



United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960



January 6, 2005

Colonel Robert M. Carpenter
District Engineer
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Dear Colonel Carpenter:

This document is the Fish and Wildlife Service's (Service) biological opinion for 133 single-family dock projects resulting in 139 slips within Reach 32 of the U.S. Army Corps of Engineers' (Corps) Reach Characterization for Florida Waters (Corps 2001). Reach 32 encompasses the Caloosahatchee River and all connecting tributaries and residential canal systems, including the cities of Fort Myers and Cape Coral, in Lee County, Florida.

This biological opinion addresses potential effects of the proposed projects on the West Indian (= Florida) manatee (*Trichechus manatus*) (manatee) subpopulation within Reach 32 and on the Southwest subpopulation of the manatee in accordance with section 7 of the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 *et seq.*) and the Marine Mammal Protection Act of 1972, as amended (MMPA) (16 U.S.C. 1461 *et seq.*).

This biological opinion was prepared based on information provided by the Corps, the Corps' Reach Characterization Analysis, the *Florida Manatee Recovery Plan* (Service 2001), the *South Florida Multi-Species Recovery Plan* (Service 1999), data supplied by the Florida Fish and Wildlife Conservation Commission (FWC) and by the Florida Marine Research Institute (FMRI), and other sources of information. A complete administrative record of this consultation is on file at the Service's South Florida Ecological Services Office in Vero Beach, Florida.

CONSULTATION HISTORY

The Service received public notices from the Corps requesting concurrence on "may affect" determinations for the manatee and initiation of formal consultation for the proposed actions listed below. The proposed actions would authorize the construction of 133 single-family docks in Reach 32 in Lee County, Florida. The construction of the proposed docks, based on information provided by the applicants, would provide 139 new slips.



Service Log No.	Corps Application No.	Boat Slips	Date	Applicant
4-1-05-PL-9630	SAJ-2004-9801	1	10/13/04	Lawrence Dragon
4-1-05-PL-9631	SAJ-2004-8325	1	10/13/04	Tom Sumerel
4-1-05-PL-9632	SAJ-2004-9687	1	10/13/04	Christian Ring
4-1-05-PL-9633	SAJ-2004-9607	2	10/13/04	Jim George
4-1-05-PL-9634	SAJ-2004-9688	1	10/13/04	Joseph Brennan
4-1-05-PL-9635	SAJ-2004-9078	1	10/13/04	Ford Peterson
4-1-05-PL-9636	SAJ-2004-10125	1	10/13/04	Steven Rende
4-1-05-PL-9637	SAJ-2004-10129	1	10/13/04	Geoff Makison
4-1-05-PL-9638	SAJ-2004-10117	1	10/13/04	Dennis Schutz
4-1-05-PL-9639	SAJ-2004-10118	1	10/13/04	Krista Patterson
4-1-05-PL-9640	SAJ-2004-10119	1	10/13/04	Isabel Collazo
4-1-05-PL-9641	SAJ-2004-10121	1	10/13/04	Gabriele Koch
4-1-05-PL-9642	SAJ-2004-10131	1	10/13/04	Kevin Iacofano
4-1-05-PL-9643	SAJ-2004-10136	1	10/13/04	Jane Lane
4-1-05-PL-9644	SAJ-2004-10394	1	10/13/04	Jerry Murphy
4-1-05-PL-9645	SAJ-2004-10390	1	10/13/04	Howard Wright
4-1-05-PL-9646	SAJ-2004-10468	2	10/13/04	David Weekly Homes
4-1-05-PL-9647	SAJ-2004-10469	1	10/13/04	Elwood Riehm
4-1-05-PL-9648	SAJ-2004-10465	1	10/13/04	Bernie Exposito
4-1-05-PL-9649	SAJ-2004-9993	1	10/13/04	Jim and Kath Acord
4-1-05-PL-9650	SAJ-2004-9989	1	10/13/04	Dorothy Pashley
4-1-05-PL-9651	SAJ-2004-9985	1	10/13/04	Michael Hamilton
4-1-05-PL-9652	SAJ-2004-9995	1	10/13/04	Sandra Wieland
4-1-05-PL-9653	SAJ-2004-10002	1	10/13/04	Niko Marjanovic
4-1-05-PL-9654	SAJ-2004-10006	1	10/13/04	George Kovacevic
4-1-05-PL-9655	SAJ-2004-10008	1	10/13/04	Bill Weikel
4-1-05-PL-9656	SAJ-2004-10009	1	10/13/04	Wade and Laura Ray
4-1-05-PL-9657	SAJ-2004-10011	1	10/13/04	Mark Skelton
4-1-05-PL-9658	SAJ-2004-10014	1	10/13/04	Mark Skelton
4-1-05-PL-9659	SAJ-2004-10015	1	10/13/04	Ron Gabriel
4-1-05-PL-9660	SAJ-2004-10020	1	10/13/04	Donald Webber
4-1-05-PL-9661	SAJ-2004-10022	1	10/13/04	Clare Dordon
4-1-05-PL-9662	SAJ-2004-10060	2	10/13/04	James George
4-1-05-PL-9663	SAJ-2004-10061	1	10/13/04	James Gledhill
4-1-05-PL-9664	SAJ-2004-10062	1	10/13/04	Wayne Thomas
4-1-05-PL-9665	SAJ-2004-10072	1	10/13/04	Robert Lee
4-1-05-PL-9666	SAJ-2004-10101	1	10/13/04	Robert Snyder
4-1-05-PL-9667	SAJ-2004-9697	1	10/13/04	Laurie Laurance
4-1-05-PL-9668	SAJ-2004-9699	1	10/13/04	Finn Gammerath
4-1-05-PL-9669	SAJ-2004-9693	2	10/13/04	Ed Neese
4-1-05-PL-9670	SAJ-2004-9694	1	10/13/04	Kenneth Gustafson
4-1-05-PL-9671	SAJ-2004-9695	1	10/13/04	Laurie Laurance

Service Log No.	Corps Application No.	Boat Slips	Date	Applicant
4-1-05-PL-9672	SAJ-2004-9653	1	10/13/04	Beat Anlicker
4-1-05-PL-9673	SAJ-2004-9667	1	10/13/04	Brian Rauss
4-1-05-PL-9674	SAJ-2004-0654	1	10/13/04	H and M Bergmann
4-1-05-PL-9675	SAJ-2004-9658	1	10/13/04	Jeremy Sposato
4-1-05-PL-9676	SAJ-2004-9659	1	10/13/04	Bruno Schlaepfer
4-1-05-PL-9677	SAJ-2004-9661	1	10/13/04	Juan Montero
4-1-05-PL-9678	SAJ-2004-9665	1	10/13/04	Richard McGloin
4-1-05-PL-9679	SAJ-2004-9666	1	10/13/04	Ray Santini
4-1-05-PL-9680	SAJ-2004-10445	1	10/13/04	John and Shirley Ensor
4-1-05-PL-9681	SAJ-2004-10472	1	10/13/04	Robert Albright
4-1-05-PL-9682	SAJ-2004-9612	1	10/13/04	Daniel Sarol
4-1-05-PL-9683	SAJ-2004-9338	1	10/13/04	Peter McGuire
4-1-05-PL-9684	SAJ-2004-9404	1	10/13/04	Carl Bagshot
4-1-05-PL-9685	SAJ-2004-9471	1	10/13/04	Michael Fazzio
4-1-05-PL-9686	SAJ-2004-9475	1	10/13/04	Donald Ulzheimer
4-1-05-PL-9687	SAJ-2004-9477	1	10/13/04	Edward Johnson
4-1-05-PL-9688	SAJ-2004-9472	1	10/13/04	Lorne McHugh
4-1-05-PL-9689	SAJ-2004-9834	1	10/13/04	Thomas Balistreri
4-1-05-PL-9690	SAJ-2004-9826	1	10/13/04	Gary and Laura Mock
4-1-05-PL-9691	SAJ-2004-9827	1	10/13/04	Wm and Chris Arthur
4-1-05-PL-9692	SAJ-2004-9828	1	10/13/04	Michael Meyer
4-1-05-PL-9693	SAJ-2004-9829	1	10/13/04	James Blachowiak
4-1-05-PL-9694	SAJ-2004-9830	1	10/13/04	Bob Hendrickson
4-1-05-PL-9695	SAJ-2004-9825	1	10/13/04	Marilee Moyle
4-1-05-PL-9696	SAJ-2004-9649	1	10/13/04	Wm Blauvelt
4-1-05-PL-9697	SAJ-2004-9810	1	10/13/04	Ron Lipschitz
4-1-05-PL-9698	SAJ-2004-9811	1	10/13/04	Wayne Davis
4-1-05-PL-9699	SAJ-2004-9812	1	10/13/04	Edward Kennedy
4-1-05-PL-10160	SAJ-2004-10804	1	12/07/04	Uwe Hinz
4-1-05-PL-10161	SAJ-2002-5867	1	12/07/04	Albert Bartoletti
4-1-05-PL-10162	SAJ-2003-10220	1	12/07/04	Vilnis Ezerins
4-1-05-PL-10163	SAJ-2004-10600	1	12/07/04	Walter Stephenson
4-1-05-PL-10164	SAJ-2004-10979	1	12/07/04	Robet Brickman
4-1-05-PL-10166	SAJ-2004-10939	1	12/07/04	Pat McLaurin
4-1-05-PL-10167	SAJ-2004-10945	1	12/07/04	Harvey Jaffe
4-1-05-PL-10168	SAJ-2004-10942	1	12/07/04	Bruce Fowler
4-1-05-PL-10169	SAJ-2004-10467	1	12/07/04	Dennis Bertollo
4-1-05-PL-10170	SAJ-2004-8595	1	12/07/04	Mediterranean Cove
4-1-05-PL-10190	SAJ-2004-8048	1	12/07/04	Rafael Carrion
4-1-05-PL-10191	SAJ-2004-10604	1	12/07/04	Carl Montequin
4-1-05-PL-10192	SAJ-2004-10606	1	12/07/04	Ronald Conti
4-1-05-PL-10193	SAJ-2004-10610	1	12/07/04	Arno Daum

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4-1-05-PL-10194	SAJ-2004-10614	1	12/07/04	Roddy Woodward
4-1-05-PL-10195	SAJ-2004-10616	1	12/07/04	Richard Pardi
4-1-05-PL-10196	SAJ-2004-10620	1	12/07/04	Ron Barron
4-1-05-PL-10197	SAJ-2004-10646	1	12/07/04	Steve Duquette
4-1-05-PL-10198	SAJ-2004-10652	1	12/07/04	Henry Bornemon
4-1-05-PL-10199	SAJ-2004-10650	1	12/07/04	Brad Schweers
4-1-05-PL-10200	SAJ-2004-10655	1	12/07/04	Steve Crane
4-1-05-PL-10201	SAJ-2004-10662	1	12/07/04	Kevin Broadhurst
4-1-05-PL-10202	SAJ-2004-10664	1	12/07/04	Gunther Thielman
4-1-05-PL-10203	SAJ-2004-10690	1	12/07/04	Charlie Commer
4-1-05-PL-10204	SAJ-2004-10952	1	12/07/04	Don Wichelt
4-1-05-PL-10205	SAJ-2004-10951	1	12/07/04	Anthony Vazquez
4-1-05-PL-10206	SAJ-2004-10872	1	12/07/04	Paul Homes, Incorporated
4-1-05-PL-10207	SAJ-2004-10691	1	12/07/04	Ian Calvin
4-1-05-PL-10208	SAJ-2004-10840	1	12/07/04	Gui Denegri
4-1-05-PL-10209	SAJ-2004-10869	1	12/07/04	Heidi Campbell
4-1-05-PL-10210	SAJ-2004-10941	1	12/07/04	Debra A. Balboni and Merle A. Frissell
4-1-05-PL-10211	SAJ-2004-10981	1	12/07/04	Steven Parker
4-1-05-PL-10212	SAJ-2004-10980	2	12/07/04	Kevin Touhey
4-1-05-PL-10213	SAJ-2004-10973	1	12/07/04	Nancy Anzola
4-1-05-PL-10214	SAJ-2004-10953	1	12/07/04	John Shuminsky
4-1-05-PL-10215	SAJ-2004-11708	1	12/07/04	Gary Bates
4-1-05-PL-10216	SAJ-2004-11823	1	12/07/04	Greg Nichols
4-1-05-PL-10217	SAJ-2004-11824	1	12/07/04	Michael Brown
4-1-05-PL-10218	SAJ-2004-11827	1	12/07/04	Daniel Lanier
4-1-05-PL-10219	SAJ-2004-11637	1	12/07/04	Manuel Sousa
4-1-05-PL-10220	SAJ-2004-11703	1	12/07/04	Fredric Kearnes
4-1-05-PL-10221	SAJ-2004-11705	1	12/07/04	Dan Voelker
4-1-05-PL-10222	SAJ-2004-11706	1	12/07/04	Matteo Mongelli
4-1-05-PL-10223	SAJ-2004-11707	1	12/07/04	Jeffrey Snow
4-1-05-PL-10224	SAJ-2004-11485	1	12/07/04	Robert Casey
4-1-05-PL-10225	SAJ-2004-11486	1	12/07/04	Ronald Reinert
4-1-05-PL-10226	SAJ-2004-11456	1	12/07/04	Roger Mayes
4-1-05-PL-10227	SAJ-2004-11457	1	12/07/04	AVS Cape Coral
4-1-05-PL-10228	SAJ-2004-11458	1	12/07/04	Larry Freeswick
4-1-05-PL-10229	SAJ-2004-11452	1	12/07/04	Gil Baran
4-1-05-PL-10230	SAJ-2004-11249	1	12/07/04	Michael Canzano
4-1-05-PL-10231	SAJ-2004-11250	1	12/07/04	Brain Jackson
4-1-05-PL-10232	SAJ-2004-11251	1	12/07/04	David Keith
4-1-05-PL-10233	SAJ-2004-11242	1	12/07/04	Robert Vittoria
4-1-05-PL-10234	SAJ-2004-11228	1	12/07/04	Lawrence Neubert

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4-1-05-PL-10235	SAJ-2004-11231	1	12/07/04	Lori Willing
4-1-05-PL-10236	SAJ-2004-11232	1	12/07/04	Norman Jaschen
4-1-05-PL-10237	SAJ-2004-11236	2	12/07/04	Brenda Bryant
4-1-05-PL-10238	SAJ-2004-11237	1	12/07/04	Bruce Seder
4-1-05-PL-10239	SAJ-2004-11238	1	12/07/04	Theodore Schave
4-1-05-PL-10240	SAJ-2004-10837	1	12/07/04	Nicholas Lonneman
4-1-05-PL-10241	SAJ-2004-10838	1	12/07/04	Joe Champion
4-1-05-PL-10242	SAJ-2004-11839	1	12/07/04	Robert Madison

These proposed actions resulted in “may affect” determinations after processing them through the Corps and Florida Department of Environmental Protection’s (DEP) January 2, 2001, Manatee Key. [Note - Service concurrence for the key was provided in a letter dated January 2, 2001]. The Corps has provided the Service with its Reach Characterization Analysis, a database that characterizes reaches or segments of manatee habitat. The database includes general and specific information on factors in the area that may contribute to manatee-watercraft interactions including dock density, watercraft destinations, watercraft density, and watercraft traffic patterns. This database was used to assist in our review of these Corps permit applications.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTIONS

On the dates listed above, the Service received public notices from the Corps requesting concurrence on “may affect” determinations for the manatee and initiation of formal consultation for the proposed actions. The proposed actions would authorize the construction of 133 single-family docks resulting in 139 slips in Reach 32 in Lee County, Florida. Reach 32 begins at the Franklin Lock upstream and ends at the confluence of the Caloosahatchee River and San Carlos Bay, a distance of approximately 24 miles.

To reduce direct construction-related effects to the manatee, the Corps will incorporate *Standard Manatee Construction Conditions* (FWC 2001) as a condition of the Department of the Army permits, if issued, for the projects listed above. No dock constructions or dredging are proposed over or in seagrasses; therefore, no seagrasses will be directly affected by these projects. Indirect effects of the projects to the manatee have been ameliorated by providing boater education and manatee awareness programs and brochures to local marinas, State, county, and city public offices, and at local boating events; by establishing and posting appropriate manatee speed zones in the project vicinity; and by providing enforcement of these zones by Federal and local law enforcement agencies.

Action Area

According to FWC's Caloosahatchee River study (2002), the most likely travel route for watercraft leaving slips in this reach is to travel downstream from southwest portion of the Caloosahatchee River, west of Mile Marker "93", and out of the mouth of the river into San Carlos Bay. Therefore, for the purposes of this consultation, the Service defines the action area for this biological opinion as all waters within Reach 32 of the Corps' Reach Characterization for Florida Waters (Corps 2001).

New watercraft access projects may have a number of direct and indirect effects on manatees and manatee habitat. Direct impacts include potential direct harm or harassment of manatees during construction activities and are generally addressed through application of the *Standard Manatee Construction Conditions* (<http://www.floridaconservation.org/psm/permit/construct.htm>) codeveloped by the Corps, Service, and FWC. Anticipated direct impacts to habitat, such as the presence of seagrasses within the project footprint are minimized through modifications in the project design during the permit review process and/or the application of *Dock Construction Guidelines for Florida* developed by the Corps and the NOAA Fisheries (Corps and NOAA Fisheries (formerly the National Marine Fisheries Service (NMFS)) 2001). These two minimization efforts are routinely included as conditions of Department of the Army permits issued for construction projects in manatee habitat and have previously undergone section 7 consultation.

Indirect effects to manatees include effects to routine movement and migration patterns to freshwater, foraging, calving, and breeding areas, and associated behavior patterns. Indirect effects also include effects to manatee habitat caused by operation of the proposed watercraft access projects. Construction of the proposed watercraft access projects may provide increased access by watercraft to areas frequented by manatees or may alter watercraft traffic patterns in such a way as to increase watercraft-manatee interactions. The lack of protective measures for manatees, such as speed zones, signage, and enforcement, may lead to increased harassment of manatees or increased watercraft collisions with manatees. Depending on the location, construction of watercraft access projects may encourage watercraft to travel through important manatee habitat features such as submerged aquatic vegetation, warmwater refugia, and freshwater, foraging, calving, and breeding areas, thereby potentially altering manatee habitat and manatee habitat use patterns.

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/Critical Habitat Description

Florida manatees are massive fusiform-shaped mammals with skin that is uniformly dark grey, wrinkled, sparsely haired, and rubber-like. Manatees possess paddle-like forelimbs, no hind limbs, and a spatulate, horizontally flattened tail. Females have two axillary mammae, one at the posterior base of each forelimb. Their bones are massive and heavy with no marrow cavities in the ribs or long bones of the forearms (Odell 1982). Adults average about 10 feet in length and

2,200 pounds in weight, but may reach lengths of up to 15 feet (Gunter 1941) and weigh as much as 3,570 pounds (Rathbun et al. 1990). Newborns average 4 to 4.5 feet in length and weigh about 66 pounds (Odell 1981). The nostrils located on the upper snout, open and close by means of muscular valves as the animals surface and dive (Husar 1977; Hartman 1979). A muscular flexible upper lip is used with the forelimbs to manipulate food into the mouth (Odell 1982). Bristles are located on the upper and lower lip pads. Molars designed to crush vegetation form continuously at the back of the jaw and move forward as older ones wear down (Domning and Hayek 1986). The eyes are very small, close with sphincter action, and are equipped with inner membranes that can be drawn across the eyeball for protection. The ears are external, minute, with no pinnae. The anatomy of the internal ear structure indicates that they can hear sounds within a relatively narrow low frequency range, that their hearing is not acute, and that they have difficulty in localizing sound (Ketten et al. 1992). However, Gerstein (1995) suggested that manatees may have a greater low-frequency sensitivity than other marine mammal species that have been tested.

Critical habitat for any species is described as the specific area within the geographic area occupied by the species, at the time it is listed under the provisions of section 4 of the ESA, on which are found those physical or biological features (*i.e.*, constituent elements): (1) essential to the conservation of the species; and (2) which may require special management considerations or protection [ESA §3 (5)(A)].

Critical habitat for this species was designated in 1976 (50 CFR 17.95). Designated critical habitat on the west coast of Florida includes Crystal River in Citrus County, portions of the Little Manatee River in Hillsborough County, the Manatee River in Manatee County, the Myakka River in Sarasota and Charlotte Counties, the Peace River in DeSoto and Charlotte Counties, and the Caloosahatchee River in Lee County. It also includes all the coastal waters in Lee, Collier, and Monroe Counties between Gordon's Pass (Collier County) and Whitewater Bay (Monroe County).

Designated manatee critical habitat on the Atlantic Coast of Florida includes those intracoastal waters connecting rivers and bays from the Florida/Georgia border south to Key Largo in Monroe County, excluding those waters in Broward County, Florida. The Atlantic subpopulation of manatees also uses critical habitat identified between Key Largo and mainland Miami-Dade County in Florida Bay.

Constituent elements for any designated critical habitat include those physical and biological features essential to the conservation of the species. No specific primary or secondary constituent elements were included in the critical habitat designation. However, researchers agree that essential habitat features for the manatee include seagrasses for foraging, shallow areas for resting and calving, channels for travel and migration, warmwater refuges during cold weather, and fresh water for drinking (Service 2001).

Life History

Manatees are herbivores that feed opportunistically on a wide variety of aquatic vegetation. Feeding rates and food preferences depend, in part, on the season and available plant species. Manatees frequently feed in water depths of 3 to 9 feet where aquatic vegetation is abundant. Seagrasses appear to be a staple of the manatee diet in coastal areas (Ledder 1986; Provancha and Hall 1991; Kadel and Patton 1992; Koelsch 1997; Lefebvre et al. 2000). Manatees can remain submerged for several minutes with the longest submergence record lasting 24 minutes (Reynolds 1981).

Breeding takes place when one or more males (ranging from 5 to 22 individuals) are attracted to an estrous female to form a temporary mating herd (Rathbun et al. 1995). Mating herds can last up to 4 weeks, with different males joining and leaving the herd daily (Hartman 1979; Bengston 1981; Rathbun et al. 1995; Rathbun 1999). Permanent bonds between males and females do not form. During peak activity, the males in mating herds compete intensely for access to the female (Hartman 1979). Successive copulations involving different males have been reported. Some observations suggest that larger, presumably older, males dominate access to females early in the formation of mating herds and are responsible for most pregnancies (Rathbun et al. 1995). Although breeding has been reported in all seasons, Hernandez et al. (1995) reported that histological studies of reproductive organs from carcasses of males found evidence of sperm production in 94 percent of adult males found between March and November. Females appear to reach sexual maturity by about age 5 but have given birth as early as 4 (Marmontel 1995; Odell et al. 1995; O'Shea and Hartley 1995; Rathbun et al. 1995), and males may reach sexual maturity at 3 to 4 years of age (Hernandez et al. 1995). Manatees may live in excess of 50 years (Marmontel 1995), and evidence for reproductive aging is unclear (Marmontel 1995; Rathbun et al. 1995).

Calf dependency usually lasts 1 to 2 years after birth (Hartman 1979; O'Shea and Hartley 1995; Rathbun et al. 1995; Reid et al. 1995). Calving intervals vary greatly among females, with an average birth cycle of 2 to 2.5 years, but may be considerably longer depending on age and perhaps other factors (Marmontel 1995; Odell et al. 1995; Rathbun et al. 1995; Reid et al. 1995). Females that abort or lose a calf due to perinatal death (small manatees, less than 60 inches in length) (O'Shea and Hartley 1995), may become pregnant again within a few months (Odell et al. 1995) or even weeks (Hartman 1979).

Manatees often use secluded canals, creeks, embayments, and lagoons, particularly near the mouths of coastal rivers and sloughs, for feeding, resting, playing, mating, and calving (Marine Mammal Commission [MMC] 1986 and 1988). Manatees frequent coastal, estuarine, and riverine habitats and are capable of extensive north-south migrations. Based on telemetry, aerial surveys, photo-identification sighting records, and other studies over the past 20 years, manatee distribution in the southeastern United States is better understood (Beeler and O'Shea 1988; O'Shea 1988; MMC 1984 and 1986; Lefebvre et al. 1989). In general, the data reveal that manatees exhibit opportunism, as well as predictable patterns in their distribution and movement.

They are able to undertake extensive north-south migrations with seasonal distribution determined by water temperature below 68 degrees Fahrenheit (20 degrees Celsius). Manatees depend on areas with access to natural springs, manmade warmwater refugia, areas with vascular plants, and freshwater sources. Manatees normally migrate along shorelines and use deeper corridors to access shallow water feeding and resting areas. When ambient water temperatures drop below 68 degrees Fahrenheit in autumn and winter, manatees aggregate within the confines of natural or artificial warmwater refuges (Lefebvre et al. 1989) or move to the southern tip of Florida (Snow 1991). Most warmwater artificial refuges are created by outfalls from power plants or paper mills. As water temperatures rise, manatees disperse from these winter aggregation areas. While some remain near their winter refuges, others undertake extensive migrations along the coast of Florida and far up rivers and canals. Most manatees return to the same warmwater refuges each year. However, some manatees use different refuges in different years, and others use two or more refuges in the same winter (Reid and Rathbun 1984; Rathbun et al. 1990; Reid et al. 1991). There are numerous lesser known, minor aggregation areas used as temporary thermal refuges. Many of these areas are canals or boat basins where warmwater temperatures persist as temperatures in adjacent bays and rivers decline.

Population Dynamics

Long-term studies suggest four regional populations of manatees in Florida: the Northwest subpopulation, comprising approximately 12 percent of the total Florida manatee population, and consisting of the counties along the Gulf of Mexico from Escambia County east and south to Hernando County, Lafayette, and Gilchrist Counties, and Marion County adjacent to the Withlacoochee River; (b) the Upper St. Johns River subpopulation, comprising approximately 4 percent of the total Florida manatee population, and consisting of Putnam County from Palatka south, Volusia, Flagler, and Marion Counties adjacent to the St. Johns River or its tributaries, and Lake and Seminole Counties; (c) the Atlantic subpopulation, comprising approximately 42 percent of the total Florida manatee population, and consisting of counties along the Atlantic coast from Nassau County south to Miami-Dade County, the portion of Monroe County adjacent to the Florida Bay and the Florida Keys, Okeechobee County, and counties along the lower portion of the St. Johns River north of Palatka, which includes Putnam, St. Johns, Clay, and Duval Counties; and (d) the Southwest subpopulation, comprising approximately 42 percent of the total Florida manatee population and consisting of the counties along the Gulf of Mexico from Pasco County south to Whitewater Bay in Monroe County and DeSoto, Glades, and Hendry Counties. These divisions are based primarily on documented manatee use of wintering sites and from radio-tracking studies of individuals' movements (Bengston 1981; MMC 1988; Rathbun et al. 1990; Beck and Reid 1995; Rathbun et al. 1995; Reid et al. 1995; Deutsch et al. 1998).

The previous recovery plan (Service 1996) identified the need for a population status working group to assess manatee population size and trends. The first meeting of the Manatee Population Status Working Group (MPSWG), a subcommittee of the Recovery Team, was held in March 1998. The goals of the MPSWG are to: (1) assess the status of the Florida manatee population; (2) advise the Service on population recovery criteria for determining when recovery has been achieved; (3) provide interpretation of available information on manatee population

biology to managers; (4) make recommendations concerning needed research directions and methods; and (5) obtain rigorous external review of manatee population data, conclusions, and research methods by independent researchers with expertise in population biology.

In 2001, the MPSWG provided a statement summarizing what they believed to be the status of the Florida manatee at that time (Wildlife Trust 2001). The MPSWG stated that, for the Northwest and Upper St. Johns River Stocks, available evidence indicated that there had been a steady increase in animals over the last 25 years. The statement was less optimistic for the Atlantic subpopulation due to an adult survival rate that was lower than the rate necessary to sustain population growth. The MPSWG believed that this subpopulation had likely been growing slowly in the 1980s, but since then may have leveled off or even possibly declined. They considered the status of the Atlantic subpopulation to be “too close to call.” Such finding was consistent with high levels of human-related and, in some years, cold-related deaths in this subpopulation.

Regarding the Southwest subpopulation, the MPSWG acknowledged that further data collection and analysis would be necessary to provide an assessment of the manatee’s status in this subpopulation. Preliminary estimates of adult survival available to the MPSWG at that time indicated that the Southwest subpopulation was similar to the Atlantic subpopulation and “had substantially lower [adult survival estimates] than for the Northwest and Upper St. Johns River [subpopulations].” The Southwest subpopulation was noted for having high levels of watercraft-related manatee deaths and injuries and natural mortality events (*i.e.*, red tide and cold stress). According to more recent analyses by Runge et al. (in review), growth rates in the Southwest subpopulation approximate a rate of -1.1 percent per year (95 percent confidence interval of -5.4 to 2.4). Estimated growth rates are thought to be highest in the Upper St. Johns River subpopulation (+6.2 percent per year [95 percent confidence interval of 3.7 to 8.1]), followed by the Northwest subpopulation (+3.7 percent per year [95 percent confidence interval of 1.6 to 5.6]), and the Atlantic subpopulation (+1.0 percent per year [95 percent confidence interval of -1.2 to 2.9]).

A Population Viability Analysis (PVA), in which random events (such as red tide, extremely cold winter, and loss of warmwater sites) are incorporated into a model, was carried out for manatees based on age-specific mortality rates estimated from the age distribution of manatees found dead throughout Florida from 1979 through 1992 (Marmontel et al. 1997). This method of estimating survival relied on certain assumptions that were not fully testable; despite this, the results again pointed out the importance of adult survival to population persistence. Given a population size that reflected a 1992 minimum population estimate, the PVA showed that if adult mortality as estimated for the study period were reduced by a modest amount (for example, from 11 percent down to 9 percent), the Florida manatee population would likely remain viable for many years. However, the PVA also showed that slight increases in adult mortality would result in extinction of manatees within the next 1,000 years.

Status and Distribution

Based on telemetry studies, aerial surveys, photo-identification studies, and other research over the past 20 years, manatee distribution in the southeastern United States is better understood (Beeler and O'Shea 1988; O'Shea 1988; MMC 1984, 1986; and Lefebvre et al. 1989). Florida manatees can be found in Florida waters throughout the year, and nearly all manatees use the waters of peninsular Florida during the winter months. In winter months, most manatees rely on warmwater from industrial discharges and natural springs for warmth. In warmer months, they expand their range and occasionally are seen as far north as Rhode Island on the Atlantic Coast and as far west as Texas on the Gulf Coast.

Despite significant efforts dating back to the late 1970s and early 1980s, scientists have been unable to develop a statistically and scientifically repeatable means of estimating or monitoring trends in the size of the overall manatee population in the southeastern United States (O'Shea 1988; O'Shea et al. 1992; Lefebvre et al. 1995). Even though many manatees aggregate at warmwater refuges in winter and most, if not all, such refuges are known, direct counting methods (*e.g.*, aerial and ground surveys) are unable to account for the number of animals that may be away from these refuges at any given time, the number of animals not seen because of turbid water, and other factors. The use of mark-resighting techniques to estimate manatee population size based on known animals in the manatee photo-identification database is also not a statistically and scientifically repeatable method.

It is possible, however, to monitor the number of manatees using the Blue Spring (Volusia County) and Crystal River (Citrus County) warmwater refuges. At Blue Spring (in the Upper St. Johns River subpopulation), with its unique combination of clear water and confined spring area, it has been possible to count the number of resident animals by identifying individual manatees from scar patterns. The data indicate that this group of animals has increased steadily since the early 1970s when it was first studied. During the 1970s, the number of manatees using the spring increased from 11 to 25 (Bengston 1981). In the mid 1980s, about 50 manatees used the spring (Service 2001), and by the winter of 1999-2000, the number had increased to 147 (Hartley 2001).

In the Northwest subpopulation, the clear, shallow waters of Kings Bay (Citrus County) have made it possible to monitor the number of manatees using this warmwater refuge at the head of Crystal River. Large aggregations of manatees apparently did not exist there until recent times (Service 2001). The first careful counts were made in the late 1960s. Since then, manatee numbers have increased significantly. From 1967 to 1968, Hartman (1979) counted 38 animals in Kings Bay. By 1981-1982, the maximum winter count had increased to 115 manatees (Powell and Rathbun 1984) and, in November 2000, the maximum count was 301 (J. Kleen, Service, personal communication).

In the Atlantic and Southwest subpopulations, no similar shallow, clear water areas are present that make it possible to monitor the number of manatees using warmwater refugia, although such

refugia are present. In these locations, visual counts of those manatees that can be seen by aerial surveys are the basis of the population estimates and estimates of adult survival and population growth.

The only data on population size include uncalibrated indices based on maximum counts of animals at winter refuges made within 1 or 2 days of each other. Based on such information in the late 1980s, the total number of manatees throughout Florida was originally thought to include at least 1,200 animals (Service 2001). Because aerial and ground counts at winter refuges are highly variable depending on the weather, water clarity, manatee behavior, and other factors (Packard et al. 1985; Lefebvre et al. 1995), interpretation of these data to assess short-term trends is difficult (Packard and Mulholland 1983; Garrett et al. 1994).

Beginning in 1991, the State of Florida initiated a statewide, synoptic, aerial survey program to count manatees in potential winter aggregation areas during periods of severe cold weather (Ackerman 1995). The highest statewide minimum count from these surveys was 3,276 manatees in January 2001 with 1,520 individuals on the east coast and 1,756 individuals on the west coast. A more recent survey conducted on January 21-22, 2003, provides a minimum population estimate that includes 3,113 individuals with 1,814 and 1,299 manatees on the east and west coasts, respectively (<http://www.floridamarine.org>).

While aircraft synoptic surveys provide a “best estimate” of the minimum Florida manatee population size, there are no confidence intervals (derived through reliable, statistically based, population-estimation techniques) for these estimates. With the exception of a few places where manatees may aggregate in clear, shallow water, not all manatees can be seen from aircraft because of water turbidity, depth, surface conditions, variable times spent submerged, and other considerations (Lefebvre et al. 1995). While these results are of value in providing information on where manatees occur, likely relative abundance in various areas, and seasonal shifts in manatee abundance, they do not provide good population estimates nor can they reliably measure trends in the manatee population. Consequently, the *Florida Manatee Recovery Plan* (Service 2001) concludes that “despite considerable effort in the early 1980s, scientists have been unable to develop a useful means of estimating or monitoring trends in size of the overall manatee populations in the southeastern United States.”

At the end of winter, manatees leave warmwater aggregation sites and head for warm weather use areas. There appears to be no significant spring aggregation areas on the west coast, although Charlotte Harbor was visited in the spring by almost half of the 35 manatees radio-tagged at the Fort Myers Power Plant in Lee County in the early 1980s (Lefebvre and Frohlich 1986). During the summer, manatees can be found throughout Florida where water depths and access channels are greater than 1 to 2 meters (3.3 to 6.6 feet) (O’Shea 1988).

Summer use areas are generally typified by extensive foraging resources. Seagrasses and other food sources occur throughout coastal Florida. There are an estimated 3.73 million acres of open-water habitat in coastal and interior areas, of which an estimated 1.1 million acres are designated manatee critical habitat (FWC and Service Geographic Information System data).

Almost 57,000 acres of known manatee aggregation habitat exists in the State, 85 percent of which is located in the Atlantic and Southwest subpopulations. These are significant statewide resources essential for a healthy and stable Florida manatee population.

Reasons for Legal Protection

In 1967, both the Florida and Antillean subspecies of manatees (*T. manatus latirostris* and *T. manatus manatus*) were listed as endangered (32 FR 4061) and received Federal protection with the passage of the ESA in 1973. However, since the manatee was designated as an endangered species prior to enactment of the ESA, there was no formal listing package identifying threats to the species, as required by section 4(a)(1) of the ESA. However, since that time, threats to the manatee (discussed below) have been identified.

Manatees are also protected under the MMPA. The MMPA establishes, as national policy, maintenance of the health and stability of marine ecosystems and, whenever consistent with this primary objective, obtains and maintains optimum sustainable populations of marine mammals. It also establishes a moratorium on the taking of marine mammals, which includes harassing, hunting, capturing, killing, or attempting to harass, hunt, capture, or kill any marine mammal. Section 101(a)(5)(A) of the MMPA allows the Service, upon request, to authorize by specific regulation the incidental, unintentional take of marine mammals by persons engaged in identified activities within specific geographic areas, if the Service determines that such taking would have a negligible impact on the species or subpopulation. Since the manatee, which is comprised of the Florida and Antillean manatee subpopulations, is currently listed as “endangered” under the ESA, they are considered “depleted” under the MMPA.

In the case of the Florida manatee, the Service developed the initial recovery plan for the manatee in 1980. This initial plan focused primarily on manatees in Florida, but included Antillean manatees in the Commonwealth of Puerto Rico and the United States Virgin Islands. In 1986, the Service adopted a separate recovery plan for manatees in Puerto Rico. To reflect new information and planning needs for manatees in Florida, the Service revised the original plan in 1989 and focused exclusively on the Florida manatee. This first revision covered a 5-year planning period ending in 1994. The Service revised and updated the plan again in 1996, which again covered a 5-year planning period ending in 2000. In 1999, the Service initiated the process to revise the plan for a third time. An 18-member recovery team, consisting of representatives of the public, agencies, and groups that have an interest in manatee recovery and/or could be affected by proposed recovery actions, was established to draft the third revision. The latest manatee recovery plan, which also covers a 5-year planning period, was finalized in October 2001.

Threats

The main threat faced by manatees in Florida is death or serious injury from watercraft strikes. Another threat includes uncertainty in the availability of warmwater refuges as deregulation of the power industry in Florida occurs. Consequences from an increasing human population and

intensive coastal development are also long-term threats to the manatee. Their survival will depend on maintaining the integrity of ecosystems and habitat sufficient to support a viable manatee population. A viable manatee population includes values that are indicative of a stable or increasing population for the periods of analysis and provides us with additional positive recovery indicators, such as progressively higher minimum counts, increasing adult manatee survival, reproduction (cows with calves), and population growth rates.

The largest identified human cause of manatee deaths is collisions with watercraft and/or propellers of watercraft. Between 1976 and 2002, watercraft-related manatee deaths accounted for 25 percent of the total mortality. Data on manatee deaths in the southeastern United States have been collected since 1974 (O'Shea et al. 1985; Ackerman et al. 1995; FWC unpublished data). Data since 1976 were used in the following summary as carcass collection efforts were more consistent following that year. These data indicate an increase in manatee deaths over the last 25 years (Ackerman et al. 1995; FWC unpublished data). This is an increase of an average of 7.2 percent per year (Ackerman et al. 1995; FWC unpublished data). Watercraft-related manatee deaths were lower in 1992 and 1993, but increased thereafter. From 1996 to 2002, watercraft-related manatee deaths were the highest on record, which also corresponds to an increase in the manatee population and an increase in registered watercraft.

In a parallel fashion, residential growth and visitation to Florida have increased dramatically. It is expected that Florida will have 83 million visitors annually by the year 2020, up from 48.7 million visitors in 1998. In concert with this increase of human population growth and visitation is the increase in the number of watercraft that travel Florida waterways. In 2002, 961,719 watercraft were registered in the State of Florida (Division of Motor Vehicles 2003). This represents an increase of 59 percent since 1993. The Florida Department of Community Affairs estimates that, in addition to watercraft belonging to Florida residents, between 300,000 and 400,000 watercraft registered in other states use Florida waters each year.

There has been an increasing trend in watercraft-related manatee mortality in all four subpopulations over the past decade. This is reflected in increases in the average annual number of watercraft-related manatee mortalities as the period over which the average is taken becomes more recent. For instance, in the Atlantic subpopulation, the mean observed mortality due to watercraft was 25.8 deaths per year for the period 1990-1999, 29.8 per year for the period 1993-2002, and 37 per year for the 5-year period from 1998-2002. This trend is statistically significant in all four subpopulations. The slope of the increase (as fit to the period 1992-2002) does not differ between the Upper St. Johns River and Northwest subpopulations (5.96 percent) nor does it differ between the Atlantic and Southwest subpopulations (9.53 percent). To interpret these mortality rates of increase, however, it is important to compare them to the historic growth rates (1990-1999) in each subpopulation, to account for the increase in manatee mortalities that would be expected due to increases in manatee population size. In the Atlantic and Southwest subpopulations, the rate of increase in watercraft-related manatee mortality over that period exceeded the estimated growth rate of those populations (by 8.5 percent in the Atlantic and 10.6 percent in the Southwest). In the Northwest subpopulation, the rate of increase in mortality (6.0 percent) is somewhat larger than the estimated growth rate (3.7 percent).

The next largest human-related cause of manatee deaths is entrapment or crushing in water control structures and navigational locks, and this accounts for approximately 4 percent of the total mortalities recorded between 1976 and 2002 (Ackerman et al. 1995; FWC unpublished data). These deaths were first recognized in the 1970s (Odell and Reynolds 1979), and steps have been taken to eliminate this source of mortality. Beginning first in the early 1980s, gate-opening procedures were modified. Annual numbers of deaths initially decreased after this modification. However, the number of deaths subsequently increased and, in 1994, a record 16 deaths were documented. Manatee mortality decreased during 2000-2002 with 14 manatee mortalities for the 3-year period. An ad hoc interagency task force was established in the early 1990s and now includes representatives from the South Florida Water Management District, Corps, Service, Miami-Dade Department of Environmental Research Management, FWC and the DEP. This group meets annually to discuss recent manatee deaths and develop measures to protect manatees at water control structures and navigational locks as well as to prevent entrapment in culverts and pipes. The overall goal is to eliminate structure-related manatee deaths.

Other known causes of human-related manatee deaths include poaching and vandalism, entanglement in shrimp nets, monofilament line (and other fishing gear), and ingestion of debris. These account for about 3 percent of the total mortality from 1976 to 2002. Together, deaths attributable to these causes have remained constant and have accounted for a low percentage of total known deaths, *i.e.*, about 4 percent between 1976 and 1980, 3 percent between 1981 and 1985, 2 percent between 1986 and 1991, and 2 percent between 1992 and 2002 (Ackerman et al. 1995; FWC unpublished data). Entrapment in shrimp nets is the largest component of this category. Eleven deaths between 1976 and 1998 (seven in Florida, four in other states) were thought to be related to shrimping activities (Nill 1998). These deaths have become less common since regulations on inshore shrimping, the 1995 Florida Net Ban regulations, and education efforts about protecting manatees were implemented.

These data on causes of manatee mortality, particularly the increasing number of watercraft-related manatee deaths, should be viewed in the context of Florida's growing human population, which increased by 130 percent since 1970, from 6.8 to 15.7 million people (Florida Office of Economic and Demographic Research 2001). The rise in manatee deaths during this period is, at least in part, the result of the increasing numbers of people and watercraft sharing the same waterways.

As Florida's human population increases (the State of Florida is projected to have the third largest human population in the United States by 2030), increased human/manatee interactions are expected to occur. Vessel registration in Florida is also expected to increase within the next 5 years, placing more boats in manatee-inhabited waters, thereby adversely affect the health of manatees at the individual and population levels, through sublethal and lethal events. All of the life history parameters of manatees, including movement and foraging patterns, reproduction, and social interactions, will be affected. The frequency and magnitude of watercraft-manatee interactions, such as boat strikes and separation of calves from their mothers, are projected to increase with vessel density.

Human activity has other effects on manatees besides direct mortality. Dredge and fill activities, polluted runoff, and propeller scarring have resulted in the loss of vegetated areas. Quiet backwaters have been made more accessible to human activities, and increasing levels of vessel traffic have made manatees increasingly vulnerable to watercraft collisions in travel corridors. For example, industrial warmwater discharges and deep-dredged areas are now used as wintering sites, stormwater pipes and freshwater discharges in marinas provide manatees with drinking water, and the imported exotic plant, hydrilla (*Hydrilla verticillata*), which has supplanted native aquatic species), has become an important food source at wintering sites.

While some changes substitute for natural biological needs, some activities have an adverse effect on the species. The loss of industrial warmwater discharges can result in the deaths of individuals using these sites. Other activities may also affect manatees, albeit on a much more subtle level. Harassment by watercraft and swimmers may drive animals away from preferred natal areas and winter refugia, and the loss of vegetation in certain areas (*e.g.*, winter foraging areas) may require manatees to travel greater distances to feed. The impact of these kinds of activities on the survival, recovery, and mortality of the species is not fully understood.

Natural causes of death include disease, parasitism, reproductive complications, and other nonhuman-related injuries as well as occasional exposure to cold and red tide (O'Shea et al. 1985; Ackerman et al. 1995). These natural causes of death accounted for 13 percent of all deaths between 1976 and 2002 (FWC unpublished data). Perinatal deaths accounted for 20 percent of all deaths in the same period. A prominent natural cause of death in some years is exposure to cold. Following a severe winter cold spell at the end of 1989, at least 46 manatee carcasses were recovered in 1990; cause of death for each was attributed to cold stress. Exposure to cold is believed to have caused many deaths in the winters of 1977, 1981, 1984, 1990, 1996, and 2001; and have been documented as early as the 19th century (Ackerman et al. 1995; O'Shea et al. 1985; FWC unpublished data).

In 1982, a large number of manatees also died coincidentally with a red tide dinoflagellate (*Gymnodinium breve*) outbreak between February and March in Lee County, Florida (O'Shea et al. 1991). At least 37 manatees died, perhaps in part, due to incidental ingestion of filter-feeding tunicates that had accumulated the neurotoxin-producing dinoflagellates responsible for causing the red tide. In 1996, from March to May, at least 149 manatees died in a red tide event over a larger region of southwest Florida (Bossart et al. 1998; Landsberg and Steidinger 1998). Although the exact mechanism of manatee exposure to the red tide brevetoxin is unknown in the 1982 and 1996 outbreaks, ingestion, inhalation, or both are suspected (Bossart et al. 1998). Since January 2003, the current red tide outbreak has been responsible for the deaths of 75 manatees (<http://www.floridamarine.org>). The critical circumstances contributing to red tide-related deaths are concentration and distribution of the red tide, timing and scale of manatee aggregations, salinity, and timing and persistence of the outbreak (Landsberg and Steidinger 1998).

Perinatal deaths include aborted fetuses, stillborn, or those that die of natural causes within a few days of birth. Some may die from disease, reproductive complications, and/or congenital abnormalities. The cause of many perinatal deaths cannot be determined, because these carcasses are generally in an advanced state of decomposition at the time of recovery. Additionally, watercraft-related manatee injuries or disturbance or other human-related factors affecting pregnant and nursing mothers may also be responsible for some of the perinatal deaths. It has been suggested that some may die from harassment by adult males (O'Shea and Hartley 1995). Between 1976 and 2002, perinatal deaths increased at an average of 9.2 percent per year (Ackerman et al. 1995; FWC unpublished data).

Status and Distribution of the Southwest Subpopulation

Manatee distribution and dispersal patterns, and numbers of individuals within an area, can vary considerably from year-to-year and season-to-season. This variability in dispersal patterns is dependent on a variety of biotic and abiotic factors, such as warmwater discharges, freshwater supplies, high quality feeding areas, and mating season.

The projects discussed in this biological opinion are located in waters accessible to the Southwest subpopulation of manatees. The Southwest subpopulation comprises approximately 42 percent of the total Florida manatee population. The Southwest subpopulation of manatees includes all coastal areas from Pasco County south to Whitewater Bay in Monroe County as well as DeSoto, Glades, and Hendry Counties.

Collection of life history data for the Southwest subpopulation only began in 1995 and is not sufficient to estimate survival rates. The Service understands that the current status statement of the Southwest subpopulation presented by the MPSWG is incomplete. However, we also understand that the other qualitative information warrants consideration in developing a complete view of the overall status of the subpopulation. We believe that there are more manatees now than there were in the 1970s and 1980s. However, this does not mean that the threats have been reduced. For instance, when compared with manatee mortality resulting from watercraft collisions (17 deaths), red tide (75 deaths) has had a greater effect on the Southwest subpopulation for the same time period (January-July 2003).

Threats to the Southwest Subpopulation

Data on manatee deaths in the Southwest subpopulation have been collected since 1974 (O'Shea et al. 1985; Ackerman et al. 1995; FWC unpublished data). Data since 1976 were used in the following summary as carcass collection efforts were more consistent following that year. These data indicate an increase in manatee deaths over the last 26 years. This increase can be attributed to increases in watercraft-related manatee mortality and perinatal deaths (MMC 1993), which also corresponds to an increase in the human population and registered watercraft (Wright et al. 1995).

Between 1976 and 2003, 2,223 manatee deaths were recorded within the Southwest subpopulation. The cause of death categories includes watercraft, flood gate/canal lock, other human causes, perinatal, cold stress, natural, and undetermined. Death category quantities for the period above are as follows:

watercraft	gate/lock	other human	perinatal	cold stress	natural	undetermined
504	32	38	363	89	476	721

Another threat includes the uncertainty in the availability of warmwater refuges as deregulation of the power industry in Florida occurs. We believe that an increasing human population and intensive coastal development are also long-term threats to the manatee. As Florida's human population increases, particularly in coastal counties, threats to submerged aquatic vegetation communities may increase. These submerged aquatic vegetation communities are an important component in the survival and recovery of the manatee. The combined effects of propeller scarring of seagrass beds, water pollution from stormwater discharges, new docks, dredging, and filling may further degrade the seagrass beds. These activities may continue to degrade habitat reducing foraging opportunities for manatees.

Manatee Protection Plans

Concerned with an increased number of manatee mortalities and boating accidents, the Governor and Cabinet directed the Florida Department of Natural Resources (DNR) in June 1989 to make recommendations for specific actions to protect the manatee and its habitat and to make the State's waterways safer for the boating public. DNR's final report, *Recommendations to Improve Boating Safety and Manatee Protection on Florida Waterways*, found that over 80 percent of all watercraft-related manatee mortality occurred in 10 counties: Brevard, Broward, Citrus, Collier, Dade (now Miami-Dade), Duval, Lee, Martin, Palm Beach, and Volusia. Though watercraft-related mortality was not high for St. Lucie, Indian River, and Sarasota, these three counties were considered important areas as travel corridors as well as foraging and resting areas for manatees.

Subsequent to this report, the Governor and Cabinet directed each of these 13 coastal (= key) counties to develop a Manatee Protection Plan (MPP). The purpose of an MPP is to present a summary of existing information about manatee use and watercraft use within the county and to develop strategies to balance manatee protection, resource protection, waterway uses, boating facility siting, speed zones and signage, boating safety, and to educate the boating public. The final report recommended new or expanded boating facilities in these key counties should be limited to one powerboat slip per 100 linear feet of shoreline (the 1:100 ratio) until the county implements its State-approved MPP, including a boating facility siting component. Watercraft access projects that are consistent with a county's MPP provides a level of boater access and activity that is within the capacity of the manatee protection measures provided. Projects that are

not consistent with an MPP may exceed the capacity of the protective measures and, therefore, may result in incidental take of manatees. Countywide MPPs are identified in the *Florida Manatee Recovery Plan* (Service 2001) as a method for protecting manatees and manatee habitat.

Citrus County was the first county to have a State-approved MPP in 1991. The county's MPP identified actions that address manatee mortality and included a boating facility siting plan. The MPP also discussed conservation measures to protect manatee habitat. Subsequent to its approval, the State established regulatory speed zones for watercraft. The State of Florida subsequently approved MPPs for Collier County in May 1995 followed by Miami-Dade County in December 1995; Duval County in June 1999; Indian River County in August 2000 which was amended in February 2002; St. Lucie County in March 2002; Martin County in June 2002; Brevard County in February 2003; and Sarasota County in February 2004. The State and the Service are presently reviewing Lee County's draft MPP.

The Florida Legislature recognized the importance of site planning for marinas in passing Chapter 296-2002, Laws of Florida, which became effective on May 31, 2002. This law amended Section 380.06(24), Florida Statutes, to establish a process for exempting marinas from the Development of Regional Impact (DRI) review process, provided that certain planning requirements are met. Specifically, marinas are exempt if the local government comprehensive plan includes a boating facility siting plan that incorporates appropriate siting criteria as referenced in the statute. A boating facility siting plan allows local governments to direct marinas, boat ramps and other boating facilities to suitable locations that minimize impacts to marine resources. Rather than addressing the impacts of a proposed marina through the DRI process, the new law establishes a process for adopting criteria to ensure marinas are sited in a manner that minimizes regional impacts to marine resources. Through a boating facility siting plan, local governments can encourage marinas at appropriate locations, while directing marinas away from sites that would adversely impact important resources.

The Service believes that county MPPs are one of the best vehicles to address such issues as boating facilities (marinas, docks, boat ramps, and dry storage areas); boating activity patterns; manatee information; a boat facility siting plan; manatee protection measures; and an education and awareness program for the boating public. They are valuable planning tools and provide an excellent venue for local manatee protection efforts. In addition, it is our view that an effective MPP must contain components that address manatee protection areas (e.g., manatee refuges), speed zone enforcement, funding for manatee protection efforts, and a reporting/monitoring element. Implementation of a State-approved MPP will have met State standards and addressed our concerns in maximizing benefits to the manatee while providing regulatory certainty to the public. The Service is currently working with Lee County regarding the development of their MPP to address appropriate protection measures for manatees within the county.

Analysis of the Species/Critical Habitat Likely to be Affected

Due to the increase in the number of single-family docks and slips resulting from the proposed actions, the Corps has determined that the proposed projects "may affect" the manatee. We

concurred with the Corps' determinations and have performed a more comprehensive analysis of the effects of the proposed actions in order to determine whether or not the proposed activities are likely to adversely affect the Southwest subpopulation of manatees.

The construction of these 133 single-family docks resulting in 139 slips may affect the manatee and its critical habitat by increasing watercraft and human presence in the action area, and increasing the potential to adversely affect submerged aquatic resources (*i.e.*, seagrasses). These actions may disrupt, disturb, or delay manatee migration to warmwater refugia, freshwater drinking sources, and cause additional stress to manatees and calves present in the action area. An analysis of these project-related effects and impacts to seagrasses will be considered further in the remaining sections of this document.

ENVIRONMENTAL BASELINE

This section analyzes all past and ongoing human and natural factors leading to the current status of the manatee in the action area. In 2000, the Save the Manatee Club, other environmental groups, and several individuals filed suit in the District of Columbia against the Corps and the Service. Plaintiffs alleged violations of the ESA, the National Environmental Policy Act, the MMPA, and the Administrative Procedure Act, with regard to the Florida manatee, and alleged that the Clean Water Act Section 404 permitting of Florida boating facilities was responsible for watercraft-related manatee mortality in Florida's coastal counties.

A settlement agreement was signed by all parties of the lawsuit on January 5, 2001, containing the following elements to which the Service agreed to complete and/or implement: (1) revision of the manatee recovery plan; (2) designation of manatee refuges and sanctuaries as manatee protection areas in peninsular Florida; (3) promulgation of a rule for incidental take of manatees under the MMPA; and (4) development of an interim guidance document to be used in section 7 consultations pending completion of the MMPA rule. The designation of refuges and sanctuaries as well as the interim strategy were short-term measures intended to address recent levels of mortality and that a long-term solution to address historic levels of mortality depended on the development of small take regulations under the MMPA.

Within the Southwest subpopulation, the Service, based on an analysis of manatee mortality data, identified four prerequisites necessary to ensure that incidental take would be unlikely to occur. These four prerequisites are: (1) appropriate speed zones; (2) appropriate signage; (3) speed zone enforcement to prevent watercraft collisions with manatees from occurring as a result of the proposed project; and (4) placement of these measures prior to project implementation. If these prerequisites are not met, the Service believes that a new watercraft facility in this area would result in adverse effects to manatees and the Service would identify the area as an area with "inadequate protection."

Within the range of the Southwest subpopulation, the Service designated in 2001 several locations as areas with "inadequate protection" including a portion of Lemon Bay and Peace River in Charlotte County; a portion of Chokoloskee Bay in Collier County; and Mullock Creek,

Ten-Mile Canal, the Caloosahatchee River, and the waters around the northern tip of Pine Island (Bokeelia) in Lee County. Since designating these waterways as “areas of inadequate protection” for the manatee, the Service has been working with the State, county, and city entities to ameliorate the watercraft collision threats specific to these regions.

Although many actions that the State has identified to reduce watercraft-related manatee mortality (*e.g.*, speed zones, increased State law enforcement, public education) apply to the manatee’s conservation throughout the species’ range in the State, other actions proposed by individual counties, cities, and other municipalities, and in some instances Federal and State agencies, are specific to designated areas. For example, a State-approved MPP is developed by the county, but a local MPP can be developed and implemented by municipalities as well. In addition to those approved by the State, manatee speed zones can be designated by both the county and city with the county Sheriff as well as city Police Department providing enforcement of these local zones within their respective jurisdictional boundaries. Specific Federal and State actions can include refuges, sanctuaries, and parks with enforcement of speed zones within these refuges, sanctuaries, and parks.

ACTION AREA

According to FWC’s Caloosahatchee River study (2002), the most likely travel route for watercraft leaving slips in this reach is to travel downstream from the Franklin Locks and out of the mouth of the river into San Carlos Bay. Vessels moored near the Franklin Locks will have to travel a distance of approximately 24 miles to access the bay. From the bay, watercraft will either access the Gulf of Mexico, Pine Island Sound, or Matlacha Pass. Therefore, for the purposes of this consultation, the Service defines the action area for this biological opinion as all waters within Reach 32 of the Corps’ Reach Characterization for Florida Waters (Corps 2001).

Status of the Species Within the Action Area

All waters within Reach 32 are designated as manatee critical habitat. The critical habitat designation for the manatee did not include specific primary or secondary constituent elements. However, important components of manatee critical habitat include areas of submerged vegetation for foraging, shallow areas for resting and calving, channels for travel and migration, warmwater refugia for cold weather events, and fresh water for drinking.

Manatee abundance in Lee County has been documented repeatedly through aerial surveys conducted from 1995 to 2002; however, the survey data do not indicate the number of manatees observed in Reach 32. Though there were three synoptic aerial surveys performed statewide during January 2003, the number of manatees observed within Lee County is not currently available for this year.

Survey year	1995	1996	1997	1998	1999	2000	2001	2002
Manatee abundance	351	480	417	221	374	316	485	347

Manatees aggregate in areas adjacent to the Fort Myers Power Plant discharge canal, downstream of the Franklin Locks, and within the natural waterways and manmade canal systems (such as those found in the City of Cape Coral) adjoining the river as warmwater refugia during the winter months. As many as 434 manatees have been counted at the power plant discharge area in a single day (FWC 2002). They also use other waterways outside the action area, but in Lee County, as warmwater refugia.

Many of these connecting tributaries and artificial waterways are used by manatees for freshwater sources and as areas of minimal disturbance for resting and calving as well as additional warmwater refuge sites (FWC 2002). Such areas include the Eight Lakes, Chiquita Canal, and Bimini Basin within the Cape Coral canal system.

Except for the area near the confluence of the Caloosahatchee River and San Carlos Bay, submerged vegetation is very limited in its abundance and distribution within the action area (FWC 2002). Seagrasses occur along the south shoreline of the river between channel markers 74 and 93. Freshwater grasses occur as discontinuous strips upstream near both shorelines between channel markers 15 and 61.

Based on satellite and radio-tag telemetry as well as aerial surveys, manatees have established cold and warm season travel paths within Reach 32 (FWC 2002). Movements during the cold season are more restricted than the warm season and are concentrated near the Fort Myers Power Plant warmwater effluent and the 56-foot deep channel downstream of the Franklin Locks. Some individuals were recorded traveling to and from other warmwater refugia within and outside of the action area. During mild winters ($> 68^{\circ}\text{F}$ ambient temperature), manatees will move away from these refugia to feed within and outside the action area. Warm season use of the action area indicates that manatees use the Caloosahatchee River as a travel corridor between Edison Bridge (channel marker 41) and Shell Point (channel marker 93) to access foraging areas both upstream and downstream (FWC 2002). Manatees also use the residential canal systems adjoining the river, like Cape Coral, as a source for fresh water and for resting.

According to the telemetry data (satellite and radio-tags) and aerial surveys, manatees typically travel within a $\frac{1}{4}$ mile of each shoreline of the river between Edison Bridge and Shell Point (FWC 2002). Staying close to the shoreline allows manatees to opportunistically feed on submerged vegetation and drink fresh water or rest within the connecting waterways. Traveling in this manner (shallower waters closer to shore) minimizes the likelihood of interaction between manatees and watercraft since vessel traffic typically travels in the marked channel of the river. Further analysis of the telemetry data indicates that manatees appear to cross the river in the narrow areas near Redfish Point (channel markers 72 to 76) and Shell Island (channel markers 93 to 99). The Redfish and Shell Island sections of the river represent specific areas where manatees and watercraft overlap during their travels.

Factors Affecting Species Habitat Within the Action Area

According to the FWC's recent study of manatee mortality, manatee habitat, and boating activity in the Caloosahatchee River (2002), vessel traffic increases as the day progresses and doubles on the weekends compared to weekdays. The highest volumes of traffic were recorded in the spring and the lowest volume in the winter. Highest vessel traffic densities occurred at Shell Point where the Caloosahatchee River and San Carlos Bay converge.

Within the action area, the first manatee speed zones were established in the Caloosahatchee and Orange rivers around the Fort Myers Power Plant in 1979. Water to cool the power plant was drawn from the Caloosahatchee River and discharged into the Orange River. These initial zones were seasonal zones designed to protect the herd of manatees wintering near the power plant. Watercraft traveling in the area were required to travel slow and idle speeds from November 15 through March 31 each year.

Additional speed zones were established in the Caloosahatchee downstream from the power plant in November 1989. These zones were designated as slow speed year-round and unregulated beyond a ¼ mile from shore. Sign posting of these zones was completed in March 1991. The State passed a rule establishing manatee speed zones countywide in November 1999 (68C-22.005 Florida Administrative Code). Additional signs and buoys were installed by Lee County in 1999 and upgraded in the spring and summer of 2001. These changes were necessary to improve awareness and enforceability of the existing speed zones (Steve Boutelle, Lee County, personal communication) within the river. In response to the State's rule establishing manatee speed zones throughout the county, the City of Cape Coral designated all the canal waterways within its jurisdiction as idle speed zones (along with appropriate signage) in March 2000.

For a speed zone to be enforced the zone must be correctly signed and the signs must be in compliance with State-approved design parameters. All zones within the Lee County, including the action area, were posted by the county by July 2001 with speed zone signs in compliance with State-approved design parameters (68D-23 Florida Administrative Code).

Through an analysis of threats to the manatee, the Service designated Reach 32 as an "area of inadequate protection" for manatees in February 2002. In accordance with the final interim strategy implemented on August 21, 2001 (66 FR 43885), the Service assessed the effectiveness of the State's law enforcement efforts by comparing watercraft-related manatee mortality data for 2001 with mortality data for 2000. From December 31, 2000, to December 31, 2001, manatee mortality increased from 13 to 23 individuals in Lee County.

Despite the establishment of manatee speed zones and the appropriate signage associated with these zones as well as an increase in law enforcement personnel provided by the State, watercraft-related manatee mortalities increased in Lee County from 13 to 23 individuals for

2000 and 2001, respectively. From January 1, 1999, through December 20, 2004, 80 manatees died as a result of a watercraft collision in the county, 26 of those deaths (33 percent) occurred in Reach 32.

Year	1999	2000	2001	2002	2003	2004
Lee County	10	13	23	13	9	12
Reach 32	3	5	10	7	0	1

As previously stated, watercraft-related manatee death and serious injury is the most important human-related factor affecting the status of the species within the action area. Based on an analysis of the four factors the Service uses to determine the likelihood of adverse effects to manatees from the proposed actions (see Environmental Baseline introduction), the Service believed that deficiencies in these factors were present within Reach 32 and these deficiencies needed to be addressed to remove the designation of the Caloosahatchee River as an “area of inadequate protection.” The following provides a summary of the actions taken to address these deficiencies and provides the current status of the species in the action area.

To address recent manatee mortality consistent with the January 2001 settlement agreement and in response to the Court Order issued in August 2002, the Service designated 13 manatee protection areas in peninsular Florida. Shell Island was one of these areas established as a manatee refuge with a year-round slow speed zone in November 2002 (67 FR 68450). The appropriate signage for the Shell Island manatee refuge was installed in April 2003. This independent action was consistent with the findings of the Caloosahatchee River study (FWC 2002) which identified the confluence of the river and San Carlos Bay as an area supporting a high diversity of watercraft activities (*e.g.*, fishing, cruising, and sailing) resulting in high density of vessel traffic in a narrow area where manatees also travel.

The southern boundary of the City of Cape Coral borders the north shore of the Caloosahatchee River between channel markers 58 and 93. In addition to the existing ¼ mile year-round slow speed zone in the river that borders the City of Cape Coral (established by the State in November 1999), all of the canals within the City of Cape Coral are designated as idle speed zones (established in March 2000). Appropriate signage has been installed by the City of Cape Coral to clarify these speed zones within their jurisdictional waters and to inform boaters of the ¼ mile year-round slow speed zone in the river. Watercraft must idle when traveling within these canals and then travel at slow speed for a ¼ mile in the river when exiting the canal system.

In conducting a more detailed review of the recent study of the Caloosahatchee River (FWC 2002), it appears that manatee use in the river occurs within the current ¼ mile (1,320 feet) shoreline buffer. This is consistent with the existing zones in the Caloosahatchee River which provide protection over most of the areas within the river where manatees and watercraft are likely to interact. However, our analysis of the data indicated that an additional zone was necessary to address a narrow area for traveling manatees and watercraft traffic in the

river. The Caloosahatchee River study identified Redfish Point as a narrow area where watercraft and manatees overlap in their travels along the river, thereby increasing the likelihood of manatee-watercraft interaction.

The Service published its final rule designating the Caloosahatchee River and San Carlos Bay as a manatee refuge in the Federal Register on August 6, 2003, (68 FR 46870). In accordance with the Stipulated Order issued by the Court on March 18, 2003, the Service will place permanent or temporary signs/buoys within the river and bay by August 31, 2003, and notify the public on the applicable restrictions. The Service will initiate the process for placing permanent signs at designated manatee protection areas by September 2003. [Note - the various speed zones and applicable speed limit restrictions are discussed in the indirect effects section of the Effects of the Action.]

The importance and significance of the posting of speed zones and appropriate signage is seen in the enforcement of the zones by law enforcement officers and increased compliance by local boaters. Law enforcement officers from the Lee County Sheriff's Office as well as the cities of Fort Myers and Cape Coral enforce posted speed zones. The City of Cape Coral increased their law enforcement staff to six officers by adding three more officers for additional on-the-water enforcement in January 2003. The City of Cape Coral is now providing two full-time officers to patrol a 12-hour shift each day, 7 days per week. To more effectively increase law enforcement in county jurisdictional waters, the Lee County Sheriff's Office has also deputized City of Cape Coral police officers, thereby, effectively increasing enforcement on the river. Furthermore, the Sheriff's Office has received funds (\$281,000) from an outside source to hire an additional deputy to enforce manatee speed zones. These eight deputies are now patrolling 12-hour shifts each day, 7 days per week.

According to FWC's Division of Law Enforcement, there were 10 officers assigned to Lee County as of January 1, 2001, with another 3 officers assigned on July 1, 2001, for a total of 13 officers. However, as a result of the terrorist attack on September 11, 2001, two of these officers were activated for military duty, thus reducing the number of sworn officers available to patrol manatee speed zones within Lee County to 11 individuals through 2002.

The Service's Division of Law Enforcement also provides speed zone enforcement through special task force events. The law enforcement officers (special agents, refuge officers) target their patrol efforts on manatee speed zones where the risk to manatees encountering non-compliant boaters has been high. Service law enforcement operations conducted five task force events in Lee County during 2002, compared with three such events for 2001. This effort continued with the Service's Law Enforcement Division conducting seven task force events during January-June 2003, with more events scheduled throughout the remainder of the year. Furthermore, the Lee County Sheriff's Department, Cape Coral Police Department, and Sanibel Police Department Marine Units have all increased their enforcement efforts (staff and patrols) significantly throughout the county.

This increased enforcement action has resulted in a noticeable increase in boater compliance. Based on the task force events conducted since January 2003 (1,264 enforcement hours), Service Law Enforcement has observed that boater compliance with the current speed zones is greater than 90 percent. In the Shell Island Manatee Refuge, compliance has increased from an observed average of 80 percent during January-March of this year to an observed estimate of approximately 99 percent during the May-June task force events. The observed increase in boater compliance is in the same area where the FMRI (FWC 2002) conducted its compliance rate study which noted a 35 percent compliance rate with boat traffic peaking in excess of over 400 boats per hour.

Enforceability of designated speed zones in Lee County has been substantially reduced by a December 12, 2003, Lee County Circuit Court ruling. This ruling was the result of 10 citations issued for speeding in manatee speed zones. William Wilkinson and nine other Lee County boaters were cited for speeding in manatee speed zones in 2002 (dates unknown). Wilkinson et al. sued the FWC claiming that the speed zones were unconstitutional because they were not based on sound science. On November 12, 2002, the Circuit Court ruled in favor of Wilkinson et al. FWC filed a notice to appeal that ruling on May 16, 2003. Subsequently, FWC filed three requests for an extension of time, but the agency never filed their initial brief. The court granted their extension requests and ordered the agency (on July 17, September 5, and October 1) to show cause why their appeal should not be dismissed for failure to file an initial brief. On December 12, 2003, the appellate court dismissed FWC's appeal citing that they failed to comply with the appellate rules and the Court's prior orders.

The Court's ruling affects speed zones in Estero Bay, Matlacha Pass, southwest side of Pine Island, eastern San Carlos Bay, and the mouth of the Caloosahatchee River. FWC's Law Enforcement Division has notified members of the Lee County Law Enforcement Task Force that FWC officers will not be enforcing any of the affected by the ruling. These zones include:

Matlacha Pass - All Slow Speed areas [68C-22.005(2)(d)1 and (d)2].

York Island/Chino Island area of Pine Island Sound - All Slow Speed areas [68C-22.005(2)(g)4].

North of the mouth of Caloosahatchee River - Slow Speed areas downstream of marker 93 [68C-22.005(2)(d)4].

Punta Rassa/Shell Creek area - All Slow Speed areas [68C-22.005(2)(d)3].

Estero Bay area - All seasonal Slow Speed/25 mph areas in Estero Bay, Hell Peckney Bay, and Hendry Creek [68C-22.005(2)(f)2, (f)3 and (f)4].

On March 2, the 2nd District Court of Appeals in Lakeland, Florida denied the review of the commission's case to overturn 20th Circuit Court's ruling that five state manatee protection zones in Lee County are unconstitutional. The Commission is assessing its appeal options.

The Court's ruling does not affect Federal speed zones in Lee County. The Service established Shell Island as a manatee refuge in November 2002, and the Caloosahatchee River-San Carlos Bay as a manatee refuge in August 2003.

As a result of the court's decision and based on the best available data, the Service will exercise its authority under the Federal ESA and the MMPA, and use an emergency designation to establish the Pine Island-Estero Bay Manatee Refuge.

These Federal protection areas correspond exactly to the previous State designations in these areas. With this emergency designation, the Service is initiating the formal rule making process to make this designation permanent. This process will include an opportunity for public comment.

Aside from enforcement, another factor influencing boater compliance is education. The county mailed over 30,000 copies of the Lee County Boater's Guide to every person who registered a vessel in the county during fiscal year 2002-2003. Total distribution to date is over 270,000 copies since 1997. This guide is regularly updated to show the latest information on manatee protection and vessel speed regulations and is the only comprehensive source for this information available to the public in the county. [Note - in light of the recently designated manatee refuge for Caloosahatchee River-San Carlos Bay, the county anticipates that the guide will be revised accordingly.] These guides are distributed to all area marinas, bait shops, boat dealers, realtors, and chambers of commerce. Excerpts from the Boater's Guide have been used in signs placed at all local public boat ramps. The signage depicts an overview of Lee County and its speed zones as well as a detailed view of the area specific to the location where a sign is installed.

Lee County has also worked extensively to supplement manatee education by producing a Boaters Environmental Education Module for new boaters. The intent is to make this module available for use by all groups conducting boater education classes, including the local Power Squadrons and Coast Guard Auxiliaries. These additional materials are integrated into current programs, thereby supplementing information presently provided in boater's education classes.

Additionally, the Lee County Sheriff's Office has created a video to educate new boaters and visitors about Lee County speed zones and manatee protection. The video is used as part of a traveling enforcement display at boat shows and other public events and includes a mock enforcement vessel and sample signage.

Finally, Lee County's DNR staff accompanies FMRI staff on aerial flights of Lee County during synoptic surveys. The county's intent is to have at least one staff member accredited by the State as an official "manatee spotter." This person would then be able to conduct aerial surveys of Lee County, taking note of the various areas in which manatees are congregating. The information obtained during these aerial flights will be used (1) by local law enforcement units in the allocation of resources for patrol and enforcement situations (comparable to our Federal task force events) and (2) by local media in a weekly manatee report, in much the same manner as the

weekend fishing and boating forecasts. This effort provides an outlet to inform the boating public of the movements of manatees in Lee County, thereby increasing awareness and decreasing the potential for vessel/manatee interactions. Boater education is an integral component of Lee County's overall manatee protection efforts. Its effectiveness among the residents living along the Caloosahatchee River, including the City of Cape Coral, appears to be reflected by the high level of compliance from boaters in Reach 32.

In reviewing the baseline and to determine if speed zones or levels of enforcement were sufficient to minimize the likelihood of adverse effects to manatees, we looked at existing speed zones, levels of enforcement, manatee aggregation areas, warmwater refugia, freshwater sources, seagrass beds, and mortality data, as well as other biological factors.

Based on this review, we focused on manatee mortality because this is the only form of take for which quantitative data are available. For the Caloosahatchee River, the result of all these factors (*i.e.*, zones in the right place with the correct signage for Federal and local law officers to enforce) is that only one manatee watercraft-related mortality was recorded in the river from January through July 2003. Compared to the same time intervals for 2001 and 2002, this is a decrease in manatee mortality when four and six manatees, respectively, died due to watercraft collisions. Furthermore, the one watercraft-related manatee mortality recorded in May 2003 was the first such death since September 2002 (a period of 10 months) and the second such death since February 2002 (a period of 17 months) in the river. However, caution must be used when interpreting data on carcass locations resulting from watercraft collisions because such locations do not indicate where an animal was struck or injured or died (FWC 2002). Currents, tides and wind also play a role in moving carcasses to where they are actually recovered.

We know that sublethal forms of take (such as injury and harassment) occur, but some of these forms are immeasurable. Sublethal injury to manatees due to boat interactions is a significant factor. On a continued basis, this type of injury could have an impact on maintaining a healthy and viable population. In that regard, most manatee carcasses examined bear scars from previous strikes with watercraft (Wright et al. 1995), and a significant number of living, but scarred, manatees exist. A photo-identification system and database of scarred manatees currently maintained by the Sirenia Project (Beck and Reid 1995) contain only individuals with distinct scars, the vast majority of which appear to have been inflicted by propeller blades or keels. This database now documents 1,184 living individuals scarred from collisions with boats. Most of these manatees (1,153, or 97 percent) have more than one scar pattern, indicating multiple strikes with boats. Carcasses examined at necropsy also bear healed scars of multiple past strikes by boats; one extreme case, recently noted by the FMRI, had evidence of more than 50 past boat collisions (O'Shea et al. 2001). The severity of these boat strikes, including completely severed tails, major tail mutilations, and multiple disfiguring dorsal lacerations, is thought by some manatee researchers to impact population processes by reducing calf production (and survival) in wounded females, although there are no reliable data to establish this cause and effect relationship. Overall, the full effects of harm to manatee population dynamics resulting from boat strikes remain largely unknown.

In addition to direct injury due to boat strikes, harassment by boats and swimmers may drive animals away from preferred sites thus altering manatee behavior and movement patterns. Significant and/or long-term harassment may require manatees to travel greater distances to feed or to reach warmwater refugia. Furthermore, some researchers are concerned that manatee calves can be separated from their mothers and some individuals may be driven from preferred warmwater refuges due to harassment.

Based on the increased enforcement efforts by Federal and local law enforcement entities as well as a reduction in watercraft-related manatee mortality in 2002, the Service removed the “area of inadequate protection” designation from the Caloosahatchee River on May 13, 2003. The Service continues to monitor and document any changes in manatee mortality, law enforcement operations, speed zone compliance, ongoing Federal and local task force events, existing speed zones, and associated signage.

Summary

Designated manatee critical habitat is present within the action area and important components of manatee critical habitat are also present. These components, although not identified as primary or secondary constituent elements of critical habitat, include seagrasses for foraging, shallow areas for resting and calving, channels for travel and migration, warmwater refugia for cold weather events, and fresh water for drinking. Very little seagrass is present in the action area, excluding a small area near the confluence of the Caloosahatchee River and San Carlos Bay. Manatees congregate at the Fort Myers Power Plant discharge canal, the area of Franklin Locks, and within the natural waterways and manmade canal systems adjoining the river during the colder months.

Manatee mortality has decreased in the Caloosahatchee River from four and six watercraft-related manatee deaths during January through July 2001 and 2002, respectively, to only one watercraft-related death recorded in the river during the same time period for 2003. Furthermore, the one watercraft-related manatee mortality recorded in May 2003 was the first such death since September 2002 (a period of 10 months) and the second such death since February 2002 (a period of 17 months) in the river. However, caution must be used when interpreting data on carcass locations resulting from watercraft collisions because such locations do not indicate where an animal was struck or injured or died (FWC 2002). Currents, tides and wind also play a role in moving carcasses to where they are actually recovered.

This decrease in mortality is a direct result of established manatee speed zones posted with the appropriate signage coupled with increasing enforcement efforts from Federal, State, and local law enforcement entities which lead to improved boater compliance. As these factors are maintained or improved as needed, the Service expects this decreasing trend in manatee mortality to continue.

EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed actions on the manatee and/or its critical habitat and its interrelated and interdependent activities.

Factors to be Considered

New watercraft access projects may have a number of direct and indirect effects on manatees and manatee habitat. Direct impacts include potential direct harm or harassment of manatees during construction activities and are generally addressed through application of the *Standard Manatee Construction Conditions* (FWC 2001). Anticipated direct impacts to habitat, such as the presence of seagrasses within the project footprint are minimized through modifications in the project design during the permit review process and/or the application of *Dock Construction Guidelines for Florida* developed by the Corps and the NOAA Fisheries (Corps and NOAA Fisheries 2001). These two minimization efforts are routinely included as conditions of Department of the Army permits issued for construction projects in manatee habitat, and have previously undergone section 7 consultation.

Indirect effects to manatees include effects to routine movement and migration patterns to freshwater, foraging, calving, and breeding areas, and associated behavior patterns. Indirect effects also include effects to manatee habitat caused by operation of the proposed watercraft access projects. Construction of the proposed watercraft access projects may provide increased access by watercraft to areas frequented by manatees or may alter watercraft traffic patterns in such a way as to increase watercraft-manatee interactions. This may lead to increased harassment of manatees or increased watercraft collisions with manatees. Depending on the location, construction of watercraft access projects may encourage watercraft to travel through important manatee habitat features such as submerged aquatic vegetation, warmwater refugia, and freshwater, foraging, calving, and breeding areas, thereby potentially altering manatee habitat and manatee habitat use patterns.

The proposed actions are in areas that are occupied by the manatee and within designated critical habitat. The timing of construction for these projects (when they will be constructed) as they relate to sensitive periods of the manatee's life cycle is unknown. Manatees may be found adjacent to the proposed construction footprints during any time of the year. However, due to cooler water temperatures generally present during mid-winter, there is a lower likelihood that manatees will be adjacent to the construction footprints during this time. There is a high probability that, during the cooler months, manatees will be present at warmwater sites located in and adjacent to the Caloosahatchee River. Each individual single-family dock will be constructed in a single, disruptive event, which depending on the design of the structure can take from 1-2 days to 4-5 days. Once construction is completed, perpetual activities certain to follow include maintenance of the dock structure and watercraft entering and leaving the dock. According to the marine industry, the decking on docks (single-family and multi-slip) lasts from 10-15 years whereas the undercarriage of a dock (the pilings and framework) lasts 20-30 years. The entire construction sequence for each individual dock is expected to be completed in less

than 1 week, though not all 133 single-family docks will be constructed at once. Although users of watercraft associated with these projects must operate at posted speeds within the action area, physical contact with manatees or harassment of manatees is still possible.

Analyses for Effects of the Action

The Corps has determined that the proposed 133 single-family docks resulting in 139 slips are within Reach 32, as defined by the Corps' Reach Characterization Analysis. Manatees are found in the waters surrounding the proposed projects. Designated manatee critical habitat is present within the action area and important components of manatee critical habitat are also present. These components, although not identified as primary or secondary constituent elements of critical habitat, include seagrasses for foraging, shallow areas for resting and calving, channels for travel and migration, warmwater refugia for cold weather events, and fresh water for drinking. Seagrasses are limited to an area near the confluence of the Caloosahatchee River and San Carlos Bay. The Fort Myers Power Plant discharge canal, a warmwater refugia, is on the Orange River, a tributary of the Caloosahatchee River. Water coursing downstream from the Franklin Locks also provides fresh water for drinking.

Beneficial Effects - There are no known beneficial effects to manatees from the proposed actions.

Direct Effects - Direct effects are those effects that are caused by implementation of the proposed actions at the time of construction. The direct effects of watercraft access facilities on manatees and essential features of manatee habitat (such as seagrasses), include those arising from the location, design, and construction of watercraft access facilities, and associated dredging and filling for the construction of those facilities. In examining such effects, including those on seagrasses and other important features of manatee habitat, the Service analyzes the extent to which such effects are addressed by local MPPs, State review, and other protective conservation measures, such as standard construction precautions to protect manatees during construction. Standard construction conditions have been used throughout the range of the manatee for more than a decade and have proven to reduce the direct effects to manatees and their habitat within the facility footprint. The direct effects that these projects will have on the manatee and critical habitat within the action area include noise from barge operation and construction equipment; in-water movement of construction equipment and work watercraft; placing and securing dock support structures and mooring piles; and barge ingress and egress to the construction sites.

To reduce potential construction-related impacts to the manatee and critical habitat, the Corps has agreed to include as a condition of the permit, if approved, and the applicants have agreed to implement, as part of their construction, the *Standard Manatee Construction Conditions* (FWC 2001), which are as follows:

The permittee shall comply with the following manatee protection construction conditions:

- a. The permittee shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel are responsible for observing water-related activities for the presence of manatee(s).
- b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the MMPA of 1972, the ESA of 1973, and the Florida Manatee Sanctuary Act.
- c. Siltation barriers shall be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.
- d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.
- e. If manatee(s) are seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet to a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Activities will not resume until the manatee(s) has departed the project area of its own volition.
- f. Any collision with and/or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-FWCC. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-232-2580) for north Florida or Vero Beach (1-772-562-3909) in south Florida.
- g. Temporary signs concerning manatees shall be posted prior to and during all construction/dredging activities. All signs are to be removed by the permittee upon completion of the project. A sign measuring at least 3 feet by 4 feet which reads *Caution: Manatee Area* will be posted in a location prominently visible to water related construction crews. A second sign should be posted if vessels are associated with the construction, and should be placed visible to the vessel operator. The second sign should be at least 8-1/2" by 11" which reads *Caution: Manatee Habitat. Idle speed is required if operating a vessel in the construction area. All equipment must be shutdown if a manatee comes within 50 feet of operation. Any collision with and/or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-FWCC. The U.S. Fish and Wildlife Service should also be contacted in Jacksonville (1-904-232-2580) for north Florida or in Vero Beach (1-772-562-3909) for south Florida.*

With the incorporation of the above *Standard Manatee Construction Conditions* (FWC 2001) into each project permit, if approved by the Corps, the Service believes that the construction of the proposed projects will not directly affect the manatee.

Interrelated and Interdependent Actions - There are no interdependent or interrelated actions associated with the proposed activities that are expected to adversely affect manatees.

Indirect Effects - Indirect effects are those long-term effects that are caused by or result from the proposed actions, are later in time, and are reasonably certain to occur. Authorizing a dock or marina or boat ramp in some manatee-inhabited areas indirectly affects manatees by increasing the likelihood of manatee mortality and injury resulting from collisions with new vessels associated with the permitted facility. Placement of watercraft access points has the potential to concentrate boating activities to that particular vicinity. If this area is frequented by manatees, the likelihood of watercraft collisions with manatees is increased proportional to the number of watercraft using the area, given that the boats are operating at a speed that could result in collisions with manatees. Also, take in the form of harassment from watercraft could increase in certain areas with the addition of more sublethal watercraft-manatee interactions. However, the likelihood of take is reduced if the adequate and appropriate regulatory measures (*i.e.*, designated manatee speed zones with the appropriate signage coupled with the necessary speed zone enforcement to prevent watercraft collisions with manatees from occurring as a result of the proposed project) are in place.

Critical habitat is present and manatee presence has been documented in the action area through aerial surveys, photo-identification studies, telemetry studies, and a carcass salvage program (FWC 2000). Per these studies, it is apparent the entire Caloosahatchee River is used throughout the year by manatees. Primary winter-use areas include the Fort Myers Power Plant. Owned and operated by the Florida Power and Light Company (FPL), the power plant is a major winter refuge for manatees.

The Service assumes that an increase in the number of private watercraft access projects will mean an increase in the number of watercraft in the Caloosahatchee River. Watercraft in the action area is typically used for fishing, sight-seeing, and waterskiing by local and seasonal residents. Lee County, along with the West Coast Inland Navigation District and the University of Florida Sea Grant Program, conducted a waterway management evaluation of the Caloosahatchee River and its adjoining tributaries and canal systems (Fann et al. 2002). This evaluation was designed to analyze the human ecosystem (= watercraft user) and the environment (= waterway system) to facilitate boating safety and reduce boating impacts on natural resources. The study measured several variables including the number of moorings within the Caloosahatchee waterway. For the purposes of the study, moorings were defined as anchorage, boat lift, davits, dry stack, hoist, mooring, ramp, seawall, trailer, and wet slip. Of the 30,751 moorings identified in the river, only 14,981 (or 49 percent) were occupied by watercraft. Essentially, half of all the docks and wet slips in Reach 32 (and probably for the county as well) were occupied by a watercraft.

The 133 single-family dock projects (for 139 slips) are proposed to be constructed in Reach 32. If the number of vessels associated with these new docks is consistent with the rate of occupancy for Reach 32, then 139 new vessels would be added to Reach 32. The waters in and around these dock facilities are designated as idle speed and slow-speed year-round, no seagrasses are present in the projects' footprints, speed zones and signs are in place (including portions of the newly established Caloosahatchee River-San Carlos Bay manatee refuge), and enforcement is provided by a combination of Federal and local law enforcement personnel.

Manatee mortality has decreased for the Caloosahatchee River from four and six watercraft-related manatee mortalities during January through July 2001 and 2002, respectively, to one watercraft-related manatee mortality recorded in the river during the same time period for 2003. Furthermore, the one watercraft-related manatee mortality recorded in May 2003 was the first such death since September 2002 (a period of 10 months) and the second such death since February 2002 (a period of 17 months) in the river. This decrease in mortality is a direct result of established manatee speed zones posted with the appropriate signage coupled with increasing enforcement efforts from Federal and local law enforcement entities which have lead to improved boater compliance. As these factors are maintained or improved as needed, the Service expects this decreasing trend in manatee mortality to continue.

Species Response to the Proposed Actions

Should the Corps authorize the construction of these 133 single-family docks, it is anticipated that the associated watercraft will be used primarily for day trips, mostly on weekends and holidays, and during daylight hours, traveling throughout the Caloosahatchee River, San Carlos Bay, and out into the Gulf of Mexico for fishing and pleasure purposes.

The Service believes that the disruption of behavioral patterns on the manatee population from the addition 133 single-family docks resulting in 139 slips will be insignificant because the waters in and around these dock facilities are designated as slow-speed year round, no seagrasses are present in the project footprints, speed zones and signs are in place (including portions of the newly established Caloosahatchee River-San Carlos Bay manatee refuge), and enforcement is provided by a combination of Federal, State, and local law enforcement personnel. In addition, the level of compliance with the existing speed zones in the Caloosahatchee River has increased since January 2003, not all 133 single-family docks will be constructed at the same time, and the 139 slips (= watercraft) associated with these new docks represents 0.31 percent of the total number of registered vessels (45,145) in Lee County for 2002. Based on the waterway management study for the Caloosahatchee River (Fann et al. 2002), the estimated number of watercraft associated with these 139 slips is approximately 68 vessels.

Although critical habitat is present in the action area, the Service believes that the addition of 133 single-family docks resulting in 139 slips will not result in adverse modification of critical habitat because of the absence of and/or the minimization of risk to important components of manatee critical habitat, which are present in the action area. Risk to important components of manatee critical habitat were minimized through placement of slow speed signs in winter

warmwater refugia, and calving and freshwater areas. The Corps has agreed to include as a condition of the permit, and the applicants have agreed to implement as part of their construction, the *Standard Manatee Construction Conditions* (FWC 2001). Seagrasses, if present, are avoided through modifications in the project design during the permit review process and/or the application of *Dock Construction Guidelines for Florida* developed by the Corps and NOAA Fisheries (Corps and NMFS 2001).

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, 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 actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

In August 1999, the Service conducted a workshop to: (1) review what is known about the manatees' winter use of natural and industrial warmwater sites, (2) discuss the status and future of these sites, and (3) discuss information and management needs necessary to ensure the availability of warm water for wintering manatees (Service 2000). Well over half of the manatee population relies on industrial warmwater discharges for warmth during the winter. While these discharges are reliable sources of warmth, they are ephemeral in nature, restricted by the life span of generating facilities, operational limitations, fluctuating demand for power, and pending deregulation of the power generation industry. This, in combination with the fact that some industrial discharges have attracted manatees outside of their traditional wintering habitat, has put this species at risk.

One of the presentations at the workshop reported the results of a study on the manatees' response to the elimination of a warmwater refuge in north Florida. Of the 15 animals that were radio-tagged and tracked in this study, six manatees died and two were rescued between October 1997 and March 1998. A couple of the preliminary conclusions are that five of the six manatee deaths were due to prolonged exposure to colder temperatures and not all manatees migrate south to warmwater aggregation sites once their current source of warm water is eliminated. As discussed earlier in this biological opinion, manatees use the Fort Myers Power Plant discharge as a warmwater refuge during the winter months. If FPL chooses to shutdown this plant, thereby eliminating the warmwater discharge, then hundreds of manatees would be at risk to chronic exposure to colder temperatures.

CONCLUSION

After reviewing the current status of the manatee, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the Service's biological opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the manatee and are not likely to adversely modify critical habitat.

For the reasons identified in the Effects section above, and as a result of increased enforcement, increased and improved signage, placement of speed zones, and increased boater education, we have seen a decrease in manatee mortality and an increase in boater compliance in Reach 32. In addition the Service has recently designated additional manatee refuges in Reach 32. These actions all have had a positive impact on manatee conservation and will have a continued positive impact on the species and its habitat. The proposed actions also represent less than a 1 percent increase in the total number of registered watercraft in Lee County. Therefore, each of these measures will contribute to a reduced likelihood of take and taken together the Service is reasonably certain that take will not occur associated with the proposed docks in Reach 32 of the Caloosahatchee River. However, to confirm this conclusion, we will continue to closely monitor Reach 32 because of the high historic watercraft-related mortalities and the year-round utilization of the area by manatees. If the current trend in manatee mortality changes, we will need to re-evaluate and implement an adaptive management approach to improving manatee protection in the future and reinitiate consultation with the Corps, when warranted.

Furthermore, based on the decrease of watercraft-related manatee mortality due to the existing speed zones and associated signage, the additional speed zones established by the recent designation of the Caloosahatchee River-San Carlos Bay as a manatee refuge, the emergency designation to establish the Pine Island-Estero Bay Manatee Refuge, the level of enforcement provided by Federal and local law enforcement officers, the high level of compliance exhibited by boaters in the river and bay, and that these protective measures are currently in place as well as Lee County's implementation of a boater's education program, we believe that the proposed actions may affect, but are not likely to adversely affect the manatee or its critical habitat in Reach 32. In addition, the *Standard Manatee Construction Conditions* (FWC 2001) will be implemented during the construction of each dock.

INCIDENTAL TAKE STATEMENT

The Service does not anticipate that the proposed actions will result in the incidental take of manatees. Furthermore, the Service is not including an incidental take authorization for marine mammals at this time because the incidental take of marine mammals is not expected to occur and has not been authorized under section 101(a)(5) of the MMPA and/or its 1994 Amendments. Following issuance of such regulations or authorizations, the Service may amend this biological opinion to include an incidental take statement for marine mammals, as appropriate.

REINITIATION NOTICE

This concludes section 7 consultation on the proposed issuance of Corps' permits for the proposed projects.

As provided in 50 CFR 402.15, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not

considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your cooperation and effort in protecting fish and wildlife resources. If you have any questions regarding these projects, please contact Chuck Kelso at 772-562-3909, extension 241.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "James J. Slack". The signature is fluid and cursive, with a large, sweeping initial "J".

James J. Slack
Field Supervisor
South Florida Ecological Services Office

Regional Solicitor, DOI, Atlanta, Georgia (Delores Young)
Service, Atlanta, Georgia (Acting ARD-ES)
Service, Jacksonville, Florida (Dave Hankla)
NOAA Fisheries, St. Petersburg, Florida
FWC (BPSM), Tallahassee, Florida (Carol Knox)
FWC, Punta Gorda, Florida
Corps, Fort Myers, Florida (Skip Bergman, Carol Crane)

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