

has recovered to a point that it warrants reclassification to threatened or removal from the List of Endangered and Threatened Wildlife and Plants, the species' status must have improved to the point at which the current classification is no longer appropriate under the threat-based listing factors set out in section 4(a)(1) of the ESA. That is, threats to the species must be reduced or eliminated such that the species no longer fits the definition of endangered, if reclassifying to threatened, or threatened, for delisting. While suggestions of increasing manatee population size are very encouraging, there has been no confirmation that significant threats to the species, including human-related mortality, injury, and harassment, and habitat alteration, have been reduced or eliminated to the extent that the Florida manatee may be reclassified from endangered to threatened status. Accordingly, the Third Revision of the Florida Manatee Recovery Plan (Service, 2001) establishes criteria for downlisting and delisting the Florida manatee under the relevant threat factors in section 4(a)(1) of the ESA. Pursuant to our mission, we continue to assess this information with the goal of meeting our manatee recovery objectives.

Threats to the Species

Human activities, and particularly waterborne activities, are resulting in the take of manatees. Take, as defined by the ESA, means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Harm means an act which kills or injures wildlife (50 CFR 17.3). Such an act may include significant habitat modification or degradation that kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass includes intentional or negligent acts or omissions that create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3).

The MMPA sets a general moratorium, with certain exceptions, on the take and importation of marine mammals and marine mammal products (section 101(a)) and makes it unlawful for any person to take, possess, transport, purchase, sell, export, or offer to purchase, sell, or export, any marine mammal or marine mammal product unless authorized. Take, as defined by section 3(13) of the MMPA means to harass, hunt, capture, or kill, or attempt

to harass, hunt, capture, or kill any marine mammal. Harassment is defined under the MMPA as any act of pursuit, torment, or annoyance which—(i) Has the potential to injure a marine mammal or marine mammal stock in the wild; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Human use of the waters of the southeastern United States has increased dramatically as a result of residential growth and increased visitation in this region. This phenomenon is particularly evident in the State of Florida. The human population of Florida has grown by 146 percent since 1970, from 6.8 million to 16.7 million residents (U.S. Census Bureau, 2003), and is expected to exceed 18 million by 2010, and 20 million by 2020. According to a report by the Florida Office of Economic and Demographic Research (2000), it is expected that, by 2010, 13.7 million people will reside in the 35 coastal counties of Florida. In a parallel fashion to residential growth, visitation to Florida has increased dramatically. It is expected that Florida will have 83 million visitors annually by 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 vessels were registered in the State of Florida (Florida Division of Highway Safety and Motor Vehicles, 2003). This represents an increase of 59 percent since 1993. The Florida Department of Community Affairs estimates that, in addition to boats belonging to Florida residents, between 300,000 and 400,000 boats registered in other States use Florida waters each year.

Increases in the human population and the concomitant increase in human activities in manatee habitat compound the effect of such activities on manatees. Human activities in manatee habitat cause direct and indirect effects to manatees. Direct effects include injuries and deaths from watercraft collisions, deaths from water control structure operations, lethal and sublethal entanglements with recreational and commercial fishing gear, and alterations of behavior due to harassment. Indirect effects can result from habitat alteration and destruction, such as the creation of artificial warm water refuges, decreases in the quantity and quality of warm water in natural spring areas, changes in water quality in various parts of the

State, the introduction of marine debris, and other, more general disturbances.

The number of watercraft-related deaths each year continues to rise. The following is an excerpt from an analysis conducted by the U.S. Geological Survey's Biological Resources Division (USGS-BRD) for our recent efforts to promulgate incidental take regulations for manatees pursuant to the MMPA. "There has been an increasing trend in watercraft-related mortality in all four stocks over the past decade. This is reflected in increases in the average annual number of watercraft-related mortalities as the period over which the average is taken becomes more recent. For instance, in the Atlantic Stock, the mean observed mortality due to watercraft was 25.8 per year for the period 1990 to 1999, 29.8 per year for the period 1993 to 2002, and 37.0 per year for the most recent 5-year period. This trend is statistically significant in all four stocks. The slope of the increase (as fit to the period 1992 to 2002) does not differ between the Upper St. Johns and Northwest stocks (5.96 percent), nor does it differ between the Atlantic and Southwest regions (9.53 percent). To interpret these rates of increase, however, it is important to compare them to the historic growth rates (1990 to 1999) in each stock, to account for the increase in watercraft-related mortalities that would be expected due to increases in manatee population size. In the Atlantic and Southwest stocks, the rate of increase in watercraft-related mortality over that period far outstripped the estimated growth rate of those populations (by 8.5 percent in the Atlantic and 10.6 percent in the Southwest). In the Northwest stock, the rate of increase in mortality (6.0 percent) is somewhat larger than the estimated growth rate (3.6 percent). In the Upper St. John's stock, the increase in boat-related mortality can be completely explained by the estimated increase in the population size.

The continuing increase in the number of recovered dead manatees throughout Florida has been interpreted as evidence of increasing mortality rates (Ackerman *et al.*, 1995). From 1976 to 1999, the number of carcasses collected in Florida increased at a rate of 5.8 percent per year, and deaths caused by watercraft strikes increased by 7.2 percent per year (Service, 2002). Because the manatee has a low reproductive rate, a decrease in adult survivorship due to any cause, including watercraft collisions, could contribute to a long-term population decline (O'Shea *et al.*, 1985). It is believed that a 1 percent change in adult survival likely results in a