

may reduce the quality of the waterborne activity, or cause them to forgo the activity. This will manifest in a loss of consumer surplus to these recreationists. In addition, to the extent that recreationists forgo recreational activities, this could result in some regional economic impact. In this section, we examine the waterborne activities taking place in each area and the extent to which they may be affected by designation of the manatee refuges. The resulting potential economic impacts are discussed below for each manatee refuge area. These impacts cannot be quantified because the number of recreationists and anglers using the designated sites is not known.

*Caloosahatchee River Area:* In the Caloosahatchee River Manatee Refuge, affected waterborne activities include transiting, fishing, sailing, waterskiing, and personal watercraft use. The number of registered recreational vessels in Lee County in 2002 was 45,413 (Division of Highway Safety and Motor Vehicles, 2003). Based on aerial surveys and boat traffic surveys conducted in 1997 and 1998, the highest number of vessels observed on the Caloosahatchee River sites on a given day was 477 vessels. Based on aerial, boat traffic, and boater compliance surveys of the Caloosahatchee River, over 60 percent of vessels observed were small powerboats, while less than seven percent were personal watercraft (*e.g.*, jet skis) (Gorzelay, 1998). Waterskiing and personal watercraft use in the Caloosahatchee primarily occurs between the Caloosahatchee and Cape Coral Bridges (Lee County, 2003). Shell Point and Redfish Point are also popular access areas where personal watercraft use may be affected (FWCC, 2002). The Caloosahatchee River area is also a popular location for recreational guiding for snook and redfish fishing, particularly at night (FWCC, 2003c). The extra time required for anglers to reach fishing grounds could reduce onsite fishing time and could result in lower consumer surplus for the trip. The number of anglers on the Caloosahatchee, and their origins and destinations, are currently unknown. One study indicates that approximately 70 percent of the boat traffic on the Caloosahatchee originates from the Cape Coral Canal system (FWCC, 2002). Another boat traffic survey indicated that the majority of boat traffic exits the Caloosahatchee River in the morning and enters the river in the afternoon. The majority of vessels leaving the Caloosahatchee River travel south toward the Sanibel Causeway and Gulf of Mexico. Approximately 94 percent of

vessel traffic on the Caloosahatchee was reported as "traveling," while less than one percent was engaged in "skiing" based on boater compliance observations at 10 sites along the Caloosahatchee River (Gorzelay, 1998).

Based on these trends, it appears that most recreational waterborne activity on the Caloosahatchee River will be affected by the manatee refuge. While the designation will cause an increase in travel time, it is unlikely that the increase will be great enough to cause a significant economic dislocation. Much of the boat traffic on the Caloosahatchee likely originates from the Cape Coral Canal system (FWCC, 2002) and would experience added travel time of approximately 15 minutes (from Cape Coral Bridge to Sanibel Causeway) for a trip that currently lasts 50 minutes. At most, a boat traveling from Beautiful Island to the Sanibel Causeway will experience an estimated added travel time of 20 minutes to 35 minutes (depending on time of the year) due to the final designation; currently this trip would take approximately 1 and one-quarter hours.

The small percentage of recreational boaters using the river for waterskiing or personal watercraft use will choose either to go to alternative sites such as San Carlos Bay or Pine Island Sound or to forgo the activity. The amount of added travel time to get to an alternative site will depend on the origin of the trip and whether the trip originates from a dock or a ramp. For example, ramp users may choose to trailer their boats to a different location, closer to the alternative site, and may experience little added travel time. For dock users, under the rule, travel time on the Caloosahatchee from the Cape Coral Bridge to the Sanibel Causeway could be approximately 1 and one-quarter hours. The amount of added travel time and the expected quality of the experience will likely influence the recreationists' choice of whether to travel to an alternative site or forgo the activity. The number of recreationists who will use alternative sites or forgo recreational activities is unknown, but it is not expected to be a large enough number to result in a significant economic impact.

*St. Johns River Area:* In the Lower St. Johns River Manatee Refuge, the affected recreational waterborne activities are likely to include cruising, fishing, and waterskiing. Based on a survey of boat ramp users in Duval County, these three activities were the most popular reasons cited as the primary purpose of the trip. Recreational fishing was cited as the primary purpose by 62 percent of those

surveyed, while cruising was cited by 19 percent and waterskiing was cited by 7 percent (Jacksonville University, 1999). The total number of recreational vessels registered in Duval, Clay, and St. Johns counties in 2002 is 57,388 (Division of Highway Safety and Motor Vehicles, 2003). The portion of these vessels using the St. Johns River area covered by the designation is unknown. Recreational fishing for bass, redfish, sea trout, croaker, and flounder, as well as shrimping with nets, are popular activities in the near-shore waters of the St. Johns River south of the Fuller Warren Bridge. Because the submerged aquatic vegetation near shore provides food, and docks provide protection, for the fish, this is where the fishing activity primarily takes place (FWCC, 2003c). Because recreational fishing is likely occurring primarily in existing slow speed areas, the extension of slow speed zones by not more than 152 meters (500 feet) further will not have a significant effect. Recreationists engaging in fishing or cruising are unlikely to experience much impact due to the regulation. The expanded/extended buffers are not expected to increase travel times by any more than about 8 minutes (one way). The designation will cause some inconvenience in travel time, but alternative sites within the proximity of designated areas are available for all waterborne activities. Because the designated areas are part of larger waterbodies where large areas remain unrestricted, the impact of the designation on recreational waterborne activities in the St. Johns River and adjacent waterbodies will be limited. Recreationists engaging in cruising, fishing, and waterskiing may experience some inconvenience by having to go slower or use undesignated areas; however, the extension of slow speed zones is not likely to result in a significant economic impact.

*Halifax River and Tomoka River Area:* In the Halifax River and Tomoka River Manatee Refuge, affected waterborne activities include fishing, traveling, cruising, waterskiing, and personal watercraft use. Based on a boating activity study that relied on a variety of survey mechanisms, the two most popular activities in the Intracoastal Waterway in Volusia County were recreational fishing and traveling (Volusia County Environmental Management Services, 1996). Recreationists engaging in fishing or traveling are unlikely to experience much impact due to the regulation. The two most popular destinations are the Mosquito Lagoon and the Ponce Inlet