed their existence. A total of 38 CBM were captured during the four trapping periods. Population estimates ranged between 3 to 7 CBM (Shea unpublished data). Shea (unpublished data) also documented movement of CBM between

Grayton Beach SRA and the south parcel. Because of the lack of long-term onsite data, density of CBM (number of CBM/acre) at the project site cannot be determined.

Deer Lake population

The Deer Lake population contains Deer Lake State Park, the Applicant's Camp Creek and Camp Creek Pointe property. For the same time period, no CBM were captured during trapping surveys at the Camp Creek project site. No historic occurrence of CBM at any of these areas has been documented. The closest historical trapping occurred in 1979, approximately 1 mile (1.6 km) to the west at Eastern Lake by Humphrey and Barbour (1981). No CBM were captured at the time. Trapping conducted at Deer Lake State Park in May 1997 by Auburn University funded by the Service did not capture any CBM (Auburn unpublished data). Quarterly surveys conducted at the Camp Creek site by the Applicant during December 1998, February 1999, May 1999, and September 1999 also did not result in capture of CBM (Shea unpublished data). However, it is assumed that all the sites were once occupied by CBM as the habitat is suitable. The CBM that once occupied the habitat were either extirpated by a storm event and/or were isolated from other populations by coastal development and were unable to reoccupy by natural dispersal.

Factors affecting the species environment within the action area

Hurricanes

Since records on hurricane intensity began in 1885, about 16 hurricanes have struck within the range of the CBM (Williams and Duedall 1997). No more than two of those hurricanes occurred in any decade until the 1990s when five occurred. In recent years, the most destructive hurricanes in terms of coastal dune habitat damage and impacts on CBM were Hurricanes Eloise (1975), Kate (1985), and Erin and Opal (1995). Recent hurricanes Allison (1995), Earl (1998), and Georges (1998) resulted in less damage to CBM habitat.

Hurricane Opal was the most intense storm to affect CBM habitat in recorded history. All three CBM populations were affected. Areas of high, continuous dunes experienced substantial recession. Lower dune areas experienced tremendous overwash. In Bay County the average beach recession was 31 feet (9.4 meters) with a maximum of 153 feet (46.6 meters) and dune recession averaged 38 feet (11.6 meters) with a maximum of 120 feet (36.6 meters). Most of the primary dune habitat at Shell Island was lost and the island overwashed. In Walton County the average beach recession was 35 feet (10.7 meters) with a maximum of 76 feet (23.2 meters) and dune recession averaged 44 feet (13.4 meters) with a maximum of 155 feet (47.2 meters). Large escarpments were created in the primary dunes at Topsail Hill State Preserve and Grayton Beach SRA (Leadon 1996). Dune habitats were beginning to show signs of recovery (pioneer vegetation establishment along the foredune) within 2 years. In spite of the catastrophic nature of this storm, the CBM populations on Topsail Hill State Preserve and Grayton Beach SRA have

recovered to densities found prior to the hurricane and the population on Shell Island is recovering (Appendix B, Auburn unpublished data 1999).

Genetic viability

Auburn (unpublished data 1999) indicated a concern that weights of sub-adult females at Grayton Beach SRA might be an indicator of reduced genetic variability of this reintroduced population. Auburn found similar results for Perdido Key beach mice reintroduced to Gulf Islands National Seashore, Perdido Key Beach Unit. These data may indicate that reintroduced populations of beach mice may be experiencing low genetic diversity as a result of founder effects, inbreeding or bottle-neck events. We have no data for the Grayton Beach SRA population between 1988 and 1995 to indicate population status prior to the genetic work accomplished by Auburn.

Predation

The greatest threat to CBM is from feral and free-ranging domestic cats, in particular in Walton County. Cat colonies are maintained by a local group, the "Whisker's Friends" between the Town of Grayton Beach and Inlet Beach, Walton County (Evans 1999). Stray cats are picked up (trapped if needed), tested, treated, vaccinated, and spayed or neutered by an area veterinarian and then returned to the area from where they were picked up. The cat colony is also fed. The intent of the group is to stabilize and manage stray cat populations in the coastal community. They have campaigns such as the annual "Prevent a Litter" where additional cats from the colony are spayed and/or neutered. The group also attempts to take kittens from the colony that are young enough to tame for adoption. Their work is supported by donations of money and time (volunteers and veterinarians). Although their mission is well-meaning, they have been misinformed about the ability to control the number of cats in an area by this method. The cat has a unique ecological position: it is a semi-domesticated, exotic, and subsidized predator. Because of supplemental feeding in managed colonies, this results in artificially high densities of this predator to occur (as cited in Hawkins 1999). Predation by cats have driven wildlife populations in some areas of California well below levels that can support native predators (as cited in Hawkins 1999). This could become a concern for beach mice. Predation in beach mouse populations that have sufficient recruitment and habitat availability is natural and not a concern. However, in small, local populations of beach mice predation pressure from natural and non-native predators may result in their extirpation. This could become a concern for CBM in the Grayton Beach and the Deer Lake reintroduced population. At this time, however, no cat tracks have been documented in occupied habitat of the Grayton Beach SRA (Dale Shingler, Grayton Dunes GeoPark and John Bente, FDEP/FPS, District 1 Office, personal communication, 1999).

Depredation by other native (raccoon) and non-native predators (coyote, red fox) has been documented in isolated situations in areas occupied by CBM. Trapping surveys have been discontinued on Shell Island because of raccoon predation (Novak 1997, Auburn unpublished data 1999). A radio collared CBM relocated to Grayton Beach SRA main unit in 1999 was apparently eaten by a coachwhip snake. Biologists were able to locate and follow the snake for three weeks. Another radio from a radio collared introduced CBM was found in an owl pellet (Jeff Van Zant, Auburn University, personal communication, 1999). Fox tracks have been observed at the Camp Creek site (Steve Shea, St. Joe Timberlands, personal communication 1999 and Jim Moyers, ESI, Inc., personal communication 1999).

The cooperative agency effort is and will continue to implement protection of beach mouse populations and sea turtles through predator control on public lands. An annual work schedule is prepared by the group and USDA. The schedule is based on species priority and status and documented depredation. Although in 1996 and 1997, areas with high depredation rates of sea turtles were priority work areas, in 1998 and 1999, and 2000, beach mouse areas have been or will be top priority. USDA is funded by the group to implement the control according to the schedule.

Low densities of CBM on primary dune habitats at Grayton Beach SRA

A disparity in the number of captures between frontal and primary dunes and scrub dunes, secondary flats, and swales habitats was found at Grayton Beach SRA (Auburn unpublished data 1999). The majority of CBM captures at Grayton Beach SRA conducted by Auburn (unpublished data 1999) occurred in the scrub dunes, secondary flats, and swales. As shown in most beach mouse trapping studies, the frontal and primary dunes usually support the highest densities of beach mice at Grayton Beach SRA. However, because they compose only a small percentage of available habitat on the main unit, the majority of CBM appear to be supported by the scrub dunes, secondary flats and swales.

Absence of CBM on the western units of Grayton Beach SRA

The two western units of Grayton Beach SRA compose approximately 81.5 acres (32.9 hectares) along 1 mile (1.6 km) of beachfront. Neither unit is within designated critical habitat for the CBM. Several tracking efforts for CBM on the units were made between 1995 and 1998, but no track evidence was present to indicate beach mice were occupying available habitat in these areas (Jim Moyers, Auburn University, personal communication 1999). This apparent absence is probably a result of the small size of each of the units and their isolation from the main unit or other occupied areas (Auburn unpublished data 1999). The ability of beach mice to recolonize these areas via existing frontal and primary dunes is questionable based on the condition and width of the habitat, existing development, property ownership, current land management practices, and Gulf of Mexico boat launch access. Extensive habitat restoration, public education, cooperation with State and local governments, and predator control is needed to have this be a feasible management option. The separation between the western units and the main

unit of Grayton Beach SRA is relatively small. A third of the beach frontage at the Town of Grayton Beach is owned by the State of Florida and leased to the Town. The Town is responsible for management of this parcel but restoration of dune habitats, predator control, and management of beach driving has not been conducted. Reintroduction may also be needed in conjunction with implementation of the above actions.

The size of these units with the potential to provide contiguous habitat for CBM with the main unit would significantly enhance the ability of the Grayton Beach SRA to support a recovery population of CBM. Thus, the management and future reintroduction of CBM into the western unit is considered feasible.

Unauthorized beach access

At both the south parcel and the Camp Creek site unauthorized trespass for beach access has resulted in degraded dune habitats and unvegetated foot paths. Beach mice traverse these areas but because they are bare open sand, provide little to no cover (protection from predators), food, or burrow habitat. Continued degradation of habitats create weak areas in the dunes that are susceptible to blow out during hurricanes causing further degradation of habitats. At the south parcel, three such foot paths have been created, and between Deer Lake State Park and the Camp Creek site another path has been created that follows interdunal areas, further weakening the dune system. The Applicant has gated the south parcel to stop the unauthorized access and plans to restore the habitat as part of this permit. At Camp Creek a fence will be installed to direct pedestrians off the dunes and onto walkovers or the Park property. Both areas will have dune walkovers.

Other factors

Low density commercial and residential development occurs within or adjacent to the western and/or eastern edges of designated critical habitat at Grayton Beach SRA. The "Whisker's Friends" organization conducts their program between Blue Mountain Beach and Inlet Beach. This has the potential to introduce feral cats as predators, but the ten agency cooperative predator control and public education program is expected to diminish this threat. Hurricanes have affected all CBM populations. Following the largest hurricane on record to affect CBM, the population at Grayton Beach SRA declined but has shown recovery. There is no data to indicate that competition from house mice is a problem at Grayton Beach SRA.

Effects of the Action

This section is an analysis of the direct and indirect effects of the proposed action on the CBM and its critical habitat. The analysis includes effects interrelated and interdependent of the project activities. An interrelated activity is an activity that is part of a proposed action and depends on the proposed activity. An interdependent activity is an activity that has no independent utility apart from the action. Designated critical habitat occurs at the south parcel

project site and adjacent Grayton Beach SRA. No critical habitat for CBM is designated at the Camp Creek project site.

Factors to be considered

Choctawhatchee beach mouse

The south parcel project will occur within habitat for the Grayton Beach SRA CBM population and in and adjacent to designated critical habitat for the CBM. CBM are permanent inhabitants of the coastal ecosystem conducting all their life cycles in this environment. Surveys conducted by the Applicant have confirmed the existence of CBM on the south parcel project site but not at the Camp Creek site. The south parcel project therefore, will impact to some degree, every life stage of CBM. Short-term and intermediate impacts will occur from the south parcel project construction. Long-term permanent impact will occur from the loss of critical habitat, by the development infrastructure, and the human occupancy and recreational use of the area.

Construction is to commence on the south parcel project as soon as the ITP is issued -- projected date approximately early 2000. This is during the peak of the CBM reproduction season and would be the worst case scenario for the number of CBM affected. The length of time for the development construction of the south parcel is unknown but could be expected to take from 6 months to 2 years, thus possibly impacting another reproductive season. The first few months (1 to 3 months) is anticipated to consist of the majority of land clearing which would be when the CBM habitat will be permanently destroyed. The length of time it will take to clear the land is unknown but could occur during CBM breeding, reproduction, rearing/weaning, and dispersal activities. Long-term permanent impacts will occur from the human occupancy and recreational use of The Villages at Seagrove. Since the Camp Creek site is proposed to be occupied by CBM as a result of this ITP, beneficial effects are noted for the subspecies.

Analyses for effects of, and species response to, the proposed action

Direct Effects

South Parcel

The south parcel project site consists of open beach, frontal (foredune) dune, and primary dune habitat that quickly grade into dense oak and palmetto scrub habitat including disturbed former scrub habitat. The south parcel project will permanently eliminate a total of 7.81 acres (3.16 hectares) of designated CBM critical habitat. Residential and commercial (Inn, beach club, residences, condominium) structures and facilities will occupy about 7.73 acres (3.12 hectares) of the habitat and consists of scrub and disturbed habitat. Four boardwalks will occupy 0.08 acre (0.03 hectare) of critical habitat consisting of scrub, primary dune, and frontal dune (Table 1).

Table 1: Acres of CBM Critical Habitat and Impact at The Villages at Seagrove South Parcel

		South Parcel			

Habitat	Acres of Critical Habitat Not Impacted	Acres of Critical Habitat with Constituent Elements Impacted	Acres of Critical Habitat without Constituent Elements Impacted	Acres of Critical Habitat Restored	Total Acres

Beach	3.58	walkover pilings 0.03	0.00	0.00	3.61

Dune	1.88	walkover pilings 0.05	0.00	0.73	2.66

Oak scrub	1.70	0.93	0.00	0.00	2.63

Palmetto scrub	0.05			0.37	4.27
(landward of road)			0.67		
(seaward of road)		3.18			

Sand pine scrub	0.00	0.00	1.04	0.00	1.04

Disturbed	0.02			0.18	2.11
(road bed)			1.45		
(foot trails in scrub)		0.46			

Total	7.23	4.65	3.16	1.28	16.32

As stated above, a direct impact will be the permanent take of 7.81 acres (3.16 hectares) of designated critical habitat for the CBM. The constituent elements for CBM designated critical habitat is defined as dunes and interdunal areas, and associated grasses and shrubs that provide food and cover. Of the 7.81 acres (3.16 hectares), approximately 3.16 acres (1.28 hectares) do not meet this definition (Auburn unpublished data 1999 and 1999 GIS maps available and occupied habitats Grayton Beach SRA). This area consists of a gravel road bed (1.45 acres/0.59 hectares), and sand pine scrub (1.04 acres/0.42 hectares), and palmetto scrub (0.67 acre/0.27 hectares) located on the landward side of the road bed. The road is an abandoned gravel road bed approximately 50 to 60 feet (15.2 to 18.2 meters) wide oriented parallel to the shoreline along the entire length of the property stopping 90 feet (27.3 meters) from the eastern property line. This area was probably once palmetto scrub and/or pine scrub but has been roadway since at least 1979 (EPA infrared aerials 1979, Fish and Wildlife Service, Panama City, FL). The road bed is generally devoid of vegetation because of heavy beach visitor vehicle parking that is now prohibited. The road interrupts the connection of the landward pine and palmetto scrub from other occupied or available habitat onsite on or adjacent to Grayton Beach SRA. CBM could use the gravel road bed as a travel or migration corridor to and from the pine scrub habitat but it does not meet the criteria for critical habitat constituent elements and would not result in adverse modification.

The sand pine scrub habitat has slash pine as the dominant tree species in the canopy layer with an understory of scrub oak, dense saw palmetto and grass species that thickly colonize the open areas. This area trends toward wet flatwoods to the west. The areas adjacent to the gravel road have been impacted by the vehicle parking and pedestrian beach traffic and the roadside vegetation is composed of salt grass (*Distichlis spicata*) and Bermuda grass and opportunistic species such as beggar-ticks (*Bidens* spp.). A natural event such as a hurricane or fire would be needed to open the habitat for it to be suitable for colonization by CBM (Jim Moyers, Environmental Services Inc., formerly Auburn University, personal communication, 1998 and 1999). Mechanical clearing could also be used to open the sub-canopy and ground cover.

One factor supporting the unsuitability of the disturbed pine and palmetto scrub areas is the absence of CBM on the most landward transect which is in the palmetto scrub immediately adjacent on the seaward side of the road bed (Appendix A, HCP). The trapping conducted by the Applicant covered all seasons (fall, winter, spring, and summer). Dispersal of CBM into these habitats would be expected. However, no CBM were caught. The palmetto scrub in this area is also dense with little open sandy areas (Jim Moyers, Environmental Services Inc., formerly Auburn University personal communication, 1998 and 1999; and Lorna Patrick, FWS, Panama City, Florida).

Another factor includes the landward extent of critical habitat on the property when it was originally designated. The shoreline has eroded approximately 78.5 feet (23.9 meters) since critical habitat for the CBM was designated in 1985. Thus, at the time of designation, the 1.04 acres (0.42 hectares) of pine scrub and 0.67 acres (0.27 hectares) of palmetto scrub were outside

critical habitat (500 feet (152 meters) from MHW) (Appendix A, HCP and aerial photography 4/11/82 used for critical habitat designation). At the current time, 3.16 acres (1.28 hectares) of the 7.81 acres (3.16 hectares) do not meet the criteria for defined critical habitat constituent elements for the CBM. Loss of this habitat would not appreciably diminish the capability of the Grayton Beach critical habitat to satisfy essential requirements of the species because it is not currently, or is not expected to, provide habitat without restoration. Therefore, the permanent loss of this habitat would not result in adverse modification of critical habitat for the CBM.

The remaining 4.65 acres (1.88 hectares) of beach (0.03 acre/0.01 hectares), dune (0.05 acre/0.02 hectares), palmetto scrub (3.18 acres/1.27 hectares), pedestrian trails (0.46 acre/0.19 hectares) and oak scrub (0.93 acre/0.38 hectares) do meet the criteria for the defined critical habitat constituent elements for the CBM. The beach and dune impacts will be caused by the installation of the dune walkover pilings. Placement of the pilings could kill a CBM or destroy its burrow or both. The walkovers will be constructed in a top-down method that protects the dune habitats within and adjacent to the walkover route. The walkovers will result in the protection of CBM habitat in the long term. The palmetto and oak scrub occur on flat terrain landward of the primary dunes. The habitats have been impacted by 15-foot (4.6 m) wide foot paths and 20 to 50-foot (6.1 to 15.2 m) wide dune crossings from unauthorized pedestrians accessing the beach. However, CBM were captured in the palmetto and oak habitats, including the pedestrian trails, during the February and May 1999 trapping surveys. No CBM were collected during the December 1998 or September 1999 trapping survey (Appendix A, HCP).

The direct impacts on the 4.65 acres (1.88 hectares) of habitat with constituent elements may result in injury or death of CBM at any life stage by being crushed or entombed in their burrows. These impacts may occur from construction activities through site preparation, heavy equipment operation, earth moving, and walkover piling installation. Construction activities will occur during daytime hours, thus, CBM, being nocturnal mammals, would be in their burrows and subject to being killed or harmed. Increased loss or injury of CBM could occur during breeding season or the summer season. The resiliency or ability to move out of harms way by newborn or young CBM is unknown but thought to be less than juvenile, sub-adult, or adult CBM. The summer season is the most stressful season for all beach mouse life stages because adults are stressed following breeding season, the weather is hottest, and competition for limited food resources is high.

One year of quarterly surveys conducted by the Applicant from 1998 to 1999 confirmed the existence of CBM on the south parcel site. Because of the lack of long-term onsite data, density of CBM (number of CBM/acre) at the south parcel site cannot be determined. However, the density of CBM determined for all occupied habitats in the Grayton Beach SRA (main unit) for the period 1995 to 1999, ranged from 0.29 to 1.36 CBM per acre. At the Topsail Hill State Preserve for the period 1995 to 1999, the density ranged from 0.02 to 0.26 CBM/acre (Auburn unpublished data 1999). Novak (1997) reported winter and early spring densities of 5.95 to 14.25 mice/acres (14.7 to 35.2 mice/hectares) for CBM on Shell Island, Tyndall Air Force Base (AFB) in 1993 and 1994, prior to Hurricane Opal. Three years following the hurricane in 1998,

based on Auburn (unpublished data 1999) data, densities of CBM were 0.72 mice/acre (1.78 mice/hectare) on Shell Island. The range of densities is a result of normal population seasonal and annual fluctuations including response to natural events such as hurricanes and differences in habitat types. Thus, the estimated number of CBM that could be killed, injured, harmed, or harassed due to the permanent destruction of 4.65 acres (1.88 hectares) and installation of walkover and boardwalk pilings ranges from 1 to 6 CBM based on densities and habitats similar to Grayton Beach SRA. If the worst case scenario occurs (during the reproduction season), we would anticipate the greater number of CBM would be lost.

For the Service to determine if loss of this habitat would adversely modify critical habitat, we must determine if the loss of this acreage appreciably diminishes the capability of the Grayton Beach population designated critical habitat to satisfy essential requirements of the CBM. Scrub habitat is now considered a component of CBM habitat along with beach and dune habitats. The long-term maintenance of the CBM population in this area could be compromised if too much of the scrub habitat is lost.

In general, CBM habitat on the main unit of Grayton Beach SRA can be described as a large continuous dune field 7,000 feet (2,130 meters) in length and varying in width from 500 to 750 feet (152 to 229 meters). The dune fields lie between the Gulf of Mexico and Western Lake, a coastal dune lake. The frontal and primary dunes on Grayton Beach SRA main unit represent a small percentage of the habitat. Most of the area is scrub dunes and secondary flats and swales. The dune habitat (primary, secondary, and scrub) narrows considerably on the eastern end of the SRA where it meets the south parcel site. The oak and palmetto scrub become a very narrow strip of vegetation less than 100 feet (30.5 meters) wide, grading quickly into wetlands. This narrow strip of scrub continues onto the south parcel site. The expanse of the wetlands (approximately 250 feet/76.2 meters) on the SRA disrupts the continuity of the scrub habitat from the SRA to the south parcel north of the east-west pedestrian trail (Appendix B, HCP, Exhibit 2 10/14/99). Thus, movement of CBM into the scrub habitat north of the pedestrian trail probably only occurs from within the south parcel. CBM have been documented to move between Grayton Beach SRA and the south parcel (Auburn unpublished data 1999 and Appendix B, HCP). However, these CBM were captured only in primary dune habitat.

The development plans for the south parcel will preserve in covenants and restrictions, 65 percent (1.70 acres/0.69 hectares) of the oak scrub habitat immediately landward of the primary dune and portions of palmetto scrub on the western and central portions of the site. Along 1,300 feet (396 meters) of the width of the oak scrub to be protected varies from 50 to 100 feet (15.2 to 30.5 meters), along 60 feet (18.3 meters) the width is reduced to approximately 40 feet (12.2 meters) in width, and along 40 feet (12.2 meters) of the site, the width is reduced to 20 feet (6.1 meters) (Appendix B HCP, Exhibit 2 10/14/99). The palmetto scrub to be protected ranges in width from 30 to 150 feet (9.1 to 51.8 meters) (Appendix B, HCP, Exhibit 2 10/14/99). In total, the remaining corridor (primary, oak and palmetto scrub) for CBM on the south parcel will be 1,400 feet (426.7 meters) in length and will vary in width from 80 to 200 feet (24.8 to 61 meters) (Appendix B, HCP, Exhibit 2). Of the 38 captures (13 individual mice) of CBM on the south

parcel, only one individual beach mouse was captured outside but within 10 feet (3.0 m) of the habitats (primary and oak and palmetto scrub) identified for protection.

Approximately 91 percent of the lands (659 of 724 acres/267 of 293 hectares) designated critical habitat, 99.8 percent of the lands (930.4 of 931.6 acres/376.5 of 377 hectares) that are inhabited, and 92 percent (1,445 of 1,570 acres/585 of 635 hectares) that have available habitat for CBM are public lands. Private lands will support the recovery of the CBM through population dispersal and provision of habitat for CBM during and after severe weather events. The south parcel property accounts for 2 percent of the total critical habitat designated for the CBM. The contribution of the critical habitat on the south parcel (primary dune, oak and palmetto scrub) to the Grayton Beach population is considered to be of a supportive nature. The future Grayton Beach population would be considered to consist of two isolated parcels currently connected by a narrow strip of primary dunes. The two parcels are: 1) Grayton Beach SRA main unit (occupied), includes the south parcel (occupied) and Seaside (unknown) (private lands), and 2) western Grayton Beach SRA between Little Redfish and Big Redfish lakes (unoccupied). The entire Grayton Beach population is 9 percent of CBM designated critical habitat, 12 percent (181.57 of 1,570 acres/73.5 of 635 hectares) of the habitat available for CBM, and 9 percent of the habitat is occupied (86.6 of 931.6 acres/35 of 377 hectares).

To minimize impacts of the project, the Applicant has committed to preserving and maintaining a portion of the palmetto and oak scrub habitat through covenants and restrictions. Because there is no available scrub habitat landward of the south parcel, immediately adjacent on the Grayton Beach SRA main unit or the Seaside property, fragmentation of CBM habitat will not occur from the loss of the scrub habitat. In addition, since the primary dunes will also be preserved and protected, the habitat between the property from Grayton Beach SRA to Seaside remains continuous.

To compensate for the loss of CBM habitat, the Applicant has also committed to accomplish habitat restoration. Restoration of the frontal dunes will occur along the base of the existing primary dune line by planting appropriate dune vegetation and the use of sand fence as needed. The frontal dunes were destroyed along Grayton Beach SRA, south parcel, and Seaside beachfront as a result of Hurricane Opal in 1995. No active dune restoration was implemented along any of the shoreline of these three areas. Hurricanes Earl and Georges in 1998 impacted the naturally restoring dunes. Restoration of scrub habitat will occur where pedestrian access has resulted in destruction of vegetation and dune elevations. The presence of vegetation will accelerate habitat restoration and the establishment of preferred CBM food plants. Further, compatible sand from an upland source will be placed to restore historic elevations where needed. Although the habitat restoration will not increase the acreage of CBM habitat onsite, it will enhance the carrying capacity of the habitat by increasing food resources, burrow sites (breeding and shelter), and provide additional habitat protection from weather and wave erosion. Thus, a full complement of primary and scrub habitat for dispersal, resident CBM, and refugia following a storm will remain intact.

In addition, to compensate for the loss of the 4.65 acres (1.88 hectares) of CBM critical habitat, the Applicant has offered the protection of 80.4 acres (32.5 hectares) along 6,000 feet (1,823 meters) of beachfront on the Camp Creek site. The Applicant will conduct or fund the reintroduction of CBM into this habitat. This results in a ratio of approximately 17 to 1. The Camp Creek property is contiguous with Deer Lake State Park to the west and the Applicant's Camp Creek Pointe development to the east. It is expected that the reintroduced CBM and/or their offspring or future generations will disperse into these areas. The addition of both these sites increases the habitat available for a CBM population to 132.6 acres (54 hectares) (Deer Lake State Park = 49 acres/20 hectares and Camp Creek Pointe = 3.2 acres/1.3 hectares) along 9,700 feet (2,957 meters) Gulf beachfront. Thus, this area would be large enough to support a population of CBM and may be considered as a fourth population for CBM recovery in the future. Based on recommendations by Wooten and Holler (1999) CBM from Topsail Hill would be used to establish a population at this site. A reintroduction plan will be prepared by the Service. The plan will provide requirements based on population data, the number of CBM that can be moved from Topsail Hill population to the Camp Creek population site. If adequate numbers of CBM are not available from the Topsail Hill population, other alternatives will be identified (i.e. using CBM from Shell Island or waiting for the Topsail Hill population numbers increase).

This opportunity to re-establish another population of CBM is significant for two reasons. It will establish a fourth population further ensuring the survival and recovery of CBM against catastrophic losses (hurricanes) and will increase the genetic vitality of CBM by using beach mice from Topsail Hill State Preserve as the source population.
Reintroduction of Anastasia Island, Perdido Key, St. Andrew, Choctawhatchee, and Alabama beach mice have been successfully accomplished (Holler and Mason 1987, Frank 1995, Van Zant *et. al*, 1998, Celeste South, Fish and Wildlife Service, Daphne Field Office Alabama personal communication 2000). Reproduction and dispersal of individuals have been documented within 30 to 90 days (Frank 1995, Van Zant *et. al.*, 1998). Frank (1995) found Anastasia Island beach mice released on the northern portion of Guana River State Park dispersed up to 4.0 miles (6.3 km) within 4 months. Holler *et. al* (1989) found tracks of reintroduced Perdido Key beach mice within 30 to 150 days from 82 to 1,300 feet (25 to 396 meters) of the release site. Auburn University relocated St. Andrew beach mice to Tyndall AFB in November 1997 and January 1998. By February of 1998, pregnant and lactating females and new individuals were captured. Telemetry work also showed dispersal up to 2.5 miles (4 km) from the release site (Van Zant *et. al.*, 1998). Thus, beach mice can become established within a reasonable time frame of the proposed project initiation with an expectation that reproduction and dispersal of introduced CBM will occur within 30 to 90 days.

The longevity and survival of reintroduced beach mouse populations have been documented on the Atlantic and Gulf Coasts of Florida and Alabama. In all cases, the areas of reestablishment have been on public lands and have been subjected to hurricanes and other severe storms, excessive depredation by non-native predators (cats and red fox), and development of adjacent coastlines. The longest known survival of beach mouse reintroduction is 14 years (Perdido Key

beach mice at Gulf Islands National Seashore 1986 to 2000). Other documented survival of reintroduced populations include 11 years (Choctawhatchee beach mouse at Grayton Beach State Recreation Area 1989 to 2000), 8 years (Anastasia Island beach mouse at Guana River State Park 1992 to 2000), 3 years (St. Andrew beach mice at Tyndall AFB 1997 to 2000), and 3 years (Alabama beach mice at Gulf State Park 1997 to 2000). Therefore, it can be reasonably expected that there is a high probability that the reintroduced population at the Camp Creek site will survive for the length of the ITP.

Camp Creek

The Camp Creek coastal areas are characterized by open beach and a field of primary, secondary, and scrub dunes that extend from 500 to 1,500 feet (152 to 457 meters) landward of the mean high water line. This expansive dune field abruptly ends at dense oak scrub with more landward habitats of pine flatwoods, sand pine flatwoods, and isolated stands of longleaf pine. The development portion of the Camp Creek project will be located landward of the suitable CBM habitat. The only direct project impacts will occur from the installation of pilings for the dune walkovers and interconnecting boardwalks. Based on pilings placed for the walkovers and boardwalks, 0.5 acre (0.2 hectare) will permanently eliminate CBM habitat. It is estimated that 7 to 10 walkovers and interconnecting boardwalks will cover the 5 acres (2 hectares) and the pilings will be installed every 10 to 12 feet (3.0 to 3.7 meters) (Table 2).

Table 2: Acres of CBM Habitat and Impact at Camp Creek Site

		Camp Creek		
Habitat	**Acres of CBM Critical Habitat Impacted **NONE** Designated at Camp Creek**	**Acres of CBM Habitat Impacted**	**Acres of CBM Habitat Not Impacted**	**Total Acres**
Beach	0.0	walkover pilings 0.25	39.15	39.4
Dune	0.0	walkover pilings 0.25	40.75	41.0
Total	0.0	0.50	79.90[1]	80.4

[1] Acres not impacted will be permanently protected through covenants and restrictions

Since CBM currently do not inhabit the Camp Creek area and the number of CBM to be reintroduced is unknown it is difficult to estimate the number of CBM that could be killed or harmed from the walkover and boardwalk construction. Based on densities extrapolated for the south parcel, it is estimated one CBM could be killed or harmed by the piling installation.

Indirect Effects

South parcel

Indirect effects are a result of a proposed action that occurs later in time and are reasonably certain to occur. The indirect effects of developing 4.65 acres (1.88 hectares) of palmetto and oak scrub habitat on the south parcel could include impairment of essential breeding, feeding, or sheltering behaviors as a result of the decreased amount of remaining CBM habitat from the presence of the structures and infrastructure. The effect of the loss could be reduced fecundity or reproductive success of adult female CBM and/or reduced fitness of offspring.

Scrub habitats may be important to female CBM during the reproductive season. Extine and Stout (1987) found a statistical significance in the number of reproductively active female beach mice in scrub rather than primary and secondary dunes. Inference was made that females during the periods of high reproductive activity received a greater proportion of needed nutrients in the scrub. This type of dietary response and habitat selection has also been noted in cotton rats (*Sigmodon hispidus*) (Kincaid and Cameron 1985). In this study, the diet measurements in known habitats remained the same, however, the pattern was maintained by the shifts in resource selection (i.e., they moved where the necessary diet was located). Females were shown to be more specific to monocot (grasses) habitat than males, but when lactating they occurred most frequently in mixed habitat (possibly to acquire a balanced diet) (Kincaid and Cameron 1985). Similarly, it has been shown that female deer mice (P. *maniculatus*), in heterogenous habitat, inhabit the more favorable microhabitats than males (Bowers and Smith 1979). Woodmice (*Apodemus syvaticus*) have been shown to significantly alter their home ranges (and use of other available habitat) at the onset of breeding (Randolph 1977).

As stated previously, to compensate for the loss of palmetto and oak scrub habitat, the Applicant is preserving and maintaining a full complement of CBM habitat (primary dune and scrub) through covenants and restrictions and implementing dune restoration. The remaining habitats will vary in width from 80 to 200 feet (24.8 to 61 meters) and will be contiguous with habitat on Grayton Beach SRA main unit and the Seaside development. The frontal dune and scrub habitat restoration will enhance the carrying capacity of the remaining habitats on the property. In addition, all the proposed dune walkovers and pedestrian boardwalks will be constructed using the top-down method to protect habitats during construction and designed to allow natural dune formation.

Camp Creek

The development at the Camp Creek project site will be located outside of suitable CBM habitat. Thus, indirect effects would be related to human occupancy and recreational use of the site. This is described below for both the south parcel and Camp Creek sites.

South parcel and Camp Creek

Other indirect impacts from both projects include human occupancy and recreational use of the commercial, residential, recreation, and common areas, and beach accesses (including the Walton County public access on the south parcel), habitat degradation from the shading of vegetated habitat under boardwalks, and garbage or refuse management that may attract CBM predators and competitors, and recreational uses of the dune systems that cause dune erosion and the loss of habitat required for CBM shelter, food, and reproduction. Human occupancy and use within the south parcel development and public access could affect CBM behavioral patterns and cause additional loss or impact to dune and scrub habitats required for CBM shelter, food, and reproduction. Activities that may cause these effects include garbage or refuse management that may attract CBM predators or competitors, and human caused impacts of the dune system that cause erosion.

The Applicant has proposed measures to control cats owned by property owners or visitors in both developments and to control exterior lights and garbage and refuse. These measures are expected to significantly reduce or eliminate CBM competition and predation that can occur from house mice and free-ranging domestic and feral cats associated with both developments. No domestic cats shall be allowed free range of the dunes and feral cats will be removed (dogs will be permitted outdoors only on a leash). Any feral animals will be captured and removed. The capture and removal of these species will be accomplished through contractual arrangements with permitted nuisance species trappers. Chemical pesticides for rodents will not be applied on the outside and the use of glue boards or snap traps will be prohibited outside of buildings. Only live trapping for rodent control will be allowed outside to ensure minimal impact to CBM.
A trash and rubbish control program will be incorporated into the covenants and restrictions of both developments. The program will include control of trash generated during the use of the outdoor recreational amenities and control of rubbish and domestic solid waste generated by the commercial entities of the developments. Trash receptacles will be installed to prevent trash exposure and attraction of pests. Trash collection on the beach will occur in cooperation with the South Walton Tourist Development Council (TDC). Trash containers will be located along trails, dune walkovers, and on the beach. The Applicant will provide the trash containers for the walkovers and boardwalks that are predator proof. However, the containers as described in the HCP for the beach locations appear to be the type currently used by the TDC along the public beaches of Walton County. These will not meet the standards for pest proof trash receptacles. The containers are heavy duty paper bags hung from a wood post, sometimes with a plastic lid that usually does remain closed. The South Walton TDC has an excellent trash pickup program on the beach, running seven days a week, with trash containers checked and emptied at least once a day during the tourist season and then as needed. However, it cannot be assured that these bags will be adequate to prevent attraction of predators and house mice and resistant to tearing. After the wave action and high tides associated with tropical storm Harvey in September of 1999, many of the bags became wet (Lorna Patrick, FWS, personal observation, 1999). If trash containers are not contained in permanent structures with heavy and close fitting lids some effects would be expected. However, trash pickup can be scheduled to accommodate peak use of the beach and in the late afternoons to avoid having full containers on the walkovers and beach at

night. Once collected, the solid waste will be deposited in a dumpster within a controlled area. Frequent pickup will be scheduled to remove waste from the development. Indirect effects to CBM will be minimal.

Solid waste from the inn and restaurant at the south parcel will be collected and placed in a dumpster on the loading dock for frequent collection. A standard rodent control program, typical for food service establishments, will be implemented for the solid waste collection point in order to prevent attracting CBM into the area.

To provide controlled beach access and protect CBM habitats, boardwalks and dune walkovers for the development, one of which is for public access on The Villages at Seagrove will be constructed and maintained. Most residential occupants and beach visitors are expected to use boardwalks and dune walkovers instead of taking the more difficult walk through the dunes and scrub habitats. The effect of the walkovers and boardwalks is to significantly reduce and virtually eliminate human foot-traffic across CBM habitats to the beach, thereby avoiding dune erosion and CBM habitat degradation. Our observations of other beach developments and public access areas with dune walkovers indicate preferred use by beach goers. Neither the Applicant nor the Service expects occupants to create trails through the dunes or scrub habitats if walkovers and boardwalks are available. To assure control of pedestrian traffic and protect CBM habitats, all walkovers and boardwalks will have side rails to direct pedestrians to the beach and prevent stepping out into the dunes. The Applicant will monitor and restore any damage to the dunes or scrub habitats should it occur as a result of unauthorized pedestrian or recreational use.

Another indirect effect to both the south parcel and the Camp Creek site may occur from other Federal agency actions related in some way to the development. Because these properties are proposed for development and inhabited by humans, protection of property and human safety is an issue. For example: following a hurricane the Federal Emergency Management Agency may provide Federal funds for beach berms to protect or replace structures. This was done following hurricanes Opal, Earl, and Georges. It would be reasonable to expect this action to occur following another catastrophic weather event. The Federal agency and the Service undergo consultation under the Endangered Species Act to ensure that federally protected species are not jeopardized or their critical habitat adversely modified.

The presence of the south parcel and the Camp Creek developments may increase visitation on adjacent Grayton Beach SRA and Deer Lake State Park, respectively. Since the developments provide Gulf beachfront, visitor use of both areas would be expected to be in areas where CBM would not occur (hiking trails, camping, etc.). In addition, the Service has been involved in the preparation and implementation of land use management plans for both areas. The Florida Park Service, District 1 has been pro-active and a partner with us in planning and accomplishing recovery efforts for the CBM and have requested assistance from us in implementing some of the efforts. Thus, we do not expect that the District 1 will need to request an ITP from the Service.

Interrelated and interdependent actions effects

South parcel and Camp Creek

An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the proposed action. The lighting that will be used for the south parcel and Camp Creek development is considered an interrelated action because it is a necessary component of residential and commercial development. Lighting may alter CBM nocturnal behavior or increase predation.

Light pollution resulting from real estate development of the south parcel could effect the suitability of adjacent habitat by decreasing movements of beach mice similar to that experienced during bright, moonlit nights. Auburn's trapping efforts at Topsail Hill State Preserve and on areas supporting Perdido Key and St. Andrew beach mice indicate that clear nights coinciding with half to full moon phases resulted in reduced captures and capture probabilities (Auburn unpublished data 1999). However, trapping of CBM at Grayton Beach SRA main unit conducted by Auburn has seen variable behavior of CBM related to moon phase (Jeff Van Zant, Auburn University, personal communication 1999). Movements of prairie deer mice (*Peromyscus maniculatus bairdii*), a close relative of *P. polionotus*, were influenced by illumination in experimental arenas (Brillhart and Kaufman 1991). Mouse movements as determined by total number of footprints in experimental areas were significantly less on bright nights. Mice also altered their movement behavior in open and shaded areas, favoring shaded areas significantly during bright nights. It is assumed the reduced movement minimizes the chances of predation. Little or no information on predation of beach mice under natural illumination conditions and artificial illumination from adjacent developments is available. Clark (1983) (as cited in Brillhart and Kaufman 1991) found that, in the presence of short-eared owls (*Asio flammeus*), deer mice reduced their activity in areas during bright nights.

Lighting from beachfront and coastal development could also elicit the same reaction in CBM of abnormal or reduced movement thereby affecting searching for food and interacting with other CBM. Implementation of State of Florida CCCL sea turtle compatible lighting will significantly reduce light within CBM habitat. Sea turtle compatible lighting reduces light on the beach, however, some amount of lighting is visible. The permitted lighting is in the short-wave range (ultraviolet range). How beach mice or their predators react to this wavelength of light is unknown. Thus, lighting on the seaward side of the development will be minimized to that needed for safety and security. Decorative landscape lighting on the seaward side of the development will not be used. With the incorporation of sea turtle compatible lighting and additional reduction in development lighting, the chances of inducing abnormal behavior in CBM will be minimized. Also, these restrictions will avoid illuminating CBM and increasing the risk of nocturnal predation. It is reasonable to assume that a beach mouse would eventually leave his burrow because of the need to seek food. Upon locating food in safe areas from predators, the beach mouse would probably continue to forage the next and following nights (Jeff Gore, FWC, personal communication, 1999).

The reintroduction of CBM on the Camp Creek site as off-site mitigation for the south parcel development could be affected by the development at Camp Creek. The development here will not be in CBM habitat except for the dune walkovers and boardwalks. The Applicant will be protecting the beach and dune habitats with covenants and restrictions so no additional construction is anticipated in CBM habitats. The Applicant as described above has committed to all necessary CBM conservation measures which based on the best current available scientific information is expected to minimize impacts. Thus, the effects on the mitigation site are minimized to the maximum extent possible and no further mitigation is needed.

The Walton County public beach access is considered an interdependent activity because it is part of the south parcel development per agreement with the Applicant and Walton County to provide public access. Increased public visitation and beach use may be expected to occur due to this access. Even with the provision of parking, it is anticipated that the level of use will be similar to previous unauthorized use at the south parcel because the new development, Seaside, and Grayton Beach SRA (fee) also provide parking and access. The construction and maintenance of the walkover will control pedestrian traffic to the beach and protect the CBM primary and scrub dune habitats that were impacted from previous unauthorized use.

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 ESA.

Walton County, Florida, issues permits for coastal development. Developments must meet the requirements of the County's Comprehensive Plan which provides protection for endangered and threatened species and their habitats. The Service has been able to work cooperatively with Walton County and private landowners to implement CBM conservation measures into coastal development plans. The Service participates on the County Technical Review Board for beachfront developments. Coastal development related to tourism has significantly benefitted the economy of Walton County and is expected to continue. South Walton County is located on the Gulf of Mexico between Destin and Panama City, Florida. It has been become an increasingly popular destination for tourists because the beaches are consistently ranked among the best in the United States. After a boom in the early 1980's, the construction market slumped and resurged again in the early 1990's. The trend has continued (Urbanomic, Inc. 1997). There are more than 11,000 residential units in South Walton, the majority of these units, 7,200, are used by non-resident owners and visitors. Seasonal housing in South Walton has increased by an average 370 units per year since 1990. Seaside, the Town of Grayton Beach, Gulf Trace subdivision, and Blue Mountain Beach are located between or adjacent to the main unit of Grayton Beach SRA and the western units. The beachfront east (Seacrest and Inlet beach area) and west (Eastern Lake area) of Deer Lake State Park and the Camp Creek site are primarily

single-family subdivisions and condominiums. Both these areas are destinations for tourists to either visit or stay.

South Walton tourism industry contributed an estimated $1.33 billion to the county real property tax base in 1996, which is 56 percent of the county total. All real estate in South Walton accounts for 84 percent of the countywide tax base. These tax revenues provide the majority of local tax support for the county school system and general government services. Jobs and earnings generated, supported, and otherwise impacted by South Walton were equivalent to 81 percent of the jobs and 72 percent of the earnings in Walton County (Urbanomics, Inc. 1997). South Walton is expected to continue to be a significant economic force in Walton County, Florida along with development of the coastal environment. It is expected that because of the economics, coastal development will continue in South Walton County and adjacent to the Action Area.

No large expanses of coastal dune habitat remain that could support a viable population of CBM other than the previously mentioned State of Florida lands. The Applicant's Camp Creek property is the last available large expanse of CBM habitat on private lands. With the adjacent Deer Lake State Park, it could support a long-term CBM population.

Land management at Grayton Beach SRA and Deer Lake State Park has been related to visitor access and recreational use of the Gulf beachfront. The Service has been appointed a member on the technical committee for land use management plans at the State Parks that have available or occupied CBM habitat [St. Andrew SRA, Grayton Dunes GeoPark (Camp Helen, Deer Lake State Park, and Grayton Beach SRA), Choctaw GeoPark (Topsail Hill State Preserve and Henderson Beach SRA)]. The Florida Park Service, District 1 has been a partner with us in planning and accomplishing recovery efforts for the CBM and have requested assistance from us in implementing some of the efforts. Thus, we do not expect that the District 1 will need to request an ITP from the Service because their management plans are pro active for CBM recovery.

Walton County is currently in the feasibility stages of addressing beach and dune erosion. Solutions may affect (positively and/or negatively) the south parcel and Camp Creek beach and dunes. The solutions may be local, State, or Federal (or a combination of) funded. If Federal funds are involved, a section 7 consultation will be conducted. Currently, the County believes the work can be funded with local and State funds. The Service has been asked to be a technical advisor for their beach "nourishment" (all inclusive local terminology) and management committees. We will work with the County to address potential impacts to CBM and sea turtles in the early planning process. However, if take of CBM or sea turtles may occur as a result of their selected solution, we will urge the County to prepare an HCP and apply for an ITP. The beach and dunes at south parcel and Camp Creek could be affected by any of the solutions selected by the County.

Change (foreseen) and unforeseen circumstances

Situations may arise that impact the CBM and nesting and hatchling sea turtles that humans have little ability to control. These "changed" circumstances may be biological or non-biological and include natural disasters such as hurricanes and fire, habitat succession, beach vehicular access and driving, disease, beach nourishment or other beach restoration actions, and financial insolvency because funding is appropriated on an annual basis. The Applicant has committed to adaptive management that allows flexibility and coordination with the Service to address these types of changed situations.

1. Hurricanes: passage of a hurricane may result in dune destruction and additional restoration may be needed in addition to what was originally implemented or committed to be implemented by the Applicant. Impacts from hurricanes may also require actions funded or accomplished by other Federal or non-Federal agencies such as a FEMA funded beach berm.

2. Beach nourishment or other beach restoration projects: Walton County is currently in the feasibility stages of addressing beach and dune erosion. Solutions may affect (positively and/or negatively) the south parcel and Camp Creek beach and dunes. We will work with the County to address potential impacts to CBM and sea turtles in the early planning process. However, if take of CBM or sea turtles may occur as a result of their selected solution we will work with the County to prepare an HCP and apply for an ITP.

3. Unsuccessful reintroduction of CBM onto Camp Creek: There is always the risk that the reintroduction may not be successful within the time frame committed to by the Applicant, although they follow the Service's plan. The Service agrees to be responsible for the reintroduction if this happens. The Applicant would still commit to the protection, maintenance of the habitat, and permission for the Service and FDEP to implement the plan in the long term.

4. Beach vehicular access and driving: Walton County permits beach driving to access designated boat launches to the Gulf of Mexico. Other driving includes law enforcement and emergency vehicles, South Walton Tourist Development Council trash pickup and beach patrols, and commercial vendors (chair service). Although unlikely to happen, the driving could impact existing dune habitats and the dunes may require protection or restoration.

5. Financial stability and resources: The Applicant has shown that they are willing and capable of funding the minimization and mitigation measures. Procedures for transferring this responsibility to the property owners association will be established too. The Applicant has committed to remain responsible for implementing the incidental take permit requirements until such a time the association is fully capable.

The Applicant and the Service acknowledge that even with the proposed minimization and mitigation of impacts to CBM and sea turtles, changes in circumstances could arise which were not fully anticipated and which may result in substantial and adverse change in the status of the CBM, loggerhead, green, and leatherback sea turtles. The Service's policy regarding changed and unforseen circumstances is contained in the final "No surprises" rule published on February 23, 1998 (63 FR 8859) and codified in 50 CFR Part 17. Thus, the Service would not seek additional mitigation from the Applicant except in the case of unforeseen circumstances (circumstances that could occur in the future but are unknown at this time). The Service would have the burden of demonstrating that unforeseen circumstances actually exist using the best scientific and commercial data available. The findings of unforeseen circumstances would need to be clearly documented and based upon reliable, technical information regarding the status and habitat requirements of the affected species.

CONCLUSION

After reviewing the current status of the Choctawhatchee beach mouse, the environmental baseline for the Action Area, the effects of the proposed south parcel development and the cumulative effects, it is the Service's biological opinion that the issuance of an incidental take permit, is not likely to jeopardize the continued existence of the Choctawhatchee beach mouse. Critical habitat for the Choctawhatchee beach mouse has been designated at St. Andrew SRA, Topsail Hill State Preserve, and within a portion of the Action Area at Grayton Beach SRA and the south parcel site. However, this action does not appreciably affect that area in such a manner that the critical habitat for CBM is adversely modified. Critical habitat for the CBM has not been designated at either the Deer Lake State Park or Camp Creek site.

Independent analyses are made for jeopardy when a species is present and for adverse modification when designated critical habitat is affected. The determination of both standards is based on effects of the action on the continued existence of the entire population of the listed species and/or the effect on critical habitat as designated in the final rulemaking. Adverse effects on individuals of a species or constituent elements or segments of critical habitat generally do not result in jeopardy or adverse modification unless that loss, when added to the baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the critical habitat to satisfy essential requirements of the species.

It is difficult to estimate the number of individual CBM that could be lost as a result of development at the south parcel and the Camp Creek site. For the south parcel, however, an estimate of one to six CBM, based on density data from adjacent Grayton Beach SRA habitats can be considered. The worst case scenario of six CBM loss, would account for 5 percent of the Grayton Beach SRA population and 1 percent of the overall estimated population. Since the CBM population is continuing to recover here, post-hurricane, this relative percentage may continue to decline. In addition, the Applicant has committed to trap and relocate CBM prior to beginning of land clearing and to reintroduce CBM to the Camp Creek site. A reintroduction plan will be prepared by the Service and implemented by the Applicant. At the Camp Creek site,

one CBM is estimated to be loss. This would be less than one percent of the total CBM population. Other measures to protect and restore remaining habitat have been proposed. Therefore, the loss of CBM from either site, south parcel or the Camp Creek site is not anticipated to jeopardize the continued existence of the Grayton Beach SRA or Deer Lake parcel populations and thus, the entire population of CBM.

The direct loss of critical habitat with constituent elements is 4.65 acres (1.88 hectares). The permanent loss of this habitat accounts for 5.5 percent of the critical habitat designated within the Grayton Beach SRA population and 0.6 percent (4.65 of 724 acres/1.88 hectares of 293 hectares) of the total designated critical habitat for the CBM. In addition, no fragmentation of available habitat for CBM will occur from the proposed project. Thus, this loss of critical habitat available to the population would not be expected to appreciably reduce the capability of the remaining critical habitat within the Grayton Beach population or rangewide designated critical habitat to provide the essential components for shelter (burrows), feeding (plants), and breeding and sheltering (dune and burrows). No critical habitat has been designated in the Deer Lake population.

In addition, the Applicant has committed to implementing actions to minimize and compensate for the direct take of CBM, habitat loss and degradation. These actions include trapping and translocation of potentially impacted CBM prior to land clearing, dune restoration, boardwalk and dune walkover construction, native plant landscaping, exotic plant control, and CBM predator/competitor, domestic pet, and trash control, sea turtle compatible and reduced lighting, covenants and restrictions, deed restrictions, and the reintroduction of CBM to approximately 80.4 acres (32.5 hectares) of available but currently unoccupied CBM habitat at their Camp Creek property. This will establish a fourth population, and thus numbers of CBM will increase, further ensuring the survival and recovery of CBM against catastrophic losses (hurricanes) and increasing the genetic viability of CBM by using beach mice from Topsail Hill State Preserve as the source population.

Therefore, the biological goal for issuing the ITP has been met by providing a net conservation benefit for the CBM which: 1) minimize onsite impacts by siting of structures and implementation of conservation measures; 2) maintain a continuum of habitat (primary dune, oak scrub, and palmetto scrub) within and contiguous with the adjacent Grayton Beach SRA to the west and the Seaside development to the east and Deer Lake State Park to the west; and 3) increase the number of Choctawhatchee beach mice.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit take of endangered and threatened species, respectively, without special exemption. Take is defined as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service 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 by the Service 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, 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 proposed The Villages at Seagrove and Camp Creek HCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the HCPs, together with the terms and conditions described in any associated Implementing Agreement and any section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR §402.14(I). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the permittee fails to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. The amount or extent of an incidental take anticipated under the proposed The Villages at Seagrove and Camp Creek HCP, associated reporting requirements, and provisions for disposition of dead or injured animals are as described in the HCP and its accompanying section 10(a)(1)(B) permits.

Amount or extent of incidental take

The Service anticipates incidental take will result from the proposed The Villages at Seagrove, south parcel and Camp Creek developments in Walton County, Florida. To determine the amount of incidental take resulting from the proposed projects, we evaluated the current status of each species within the Action Area and its ecology and the potential effects of the project. Our assessment included effects of the direct loss of habitats and actions that could change the normal behavior of the species. For both projects but in varying degrees, the effects are associated with the amount of habitat loss and human activity that occur from the developments.

The Villages at Seagrove

The Service anticipates incidental take of CBM will be difficult to detect for the following reasons: that the CBM is a small, nocturnal mammal residing in burrows and finding a dead or impaired specimen is unlikely; losses may be masked by seasonal and annual fluctuation in numbers. However, based on presently available information, take of this species will include: 1) loss of 1 to 6 CBM from land clearing and construction activities, 2) permanent loss of 4.65 acres (1.88 hectares) of palmetto and oak scrub dune habitat, and 3) infrequent harm related to

human occupancy and visitation of the proposed development and modification and degradation of the remaining primary, scrub oak, and palmetto scrub dune habitat.

Camp Creek

The Service anticipates incidental take of Choctawhatchee beach mouse will be difficult to detect for the following reasons: that the CBM is a small, nocturnal mammal residing in burrows and finding a dead or impaired specimen is unlikely; losses may be masked by seasonal and annual fluctuation in numbers. However, based on available information, take of this species will include: 1) loss of 1 CBM from dune walkover construction activities and 2) infrequent harm related to human occupancy and visitation of the proposed development and modification and degradation of the remaining primary and secondary dune habitat.

Effect of the take

In the accompanying biological opinion, the Service determined that the level of anticipated take for both the south parcel and the Camp Creek site is not likely to result in jeopardy to the CBM or destruction or adverse modification of critical habitat.

The Villages at Seagrove

Approximately 101.4 acres (41 hectares) of primary, secondary, and scrub dunes and interdunal areas are considered to be occupied by CBM within the Grayton Beach population that includes the south parcel of the development. The direct, indirect, and cumulative effects of the development will include death, injury, and/or harm accompanying the modification of 4.65 acres (1.88 hectares) of designated critical habitat that meets the definition of constituent elements. The loss of these habitats is 4.7 percent of designated critical habitat (4.65 of 98.4 acres/1.88 of 49.8 hectares) within the Grayton Beach population. This is 0.6 percent of the critical habitat rangewide (4.65 of 724 acres/1.88 of 293 hectares).

No fragmentation of the available habitat for CBM will occur from the proposed project. Actions to minimize and compensate for the direct take of CBM, habitat loss and degradation and human occupancy and use, includes trapping and translocation of potentially impacted CBM prior to land clearing, dune restoration, boardwalk and dune walkover construction, native plant landscaping, prohibition of planting exotic vegetation, removal of exotic plants as needed, and CBM predator/competitor, domestic pet, and trash control, sea turtle compatible and reduced lighting, and the reintroduction of CBM to approximately 80.4 acres (32.5 hectares) of available but unoccupied CBM habitat at their Camp Creek property. This results in a ratio of approximately 17 to 1. This property is contiguous with Deer Lake State Park to the west and the Applicant's Camp Creek Pointe development on the east side of Camp Creek Lake. With both these sites, the available habitat for occupation of CBM increases to another 121.4 acres (49 hectares) along 9,700 feet (2,957 meters) of beachfront. Thus, this area would be large enough to support a population of CBM and may be considered as a CBM population. This opportunity

to re-establish another population of CBM is significant for two reasons. It will establish a fourth population, further ensuring the survival and recovery of CBM against catastrophic losses (hurricanes). It will provide the opportunity to increase the genetic vitality of CBM by using beach mice from Topsail Hill State Preserve as the source population. Assurances and funding will be provided by the Applicant until such a time that the development is conveyed to the Property Owner's Association by covenants and restrictions.

Camp Creek

Approximately 121.4 acres (49 hectares) of primary, secondary, and scrub dunes and interdunal areas are considered to be potentially occupied by CBM within the Deer Lake population that includes the Camp Creek site. The direct, indirect, and cumulative effects of the development will include death, injury, and/or harm accompanying the construction of dune walkovers and boardwalks on 0.5 acres (0.2 hectares) of CBM habitat. The loss of these habitats is 0.4 percent of the available habitat (0.5 of 121.4 acres/ 0.2 of 49 hectares) within the Deer Lake population and 0.03 percent of the habitat available for CBM (0.5 of 1,570 acres/0.2 of 635 hectares). This is 0.05 percent of the occupied habitat of CBM (0.5 of 931.6 acres/0.2 of 377 hectares).

Since the proposed development is located outside of CBM habitat no fragmentation of habitat available for, or occupied by, CBM will occur. Actions to minimize and compensate for the direct take of CBM, habitat loss and degradation, and human occupancy and use includes monitoring of the onsite CBM population, boardwalk and dune walkover construction, native plant landscaping, prohibition of planting exotic vegetation, removal of exotic plant species as necessary, and CBM predator/competitor, domestic pet, and trash control, sea turtle compatible and reduced lighting. Assurances and funding will be provided by the Applicant until such a time that the development is conveyed to the Property Owner's Association by covenants and restrictions.

Reasonable and prudent measures

All conservation measures described in the HCP are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR § 402.14(I). The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of the incidental take of the CBM:

> Issue the incidental take permit under section 10(a)(1)(B) with provisions to ensure full implementation of the approved habitat conservation plan for The Villages at Seagrove and Camp Creek developments.

Terms and conditions

In order to be exempt from the prohibition of section 9 of the Act, the Applicant 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. The Applicant shall be responsible for conducting or funding monitoring of the CBM population at the south parcel site for the life of the ITP (30 years) unless approved otherwise by the Service.

2. At least 1 week prior to the land clearing on the south parcel site, trapping within the 4.65 acres (1.88 hectares) will be conducted by the Applicant to capture CBM. The CBM will be relocated to the western portion of the Grayton Beach SRA main unit. The ITP will require the Applicant to conduct the trapping and relocation of the CBM under authority of 50 CFR 17.22(b)(3). The Applicant's St. Joe Timberland Company (Stephen M. Shea permit #TE004399-1) is currently authorized under section 10(a)(1)(A) to conduct trapping surveys and will conduct the trapping and relocation of CBM from the construction site to Grayton Beach SRA. Although Mr. Shea's current permit is only for trapping, his receipt of TE004399-1, indicates he has met the requirements for experience and technical expertise needed for conducting the trapping and moving of the CBM to Grayton Beach SRA. The Applicant will be responsible for obtaining all applicable State and/or local permission or permits to conduct this activity.

3. The Applicant will conduct or fund reintroduction of the Camp Creek project site within one year of issuance of a reintroduction Plan for the CBM at Camp Creek provided by the Service. CBM from Topsail Hill State Preserve will be used for the reintroduction provided adequate numbers exist. Monitoring of the reintroduced population shall be completed by the Applicant for 5 years with consent for the Service or FDEP to continue the population supplementation and monitoring for the life of the ITP. The ITP will require the Applicant to conduct the trapping and relocation of the CBM under authority of 50 CFR 17.22(b)(3). The Applicant's St. Joe Timberland Company (Stephen M. Shea permit #TE004399-1) is currently authorized under section 10(a)(1)(A) to conduct trapping surveys and will conduct the trapping, relocation, and monitoring of the re-established CBM population for the proposed project. Although Mr. Shea's current permit is only for trapping, his receipt of TE004399-1, indicates he has met the requirements for experience and technical expertise needed for translocation and monitoring of the re-established CBM population. The Applicant will be responsible for obtaining all applicable State and/or local permission or permits to conduct this activity.

4. The following changes or additions to the dune restoration plan will be made: a) all vegetation planting shall be completed by May 1; b) irrigation of planted dune vegetation will be by backpack only; c) all dune restoration material will meet State of Florida requirements for beach quality material; and d) all fence will be installed according to State of Florida sea turtle compatible requirements.

5. The Walton County beach access shall consist at a minimum, of one dune walkover constructed to allow natural formation of the primary, secondary, and scrub dunes. The walkover shall be completed by the time the south parcel is also completed.

6. All landscaping within designated critical habitat of the CBM on the south parcel shall be in accordance with the Walton County Dune Vegetation (Appendix D) list included in the ITP.

7. All trash receptacles on the south parcel (including the Walton County beach access) and Camp Creek shall be permanent, with secure lids, and predator proof.

8. No lights shall be permitted seaward of the Coastal Construction Control Line.

9. All structure and associated facility lighting on the seaward and western portion (condominium) of the south parcel development shall be kept to a minimum for security and safety purposes only and be sea turtle compatible. No lighting in these areas shall be used for decorative landscaping purposes.

10. All construction on the beach shall be conducted outside the turtle nesting season (May 1 through October 31) or in accordance with a CCCL permit issued by the State of Florida.

11. All covenants and restrictions and deed restrictions shall further stipulate that no changes shall be made that would cause noncompliance with the requirements of the ITP.

12. Upon location of dead, injured, or sick individuals of an endangered or threatened species, initial notification must be made to the Fish and Wildlife Service Law Enforcement Office, St. Petersburg, Florida (727/570-5398). Additional notification must be made to the Fish and Wildlife Service Ecological Services Field Office, Panama City, Florida (850/769-0552). Care should be taken in handling sick or injured individuals and in preservation of specimens in the best possible state for later analysis of the cause of death or injury.

The Service believes that: 1) no more than 4.65 acres (1.88 hectares) of scrub habitat on the south parcel, and 6 CBM, 2) no more than 0.5 acre (0.2 hectare) of beach and dune habitat on the Camp Creek site and 1 CBM, and 3) all CBM that are impacted from human occupancy and use of both developments will be incidentally taken as a result of the proposed actions. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize and/or compensate the impact of incidental take that might otherwise result from the proposed action. 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 Service must immediately provide an explanation of the causes of the taking and review the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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 a listed species or critical habitat, to help implement recovery plans, or to develop information. The following recommendations are intended to improve the Service's knowledge about the biology and improve the status of the CBM, particularly as it relates to the effects of residential and commercial development. Such information and actions will improve the Service's ability to verify and improve its analysis on conservation benefits and adverse effects of issuing ITPs that affect this species.

The recovery plan for the Gulf coast subspecies of beach mice, published in 1987, identified two recovery objectives for the Gulf coast beach subspecies: stabilize populations by preventing further habitat deterioration and re-establish populations in areas from which they have been extirpated. Efforts to achieve both of these objectives have been relatively successful when applied on public lands containing CBM. The Service should pursue the tasks identified in the recovery plan and any additional ones identified by the Service and species experts to ensure the species survival and recovery. Many of these tasks will need to be coordinated with the appropriate agencies or private individuals.

The following conservation recommendations will serve as the Service's long-term conservation strategy for the CBM.

High priority

1. Complete revision of the 1987 Recovery Plan for the CBM.

2. Supplement and continue monitoring of the re-established CBM population on the Applicant's Camp Creek development. If needed, reintroduce, supplement, and monitor CBM onto Deer Lake State Park with CBM from Topsail Hill State Preserve. The FDEP, Florida Park Service has included reintroduction of the CBM to the Deer Lake State Park in the Land Use Management Plan for the Park.

3. Continue or facilitate the supplementation and monitoring of the Grayton Beach SRA main unit CBM population using beach mice from Shell Island (St. Andrew State Recreation Area and/or Tyndall AFB), Bay County, Florida. The FPS, Auburn University, and Tyndall AFB have been active participants in this effort by either conducting the work, allowing access and movement of CBM from their property, or providing housing space for Auburn.

4. Facilitate restoration of the habitat between the main unit and western units of Grayton Beach SRA. This will include dune restoration and maintenance, public education, and

predator control in cooperation with FDEP/FPS, USDA - Wildlife Services, Town of Grayton Beach, Walton County, South Walton TDC, and private individuals.

5. After habitat restoration and connection, reintroduce CBM to the western units of the Grayton Beach SRA with beach mice from Shell Island.

6. In FY 1999 the Service funded the USDA to prepare a plan to address the problem of feral cats and free-ranging domestic cats including "cat colony" programs in the Florida panhandle. Implementation of the plan should be accomplished as soon as possible.

7. Coordinate with Four-Mile Village and Sierra Club (Coffeen Preserve) to restore CBM habitat on their property adjacent to the western boundary of Topsail State Preserve.

8. Complete determination regarding the need to revise critical habitat for the CBM and either publish a negative finding, proposal to revise critical habitat, or a plan to proceed with the revision.

Public lands

Habitat management on public lands

1. Assist or facilitate to maintain, protect, and implement habitat restoration on public lands as appropriate, for survival and recovery of CBM.

   Beach habitats are dynamic and often natural recovery of the primary dunes begins soon after a storm. Where natural recovery is absent or delayed, or where recovery is fragmented, dune restoration techniques should be employed. Dune restoration efforts should use native dune vegetation and/or approved sand fence materials. All planting and sand fence placement should be conducted in accordance with guidelines of the State of Florida. Planting of vegetation and sand fencing should be set to take advantage of the prevailing wind direction found during periods of strongest wind speeds. Additionally, only native plants and soils characteristic of local dune habitats for landscaping should be used.

2. Assist or facilitate in the monitoring of human activity on all public areas managed for beach mice and initiate corrective measures where human caused damage to beach mouse habitat is occurring. Actions include construction of dune walkovers, controlled pedestrian access to the beach, siting of parking, rest rooms, and shower facilities to minimize impacts to CBM habitat. Provide dune walkovers and covered trash receptacles at key beach access points to prevent or correct damage to dune habitat and incursion of beach mouse competitors and predators.

3. Assist or facilitate implementation of recovery actions needed for CBM on all recovery units.

Species management on public lands

1. Explore the benefits of captive breeding program(s) for the CBM

2. Continue or implement reintroduction of the CBM into its historic range:

X continue to develop a comprehensive initiative to reintroduce the CBM to public lands;

X determine reasons for extirpation of CBM from historic range and address prior to reintroduction;

X implement reintroduction and population supplementation in accordance with the recovery plan and established guidelines;

X develop guidelines and standards for determining relict populations of CBM;

X establish guidelines for determining presence/absence of CBM and house mice on public lands identified for reintroduction;

X establish standards for donor populations on public lands that will be the source for reintroductions and population supplementation;

X establish guidelines for evaluating public lands for receiving or needing reintroduction and population supplementation; and

X establish minimum numbers (pairs/sex ratio) for reintroduction and population supplementation.

3. Establish guidelines for determining presence/absence of CBM on public lands.

4. Public land use policies should continue prohibition of domestic cats and other pets from access to public parks and preserves or adopt strict policies to prohibit these animals in the future. The Service should work with land managers to provide and maintain sturdy animal-proof garbage containers of sufficient quality to prevent attraction of potential predators and non-native, competitive rodents.

5. Develop new lighting standards if current lighting practices are found to be detrimental to populations of beach mice. Reduce outdoor lighting according to standards developed

for sea turtles on structures in dune and beach habitats until lighting standards are developed for beach mice.

Research on public lands

1. Evaluate current management practices and their appropriateness for conservation and recovery of CBM.

2. Loss of genetic variation can affect populations and long-term persistence in several ways and is particularly important when population size becomes reduced as in beach mice. Genetic work should continue and include:

X examine genetic relationships as they pertain to metapopulation management and interchange rates that would approximate natural gene flow between isolated populations of a given subspecies, such as relationships between inland and beach subspecies of the oldfield mouse;

X evaluate the effects of different levels of genetic variability on long-term viability of individual populations of beach mice and relationships between Gulf coast subspecies of the beach mouse;

X evaluate the relationships among Gulf coast subspecies of the beach mouse;

X evaluate relationships between inland and beach subspecies of the oldfield mouse;

X evaluate current genetic information on the various populations to determine the potential for genetic divergence; and

X identify those subspecies and populations that are candidates for metapopulation management and determine the exchange rate to be used between donor and re-established populations to retain genetic integrity and similarity of both.

3. Continue research on demographics of beach mice. These data will be extremely useful in filling data gaps and 'fine tuning' models developed for Population Viability Analysis (PVA) for subspecies of beach mice such as:

X survival rates of birth-to-weaning age beach mice;

X survival rates of juveniles (weaning to adult age);

X adult survival rates of populations in various stages of recovery; and

X dispersal rates of juvenile and adult beach mice.

4. Continue the study to evaluate the effects of dune fertilization to enhance plant growth, increase the rate of dune restoration, increase seed production for beach mouse food sources, and increase or stabilize beach mouse populations after hurricanes.

5. Develop and implement management protocols that approximate historical interpopulation exchange rates that maximize occupation of available habitat, or both, to ensure persistence of beach mice.

X Estimate the probability of CBM migration among populations using historical evidence and review current information to develop a determination if the historical pattern has been modified.

X Evaluate existing information to determine the probability of correcting any CBM migration pattern disruptions via natural connections.

6. Evaluate habitat requirements and habitat utilization by CBM as they apply to long-term population viability. How populations of beach mice respond to changes in habitat quality and availability due to either natural or anthropogenic forces are just beginning to be researched.

7. The Service should immediately fund the development of additional PVA models and approaches, building upon the density independent stochastic exponential population growth model of Holler *et al*. (1999). At least three types of models must be developed. First, time series models that incorporate and test for density dependence and environmental covariates (e.g., Dennis and Taper 1994, Dennis and Otten 1999) must be applied. Environmental covariates likely to affect beach mice populations include temperature and rainfall. Additional research using time series autocorrelation and related methods (e.g., Lewellen and Vessey 1998a and 1998b) to investigate density dependence and environmental effects should be investigated. Second, alternative modeling for investigating catastrophic effects of hurricanes by the methods described by Mangel and Tier (1993) should be initiated. Third, additional research should explore stage-based or related demographic data using maximum likelihood or other methods to predict the values of missing demographic data. With this approach, data on adult survival and variance and population size at successive intervals could be used to estimate or fit missing parameters of reproduction in the stage matrix. If missing parameters can be successfully estimated, additional stage-based demographic modeling should be pursued to explore population persistence in relation to different scenarios of hurricane frequency and magnitude.

8. Continue to collect data necessary to determine the role of scrub dunes, the population of CBM in the scrub dunes, the relationship between each habitat type and the use of each habitat type by individual CBM. Beginning in mid to late 1996, Auburn University, in

consultation with Service, switched from a line transect based sampling to a grid sampling regime. By altering the study design at these long-term monitoring sites, more intensive sampling and a more accurate number of CBM within a unit area would be elucidated. This data is important, also, in that it provides a better estimate of CBM density and will provide the Service more explicit information on CBM movement (between and among primary, secondary, and scrub dunes and interdunal areas) than what is currently known.

9. Obtain CBM population data from areas within single family and other residential developments throughout the range and compare populations in developed and undeveloped habitats. Evidence indicates beach mice can coexist within low density residential areas with existing habitat and where cats and house mice are controlled. These factors must be further evaluated to identify relationships among patch size, population size, and population persistence.

10. Initiate research on disease and parasites specific to CBM or other beach mice subspecies.
11. Maintain GIS database mapping of occupied and available (suitable) habitat for the CBM.

<u>Private lands</u>

Section 10 (a)(1)(B) incidental take permit program

1. Seek and encourage, in cooperation with appropriate State agencies and county entities, to develop and implement conservation land use management plans that provide for and encourage the conservation of habitats within the historic range of the CBM.

2. Encourage the implementation of rangewide conservation land use management plans for the CBM with the appropriate State and/or county agencies. Implementation of these plans would be expected to streamline the non-Federal planning process under the Act.

3. Develop guidelines for mitigation of impacts to CBM and their habitats

4. Work with the State and county governments, and other Federal agencies to prohibit free movement of pets (especially domestic cats) on dune/beach habitats and provide and maintain sturdy animal-proof garbage containers of sufficient quality to prevent attraction of potential predators and non-native, competitive rodents. Additionally, use only native plants and soils characteristic of local dune habitats for landscaping.

5. Work with private landowners to restore and maintain beach mouse habitat on all segments of coastal habitat that support CBM.

Habitat management on private lands

1. Work with landowners to improve the storage of trash and garbage, which can attract predators and may support populations of commensal rodent competitors.

Research on private lands

Obtain CBM population data from areas within single family and other residential developments throughout the range and compare populations in developed and undeveloped habitats. Evidence indicates CBM can coexist within low density residential areas with existing habitat and where cats and house mice are controlled. These factors must be further evaluated to identify relationships among patch size, population size and population persistence.

Critical habitat on public and private lands

Finalize the petition finding on the revision of critical habitat for the CBM.

Education and outreach - public and private lands

1. Develop a scientific and non-scientific constituency and public information program directed toward enhancing recovery actions. Educate the public and other government agencies about beach mice, their habitat, and human impacts on habitat through outreach and education.

2. Coordinate and facilitate exchange of information on conservation and recovery activities for beach mice.

3. Develop an effective communication program or network for obtaining and disseminating information on recovery actions and research results. All recovery participants, including State and Federal agencies, and NGOs working on beach mice would be urged to publish research findings in technical publications.

4. Lead the effort to collect and centralize information regarding recovery activities for beach mice. Unpublished reports (gray literature), bibliographies, and available data on beach mice should be compiled and published or otherwise made available to all participants.

5. In order to ensure effective communication among the various entities involved in beach mouse research, recovery, and management, a newsletter or internet bulletin board should be developed and disseminated on a regular basis. This consolidated information would provide all interested parties with the most up-to-date information regarding progress toward achieving the goals of the Recovery Plan. The Service should take the lead in preparing and disseminating the information.

6. Instill public stewardship about the importance of the coastal dune system to the CBM. An information and education program must be developed to inform the public of the causes of the decline of beach mice along the Gulf coast, to increase the public's awareness, understanding, and involvement in beach mouse recovery efforts and to promote wise use of beaches and coastal dune habitat. Educational materials such as brochures, newspaper and magazine articles, publications, posters, and slide and television presentations, among others, must be produced and disseminated to target audiences, such as visitors to coastal cities and parks, nature organizations, and civic organizations.

7. Design and install signs at all public areas supporting beach mouse populations to inform visitors as to the presence of the beach mouse, their basic biology and habitat requirements, the potential adverse effects of pets, and the need to avoid foot traffic in and over the dune habitat which is vital to beach mice and other coastal species.

8. Prepare a brochure/fact sheet on beach mice for distribution at all public areas with beach mouse habitat. Distribute updated slide/tape show and new video on beach mice. Place updated information about beach mice on the Service web page.

Law enforcement - public and private lands

1. Enforce all laws implemented to protect beaches and coastal dune communities. The Service and other State law enforcement entities as appropriate, should assist in enforcing regulations as feasible.

2. Strictly enforce beach driving regulations for use of motor or human-powered vehicles on beaches and dune habitat. Seek prosecution of violators. All public land managers should enforce regulations regarding use of vehicles on the beach and dune habitat. Where beach driving is presently permitted, conservation areas within dune habitat should be identified and driving subsequently prohibited.

2. Continue or increase enforcement of the Coastal Construction Control Lines and other laws and regulations governing coastal construction.

4. Encourage the implementation of rangewide conservation land use management plans for each subspecies in cooperation with the appropriate State and county agencies.

REINITIATION REQUIREMENT

This concludes formal consultation on the issuance of the ITP. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Service involvement or control over the action has been retained (or is authorized by law) and if (1) the amount of incidental

take is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered by this consultation, (3) the action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered by this consultation, or (4) a new species is listed or critical habitat designated that may be affected by the action.

PanamaCity FO:LPatrick:lap:kh:3-23-00:850-769-0552:c:wp/te/bm/SjBiologicalOpinion.wpd

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