

# Interactions of Humans and Manatees in Crystal River, Florida

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*Abstract:* Manatee/human interactions were observed at a freshwater spring in Crystal River, Florida, in January and February 1997 to evaluate the contrasting needs of manatees, an endangered species, with the values of tourists and the tourist industry. Tourists interested in swimming with manatees heavily used the site, and in some instances, the tourists displaced manatees. A temporary sanctuary, off-limits to humans, was created at the spring during the 1997–1998 winter season.

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The artesian springs at the headwaters of the Crystal River on the Florida Gulf coast are an important wintering site for the Florida manatee (*Trichechus manatus latirostris*) (Kochman et al. 1985). As many as 300 manatees winter at the Crystal River springs (O'Shea and Ludlow 1992). Manatees have limited low temperature tolerance, and utilize the springs as thermal refugia (Ackerman et al. 1995).

The Crystal River manatees are a major attraction for tourists (Shackley 1992) who come to view them and can enter the water to touch, photograph, and swim with the manatees. A local industry caters to the tourists, providing guides and rental boats, wetsuits, and snorkeling equipment.

Manatees are classified as an endangered species, and Crystal River and its springs are considered critical habitat. In response to excessive human attention at the springs, manatee sanctuaries have been established at several springs (Buckingham 1990). The sanctuaries, which are marked by buoys and ropes, are off-limits to humans.

The U.S. Fish and Wildlife Service was advised of concerns about manatee harassment at Three Sisters, an unprotected spring in Crystal River. In response to these concerns, the Service initiated the observations reported here. The purpose of record-

ing these observations was to document human/manatee interactions at Three Sisters to help wildlife managers evaluate the area for possible sanctuary designation.

## Methods

Three Sisters springs are 0.7 km east of Kings Bay on an undeveloped parcel in a residential area in the town of Crystal River, Citrus County, Florida. The surface area of water at the springs covers about 0.16 ha. The springs flow into a 3 m-wide, forested spring run. Water depth in the run is tidally influenced and ranges from 0.5–1 m deep. The spring run empties 70 m downstream into a 15 m-wide dredged canal. There is a shallow eddy (0.5–1.5 m deep, 0.3 ha surface area) on the northwest bank of the canal at the point where the spring run meets the canal.

The property surrounding the springs is privately owned, and with the exception of the landowners and guests, the area is accessible only by boat. Boats travel to Three Sisters via the dredged canal system, and are required to travel at idle speed to prevent injuries to manatees. Boats are blocked from the springs by pilings located in the mouth of the spring run. Swimmers enter the springs from the canal by swimming or wading up the run.

Observations of human/manatee interactions at Three Sisters were made from scaffolding erected on the north bank of the canal. This site was chosen because prior information indicated that most human/manatee interaction at Three Sisters occurred in the eddy where the spring run met the canal.

The observation deck on the scaffolding was approximately 3 m high. The deck afforded a clear view of the eddy and the mouth of the creek that led to the springs. Visibility was normally excellent due to the shallow, clear spring water, and the sandy bottom in the eddy. The springs were not visible from the tower, but because all access to the springs was via the spring run, it was possible to count manatees as they entered and exited the springs. The springs were initially checked for manatees before each observation period.

Observations were made on 16 days between 23 January and 17 February 1997. There were 62.5 hours of continuous observations and 11 short observation periods (<5 minute duration, designated "checks") when the springs and eddy were inspected for manatee and human presence. Most observations were made in the morning between 0600 and 1200 (48 continuous hours, 1 check). The morning observations were made on 14 days; 13 initiated before daylight. Fewer observations were made between the hours 1200–1800 (6 days, 11 continuous hours, 3 checks) and hours 1800–0600 (4 days, 3.5 continuous hours, 9 checks).

Boat traffic in the canal was recorded by time, travel pattern (anchor at study site, look and leave, or pass-by without stopping), and boat type (commercial, private, or government). Commercial and government boats were identified as such by markings on the vessels.

The number of people entering the water at Three Sisters was estimated by counting all boat passengers as swimmers for those boats that anchored and from which passengers entered the water. No attempt was made to separate swimmers by

their gear, but the vast majority of the people snorkeled. The other swimmers used scuba equipment or swam without gear.

As a comparison to manatee use of Three Sisters, 10 observations of manatees were made in the Magnolia Springs sanctuary (located 400 m west of Three Sisters). Manatees swim between Three Sisters and Magnolia Springs in the dredged canal. On each visit to Magnolia Springs a quick count was made of manatees present. The sanctuary is off-limits to tourists and other manatee watchers during the winter season. Observations at Magnolia Springs were made from the canal bank or from a canoe.

## Results

Boats began arriving at Three Sisters between 0659 and 0754. If manatees were present in the eddy, the boats anchored in the canal and the passengers entered the water and swam to the manatees. One exception to this occurred: a rental boat with swimmers left upon finding only 1 manatee resting in the eddy—they decided to go elsewhere in hopes of finding more manatees with which to swim. Later in the day, boats anchored in the canal at Three Sisters and the passengers swam in the eddy and springs regardless of manatee presence or absence. Boats that had anchored at Three Sisters left the area between 1700–1730. There was no boat in the canal between 1847 and daylight.

Boat traffic averaged 4 boats/hour. Of the 250 boats that traveled the canal, 54% anchored at Three Sisters and an estimated 688 passengers swam in the eddy and the springs. The other boats either turned around at Three Sisters (26%) after assessing the conditions there or passed by without stopping (17%). Based on these observations, 80% of the boat traffic in the canal was associated with Three Sisters. The majority of the 250 boats traversing the canal were commercial rental boats (62%). The others were either privately owned (30%), government owned (5%), or of undetermined ownership (3%).

Manatees were present at Three Sisters on 13 of the 16 observation days and maximum numbers per day ranged from 1 to  $\geq 25$  animals. Manatees made greater use of the eddy than the springs: the greatest number of manatees observed in the springs was 6, whereas on 1 occasion  $\geq 25$  animals were stacked in the eddy. Manatees were typically most abundant at Three Sisters at dawn, and they were usually absent from 1030 to 1730, but returned to Three Sisters at dusk. Their evening numbers peaked within 1 hour of sunset, and in the 4 evening survey periods their numbers declined during the night.

Manatee response to boats and swimmers was documented on 8 days. Over this period, 46% of the manatees present at dawn left within 5 minutes of the first boat arrival. Within 30 minutes of the first boat arrival, 59% of the manatees present at dawn had left the eddy.

On 5 mornings, 16% of manatees present at dawn left Three Sisters before the first boat arrived. In these cases, the movements seemed independent of human activities.

Manatee response to human swimmers was observed on 8 days. The interactions occurred in the eddy and the mouth of the spring run. Manatees appeared to differ in their tolerance to humans. As previously mentioned, some left at the same time the first boat arrived. Others left minutes after people entered the water. Most of the animals that remained continued to bottom-rest while surrounded by people. A smaller number (estimated at 16% of those present) swam towards people, appearing to solicit human contact, and were petted. The majority of manatees responded to swimmers by ignoring them, or by turning away when approached. Swimmers usually avoided touching manatees that were bottom resting. Instead, they floated around the manatees while keeping a distance of 1–2 m between themselves and the manatees. From the observation tower, the pattern looked like a sky-diving formation with the manatees as the bull's eye to a target. On 1 occasion there were 35 snorkelers in wetsuits encircling 2 manatees that were bottom-resting alongside each other.

The activities of swimmers consisted of watching, photographing, and touching manatees. There were no examples of people hitting, riding, feeding, or trying to physically harm manatees. However, a few photographers were aggressive in their attempts to take close-up flash pictures of the faces of resting manatees. A tour guide shoved a swimming manatee towards members of his party so that the members could touch the animal. The most blatant case of harassment occurred when a tourist, posing for a photograph, sat on the head of a manatee resting in the eddy. The manatee immediately left the area.

Manatees used the designated sanctuary, Magnolia Springs, more consistently than they used Three Sisters. They were observed on each of the 10 occasions the sanctuary was visited bottom-resting, surfacing-resting, and swimming. Manatees were present at Three Sisters on only 2 of the 10 occasions when they were present in the sanctuary. On 1 occasion, 2 manatees left Three Sisters and entered the sanctuary (these were recognized by propeller scars).

## **Discussion**

The eddy at Three Sisters, with its shallow, crystal clear water, is an ideal location for close-up observations and photographs of manatees. These conditions, combined with the lethargic behavior of resting manatees, made Three Sisters the first stop of the day for commercial boats carrying tourists interested in close contact with manatees.

Manatee use of Three Sisters was influenced by a number of factors, including their diurnal movement patterns, human activities, and environmental variables such as air temperature and tides. We observed numerous examples in which manatees left Three Sisters in direct response to human activities. However, because wintering manatees normally leave the springs during the day to feed (O'Shea and Ludlow 1992), it seems likely that manatees would have left Three Sisters at some point during the day regardless of human presence. Our impressions, however, were that the movements to other areas were hastened by human activity.

At least some of the manatees that left Three Sisters entered the manatee sanctuary 400 m away. The sanctuary was off-limits to tourists, and the movements suggest these manatees preferred to rest in areas without human disturbance. Buckingham (1990) reported similar findings for manatees wintering on the Gulf coast.

Our observations were made to aid wildlife managers with decisions regarding human use of the eddy and springs at Three Sisters. Based in part on the observations, the eddy at Three Sisters was temporarily designated as a manatee sanctuary during the 1997–98 winter season and proposals for permanent sanctuary designation are under review.

The project illustrates that wildlife oriented tourism can influence habitat use in negative ways. In this case, excessive tourist pressure displaced an endangered species from an important habitat. Wildlife-oriented tourism has been praised as a positive factor for wildlife conservation. Profits from tours and tourists give wildlife a tangible value that may result in increased interest in wildlife conservation. In the example reported here, regulations were used to reduce the impact of tourists on manatees in an attempt to keep the pressure with reasonable limits.

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