Marine Mammals Essay, Research Paper

1. Introduction

Humpback whales (Megaptera novaeangliae) annually migrate from their summer

feeding grounds off southeast Alaska to winter in waters off the Hawaiian

Islands, Baja California Sur, Mexico and northern Japan (Baker and

Darling). The number of humpback whales in the Hawaiian waters generally

peaks from mid-February through mid-March ( Baker & Herman, 1984). Calving

and breeding is an important function of humpback whales while wintering at

lower latitudes ( Herman and Herman et al., 1980). The presence of these

whales has spawned a popular and rapidly growing whale-watching industry.

Whale watches are undertaken with a wide assortment of vessels. Because of

the ever-growing number of boats involved, concerns are often expressed by

those in the whale-watching industry, environmental groups and governmental

agencies about the effects of vessel disturbance on the whales ( Green,

1998).

Humpback whales have been observed to react to approaching boats in a

number of different ways ranging from approach to avoidance. On rare

occasions, humpback whales have been observed charging towards approaching

boats and screaming underwater (Payne, 1978). Bauer (1986) and Bauer and

Herman (1986) found that respiration rates, diving, swimming speed, social

exchange and aerial behaviors correlated with vessel numbers, proximity,

speed and direction changes. They reported that humpback whales generally

attempted to avoid vessels and sometimes directed threats towards them.

Increased frequencies of surfacing without blows and dives initiated

without raised flukes were some behaviors indicative of avoidance. Green

and Green (1990) reported that humpback whales often reduced the proportion

of time at the surface, took longer dives, altered direction as the boats

approached (horizontal avoidance) and continued to spend more time

underwater and decreased swim speed (vertical avoidance) after boats

departed. These effects persisted over 20 min after the boats departed.

Green (1990) also observed that humpback whales moved from a favored area

on days when parasail boats operated. Bauer and Herman (1986) concluded

that reactions to vessels probably are stressful to humpback whales but the

significance of the stress is unknown.

Research performed by Baker and Herman (1989), Baker, Herman, Bays and

Stifel (1982), Baker, Herman, Bays and Bauer (1983), and Bauer (1986) in

Alaskan waters suggests that humpback whales usually use two main type of

avoidance methods. The first involves a vertical avoidance in which the

dive duration increases, with a corresponding decrease in the blow interval

and in swim speed. The second method involves a horizontal avoidance in

which there is a decrease in the dive duration, longer blow intervals and

an increase in swim speed. Baker, Herman, Bays and Stifel (1982) and Baker,

Herman, Bays and Bauer (1983) also found that approaching boats often

triggered some aerial behaviors such as breaching, flipper and tail

slapping.

There appears to be little doubt that boat traffic may affect the behavior

of humpback whales. Examples of such disturbance by vessels on humpback

whales in Hawaii can be found in Tinney (1988) and in the humpback whale

recovery team report ( HWRT, 1991). Consequently, the National Marine

Fisheries Service (NMFS), the Federal agency primarily responsible for

enforcing the Marine Mammal Protection Act, has imposed a regulation

prohibiting boats from approaching within 91 m (100 yards) of any humpback

whale in Hawaii ( NMFS, 1987).

One issue that has not received much attention is the specific effect of

boat noise on the whales. All boats from the smallest motor boat to the

largest super-tanker produce underwater noise. However, there is limited

information on noise produced by small boats typically used in coastal

waters (Richardson, Greene, Malme & Thomson, 1995). Considerably more

attention has been focused on large ocean-going vessels. McCauley, Cato and

Jeffery (1966) have measured the noise generated by whale-watching vessels

in Hervey Bay, Australia. Many of these boats in Hervey Bay operated as

ferrys and modify their routine slightly upon encountering a pod of whales.

Present regulations in Hervey Bay for approaching whales state that boats

must slow within 300 m of whales, which is very different than the 91 m

standoff range in Hawaii with no speed limitations. It is also difficult to

apply noise measurements from one location to another because underwater

acoustic propagation can vary considerably depending on the depth and types

of bottom.