

Hawaii's real life marine park: interpretation and impacts of commercial marine tourism in the Hawaiian Islands

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The Hawaiian Islands are a popular tourism destination for over seven million travelers annually. Commercial marine tourism in Hawai'i (e.g., snorkel and dive trips, wild dolphin swims, whale watching) is a multi-million dollar industry attracting visitors from around the world. By using proper interpretation, these operators may reduce some impacts on the marine environment. This article examines marine tour excursion practices and interpretation through analysis of participant observations on 29 tour boats and semi-structured interviews with 59 tour boat employees, operators, and other experts in the Hawaiian Islands. Results show that many operators and clients participate in depreciative behaviors such as dumping food scraps, feeding fish, trampling coral, and harassing marine life. The majority of tour companies offer some form of interpretation, but overlook aspects of the environment and focus primarily on equipment use and personal safety. This article highlights the lack of environmentally oriented interpretation and explores possible links between depreciative behavior and interpretation. Research and management implications are discussed.

Keywords: marine tourism; environmental impacts; interpretation; qualitative analysis; commercial tourism

Introduction

Coral reefs, beaches, warm climate, unique topography, and warm clear waters attract over seven million travelers to the Hawaiian Islands every year (Friedlander et al., 2005). The number of annual visitors to Hawai'i has escalated over 65% in the past 20 years and is expected to continue to rise (Friedlander et al., 2005). This tourism growth has led to increased participation in marine-based activities and interest in species found within aquatic ecosystems in the state. Over 80% of visitors to Hawai'i, for example, participate in marine activities during their trip such as snorkeling, diving, surfing, and ocean kayaking (van Beukering & Cesar, 2004). The number of private commercial operators offering marine tourism experiences (e.g., whale watching, parasailing, snorkel tours) has also increased, as demonstrated by the recent popularity of 'swim with wild dolphins' tours on the west coast of the island of O'ahu (i.e., from one commercial operator in the mid-1990s

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to nine operators presently; Wiener, 2006). According to Friedlander et al. (2005), more than 1000 ocean tourism companies operate in Hawai'i. There is a need to examine the interpretation offered by these commercial operators and the impacts of these operations on the state's coastal and marine environments.

Coral reefs and other coastal habitats in Hawai'i generate over US \$800 million in revenue and an additional US \$360 million in added value each year (Davidson, Hamnet, & Minato, 2003; van Beukering & Cesar, 2004). In other words, these areas are valuable economic resources. Given that there is little management and regulation of tourism expansion in these areas, however, there is concern among agencies and the public regarding practices and ethics of commercial marine tour operators (Shapiro, 2006). Commercial tours in marine areas can cause negative impacts such as crowding and pollution, but are also capable of fostering environmental awareness that may help facilitate protection of marine mammals and other species. The marine environment can serve as an 'outdoor laboratory' where operators provide access for tourists to see living examples of ecological principles (Salm & Clark, 2000). By providing this opportunity for learning, a consideration for marine conservation can be developed. In recent years, some marine travel businesses and operators in Hawai'i have strived to become more environmentally conscious and develop more conservation-oriented principles and practices (Shapiro, 2006).

This study examines observations of environmental impacts that are occurring as a result of commercial marine tours in Hawai'i, and interpretation messages that are being conveyed by operators to their clients. The overarching goal of this work is to gather baseline data about marine operator practices and interpretation to identify opportunities for facilitating information and education messages to visitors, and conservation-oriented behavior of operators and visitors. Direct observation of operator impacts and interpretation, as well as semi-structured interviews, were used to document operators' current practices and techniques used in Hawai'i. Examination of interpretation messages included a deconstruction of themes and delivery using a standardized checklist. Understanding operator impacts, practices, and interpretation is important for informing both future research and management decision making in Hawai'i and elsewhere.

Review of literature

Effects of commercial tour operators

Private commercial tour operators are a popular source for offering products, services, and activities in tourism settings. These operators typically apply for and may be granted permits, contracts, or leases by agencies to undertake commercial activity in a specific location for a particular time (Quinn, 2002). Privatization has both positive and negative effects. Allowing tour companies to operate on public lands and in public marine areas, for example, may generate employment and be more cost effective for public land-management agencies, but may exclude individuals unable to pay for the activities. Proliferation of private tour operators may also generate a rapid increase in visitation, causing impacts such as crowding, pollution, and conflict among operators, visitors, and local residents (Mowen, Kerstetter, Graefe, & Miles, 2006; Ritchie, 1999; Sem, Clements, & Bloomquist, 1996; Weaver, 2001).

Research has examined effects and impacts of commercial tour operators. Beeton (1999), for example, reported that non-commercial wilderness users were dissatisfied with the presence of commercial horseback groups partially because of the perceived environmental impacts of horseback tours. Non-motorized recreationists' were bothered by crowding,

erosion, and noise caused by commercial jeep tours (Behan, Richards, & Lee, 2001). In marine settings, Finkler and Higham (2004) found that self-guided shore-based whale watchers were concerned about commercial whale-watching boats disturbing whales and impacting the marine environment.

Many other studies have documented impacts of commercial marine tours on coral, fish, water, and other aspects of the marine environment (Danil, Maldini, & Marten, 2005; Dinsdale & Harriott, 2004; Hawkins et al., 1999; Holland & Meyer, 2003; Kay & Liddle, 1989; Rodgers & Cox, 2003; Roupheal & Inglis, 2001; Schleyer & Tomalin, 2000; Talge, 1990; Tratalos & Austin, 2001; Zakai & Chadwick-Furman, 2002). Barker and Roberts (2004), for example, found that less experienced divers and those with underwater cameras were more likely to contact and damage coral. Depreciative behaviors such as dropping anchors and allowing clients to handle marine life correlate with deleterious effects such as coral breakage and habituation and dependence of marine life. Many of these studies highlighted the need for providing tourists with interpretation about the fragility of coral reefs and other aspects of the marine environment (Randall & Rollins, 2006; Roggenbuck, Williams, & Bobinski, 1992).

Environmental interpretation

According to Filho, deCarvalho, and Hale (1998, p. 3), interpretation is 'a tool for education aimed at developing a resource-based awareness whereby components of the environment are used to build a holistic understanding of the whole'. Interpretation typically presents issues, whereas environmental education often portrays in-depth information, offering knowledge enhancement for greater understanding and possible behavior change. The goal of environmental education is to develop an awareness and concern leading to in-depth knowledge, skills, and commitment to work toward solutions for environmental problems (Jickling, 1997).

Studies have examined interpretation and environmental education in tourism settings, and their role in informing tourists and changing their cognitions and behavior (for reviews, see Filho et al., 1998; Orams, 1999; Weaver, 2001). Some researchers have suggested that interpretation may not always directly transform environmental cognitions and behavior (Kimmel, 1999; Manfredi, 2002). Bramwell and Lane (1993), for example, revealed ineffective links between tourism interpretation and behavior change, and explained that interpretation may selectively distort information and cater to tourists' needs, omitting unappealing reality. Orams (1997, 1999), Tubb (2003), Vining (2003), and others, however, have conducted empirical research showing that interpretation is one approach for effectively increasing visitor knowledge and encouraging behavior modification. Dearden, Bennett, and Rollins (2007), for example, showed that interpretation offered on dive boats increased diver perceptions and awareness of recreation impacts on marine environments (e.g., anchor damage, impact on fish). Christensen, Rowe, and Needham (2007) found that interpretation at shore-based whale-watching sites improved tourist understanding and awareness of their impacts on whales and their habitats. Medio, Orond, and Pearson (1997) showed that divers did less damage after they participated in an in-water demonstration and an illustrated dive briefing that covers issues associated with reef biology, protected areas, and implications of diver contacts with coral and other marine species.

Numerous other studies in marine settings have demonstrated that interpretation is important for raising environmental awareness and encouraging conservation behavior (Andersen & Miller, 2006; Cottrell & Graefe, 1997; Hines, Hungerford, & Tomera, 1986). Although many commercial marine tourism companies offer some form of interpretation,

few provide the type and depth of information that educates visitors and causes them to change their lifestyle and adopt more conservation-oriented behaviors (Christensen et al., 2007; Garrod & Wilson, 2003; Orams, 1997, 1999). Interpretation offered by some marine tour operators, however, attempts to encourage pro-environmental behavior by connecting place to personal action (Cottrell & Meisel, 2004). Cesar and van Beukering (2004), for example, noted that if individuals are given interpretation about proper snorkeling behavior and ethics while participating in a guided tour, they may adhere to the same principles and conservation behavior the next time they go snorkeling.

Marine tour guides and operators can serve as environmental interpreters (Cheng, Thapa, & Confer, 2005; Medio et al., 1997). Wearing and Metry (1999) suggested that tour leaders are important because they can interpret the natural environment while overseeing client behavior to mitigate environmental impacts from participation. Wiener (2006) emphasized the importance of guide and operator motivations and attitudes in providing effective marine tourism interpretation (Figure 1). Negative attitudes are often associated with no motivation to provide interpretation or participate in conservation. Feelings of futility, for example, are commonly associated with a general sense that individuals are not in a position to make a difference.

According to Orr (1994), interpretation should provoke thinking and encourage interest to galvanize participants to actively play a part in conservation. Like some other researchers, however, Orr somewhat oversimplifies the ability of interpreters to influence participants and discusses little about the complexity of the interpretation process. Researchers have suggested that marine tourism is an important venue for providing information about conservation and although marine tours are a natural setting for learning, there are unpredictable factors that make the interpretation and learning process complex (Garrod & Wilson, 2003; Orams, 1999). Marine tourism, for example, often occurs outdoors so inclement weather, poor visibility, and client trepidation of wild marine life are some factors that may hinder successful interpretation.



Figure 1. Tour operator motivations and attitudes toward conservation (Wiener, 2006).

Research questions

Taken together, these studies have contributed to a broader and more comprehensive understanding of the: (a) environmental effects and impacts associated with commercial marine tourism operators, (b) amount and type of interpretation provided by these tour companies, and (c) effectiveness of this interpretation in promoting more environmental awareness and conservation-oriented behavior. In Hawai'i, however, there has been limited research examining impacts and interpretation of commercial marine tourism operations (Division of Aquatic Resources (Hawai'i), 2006). Given the proliferation of commercial marine tour companies in Hawai'i, a baseline study is needed that observes environmental impacts caused by private marine tourism operators in the state and the amount, type, and content of interpretive messages that are being conveyed to tourists and other clients of these companies.

This article, therefore, uses exploratory qualitative data to help address these knowledge gaps and examine three research questions. First, how are marine tourism companies operating in Hawai'i and are they participating in environmentally sound practices? Second, what information and interpretive messages are being disseminated by these operators to their clients? Third, to what extent can this information about operator impacts and interpretation be used to identify future opportunities for facilitating conservation-oriented behavior of operators and tourists?

Methods

Study area

The Hawaiian Archipelago is composed of 132 islands, reefs, and shoals stretching over 1500 miles in the Pacific Ocean. The main Hawaiian Islands accommodate the majority of the population and tourism traffic. Data for this article were collected at five of the main Hawaiian Islands (O'ahu, Maui, Lana'i, Hawai'i [i.e., Big Island], Kaua'i) because of their importance in the state's marine tourism sector. O'ahu is the most populated island and remains a travel hub for gaining access to the surrounding islands. Of all incoming visitors to the state, 68% stay only on O'ahu (Department of Business, Economic Development and Tourism [DBEDT], 2007). Maui also draws a large number of tourists, attracting the majority seeking snorkeling and diving activities (DBEDT, 2005). Kaua'i's Napali coastline and Hawai'i Island's active volcano and resident dolphins have contributed to the popularity of these islands.

The majority of commercial marine tourism excursions in the state operate from larger state harbors (e.g., Maalaea Harbor on Maui) with the exception of a few private harbors such as Ko Olina and Hawai'i Kai on O'ahu. Most excursions occur in nearshore marine environments such as at submerged shipwrecks, natural and artificial reefs, shallow lagoons where spinner dolphins reside, and open waters where humpback whales are found. A variety of vehicles is used for these tours, including zodiacs, kayaks, catamarans, sailboats, and motorized boats.

Data collection

Data were obtained using two methodological techniques: (a) participant observation, which involved anonymously observing operator and client practices and effects, and (b) semi-structured interviews with marine tour employees, guides, and boat captains, and other marine tourism experts. Data collection for the participant observation began by

selecting marine tourism companies. A directory was created that included all marine tour operators in Hawai'i listed in all popular tourism advertising publications and pamphlets found at information kiosks. Although this method only provided a list of operators who chose to advertise, it generated a reasonably large, comprehensive, and representative listing of marine tourism businesses (e.g., different types of activities, size of operators, frequency and cost of tours). At present, the state Division of Boating and Ocean Recreation agency has a catalog of over 600 boats with commercial permits, but this includes boats used for any commercial activities, not just for marine tourism excursions. There is no known official data or list categorizing these businesses based on their activities. Companies operating from private harbors were also not required to register for commercial permits. This lack of information made it difficult to obtain a complete and accurate list of companies offering marine tourism excursions in the Hawaiian Islands.

In total, 29 boats or businesses offering marine excursions such as guided snorkel and dive trips, wild dolphin swim programs and tours, and whale-watching tours were selected and observed visiting over 40 locations and covering all private and publicly operated commercial harbors on the five islands. Given time and financial constraints, it was not possible to examine all marine tourism companies in Hawai'i. Data collection occurred over a 1-year period to ensure inclusion of activities that typically occur at certain times of the year, such as whale-watching tours, which are offered only when humpback whales frequent Hawai'i (i.e., from December to March). Between June and September, many companies focus on offering snorkeling and diving opportunities although several companies provide these activities throughout the year. These methods allowed for a more representative cross-section of the different types of marine tours and programs, interpretation methods, operators, and tourists in the Hawaiian Islands. Researcher participation in these tours was anonymous to avoid influencing any interpretation conveyed to tourists. A standardized checklist was used to identify topics addressed in interpretation and specific operator practices and effects such as fish feeding (Figure 2).

Following participant observation, semi-structured interviews were conducted at offices and places of work with 59 tour employees, guides, boat captains, and other experts who

MARINE TOURISM OBSERVATION CHECKLIST

Company Name:	Date of Excursion:	
Location:	Boat Type:	Activity(s):
On Board Toilets	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Waste Dumping	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Fish Feeding	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Use of Non-Biodegradable Products	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Meals Offered	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Intro Scuba	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Snuba/Bob's/Etc	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Guarantee Sightings	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Interpretation/Instruction	Yes <input type="checkbox"/>	No <input type="checkbox"/>
• Reef & Marine Etiquette	Yes <input type="checkbox"/>	No <input type="checkbox"/>
• Natural History	Yes <input type="checkbox"/>	No <input type="checkbox"/>
• Ecological Concepts	Yes <input type="checkbox"/>	No <input type="checkbox"/>
• Environmental Awareness	Yes <input type="checkbox"/>	No <input type="checkbox"/>
• Suggestions for Involvement	Yes <input type="checkbox"/>	No <input type="checkbox"/>
• Additional Information Offered	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Details:		

Figure 2. Checklist used on boats while conducting participant observation. The checklist records boat operator practices and interpretation topics and themes.

were familiar with and work in the marine tourism industry in Hawai'i. On the basis of availability, one interview was conducted with each company owner or boat captain following the participant/field observation. Other experts who were interviewed included marine tourism professionals not subject to the field observations such as aquarium employees, local non-profit authorities, and marine tourism education specialists. Purposive and snowball sampling were used to identify some interview participants. A purposive sample often ensures that certain types of individuals representing specific attributes are included, whereas snowball sampling (i.e., chain referral, respondent driven) involves asking initial participants to identify other potential participants (Berg, 2007). Interviewees were selected through referrals or were representatives of agencies or places that were targeted. Interviews ascertained perceptions and opinions about effects, interpretation, and management of tour operations. Interviews were audio recorded and electronically transcribed verbatim into word processing software.

Data analysis

Data from participant observation was analyzed using frequencies and percentages of observations recorded on the checklists completed during each marine excursion. Content analysis was used to identify common themes in the interviews. One primary and two secondary readers reviewed all of the full interview transcripts independently and coded for common themes. To ensure neutrality, secondary readers were volunteers with no previous knowledge of the fieldwork. Common themes were categorized into three broad categories: (a) interpretation problems and suggested solutions, (b) marine tourism practices and solutions, and (c) other marine issues and solutions. Other broad categories identified by the secondary readers included issues related to local populations and environmental organizations. The secondary readers, however, identified similar themes within the three categories, including comments pertaining to boaters, tourists, management, marine species, and the environment. Inter-coder reliability is one technique for improving rigor in qualitative data analysis and identifies consistency of interview themes and coding across multiple readers (Berg, 2007). Inter-coder reliability was calculated by examining agreement among readers/coders at specifically marked intervals throughout the interview transcripts. Agreement levels ranged from 82% to 92% with an average of 87% inter-coder reliability, implying a high degree of consistency in identified themes and codes.

Results and discussion

Effects of commercial tour operators

The first objective of this study was to observe how marine tourism companies are operating in Hawai'i and whether they are participating in environmentally sound practices. Table 1 shows common boat operator practices identified during the participant observations and indicates divergence in participation in ecologically sound practices. Observations were compared to best practices, which were determined based on existing operator voluntary codes of conduct and information highlighting environmentally deprecative marine tourism practices in Hawai'i (Coral Reef Alliance [CORAL], 2003; Division of Aquatic Resources (Hawai'i), 2006). Companies that took pride in engaging in 'green' practices were still observed dumping food scraps, feeding fish, and harassing or removing marine life. If companies do not practice what they preach, clients may become confused or discount any conservation messages provided.

Table 1. Observed tour boat practices.

Activity types	Observed practice	Number (<i>n</i> = 29)	Company frequency (%)
All	On board toilets	17	59
All	Waste dumping (with holding tank)	16	55
All	Meals offered	17	59
All	Removed or harassed marine species	5	17
All	Recycling	4	14
All	Dumping food scraps overboard	3	10
All	Allowance of smoking	3	10
All	Onboard photographer/videographer	3	10
All	Collect/contribute donations for conservation	3	10
Whale watching	Guarantee sightings of species	9	31
Snorkel/scuba	Introductory scuba or scuba for non-certified users	9	31
Snorkel/scuba	Fish feeding	9	31
Snorkel/scuba	Allowance of knives or gloves while diving	4	14
Snorkel/scuba	Required floatation devices while snorkeling	4	14
Snorkel/scuba	Fishing from boats while conducting tour	4	14
Snorkel/scuba	Snuba or motorized underwater craft	3	10

Practices related to conservation of coral reefs and other aspects of the marine environment were also overlooked by many operators. Only 14% of companies, for example, enforced recycling of materials and fewer companies (10%) attempted to raise or collect money for marine conservation and research (Table 1). Over 30% of businesses offered introductory diving for non-certified participants that involved placing novice divers directly into reef locations. Certification can be helpful for raising awareness and demonstrating safety techniques, but companies in Hawai'i rarely consider recertification programs or evaluate diving abilities. Novice or out-of-practice divers may pose threats to themselves and the marine environment (Tissot & Hallacher, 2000). If marine tourism excursions do not engage in environmentally sound practices around marine mammals, coral reefs, and other aquatic species, these tours can play a role in degradation of the marine environment (Weaver, 2001).

The most frequently observed impact was coral trampling and damage from operators and clients touching, kicking, breaking, and sitting or standing on coral (Figure 3). Physical



Figure 3. Sitting, trampling, or breaking coral was one of the most commonly observed impacts to reef habitats from recreation in Hawai'i. A common sight at popular beach and reef areas, a visitor at Shark's Cove on Oahu's North Shore rests on reef structure.

damage to reefs was also observed from improper boat anchoring. Additionally, operators and guides (e.g., dive masters) were observed harassing marine life such as making an octopus ink and removing urchins, sea cucumbers, and other small invertebrates for clients to view. In the interviews, many tour companies maintained that these practices were interpretive and educational, but there are arguably more appropriate ways to inform passengers (e.g., photographs, videos, naturalist talks). When passengers were observed engaging in improper actions such as chasing turtles, there were several occasions when crew members would turn a blind eye. Interviews revealed that some staff members felt obliged to do this, as they rely on customer satisfaction for business success. One interviewee, for example, claimed that 'tips are based on tourists' positive experiences and staff often ignore bad behavior for fear that they will lose their tip'. Marine life can become habituated to and dependent on humans through feeding and handling, and can alter behavior (e.g., breeding, feeding) in response to harassment from humans (Orams, 1999).

Underwater cameras are an often overlooked impact when diving and snorkeling (Barker & Roberts, 2004). Inexperienced camera users can damage coral reefs when users become distracted and lose their balance. Using cameras increases tourists' chances of collision with reefs, marine life, or other people in the water (Barker & Roberts, 2004; Salm & Clark, 2000). Some boat operators have attempted to mitigate this problem by offering onboard photographers and videographers. Only 10% of companies observed, however, offered videos or photographs to clients (Table 1). Onboard photographers and videographers can provide an opportunity to give information and interpretation to clients through narration.

Other impacts that were observed included some whale watching and dolphin interaction tours harassing species. Whale and dolphin watching has become a popular form of marine tourism in Hawai'i and other areas around the world (Christensen et al., 2007; Hoyt, 2005). In Hawai'i, boat operators have started working together to identify areas where cetaceans are located. Spinner dolphins typically come into shallow bay areas in the state to rest during the day, allowing boats to easily access the dolphins (Courbis & Timmel, in press; Danil et al., 2005). Concerns have been raised regarding disruption of these dolphins during resting hours, and possible dolphin aggression and energy depletion (Courbis & Timmel, in press; Danil et al., 2005). Several tour companies, however, were observed ignoring these concerns by steering dolphins directly into groups of pre-placed clients when dolphins began to ride the bow of the boats (Figure 4). Boat operators were also observed transmitting messages to other operators indicating dolphin locations and failing to decrease boat speeds near marine mammals.



Figure 4. Tour companies will often wait until dolphins ride the bow of the boat and then steer them directly into a group of pre-placed people in the water. Spinner dolphins are most commonly subject to this form of tourism, often taking place in shallow sandy bay areas.

Swimming with and feeding wild cetaceans is illegal under the take and harassment laws of the Marine Mammal Protection Act, but other cases of human interference were observed and documented such as operators driving motorized vessels directly through pods of dolphins. Inappropriate and illegal interactions with marine species were observed frequently including 11 separate perceived marine mammal violations. Boats and clients crowding marine mammals was witnessed as a common practice; field observations of five or more boats encircling dolphins were recorded on eight separate occasions. Some boat operators were also observed chasing after and crowding humpback whales. In an interview with one whale-watching tour operator on Maui, concern was expressed about the number and size of boat operations: 'the biggest problem with the marine tourism industry is the permit rules. The boats continue to get larger allowing for more people to come all at once. Companies that started with one 20-person boat have expanded to a fleet of six boats holding 65 passengers each'.

Some tour operators try to satiate participant interests by trying to offer closer experiences with marine mammals and other marine life (Orams, 1999, 2000). Clients in Hawai'i often verbalized extreme disappointment if they did not participate in up-close activities such as swimming with dolphins during encounter trips, even when operators said that it would not be in the best interests of the individuals or dolphins. If tourists have less elaborate expectations for these activities, they may be more likely to enjoy themselves and be more receptive to environmental interpretation (Garrod & Wilson, 2003; Kimmel, 1999). Observers can still attain satisfying experiences from being in proximity of marine life, witnessing species in their natural habitat, and observing behaviors from a distance such as fin slapping and breaching (Duffus & Dearden, 1990). Marine life should be free of stress from harassment and encirclement, so minimizing approach distances and crowding are important, given that long-term effects of wildlife viewing on marine life are still largely unknown (Orams, 2000). Commercial marine tourism activities, however, still have the potential to serve as important vehicles for information, interpretation, and conservation if implemented in a safe and respectful manner (Orams, 1999).

Environmental interpretation

The second objective of this study was to assess informational and interpretive messages disseminated by commercial marine tourism operators in Hawai'i. Although over half of the tour companies offered some form of interpretation, many focused solely on personal safety. Table 2 shows the frequency of interpretation practices observed on boat tours. Although 69% of operators addressed issues related to reef and marine etiquette (e.g., what to do, how to behave), fewer than half included interpretation on issues such as natural history, ecology, species encountered, and endemic species. Only a few companies offered pamphlets, photo identification books, or other materials on board their boats. Surprisingly, none of the tour companies provided any information or interpretation about environmental degradation of coral reef environments or suggestions on how clients can become involved in marine conservation. These observations contradict what many operators expressed during interviews, as they emphasized the importance of providing good environmental information to participants. There were, however, several operators who mentioned that they took steps to enhance the quality of their excursions. One dive operator, for example, stated that 'it is our in-house policy not to take things from the ocean; we ensure detailed environmental training for staff'.

Perceived problems with the amount and type of interpretation offered by marine tours and suggested solutions were common themes that emerged from the interviews. Many

Table 2. Observed interpretation practices on tour boats.

Interpretation practice	Number (<i>n</i> = 29)	Company frequency (%)
Any type of interpretation or instruction ('how to' or safety procedures)	22	76
Reef and marine etiquette (what to do or how to behave [e.g., not touch coral])	20	69
Natural history education (historical concepts, stories, geology about area explored)	12	41
Ecological concepts/facts presented (biology, life histories, accounts of marine species or processes)	7	24
Discuss species that will most likely be encountered (introduction or preparation for common species in area)	6	21
Information/fish ID books offered onboard (secondary reference material handed out or made available)	4	14
Additional information offered (any other information given not covered by other categories)	3	10
Photo identification/research participation (if company involved in photo identification or research studies independently or in conjunction with other organizations)	2	7
Point out endemic species (discussion of species only found in Hawai'i, and why unique)	2	7
Pamphlets available (secondary material provided with information or facts about marine environment or species)	2	7
Environmental degradation/awareness concepts (discussion of marine degradation or threats to marine species)	0	0
Suggestions for involvement (discussion of solutions to environmental problems, or ways for users to get involved [e.g., donate to reef collection fund])	0	0

operators expressed ways in which they could better inform participants. One guide, for example, stated that 'we need to present the community with biological facts that they can understand, not opinions'. This was a common belief among those working in the field. A company owner reinforced this notion by stating that 'tourists want the guidance; they feel self-conscious about destroying the reef, but do not know how to avoid bad behavior unless they are told'. Marine tour guides and operators consistently shared a desire to do more, but felt limited by state agency regulations, company policies, or lack of knowledge. Interview questions about interpretation revealed a range of opinions from indifference to strong motivation, and opinions varied in what should be shared with participants and how much should be expected from operators.

Summary, implications, and future research

Taken together, these findings suggest that although some commercial marine tourism operators in Hawai'i are engaging in environmentally oriented practices, more needs to be done to improve boat operator practices and interpretation in the state. Problems include depreciative practices and a lack of environmental interpretation from tour operators. Many companies believed that they were engaging in sustainable practices, but these opinions were often contradicted by limited or no environmental interpretation or ecologically sound practices actually observed on tours. Actions such as fish feeding, waste dumping, and condoning inappropriate client actions (e.g., standing on coral, handling

marine life) were observed and may result in complacency and a lack of stewardship toward marine ecosystems.

These results suggest that actions are necessary to help mitigate some of these observed impacts of commercial marine tourism in the Hawaiian Islands. Making benefits of participating in voluntary best management practices and codes of conduct (CORAL, 2003) widely known among operators and working to attain compliance with these standards may help minimize impacts. A formal or required certification and accreditation program for the state's commercial marine operators should also be considered for addressing impacts (Green Globe; Griffin & DeLacey, 2002). In addition, improved monitoring and enforcement of agency regulations and guidelines may be required.

There is also a need for increased and improved interpretation that links environmental problems to ways that participants can get involved. A surprising finding in this study was that on all of the tours, there was no mention of marine degradation or encouragement of participant involvement in conservation. Environmental concepts were essentially absent from interpretive presentations and participants were given little or no information from operators about how to engage in marine conservation. This was not because of a lack of opportunity; there are numerous public volunteer and paid projects in the Hawaiian Islands and elsewhere. Monitoring whales, participating in fish counts, helping with beach clean-ups, and donating to local non-profit organizations are just a few activities available to the public in the Hawaiian Islands.

The third objective of this study, therefore, was to examine the extent to which these observations of operator impacts and interpretation can be used to identify future opportunities for facilitating conservation-oriented behavior of operators and tourists. First, increased and improved guide training could influence the quality and amount of environmental interpretation provided. In this study, however, participation levels and motivations of companies were some of the biggest obstacles; operators with little motivation toward marine conservation typically provided limited interpretation that focused primarily on equipment use and safety precautions. This is a recurring issue in Hawai'i, where many nature-based tourism operators rarely provide comprehensive interpretation or invite researchers and other knowledgeable experts to join tours. Companies should provide updated staff training covering current issues on ocean processes, the nearshore environment, and marine degradation problems and potential solutions. Training staff is one necessary step to improving interpretation and promoting awareness. Guides and operators should lead by example by engaging in pro-environmental practices instead of depreciative actions such as those observed in this study (e.g., feeding fish, harassing marine life).

Second, participants in marine tourism activities need to be engaged and interested. If a positive experience is generated, then participants may be more likely to develop greater interest and concern (Cheng et al., 2005; Kimmel, 1999; Medio et al., 1997). Not only does interpretation need to reach a diversity of groups, but it must be captivating and easily understood. This is, however, a difficult and complex goal to achieve. Participants of most marine tourism activities come from diverse backgrounds, creating a heterogeneous audience. Some participants in this study, for example, were observed ignoring or talking during interpretation programs. If operators and guides were more passionate, motivated, and concerned about marine areas and broader environmental issues (Figure 1) and could communicate this in their interpretation, clients may become more engaged and interested (Weaver, 2001).

Third, observations and interviews in this study showed a lack of environmentally-oriented interpretation during commercial marine tours in Hawai'i. A more holistic approach focusing on entire ecosystems and interdependencies among species should be

utilized. It is also important to have an understanding of what messages have the greatest impact on people. Past research and ancillary observations in this study suggest that some tourists seem to respond well to concrete examples rather than superficial generalities (for reviews, see Andersen & Miller, 2006; Christensen et al., 2007; Manfredi, 2002; Weaver, 2001). Interpretation on almost every 'swim with wild dolphins' tour, for example, repeatedly gave the same factual information and there was a little connection made to dolphin behavior and preservation of this species or its habitat. Operators could combine standard descriptive information with discussion of relevant environmental problems and the roles that humans play in creating and possibly solving them.

Fourth, guides and operators providing interpretation should be amenable to questions and able to tailor interpretation and answers to different groups. If the interpreter can gauge the audience's reaction to information conveyed, then greater emphasis can be placed on elements to which particular groups respond well. Customization and adaptation of the material presented may keep an audience more captivated (Orams, 1997; Weaver, 2001).

This study helped to address important knowledge gaps in Hawai'i by providing some baseline observations about effects of commercial marine tourism operators in this state and the amount and types of interpretation provided by these operators. Important questions such as 'what interpretation is effective in Hawai'i' and 'what messages have the greatest impact on different individuals in the state', however, are beyond the focus of this article and remain unanswered by this research, so long-term follow up survey work is needed to answer these questions. Research is also needed to measure the efficacy of specific interpretation techniques used by marine tourism operators. Studies documenting effects of interpretation on encouraging conservation-oriented behavior are needed, especially in the Hawaiian Islands. Finally, additional studies are needed in Hawai'i examining issues such as recreation impacts to aquatic ecosystems; attitudes of visitors participating in marine tours; and roles of government, non-governmental organizations, local communities, and private businesses in mitigating environmental impacts of marine tourism in Hawai'i and creating effective marine interpretation programs in the state.

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