

Dolphin-initiated inter- and intra-specific contact and aggression during provisioning at Tangalooma

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Provisioning of mammals has long been recognised as resulting in changed behaviour and ecology, influencing diet, home range, primary habitat, spatial distribution, social behaviour and aggression (Southwick *et al.* 1976). Provisioning resulted in increased aggregation size and increased frequency of attacks on conspecifics in chimpanzees (Wrangham 1974) and increased fighting behaviour amongst rhesus monkeys (Southwick *et al.* 1976). Increased aggression may also lead to other social outcomes, such as the decrease in affiliative behaviour, reported by Hill (1994), among male macaques.

In many cases, provisioning of wild animals may also lead to aggression toward humans as a result of decreased wariness and awareness that humans may be associated with food sources. Examples include various primate species (Wrangham 1974; Brennan *et al.* 1985; Goodall 1986; Fa 1992) and bears (Albert and Boyer 1991; Gunther 1992). Aggression of marine mammals towards humans also occurs when interactions associated with activities such as swimming with dolphins or dolphin provisioning occur. Under provocation, dolphin aggression towards humans may even result in the death of the person involved (Samuels and Spradlin 1995).

This analysis follows Orams *et al.* (1996) study of dolphin - human aggression during provisioning at Tangalooma, Australia. Although the methods of Orams *et al.* effectively identified several key variables influencing the level of aggression by the dolphins, it is unable to discriminate levels of aggression, and their correlates, for specific dolphins. The simple methodology used in this study resolves these limitations and may form a basis for further monitoring of the dolphin - human interaction at Tangalooma.

Observations of inter- and intra-specific aggression of the bottlenose dolphins provisioned at Tangalooma were made during March - April, 1998. 15 12 feeding rotations were observed from the Tangalooma jetty. Observations were confined to the part of each feeding rotation when dolphins and humans were in close proximity at the beach. No observations were made during the intervening periods when no humans were in the water. The supervising staff member in each feeding lane was also noted. The nature of contact between each dolphin and the other dolphins and with humans was recorded. These inter- and intra-specific contacts were recorded in four categories:

- 1: no physical contact;
- 2: nudge - contact between the dolphin and another individual (dolphin or human);
- 3: push - forceful contact between the dolphin and another individual; and
- 4: ram - a contact which was sufficiently forceful to upset the balance or trajectory of the recipient. Contact categories 3 (push) and 4 (ram) are defined as aggressive contacts for the purpose of this analysis. Preliminary results of these observations are presented below.

Dolphin initiated contact with humans occurred during 7.8 % of rotations, although most of this contact (72 %) was of the mildest form (“nudge”). Dolphins “ramming” humans occurred during 0.42 % of observations (Figure 1). The rate of intra-specific physical contact was about one-third that of inter-specific contact, with a similar distribution in the aggressiveness of the contact.

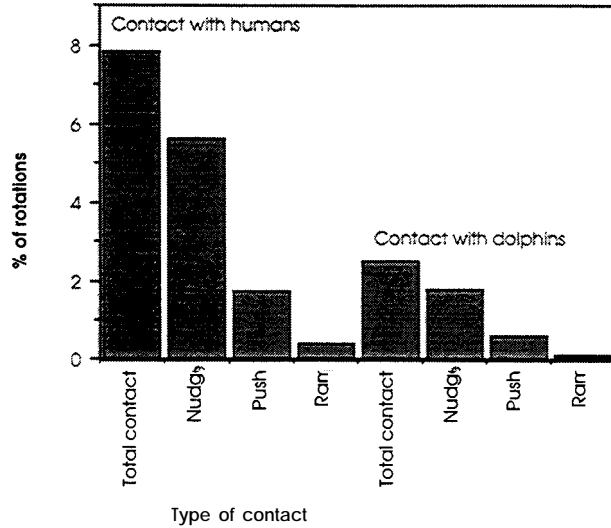


Figure 1: Inter- and intra-specific aggression by all dolphins

The frequency of inter-specific physical contact varied greatly between individual dolphins (Figure 2). Most of the contact came from the youngest of the provisioned dolphins (Shadow and Echo). Aggressive contacts with humans were most frequently perpetrated by *Shadow*, with similar frequency of aggressive behaviour from *Echo* (subadult male) and *Tinkerbell* (subadult female). Relatively low levels of contact with humans, including aggressive contact, were observed for the adult male (*Fred*) and female (*Bess*), and the subadult male (*Bobo*) and female (*Rani*). Broadly similar patterns of intra-specific contact and aggression were observed (Figure 3), although *Tinkerbell* has relatively frequent contact with other dolphins and *Echo* relatively infrequent contact. Note the very low levels of both inter- and intra-specific aggression from *Fred*, and the absence of any contact or aggression from *Rani* over the period of observation.

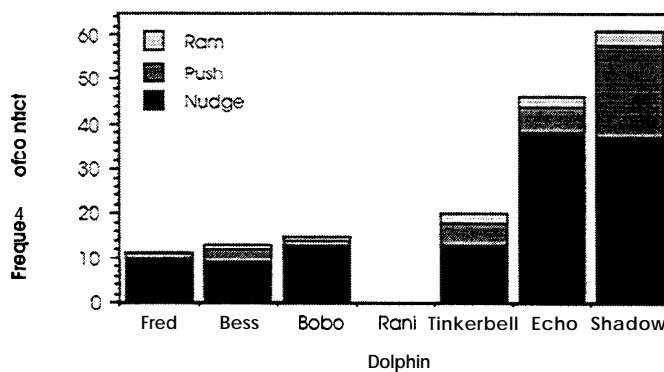


Figure 2: Frequency of inter-specific contact and aggression by individual dolphins

Supervising staff members for each feeding lane during each observation are identified by numeric codes (#1 to # 17). Although the degree of causality is unclear, marked differences in individual dolphin's aggression towards humans occurs in relation to supervision by different staff members. For example, aggressive contacts (pushes and rams) by **Bobo** occurred only in the presence of supervisors #5 and #6, by **Bess** with #3, #9 and #11, and by **Tinker-bell** with #2, #15 and #16. 51 % of **Fred's** nudges occurred with supervisor #6.

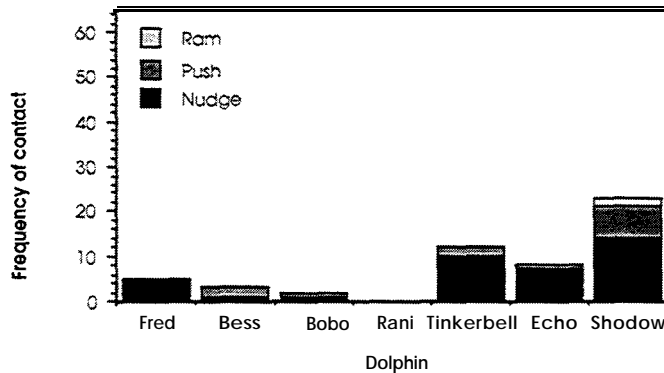


Figure 3: Frequency of intra-specific contact and aggression by individual dolphins

These observations indicate low levels of dolphin-initiated contact and aggression towards humans during provisioning at Tangalooma. The levels of aggression vary greatly between individual dolphins and in association with differing supervising staff. This suggests some potential for management to target both individual dolphins and particular dolphin - supervisor interactions with customised feeding regimes in order to reduce contact and aggression. The results also provide a baseline for monitoring of intra- and inter-specific aggression during provisioning.

Acknowledgment

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