

# The ANATOMY of a WHALEWATCH

MARINE TOURISM AND ENVIRONMENTAL EDUCATION

by Paul H. Forestell

As a species, we humans are unique in the degree to which we employ concepts and tools in the resolution of life-problems. Decisions we make in the application of science and technology are among the most complex cognitive tasks performed in the animal kingdom. Our ability to make these decisions, however, is not without cost. Benefits gained from technological advances in exploiting natural resources and taming environmental elements begins to pale in comparison with current patterns of wasteful consumption and production of toxic substances. It is important that educators address this dichotomy, for it gives unflattering testimony to the possible irrelevance of classroom science instruction to solving challenges in everyday life.

My own background leads me to consider this issue in the context of marine education. For sixteen years, I have studied whales and dolphins in Southeast Alaska, the Bonin Islands of Japan, the Sea of Cortez,

the Hawaiian Islands, the Gulf of Mexico, the Atlantic Coast of New England, and off the east and west coasts of Australia. I've seen humpback whales, right whales, fin whales, minke whales, gray whales, and some 20 different species of odontocetes.

What has impressed me as much as the whales and dolphins is the fascination with which humans regard them. Although my initial interest in marine mammals was from scientific curiosity, I find myself more and more interested in the importance of marine mammals as ambassadors for the marine environment. I have yet to see anyone remain placid in the presence of a whale, and I have seen countless people from all walks of life react with excitement after close encounters with one. The enthusiasm cuts across time and space, culture and economy. The delighted screams elicited by a breaching whale or a leaping dolphin sound the same whether in Japanese or Spanish, or with an accent from Australia or New England.



*A humpback whale breaching in front of a whalewatching boat.*



*Aerial photo of a breaching humpback whale.*

## The Development of Whalewatching in Hawaii

Hawaii's association with whales reaches back more than 150 years. The first whaling ships anchored at Lahaina in 1819, 40 years after James Cook's fatal second visit. Soon, hundreds of American whalers were putting into Honolulu and Lahaina each year. The ships came to Hawaii, not to hunt whales, but to stock provisions and fresh water before sailing for sperm whales on the Japan Ground, beyond the north-west Hawaiian Islands in the off-shore seas of Japan. Whalers visiting Hawaii were more interested in recreational shore-based activities than hunting whales. Along with humpbacks, they were among our first seasonal tourists.

With the discovery of oil in 1859, and the destruction of the North Pacific whaling fleet by an early Arctic freeze in 1871, the flow of whaling ships through the Hawaiian Islands ceased. Over the next hundred years, new technology in shipping and hunting moved the theater of Pacific operations to the polar regions on both sides of the equator. Humpback whales became a primary target for whaling efforts by pelagic factory ships. By the 1960s, the North Pacific population of humpback whales was reduced from an estimated 15,000 to fewer than 1,000, and hunting of humpback whales in the North Pacific was prohibited by international agreement in 1966. Today, there are between 2,000 and 3,500 humpbacks in the North Pacific.

While in Hawaiian waters, humpbacks come close to shore. Their spectacular behaviors have become a source of tremendous fascination and interest. Since 1975, an ever-growing number of boat owners have

offered trips along the Maui shoreline to see the whales. Today, whalewatch trips are available on all major islands beginning as early as mid-November and continuing through May. More than 150,000 people go whalewatching in Hawaii each winter.

As whalewatching has grown, so have concerns about potential impact on the humpback, which remains one of the most endangered of the great whales worldwide. Humpback whales engage in critical breeding, calving and nursing activities while here. In addition to approaches by whalewatching vessels, they must tolerate inter-island barge traffic, private boaters, low-flying aircraft, agricultural run-off, shoreline development and extensive military activity. Many are concerned that the cumulative effect of such activity may threaten the recovery and survival of this endangered species.

## Whalewatching as an Educational Opportunity

Since 1980, the Pacific Whale Foundation has recognized the need to educate the public, from a scientific perspective, about humpback whales, their endangered status, and the need to ensure their survival through a variety of ocean management and protection plans. Our philosophy has been that "...those of us who have an interest in the recovery of the humpback whales should become educated about their nature and habits before imposing on their life and activities, just as we might educate ourselves about the language and culture of another country before visiting it." (Kaufman and Forestell, 1986)

While recognizing that tourists select recreational activities that are enjoyable and attractive, we have been



*"Amazing Grace:" surface view of breaching humpback whale.*



*Humpback whale breaching near Maui (seen in the background).*

conscious of an awakening interest in the environment and a general fascination with wildlife, particularly whales and dolphins. Nonetheless, we found twelve years ago that information provided during whale-watches was trivial at best, and inaccurate for the most part. Before 1980, there were no formal interpretation programs available on any regularly scheduled whale-watches in Hawaii. Since that time, we have developed enjoyable yet educational whalewatch programs aimed at increasing visitor awareness of the natural history of marine mammals, and the need to protect the marine environment from human destruction. Whalewatch trips are operated according to federal regulations to minimize disturbance to the whales, and attention on their plight is enhanced through an on-board interpretation program.

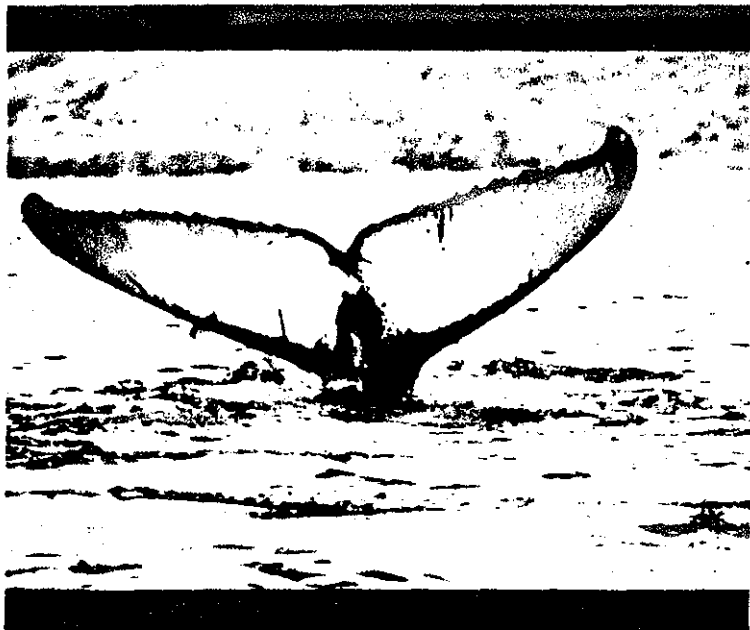
Our interpretation programs have both theoretical and practical components. Education programs should differentiate between knowledge and behavior. Our ultimate goal is not simply to increase knowledge, but to change behavior. Increased knowledge is an important step in changing behavior, but it is only a step. A significant positive impact on the environment depends on our ability to recruit the public to act in concert with an environmentally-sensitive philosophy. That is a challenge requiring a knowledge of human learning and behavior.

More than 50 years ago, Swiss psychologist Jean Piaget proposed that cognitive development depends upon physical maturation of the brain and environmentally-induced changes in learning. Piaget believed that a primary motivation underlying learning is a resolution of cognitive conflict, which he termed "disequilib-

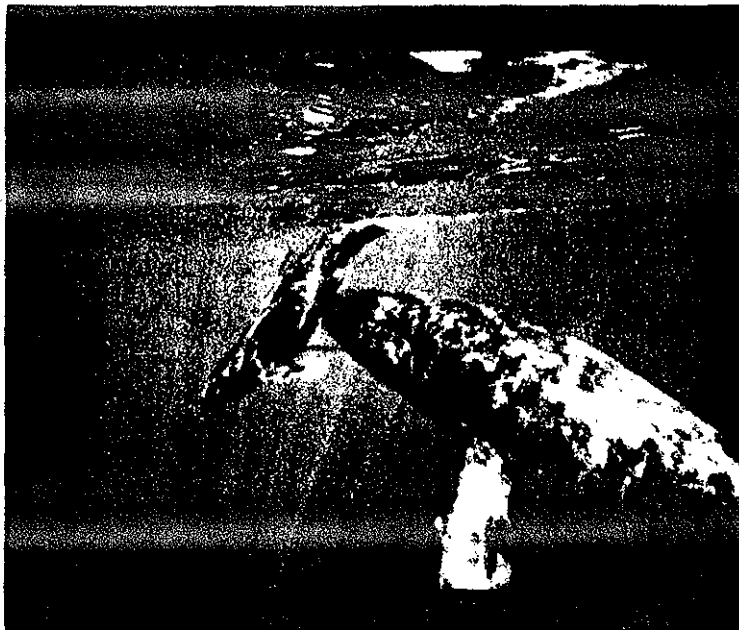
rium." When an individual experiences a dichotomy between what is known internally and what is perceived externally, cognitive conflict arises. At relatively low levels, such conflicts may be enjoyable: art and humor are based on the creation of such conflicts. At very high levels, pathology may result: racism, suicide, psychotic delusions may all have their roots in unresolvable cognitive conflict. At intermediate levels, the individual is motivated to resolve the conflict, either by up-dating the knowledge base (called accommodation by Piaget), or by re-defining the observation to fit the knowledge base already available (Piaget called this assimilation).

The first step in an effective learning cycle is to generate motivation by creating or uncovering an imbalance between an individual's initial knowledge base, and some current perception of the world. The goal should be to create a degree of cognitive conflict sufficient to ensure a desire to resolve the conflict by up-dating the knowledge base, but not so great as to intimidate or create unresolvable fears. In a figurative sense, the challenge is to knock people off balance enough to make them reach out and grab for a new idea, without knocking them so far off balance they fall on their face. I call this dynamic disequilibrium.

The discovery or awareness of an important insight through alleviation of dynamic disequilibrium, however, does not guarantee that knowledge will be applied in later problem-solving situations. Cognitive psychologists have shown that incorporation of new learning will proceed slowly if there are no opportunities to demonstrate that a new behavior is more effective, more efficient, more elegant or even more



*The patterns of marks and pigmentation on the whale's flukes are used to identify individual humpbacks.*



*Underwater view of a mother humpback whale nudging her calf.*

novel than old behavior. New information obtained from an activity may be retained for long periods of time. Transformation of that information into action may never occur, however, unless the individual is challenged to test the effectiveness of the behavior. A successful marine educational program should provide the participant with activities which will ensure that new knowledge results in constructive action.

Our educational whalewatch program incorporates the sequence presented in Table 1. Dynamic disequilibrium is created through the personal experience associated with observing and learning about whales, an emotionally charged subject for most people. The relevant formal content provided by the trip naturalist serves to alleviate the state of disequilibrium, and establish new attitudes and knowledge about the need to protect the marine environment. By the end of the participant experience, specific action alternatives are provided to raise the likelihood that the new attitudes and behaviors will lead to new constructive behaviors.

A key principle associated with this sequence is that "direct guided experience" (i.e. real life exposure to a situation, in the accompaniment of an experienced guide) leads to greater increase in knowledge than either direct experience (real life exposure without a knowledgeable guide) or guided experience (exposure to a knowledgeable guide, but not in the real life situation) independently.

Table 1

The Experiential Education Sequence
1. Creating Dynamic Disequilibrium
2. Providing Relevant Formal Content
3. Ensuring Follow-up Activity

### Anatomy of a Whalewatch

The application of the sequence can be examined in the context of a two-and-a-half-hour whalewatch trip to observe humpback whales in Hawaii. Each whalewatch trip is a different venture, controlled by such variable factors as the number and type of passengers, weather conditions, what the whales choose to do (or not, as the case may be), the type of vessel, and the experience of the captain. Nonetheless, it is possible to view the trip as a structured experience, and to guide participants through an educational sequence that has very clear goals and objectives that can be monitored and evaluated over time.

For heuristic purposes, a whalewatch is divided in three phases: Pre-contact (the time between leaving the dock and seeing the first whale); Contact (the period of time during which the whales are actively

being observed); and Post-contact (the time between sightings, and the time between observing the last pod and returning to the dock. During each phase, participants tend to be in different frames of mind, have a different knowledge base and cognitive focus, and require a different kind of presentation by the guide. It is possible to measure the transitions by listening to the questions asked and comments made by participants as the trip progresses.

Most participants of whalewatch excursions in Hawaii are experiencing their first exposure to whales in the wild. For many, it is the first time on a large boat in an offshore area. This precipitates a ready state of apprehension/excitement that leads to many questions about whales and oceans during the pre-contact phase. Often, the credentials of the guide are queried. Questions early in the trip generally have to do with perspective ("How big is a humpback whale?," "How deep is it here?," "Have you ever swum with them?"), safety, ("Do whales ever attack boats?," "How rough does it get?," "How long have you been doing this?"), or anticipation ("How close can we get?," "How long before we see them?").

The contact phase provides a dramatic counterpoint to the anticipation or apprehension of the pre-contact phase. The first sight of whales, particularly if it is associated with a spectacular behavior (eg., a leaping breach, high out of the water), or the sudden appearance of an animal in close proximity to the boat, creates an element of disequilibrium characterized by a brief period of surprise, followed by a host of questions. Once whales are observed, questions and comments begin to focus on what is actually being seen, with an eye still kept to safety and reliability of the interpreter. Questions at this time pertain primarily to identification of specific whales ("What are those marks all over its body?," "Is that a female?"), behavioral descriptions ("Why does it lift its head out of the water like that?," "Are its eyes open when it breaches?"), verification of knowledge ("How do you know?," "Why do you think that happens?"), and safety ("Are you sure they don't attack boats?").

Following observation of one or more groups of whales, two general phenomena appear—personal validation and generalization. During the post-contact phase, participants appear to contrast and compare what they knew or believed prior to the trip, with what they have seen or learned during the trip. What has just been observed is compared with what was learned from school, television, or newspapers and magazines.

A frequent pattern observed during the post-contact phase is the incorporation of the whalewatch experience into a broadened vision of environmental issues. Whalewatch participants begin to re-consider global

environmental threats (eg., oil spills, "scientific" whaling, driftnets, marine debris, over-development) in the context of the dynamic, personal interaction they have just experienced. Habitat degradation is no longer a problem somewhere out on the ocean; it is a direct threat to the very whales they have just observed.

### Defining Goals at Each Stage of the Experience

Whalewatchers constitute a large and heterogeneous group, and not all individuals react identically to each phase of the activity. However, based on extensive experience in the United States and Australia, and limited involvement in whalewatching in Canada and Japan, I have found the general trends just described sufficiently common to dictate a general-structured approach to providing educational whalewatches. Each phase requires a unique set of strategies and goals to move the participant through an effective learning cycle comprised of dynamic disequilibrium, formal knowledge, and follow-up activity.

Information provided during the pre-contact phase should be skill-oriented, preparing the participant to observe whales and the interactions between them, if and when they appear. A general orientation with respect to the boat and any observable landmarks will help participants report the location of whales, or observe whales quickly when seen by others. A description of the most frequent cues that signal the presence of a whale (a blow, a distant set of flukes above the water, a splash from a high-energy activity) is often very useful. If time permits, a discussion of the geographical surroundings and the geological, oceanographic or natural history significance of the area will help remind participants they are in the natural habitat of a wild and endangered species that does not perform on cue.

An additional task to accomplish during the pre-contact phase is to point out how the participant may assist in protecting the marine environment during the trip. Avoiding the use of styrofoam cups; saving aluminum cans for later recycling; holding on to paper and plastic materials to prevent them from blowing overboard; extinguishing cigarette butts in ashtrays on board the vessel so they do not end up in the stomachs of fish, turtles, or birds; these are all important ways to recruit participants to become stewards of the seas early in the activity.

Overall, the whalewatch experience is too brief to allow complicated explanations of anatomical adaptations, physiological specializations, evolutionary principals, or behavioral dynamics. During the pre-contact phase, such information is kept to a minimum, and generally provided in response to specific questions. Information is given in relatively short doses, and a period of consolidation allowed between the interpreter's narrative episodes.

During the contact phase, care is taken to ensure that dialogue is kept relevant to what the participants are actually seeing. Ideally, the interpreter should attempt to facilitate participant's ability to distinguish individual animals, and understand the dynamic nature of social interactions. In general, there is little the interpreter can say that will add to the excitement generated by a breaching whale, or a mother and calf swimming next to the boat. The most important thing for the interpreter to bear in mind is not to interfere with the opportunity for dynamic disequilibrium to occur.

It is during the final, post-contact phase that the most significant information is to be provided to the participants. It is during this period that the most important transition from the current experience to future behavior change must occur. Participants should be encouraged to recognize the connections between their own behavior and the survival of the whales they have just observed. Answers to their questions during this phase should emphasize the relationships between what they have just seen and their own knowledge and behavior in other contexts.

Educators should be prepared to provide participants with a number of action alternatives aimed at furthering sound environmental goals. These should range in degree from the simple to the more complex. Simple acts like signing a petition may be as far as many participants are prepared to go. Many are willing to financially support the efforts of nonprofit environmental groups. Others may wish to become advocates for or participants in specific lobbying efforts, boycotts, or other forms of demonstration. Reference materials should be available to provide many avenues of action for participants. Most communities have volunteer programs aimed at improving recycling efforts, reclaiming natural areas, enhancing awareness of the need to conserve precious resources such as fresh water, or cleaning up public areas. A wide variety of these options can be presented to program participants.

### The Need to Evaluate Program Effectiveness

One of the most difficult aspects of providing educational programs through recreational activities has been the ability to monitor the effectiveness of programs. Tourists are a transient and elusive group. The use of computer reservations systems, however, provides a tremendous opportunity to conduct follow-up studies of participants in a wide range of specific activities. Studies currently underway in Hawaii will measure environmental awareness and rates of participation in environmentally-directed activities among a variety of groups, both before and after participation in tourist activities varying in their degree of educational effort.

Currently, we are evaluating our program effectiveness in three stages. First, we have sampled nearly one thousand whalewatch participants to determine educational background and socioeconomic standing of those who show an interest in paying to view whales in a natural setting. This work, already completed, indicates that whalewatchers in Hawaii tend to be affluent and well-educated. Approximately 65 percent of them are between 21 and 60, and are actively pursuing professional and managerial careers with considerable political and economic clout. Whalewatchers in Hawaii definitely comprise an important target group of educators in developing greater public awareness of the need to protect the environment.

The second stage of our monitoring program, currently underway, involves a comparison of the environmental attitudes and behaviors of whalewatchers (just prior to going on a whalewatch) with a control group of tourists who have not participated in a whalewatch. Our interest is in determining whether whalewatch participants represent a cross-section of the population, or whether they come to the experience with a predisposition to be environmentally sensitive. The content and focus of our interpretation program should be influenced by the general nature of the participants (to avoid, for example, preaching to the converted).

The third stage of evaluation will focus on those who have gone whalewatching with us, in order to determine whether rate of participation in environmental activities has been influenced by exposure to the whalewatch program. Follow-up questionnaires will be mailed in two stages (at six months and at one year). While this work is currently being carried out in Hawaii, we hope to conduct a cross-cultural study with similar research in Australia and Japan, where whalewatching is quickly becoming as popular as it has become in the United States.

Such ambitious studies require systematic sampling of experimental and control groups, and are rather long-term in nature. Nonetheless, the results will tell us a great deal about the success that follows from structured educational programs that guide participants through recreational activities in natural settings. We must determine which elements of such programs ensure that participants develop environmentally sound attitudes, and more importantly, which elements empower participants to action consistent with those attitudes.

### Further Reading

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Paul H. Forestell, Ph.D., is Director of Education and Research for the Pacific Whale Foundation, Kihei, Hawaii. The author thanks Kathleen Heide, Greg Kaufman and Barbara Klemm for stimulating discussion of ideas presented in this paper.



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