

Managing Endangered Species Within the Use–Preservation Paradox: The Florida Manatee (*Trichechus manatus latirostris*) as a Tourism Attraction

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ABSTRACT / A significant challenge to wildlife managers in tourism settings is to provide visitors with opportunities to observe rare and endangered wildlife while simultaneously protecting the target species from deleterious

impacts. Nearly 100,000 people annually visit Crystal River, Florida, USA to observe and swim with the Florida manatee, an endangered species. This research aimed to investigate and describe human–manatee interactions in a tourism context, to understand the salient issues related to such interactions as identified by stakeholders, and to recommend a course of action to address multiple interests in the planning and management of human–manatee interactions. Five issues were identified by all stakeholder groups: water quality, harassment, density and crowding, education, and enforcement. Currently, the U.S. Fish and Wildlife Service, which is responsible for manatee management, does not have mechanisms in place to manage the tourism component of the manatee encounter. Although a regulatory approach can be taken, a better approach would be to create an organization of tour operators to establish “best practices” that reflect the goal of the managing agency to enhance manatee protection (and thus ensure their livelihood) and to enhance the visitor experience.

A significant challenge to wildlife managers in tourism settings is to provide visitors with opportunities to observe rare or endangered wildlife while simultaneously protecting the species from deleterious impacts. Currently, a myriad of opportunities exists for individuals to encounter (i.e., observe close up and/or physically interact with) marine life in the wild (e.g., Davis and others 1997; Shackley 1998). In the past decade, for example, the number of whale watchers worldwide (defined as people who “see, swim with, and/or listen to any... species of whales, dolphins and

porpoises”) increased from more than 4 million in 1991 to 9 million in 1998 (Hoyt 2001, p. 7).

The May 2001 issue of *Skin Diver* magazine illustrates the popularity of marine animal encounters. This issue featured “big animal encounters,” including articles on swimming with humpback whales (*Megaptera novaeangliae*), orcas (*Orcinus orca*), great white sharks (*Carcharodon carcharias*), manta rays (*Manta birostris*), dolphins (*Tursiops* spp.), and Florida manatees (*Trichechus manatus latirostris*). The manatee is the focal species in this article. Each year nearly 100,000 tourists visit Crystal River, Florida, USA to engage in up-close encounters with this endangered animal.

When human–wildlife interactions are placed in a tourism context, there is the potential for accrual of benefits to local, regional, and national economies as well as the participant and the target species. The positive economic impact of wildlife tourism can be significant (Hoyt 2001; Kerlinger and Brett 1995). Hoyt (2001) estimated that the amount whale watchers

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spent on tours worldwide increased from U.S. \$77 million in 1991 to \$299 million in 1998. When other travel, food, hotels, and souvenirs were included, the estimates increased (U.S. \$318 million in 1991 to more than \$1 billion in 1998). Hoyt noted that the regional impact can be significant. For example, communities such as Kaikoura, New Zealand; Provincetown, Massachusetts, USA; and Ogata and Ogasawara, Japan have been “transformed” by whale watching and its economic, educational, and scientific benefits.

At the base level, participants in marine wildlife encounters can derive cognitive benefits including increases in knowledge, awareness, and pleasure from up-close encounters with wildlife (Schänzel and McIntosh 2000). Kals and others (1999) found that emotional affinity for and interest in wildlife are equally based on direct experiences in nature. The benefits derived by tourists can translate into benefits for wildlife as people adopt more pro-environmental behaviors (Kals and others 1999; McFarlane 1994) or contribute to wildlife conservation efforts (Sekhar 2003). Benefits to wildlife and habitat also accrue as demand for these types of experiences increase, encouraging local, regional, and national governments to weigh the opportunity costs of wildlife consumption and habitat destruction (Wilson and Tisdell 2001).

There are two major concerns regarding these interactions. First, direct encounters with wildlife may not positively influence tourist attitudes or behaviors. This, along with a second concern that encounters with wildlife can have deleterious effects on the target species, may eliminate the net benefit to the species. For example, Schänzel and McIntosh (2000) found that although tourists who engaged in an up-close penguin encounter derived cognitive benefits, this did not translate into behavior change: “For most respondents the experience... was not perceived to have changed their behavior in any way or their thinking towards wildlife” (p. 46).

Most research on interactions has focused on the potential for negative impacts that result from harassment. Defined by Neil, Hoffman, and Gill (1975), *harassment* is “any activity of man... which increases the physiological costs of survival or decreases the probability of successful reproduction of wild animals” (p. 1). Ream (1980) conceptualized harassment more generally as human “disturbance” that “produces stressful situations for wildlife” resulting in negative outcomes for an individual or species, including “excitement and/or stress, disturbance of essential activities, severe exertion, displacement, and sometimes death” (Ream 1979, p. 153). The common focus of these definitions is on the potential for human

behavior to have a significant negative effect on an individual’s fitness, with potential implications at the population and community levels.

Because harassment is a primary concern for wildlife managers, marine mammals are protected from any form of “take” (including harvest and harassment) in the United States by the Marine Mammal Protection Act of 1972. Furthermore, the endangered manatee also is protected from harassment by the Endangered Species Act of 1973 (ESA) and the Florida Manatee Sanctuary Act of 1978 (FMSA) (Table 1; see Sorice and others (2003) for an in-depth discussion on manatee harassment). Moreover, concern for encounters has grown to such an extent that in 2002 the U.S. National Marine Fisheries Service sought public comment on a proposal to create regulations regarding human activities that target cetaceans (National Oceanic and Atmospheric Administration 2002).

Numerous studies have sought to examine the negative impacts of up-close encounters in the terrestrial realm (e.g., Burger and others 1995; Johns 1996; Lott and McCoy 1995; Olson and others 1997). In this discussion, however, we consider only those studies that have examined human–marine mammal encounters.

From the literature, we can reach two general conclusions. First, boats seem to affect the behavior of marine mammals significantly (Bejder 1999; Blane and Jackson 1994; Constantine and others 2004; Corkeron 1995; Erbe 2002; Heckel and others 2003; Jelinski and others 2002; Lusseau 2003a, 2003b; Magalhães and others 2002; Williams and others 2002), including manatees (Buckingham and others 1999; Nowacek and others 2004). Second, published studies on commercial swim-with wild marine mammals programs have shown changes in behavior, but no overt negative impacts on target species (Bejder 1999; Birtles and others 2002; Constantine 2001; Orams 2004; Scarpaci and others 2000).

The latter conclusion holds for research investigating manatee encounters. Shackley (1992) initiated concern about human–manatee interactions at Crystal River based on concerns regarding potential negative impacts. B.E. Abernathy (1995) observed manatee encounters and concluded that manatees may be hyperstimulated by interactions, resulting in greater frequencies of sexual behaviors. J. Abernathy (1995) found a positive correlation between human presence and increased manatee activity (resting decreased, whereas swimming behaviors increased), concluding that human interaction may result in greater energy expenditure. Wooding (1997) noted that despite some inconsistencies, manatees tended

Table 1. Three definitions of wildlife harassment as defined in U.S. state and federal statutes and regulations^a

Endangered Species Act, 1973 U.S. Code of Federal Regulations 50 CFR 17.3	Marine Mammal Protection Act, 1972 (amended in 1994) 16 USC 1362 § 3(r)(1)	Florida Manatee Sanctuary Act, 1978 Florida Administrative Code 68C-22.002(17)
An intentional or negligent act or omission that creates 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.	Any act of pursuit, torment, or annoyance which (A) has the potential to injure a marine mammal or marine mammal stock in the wild, or (B) has the potential to disturb a marine mammal stock in the wild by causing disruption of behavioral patterns including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.	“Harassment” means any intentional or negligent act or omission that creates the likelihood of causing an injury to a manatee by annoying it to such an extent as significantly to disrupt normal behavioral patterns which include breeding, feeding, or sheltering. The intentional provision of any type of food to manatees not in captivity shall be considered harassment under this definition, unless authorized by a valid federal or state permit.

^aThe two Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) definitions are based on prohibitions against taking, which means “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal” (16 USC 1362 [13]).

to be displaced from warm water by boats. Buckingham and others (1999) found that manatee use of Kings Bay is influenced by boating activity: manatee avoidance of boats is positively correlated with the number of boats. Finally, King and Heinen (2004) found manatee use of protected areas to be correlated positively with the number of swimmers and boaters in the area. Additionally, the presence of swimmers affected the manatees’ swimming, milling, and cavorting/playing behaviors.

Despite the lack of data on negative impacts resulting from commercial swim-with activities, managers must make decisions as to appropriate levels of interaction. There are generally three options regarding the relationship of human–wildlife interactions to impacts when science is lacking. At one end of the continuum, managers can assume that observed behavior changes have no substantive negative impact. At the other end, managers may presume a connection between behavior change and negative impacts and base their management strategies accordingly. King and Heinen (2004), for example, discussed changes in manatee behavior as negative. “While we (and others for that matter) have not shown specifically that interactions with swimmers actually increase mortality or reduce fecundity of manatees, one can assume that effects are negative” (p. 232).

Between the two ends of the continuum is a middle ground that invokes the precautionary principle: when there is the threat of irrevocable negative impacts, preventative measures should be taken even if some cause-and-effect relationships cannot be established. This approach is discussed or advocated by some researchers and managers in the marine-mammal viewing arena (Garrod and Fennell 2004; Heckel and others 2003; Lusseau and Higham 2004; Orams 2004; Valentine and others 2004). For example, in the case of the dwarf minke whales (*Balaenoptera ? acutorostrata*) subject to commercial swim-with programs, little is known about the biology and ecology (Birtles and others 2002). Because basic knowledge is lacking, it is difficult to assess the real or potential negative effects of encounters with swimmers. These authors as well as Valentine and others (2004) recommend guidelines to ensure that encounters are dictated by the whale and not by the operator or participant.

Regardless of the perspective along this continuum, educational and regulatory management strategies are generally advocated in the published swim-with literature. Lück (2003) found demand for increased education on whale and dolphin watching tours, and Orams (1995, 1996, 1997) argued for education as the predominant management strategy. Other research

has stressed regulatory approaches via codes of conduct or mandatory regulations (Birtles and others 2002; King and Heinen 2004; Valentine and others 2004). However, noncompliance (King and Heinen 2004; Scarpaci and others 2003; Scarpaci and others 2004) and issues surrounding enforcement of guidelines and regulations (Sorice and others 2003) can confound this strategy.

In this article, we take another approach to the management of human–marine mammal interactions. Previous research has focused exclusively on the biological aspects of the encounter using a behavioral analysis approach to identify negative impacts and recommend strategies for minimizing or eliminating them. With our approach, we did not analyze the interaction itself, but rather, the context in which the interaction took place. Thus, instead of looking at impacts, we were concerned with the issues surrounding human–manatee interactions, which have existed for over two decades. Specifically, our purpose was to understand the salient physical, social, and managerial issues related to human–manatee interactions as identified by interested parties; to assess the ability of the U.S. Fish and Wildlife Service (USFWS) to be responsive to these issues; and to recommend a course of action for addressing multiple interests in the planning and management of these interactions, namely, to control visitor use as a means of protecting manatees.

Methods

Setting

The Florida manatee (*Trichechus manatus latirostris*) is an herbivorous marine mammal that primarily inhabits the coastal waters of Florida. A federally protected species since 1967 (32 FR 4061), the Florida manatee has been on the endangered species list since its inception in 1973. As a tropical species, manatees are susceptible to hypothermia and frostbite when water temperatures fall below 20°C (O’Shea 1995). To avoid these potentially lethal conditions, manatees seek warm water refuge during the winter months, generally November through March in Florida.

Kings Bay at Crystal River, Florida, USA serves as one critical warm water site for more than 300 manatees (Figure 1). The city is located 6 miles inland from the Gulf of Mexico and approximately 70 miles north of Tampa, Florida. The bay contains more than 30 artesian springs, which, with a consistent water temperature of 23 to 24°C, serve as the headwaters for the Crystal River.

Over the past three decades, the number of manatees using Crystal River’s naturally warm waters during the winter has increased from 114 in 1981–1982 (Powell and Rathbun 1984) to more than 350 in 2001 (USFWS, unpublished data).

The Crystal River manatees are a popular attraction because they predictably inhabit the bay in the winter. They are approachable, readily viewable, and tolerant of human presence. They are a rare species, yet abundant in the winter, and they have diurnal activity patterns. Moreover, the physical setting is attractive to visitors wanting to view manatees, and the open bay and clear water allow for good visibility of the animals. These are the same factors Reynolds and Braithwaite (2001) equated with a wildlife tourism attraction. The Marine Mammal Commission (2001) estimates that almost 100,000 visitors come to Crystal River primarily to participate in the manatee encounter.

Visitors have relatively easy access to the animals via scuba diving shops that cater to manatee encounter participants during the winter. Participants may encounter manatees via guided tours, by renting boats, or via their private vessels, which can put in at the local marina. Because of private property along the bay and canals, visitors do not have shore-based access to manatees. Those on guided tours can choose between operators that carry from 6 to 40 participants per boat. There are two primary areas in which manatees congregate, and thus where manatee encounters occur: Main Spring and Three Sisters Spring (Figure 1). Secondary areas include Warden Key and Magnolia Spring.

Encounter trips generally begin early in the morning, with participants entering the water between 0700 and 0800 h, although an operator may do more than one trip per day when the temperature still is sufficiently cold to keep manatees within the warm water effluents. Operators also agree that the “best” encounters occur in the morning because the manatees generally tend to be “friendlier” (Sorice 2001). Participants snorkel almost exclusively during manatee encounters because it is generally thought that scuba, with its associated noise and bubbles, scares manatees away. Food provision is not an issue at Crystal River because manatees there tend to be gregarious, initiating contact with humans without external incentives.

Manatee encounters involve more than passive observation alone. During an educational seminar, one operator described the difference between “seeing” and “encountering” manatees while giving suggestions to a group of high school students on how to behave for a successful manatee encounter:

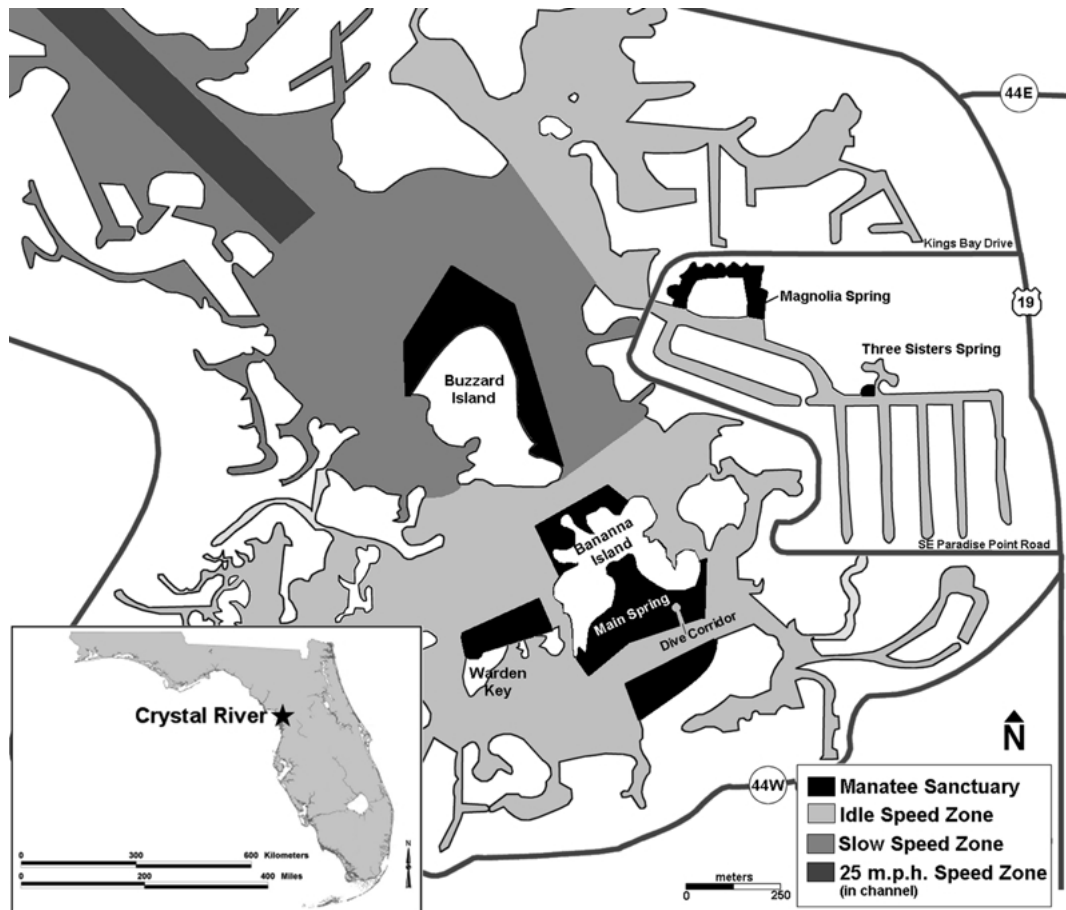


Figure 1. Kings Bay is a warm water aggregation site for Florida manatees at Crystal River, Florida, USA (Source: Adapted from a USFWS pamphlet for Crystal River National Wildlife Refuge).

“Now encountering manatees is different than seeing manatees. If you want to see manatees today you can probably stand on the front of the boat and I’ll point out some manatees. You’ll see their noses coming up. You’ll see their backs porpoising. They’ll probably swim past the boat at some point. So, you’ll be able to see them. But, if you want to encounter a manatee, which is to have it roll around and take it’s picture and rub it’s belly and stuff, then there’s a couple of things you need to do.”

This quote shows that encounters with manatees can be somewhat intimate, meaning that individual manatees may choose to engage in fairly sophisticated play behavior with a single snorkeler, and these encounters may last more than an hour. Participants report instances in which they engaged manatees in “follow-the-leader” and direct imitation (e.g., imitating a diver doing barrel rolls). Moreover, as implied by this quote, operators generally define success as this type of interaction or at least being able to touch a manatee.

The USFWS maintains a presence in the area through the Crystal River National Wildlife Refuge, comprising 18 noncontiguous parcels of land totaling

approximately 46 acres. It was established in 1983 with the mission to protect manatee habitat (Turner 1998) while providing compatible recreational uses. The only water bottom owned by the refuge is the Main Spring, which extends out from the south side of the Banana Island parcel (Figure 1). Most of this area is closed to public use during the winter except for a swim corridor that permits scuba divers and snorkelers access to the spring itself. Because this corridor is on refuge property, it is the only manatee encounter area that can be managed under refuge authority. Most manatee encounters occur outside the swim corridor and therefore off refuge property.

The USFWS uses the tour operators’ desire to access the Main Spring and requires them to obtain a special use permit. With this permit, all operators must show encounter participants a video to teach them about measures implemented to protect the manatee including the bay’s slow and idle boating speed zones, sanctuaries (where all waterborne activities are

Avoid harassing manatees. Harassment is defined as any activity which alters the animal's natural behavioral characteristics including:

- Approaching a manatee before the animal first approaches and touches you.
- Actively pursuing/chasing (swimming after) or cornering a manatee while swimming or diving.
- Poking, probing, stabbing a manatee at any time with any object. This includes but is not limited to a person's hand and/or foot.
- Any activity which would separate a cow from her calf or an individual from a group.
- Any attempt to snag, hook, hold, grab, pinch, or ride a manatee.
- Any attempt to feed a manatee.
- Touching or disturbing a resting manatee.

Figure 2. Manatee interaction guidelines as delineated by the U.S. Fish and Wildlife Service (Source: Crystal River National Wildlife Refuge pamphlet).

prohibited), and manatee encounter guidelines (Figure 2).

Because the USFWS cannot regulate activities that do not occur on its property, it falls back on its power to protect endangered species. Hence, the management tools used at Crystal River to deal with public use are implemented under the authority of the ESA as ways to minimize "take" (Table 1). The USFWS enforces boating speed zones and monitors human behavior to prevent manatee harassment, but is unable to control use or use levels (spatially or temporally).

The historical relationship between the USFWS and the manatee tourism community has been characterized by conflict (Sorice 2001). The community has tended to react negatively to increased regulations (i.e., speed zones and sanctuaries) because of its perceived economic dependence on manatee tourism. Since the mid-1990s, the USFWS and the manatee tourism community have coexisted primarily because no further regulations have been implemented. The potential for conflict is great, however, because the Save the Manatee Club, the Florida Marine Research Institute, and the Marine Mammal Commission perceive an imbalance between the use of manatees as a tourism resource and their efforts directed at species recovery.

Data Collection

The manatee encounter is a highly unique human-wildlife interaction that does not fit neatly into other wildlife tourism frameworks (Reynolds and Braithwaite 2001). Because previous research on the manatee encounter tourism setting had never been conducted, we used qualitative methods for this exploratory study. Data on manatee encounters were collected at Crystal River between January and March of 2000 through participant observation, interviews, and document analysis. Study participants were obtained using the snowball sampling method (Babbie 1998).

Using participant observation, the first author moved between roles as a complete participant (e.g., engaging as a snorkeler in manatee encounters), participant-as-observer (e.g., serving as a refuge intern), observer-as-participant (e.g., going on guided tours as an observer), and complete observer (e.g., watching the setting from an observation post). Data recorded focused on human-manatee interactions including what happened and what people were saying about the experience.

A total of 34 unstructured and semistructured in-depth interviews were conducted with state and federal wildlife agency employees, agency volunteers, manatee

Table 2. Stakeholder groups that participated in structured and unstructured formal interviews

Participants	Business community	Research/management agencies	Advocacy
14-Year veteran 3-Year veteran	Citrus County tourism agency (n = 1) Gift Shop managers Encounter tour operators (n = 14)	U.S. Fish and Wildlife Service (n = 9) USGS Sirenia Project (n = 4) Florida Marine Research Institute (n = 2)	Save the Manatee Club (n = 2)

biologists, tour operators, other manatee-related businesses at Crystal River, tourism officials, advocacy groups, and visitors (Table 2). The purpose of the interviews was to understand how the manatee encounter experience was perceived by interested parties, including the current physical, managerial, and social setting in which it occurs, with an emphasis on identifying the areas of social and resource concern. Participants were assigned pseudonyms to maintain confidentiality.

Document analysis enhanced observations and was used to verify interview data and provide historical context (Babbie 1998; Marshall and Rossman 1999). Newspaper articles from the *Citrus County Chronicle* and *St. Petersburg Times* from 1996 to the present were collected. The county's Tourism Development Council provided tourism information, and tour operators provided promotional materials. Videotapes including the informational video, *Manatee Manners*, and three documentaries filmed at or relevant to Crystal River also were analyzed.

With these three methods, we could cross-check the consistency of the information obtained, and thus enhance the validity of the research. Interviews allowed us to verify our own observations and vice versa, and document analysis was used to validate informant references to past events.

Data Analysis

Data were analyzed initially by conducting a preliminary domain search to create categories (Spradley 1979). This provided a systematic way to analyze the terms and ideas used by subjects to describe their world. From domain analysis, we constructed taxonomies, categories “organized on the basis of a single semantic relationship” (Spradley 1979, p. 137).

We entered the data into AtlasTi, a qualitative data analysis software package (Muhr 2000). Categories such as “crowding” then were used to code interviews and field notes. During this process, analytical memos were written, which served to identify inchoate themes. We then analyzed the data looking for instances that supported or negated the validity of the emerging themes.

Results

Issues identified from field notes and interviews using Spradley (1979) were grouped into encounter-specific and non-encounter-specific categories. The latter comprised general concerns such as boating-related mortality and stochastic events. Encounter-specific issues were defined as those that related directly to the manatee encounter experience. Of these issues, five were identified by all stakeholder groups: water quality, harassment, density and crowding, enforcement, and education. These concerns were expressed in relation to both visitor experiences and manatee welfare.

Water Quality

Although water quality issues were raised by all interested parties, they were not considered a primary concern. From a resource perspective, there are concerns with pollution and invasive species. Additionally, the water volume output of the springs is decreasing. The concern for the resource focuses on the change in critical habitat affecting the manatees' ability to use Crystal River. From the tourist's perspective, there are concerns that water visibility is negatively affected by the aforementioned conditions.

Harassment

Concomitant with the increasing popularity of the manatee encounter is the increasing concern of some regarding the potential deleterious impacts that can result from harassment. The Marine Mammal Commission has noted that despite efforts of the USFWS to minimize incidences of harassment, “reports of divers attempting to grab, ride, and chase manatees continue” (Marine Mammal Commission 2001, p. 125). Despite this growing concern, no research implicates encounters as harmful to the fitness of individual manatees or the Crystal River population. Moreover, there is little agreement about behaviors that constitute harassment. Sorice and others (2003) have provided an in-depth analysis of this issue as it relates to manatee encounters. The nebulous nature of harassment serves as a foundation for the education and enforcement issues discussed in the following sections.

Density and Crowding

Concern about controlling participant behavior increases as the number of people participating in manatee encounters increases. One issue consistently identified as a primary concern was density and crowding. Density is simply the number of tourists per unit area, whereas crowding is a negative psychological evaluation of density (Stokols 1972). In this case, encounter participants can feel crowded and can “crowd” manatees to such an extent that the manatee uses its only defense mechanism: to leave.

Within the past decade, use has increased in Kings Bay. This is evidenced by the growing number of operators as well as the growing capacity of each operator. One single-boat operator increased his capacity by changing from a skiff to a pontoon boat because of a perceived increase in demand by larger groups (10 to 15 people). One of the largest boats averages 34 participants per outing, but the operator’s boat can hold up to 49 people. Other operators regularly add guided or rental boats to their operation to accommodate demand.

Resident 1, a retired woman who lives near Three Sisters Spring, characterized the growth saying,

“With all the advertising... it seems like this year there’s three or four more dive groups, dive captains, places in town where you can rent a boat or go out with a group. And I think that’ll continue to go on for as long as it’s popular. So pretty soon, we’ll be stepping on them [laughs]. You walk from boat to boat.”

Walking from boat to boat was a common way to convey perceptions of crowding in the setting. When the first author commented on the high number of boats at the Main Spring encounter area one day, a refuge law enforcement officer commented, “There are days when you can walk from boat to boat to boat.” In addition, operators often discussed use levels with other operators when deciding where to take their customers. During President’s Day weekend, unofficially considered the peak of manatee encounter season, operators on the radio jokingly discussed the crowd at Three Sisters Spring and the Main Spring in terms of “millions of people,” saying that there were 3 million people at the Main Spring. Another operator interjected saying that he thought there were only 1.5 million (author’s field notes).

Increased use levels also can cause user conflicts. The Three Sisters Spring manatee encounter area is located along a relatively narrow canal, and nearby residents have seen more than 20 boats lined up along the sides of the canal. Resident 1 noted that others in the neighborhood become upset because the navigable channel becomes clogged with anchored boats and

snorkelers through which they are unable to maneuver.

There are two primary concerns regarding high use levels at Crystal River. First, operators are concerned about the visitor experience. Operator 1, a former operator, discussed this as he reminisced about the 1997 creation of the Three Sisters Sanctuary:

“At that time I also suggested that possibly we should consider developing a way of spreading the people out, reducing the numbers at any given place so that we didn’t have too many because my concerns were that the ecotourism experience with the manatee was losing some of it’s quality... When you’re talking about an ecotourism experience you’re talking about relatively limited numbers of people. And if you drop 100 people at Three Sisters Springs all at one time that’s pretty significant.”

A high density of people and boats can result in a suboptimal visitor experience. One female manatee-related business owner advised the first author not to go out on weekends because “you’re not going to get the quality time... The number of people... [have] outnumbered the manatees so much, you know, and it’s just—it’s not going to be the optimal experience.”

A male refuge volunteer further illustrated the effect of high use on manatee viewing in the relatively shallow Main Spring area:

“That one Sunday... there was nineteen boats I counted... There was low tide... It looked to me that there were so many people standing in the swimming [corridor] that there wasn’t room for a manatee... I mean, if there was one it would have been wedged in between people... Everybody was standing there. And also you get that many and they’re standing there at low tide, they’re not swimming, they start walking around with them flippers. I mean, visibility goes to zero or worse (if it can be worse than zero).”

However, some operators did not define crowding as strictly a function of density. Operator 2, a male operator who provides extensive educational programs for school groups, described it in terms of visitor behavior:

“If we had 30 people in the water and they’re all doing exactly what they’re supposed to do, it wouldn’t be a crowded situation. If you have four people jostling and trying to get in there and trying to touch the manatee and trying—it becomes crowded. The appearance is that it’s crowded. So for me it’s not a numbers thing.”

The second concern regarding high use levels is that there may be negative impacts on the manatee. A high density of people at a site may inadvertently harass manatees by causing physiological stress or altering their normal behavior. That is, participant behaviors that may not be disturbing to the manatee at lower levels may be potentially harassing at higher levels. Operator 3, who provides tours primarily in the town south of Crystal River, described his observation of another operator at a manatee encounter site in Crystal River:

“I’ve seen the captain of one of the tour boats swimming away cursing saying the damn animal can’t even come up for air. He was pissed off with his own group... He’s just doing his job and he even sees that there’s too many people in the water.”

Around the Three Sisters Sanctuary, people often stand and float around the sanctuary watching the manatees inside. When density increases, however, people stand shoulder to shoulder around the perimeter of the sanctuary. Resident 1 describes the scene as

“‘a little zoo.’ All these people line up around the sanctuary perimeter and look at the manatees and wish the manatees would come out... and I’ll see a manatee come... and all of a sudden—zoom! People would just start with the manatees. The thing is, the manatee gets tired of the people. It goes right back to the sanctuary.”

Operators originally adapted to these high use levels by providing tours earlier in the morning. However, their rationale for 7:00 AM trips changed once it was discovered that manatees tend to be more gregarious when the air temperatures are cooler. In an excerpt from the first author’s field notes, Operator 4, a male with a pontoon boat holding up to 12 people, explained why they try to be the first one out in the morning, saying that they come early because it is cooler. Manatee “moods” can “change with air temperature. The people are usually cold by 8:30 or 9:00 A.M., and the rentals come out at 8:00 A.M., at the earliest, so it is good timing. When the first author asked Operator 4 if he comes early to provide certain experiences, such as solitude, he smiled and said, “I tell them there isn’t going to be any of that” (author’s field notes).

One final concern regarding density and crowding at Crystal River reflects the idea that once a place becomes crowded, displacement may occur, with users beginning to look for other sites (Shelby and others 1988). Evidently this has occurred at Crystal River. Homosassa, a town 7 miles south of Crystal River, also has been discovered during the past decade. At least two Crystal River operators now focus most of their manatee encounter trips in Homosassa. Within the past 5 years, another operator has established a manatee encounter business there. Furthermore, anecdotal reports of unofficial manatee encounters are beginning to surface around the state, arousing concern in wildlife management agencies (Bill 2003).

Education

Use is an issue at Crystal River because as it increases, behavior becomes more difficult to control, especially when agencies such as the USFWS have limited resources. At Crystal River, two tools (enforcement and education) are used in concert to control human behavior. Most educational messages provided

by operators and the USFWS inform participants regarding speed zones, sanctuaries, and appropriate manatee encounter behavior. Although operators show the video and discuss the rules, they tend to focus on how to have a “successful” encounter, with success defined as touching or playing with manatees. Only Operator 2 presents an interpretive program that includes the manatee’s natural history, its current status, and current threats to its survival. In addition, the USFWS relies on the compliance of operators to educate the public because, unlike terrestrial refuges, visitors are not funneled through a visitor center. In most cases, a visitor’s only education is via interaction with a tour operator.

There are educational issues for four user groups: tourists on guided tours, tourists renting boats, tourists in personal boats, and bare-boat charter. Describing the amount and type of education tourists receive on guided tours, USFWS Law Enforcement Officer 1 said that operators “give an enormous amount of education. ... They know what they can and can’t do and I think they do a good job.”

During guided tours, participants repeatedly receive educational messages on sanctuaries and manatee encounter rules. All but one of the guided tour operators showed the Manatee Manners video produced by the USFWS,¹ and most supplemented this video during the 15-min boat ride to the encounter areas by reinforcing these rules and providing additional tips. Tour guides supervised and provided additional messages throughout the entire encounter.

In contrast to the positive evaluation generally given for guided tours, USFWS Officer 1 described the type of education participants receive when they rent boats (often from the same operators who provide guided tours), saying that although they are required to see the instructional video and receive relevant literature, “They don’t have, you know, a certified boat captain or someone that’s very familiar with the resource, you know, as an educational guide through their experience with the manatees.”

Boat renters may be less likely to see the instructional video or receive additional educational messages from tour operators. When law enforcement stopped boat renters who were not behaving correctly, the officer first asked if they had seen the video. There were multiple times that they had not. One 14-year repeat customer informed the first author during an

¹One operator negotiated with the USFWS to provide spoken instruction in lieu of showing the video.

interview that his family almost did not see the video that year:

“The only reason we saw the video this time around was because we said, ‘Well we have to watch the video now.’ And the guy—I don’t even know if the guy knew how to operate the doggone television. And we sat down and watched it because we knew we had to.”

As with boat renters, there are educational issues regarding the use of private boats. Private boats access the bay either from surrounding homes or from public boat ramps. These users can get information from the AM 1610 radio station and at the boat ramps in the bay. But as USFWS Officer 1 explained:

“Then they get out into the bay and they see an enormous amount of signage for the different speed zones and sometimes it’s pretty confusing. And they don’t have appropriate guidance, in my opinion, because there’s so many different regulations out there that they don’t know. And that’s where people make mistakes.”

Finally, the fourth type of operator, the bare-boat charter, is much like the rental boat user except that he is a nonlocal commercial operator using a local dive shop’s rental boat from which to run his operation. These dive shop operators are from other parts of the state or country providing manatee encounter trips for participants who travel with them. According to local operators, bare-boat charterers are illegal operators subject to citation by the U.S. Coast Guard. Not surprisingly, bare-boat charters are a main concern of some local operators. Operator 2 explained his perspective on the issue:

“When you have a dive store that comes down here and rents a boat and goes out there, it’s really tough... You have operators out there with a sole purpose of seeing manatees because they’ve been paid to show their people manatees... We’ve got them driving around 50 miles an hour going from one spot to the next. If they see some manatees they get in there real close with their boats. They, you know, don’t observe the dive flag laws. I mean, it just—it’s a tough situation.”

According to manatee tour operators, the bare-boat charter is an educational issue because the trip leaders have no responsibility to inform their visitors, and therefore do not necessarily make an effort to ensure that their participants understand or even know the rules regarding speed zones, sanctuaries, or harassment. All four groups pose enforcement issues because their lack of education often leads to increased inappropriate behavior, which then must be controlled through enforcement.

Enforcement

Although education is used as a tool to reinforce rules and regulations, the approach of the USFWS to the enforcement of visitor behavior can be characterized as “educational enforcement.” Refuge Manager 1

discussed how this approach is operationalized in the field:

“The approach that has been taken here has been to basically try to educate people about the protection that manatees have, to remind them of the penalties—you know, to give them the do’s and don’ts and remind them of the penalties if they cross the line into a situation where there’s harm and harass going on; and also the threat of possibly getting ticketed or something and the presence of the refuge and refuge staff and refuge law enforcement officers and all of that.”

All stakeholders identified the lack of a USFWS law enforcement presence as an issue. Stakeholders perceived their presence as low for several reasons. First, there was one full-time officer to enforce these regulations. Although manatee tourism has increased significantly over the past decade, the level of enforcement has remained unchanged. Additionally, manatees congregate in different areas of the bay (e.g., they began frequenting Three Sisters Spring about 1994), increasing the territory to be enforced within the bay. The amount of time USFWS law enforcement actually spends patrolling is perceived by the tourism community as inadequate. The lack of staff, the large territory, the fact that law enforcement supervises from land (i.e., is not always present on the water), and the fact that law enforcement works undercover may contribute to this perception.

An additional factor affecting the way that USFWS enforces visitor behavior in the area involves standards. The onus is on law enforcement to show that a person knew or should have known that his or her behavior was illegal. This includes all behavior including boat speed, sanctuary trespass, and harassment. Although certain egregious behaviors such as riding or physically harming manatees are perceived by most stakeholders as types of harassment, other behavior is harder to enforce. In court, USFWS law enforcement officers must show that the manatee’s behavior was significantly altered. As a special agent law enforcement officer with the USFWS endangered species office said: “So, to make a harassment case you have to be able to go to court and say... beyond reasonable doubt that that person significantly altered their breeding, sheltering, or feeding behavior, and that can be difficult.”

Discussion

The results of this study show that increased use has increased concern for both the quality of the visitor experience and the potential negative impacts to manatees. Moreover, the increase in use has exacerbated latent problems with education and enforcement in the setting. These issues identify an imbalance in the management of nonconsumptive wildlife use. Duffus

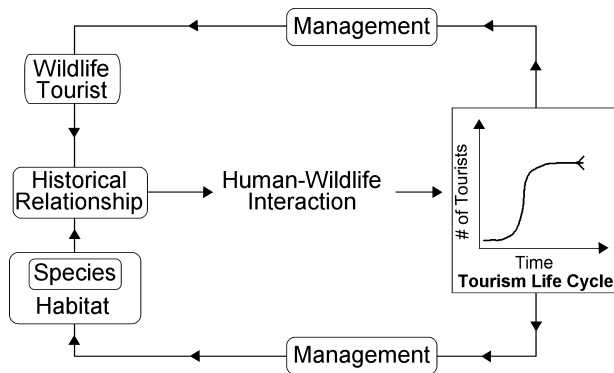


Figure 3. The core components of nonconsumptive wildlife tourism. Adapted from Duffus and Dearden (1990).

and Deardon (1990) discussed the management of both the target species and the wildlife user as two primary components of nonconsumptive wildlife management (Figure 3). To achieve goals of sustainability and ecotourism, the management of each component must be balanced (Budowski 1976). The Duffus and Deardon (1990) model uses Butler's (1980) tourism life cycle concept as the point of origin, which suggests that as tourism settings increase in popularity, there may be changes in the nature of the destination. Current growth at Crystal River is exemplified by acquisition of more or larger boats by operators to meet demand, perception of the setting as so dense that one can walk from "boat to boat," increased concern regarding visitor behavior, and concern about the effectiveness of a law enforcement system that had historically been adequate.

As these changes occur, managers must respond both to the species/habitat and to the wildlife tourist. Currently, the manatee subpopulation enjoys one of the highest survival rates in the state (Bob Bonde, personal communication). Increased concern about the visitor experience and the effectiveness of educational and law enforcement efforts demonstrate that the ability of the USFWS to manage the tourism component of the model is lacking.

For all these issues, the ability of the USFWS to manage tourism at Crystal River is confounded by the complex management setting in which it operates, with encounters occurring away from refuge property. Because of this, the USFWS cannot control use (spatially or temporally), nor can it limit access. Furthermore, because users do not gain access through a single entry point as they might at a terrestrial refuge, the USFWS has difficulty ensuring that effective educational messages reach participants. Finally, as use increases, the refuge has a limited capacity for enforcement and

education because of its limited resources. Because of this complicated setting, the USFWS relies on tourism operators to act as de facto managers in the setting.

The ability of the USFWS to manage manatee encounters effectively may become increasingly difficult in the face of increasing use as well as growing concern by some stakeholder groups. If things continue on their current course, the USFWS may have to rely increasingly on operators to self-monitor and educate participants despite the fact that not all operators recognize manatee protection as a priority. Moreover, on the basis of the historical relationship between the refuge and the tourism industry, there is a concern that any effort on the part of the refuge to implement significant changes will set in motion a conflict spiral, a vicious circle of action and reaction in which parties react to protect themselves from the actions of the other parties perceived as threatening (Pruitt and Rubin 1986).

Management Options

Currently, the USFWS could approach the management of the tourism component in at least two ways. First, it is possible that as concerns increase, the USFWS could invoke the ESA to declare Kings Bay as a "manatee refuge" during the winter months. A manatee refuge is a regulatory designation within which the USFWS "has determined that certain waterborne activity would result in the taking of one or more manatees, or that certain waterborne activity must be restricted to prevent the taking of one or more manatees, including but not limited to a taking by harassment" (50 U.S. Code of Federal Regulations 17.102, p. 509). With this designation, the USFWS would have the authority to control all uses in the bay.

Second, the USFWS could promulgate direct regulations under the "take" portion of the ESA regarding tourism operators, use levels, specific human behaviors that will be recognized as harassment, and even the level of permissible interaction. One mechanism currently available but not invoked by the USFWS is the Marine Mammal Protection Act definition of harassment (Table 1). More specific than the ESA definition, the Marine Mammal Protection Act of 1972 (MMPA) may provide a stronger basis from which to regulate the tourism setting itself. There are signs that the USFWS may move in this direction because the most current revision of the Manatee Recovery Plan includes an objective to "improve the definition of 'harassment' within the regulations promulgated under the ESA and MMPA" (USFWS 2001, p. 67).

The major limitation of these approaches is that because the interactions occur in an open access re-

source, these management strategies could be implemented only under the authority of the Endangered Species Act and not through national wildlife refuge regulations. That is, findings would need to show that these factors significantly alter manatee behavior to such an extent that these options would be warranted for the survival of the species. Without peer-reviewed science identifying a causal link between encounters and negative impacts, these strategies may be difficult to apply.

In the Duffus and Deardon (1990) model, the historical context mediates the relationship between the biological and social context. Although we believe that direct regulation may be the ultimate solution, it may not necessarily be the optimal approach. We believe that given the contentious history between the USFWS and the tourism industry, efforts to achieve direct regulation may further strain the relationship between the two groups. Instead, a better approach may be to engage the tourism community by allowing them the first right of refusal to prioritize manatee protection over the use of manatees as a resource.

In general, three relationships can exist between tourism promoters and those responsible for and concerned with conservation of nature (Budowski 1976). First, conflict can occur when tourism is perceived to have a detrimental effect on nature. Second, tourism and conservationists can coexist when there is relatively little contact or understanding between the two. This relationship usually is not static because as tourism increases, the relationship evolves either into one that is mutually satisfying or into conflict. Third, symbiosis, defined by Budowski as the optimal relationship between tourism and conservationists, can be achieved. Symbiosis involves a close working relationship between conservationists and the tourism industry to sustain the resource while providing use.

To move toward symbiosis, the USFWS must respond carefully to concerns regarding manatee encounters by reconciling the values of stakeholders with manatee protection. For the tourism industry at Crystal River, there is an economic benefit, and for the manatee protection community, the benefit is a safe area for wintering manatees as well as an increased manatee constituency. A symbiotic relationship, however, requires the tourism industry to support manatee protection while the USFWS and others in the manatee protection community work to maximize benefits to tourism operators.

Although the history between the USFWS and the tourism industry can be largely characterized by conflict, these two groups have a shared interest in manatee protection—the USFWS because of its mission to

protect endangered species and the tourism industry, at a minimum, because of its desire to sustain itself. Not only is it in the tourism community's best interest to support manatee protection efforts, they also are compelled to do so. Where endangered species are involved, protection supercedes the use of wildlife as a tourism resource.

The question then becomes how to overcome a historically problematic relationship between stakeholders and establish practices that will decrease potential for deleterious impacts and move these groups toward symbiosis, all within a complex management setting. Because manatee protection supersedes use and because of limited managerial resources, the onus is on the tourism operators to minimize potential impacts. Shafer and Inglis (2000) indicated that tourism operators acted as important "on-site managers" on Australia's Great Barrier Reef and found that operator staff had one of the highest positive influences on visitor experiences across multiple settings. Research also suggests that operator education can directly and positively affect tourist behavior related to touching and damage to underwater features (Medio and others 1996). Operators on the Great Barrier Reef are organized into an association that works with the marine park authority to establish best practices for tourism.

Participatory management approaches have been used successfully in other marine tourism settings. For example, Parsons and Woods-Ballard (2003) found that whale-watching operators were far more likely to adhere to a code of conduct developed by an association of their peers than to regulations developed by governing agencies, and operators in British Columbia, Canada "felt strongly that [their code of conduct] was an effective voluntary approach to regulating human behavior" (Gjerdalen and Williams 2000, p. 34). An association also could provide a formal point of contact with agencies and other groups that have interests in manatee protection and assist in opening dialog among the many stakeholders with an interest in the well-being of manatees. A tourism organization could provide an opportunity for the development of best practices specific to manatee encounters. A more symbiotic relationship between the USFWS and tourism may be achieved through the formation and continued support of a tourism association that can devise best practices. A best practices program for manatee encounters could address issues such as the following:

- The distribution of use during the day and across days of the week
- Specific inappropriate behaviors of tourists during encounters and their subsequent consequences

- Changes in equipment or gear used for manatee encounters (e.g., a change to smaller-sized snorkel fins may reduce the propensity for participants to pursue manatees as well as the disturbance of sediment that lowers visibility).

Best practices developed by an organization of tourism operators has the potential to be more effective than regulations imposed on the setting. Additionally, they can enhance both the visitor experience and manatee protection. For example, changes in practices, as suggested earlier, can lower density and crowding at key times while encouraging more appropriate behavior during interactions. Importantly, the approach involves the operators (arguably the group most knowledgeable about the situation) more directly in the management process. Without their buy-in, attempts at regulation are more likely to create conflict and to be less effective in achieving management goals.

Conclusion

In the first peer-reviewed work on swimming with manatees, Shackley (1992) opined that human–manatee interactions might be the “final nail in the coffin” (p. 264) for the species. More than 10 years later, the Crystal River population has one of the highest survival rates in the state, and manatee use of the bay has increased by 300% since 1985. Superficially, these indicators do not suggest a problem with manatee tourism. However, there is increasing concern from stakeholders that encounters may lead to unacceptable sublethal impacts for manatees (Soric and others 2003).

This study showed that, especially where endangered species are concerned, when mechanisms are not in place to control the tourism component, there is greater potential for negative impacts to the target species as the setting evolves. In this case, the salient issues identified by stakeholders were related to controlling visitor use and behavior more so than the management of the manatees themselves. These issues stemmed from the inability of the USFWS to manage the tourism component of the manatee encounter adequately. Although there are opportunities to regulate the tourism component directly, we believe concerns with manatee tourism at Crystal River can be mitigated by a well-organized association of tourism operators that can establish and enforce “best practices” in manatee tourism that reflect both the goals of manatee protection and visitor satisfaction.

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