

## Development and management of a feeding program for wild bottlenose dolphins at Tangalooma, Australia

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### Introduction

There are many reports throughout history of dolphins which seek-out and maintain contact with humans over a continuous period. Usually, such interactions are confined to solitary animals which allow various forms of contact, ranging from close proximity observations to actual physical contact including 'dorsal tows' and 'mounted rides'. These contacts with individual dolphins are unusual, but not unique. Until recently, the only reported case of a group of wild cetaceans regularly interacting with, and fed by humans in a shallow water, near-shore environment was at Monkey Mia in Western Australia. Recently, however, a group of inshore bottlenose dolphins (*Tursiops truncatus*) regularly accept fish from humans at Tangalooma, a tourist resort on the western shore of Moreton Island in South-eastern Queensland, Australia (Orams, 1994). A feeding program, initiated by the resort, is now actively managed and promoted as a tourist attraction.

This paper briefly reviews the long record of human interaction with dolphins on Moreton Bay and details the development of this dolphin feeding program. In addition, observations of the dolphins which frequent this feeding are discussed and the management regime established to control the feeding is outlined. Observations were made over 350 days during 1993 and 1994 and recorded on video tape for subsequent analysis of the feeding sessions.

This paper provides an accurate description of the development and management of an unusual program where wild dolphins are regularly fed by humans. It will be of interest to those who are involved in programs which seek to establish and maintain regular contact with small cetaceans. It also provides a basis for debate over the ethics of such feeding programs. Are these programs likely to be detrimental to the animals? Can they be used as a suitable alternative to keeping cetaceans in captivity and provide humans with an opportunity to interact with marine mammals in their natural environment?

### Accounts of wild, interactive dolphins

Lockyer (1990) provided an extensive review of incidents involving wild, interactive dolphins. She concluded that early legends which pertain to dolphins interacting with humans, such as those provided by 'Pliny the Elder' in 70 AD (Busnel, 1973) and 'Pliny the Younger' in 109 AD (Morris, 1988; Alpers, 1963) may not just be 'tall stories'. Characteristics of more recent incidents involving humans and dolphins appear to provide support that these early interactions may have occurred.

In modern times, accounts of interactive dolphins were recorded from such geographically diverse locations as Australia (Doak, 1981; Gawain, 1982; Conner & Smolker, 1985), the Bahamas (Dobbs, 1981), France (Hussenot, 1980); Great Britain (Gilchrist, 1967; Dobbs, 1977, 1981; Lockyer, 1978; Webb, 1978; Lockyer & Morris, 1985), New Zealand (Alpers, 1963; Dawson, 1985) and the United States of America (Stenuit, 1969; Caldwell & Caldwell, 1972; Dobbs, 1981). These dolphins all were solitary and primarily the bottlenose species.

The only reported case of a group of dolphins regularly interacting with humans over a long period occurs at Monkey Mia, located on the shores of Shark Bay, Western Australia. Since the 1960s a group of inshore bottlenose dolphins frequented the beach at Monkey Mia and accepted fish from visitors. They also allowed humans to swim with and touch them. This case is unique and well-reported in the literature (Doak, 1981; Gawain, 1982; Fisher, 1983; Conner & Smolker, 1985; Keys, 1987; Edwards, 1988; Booth, 1989; Dowling, 1990).

### Cetaceans in Moreton Bay

Tangalooma, on the western shores of Moreton Island, was a whaling station from 1952 to 1962 (see Fig. 1). The location, on a sheltered bay adjacent to the migratory routes of the Pacific Humpback whale (*Megaptera noevanglaie*) and close to Australia's largest northern city, proved beneficial

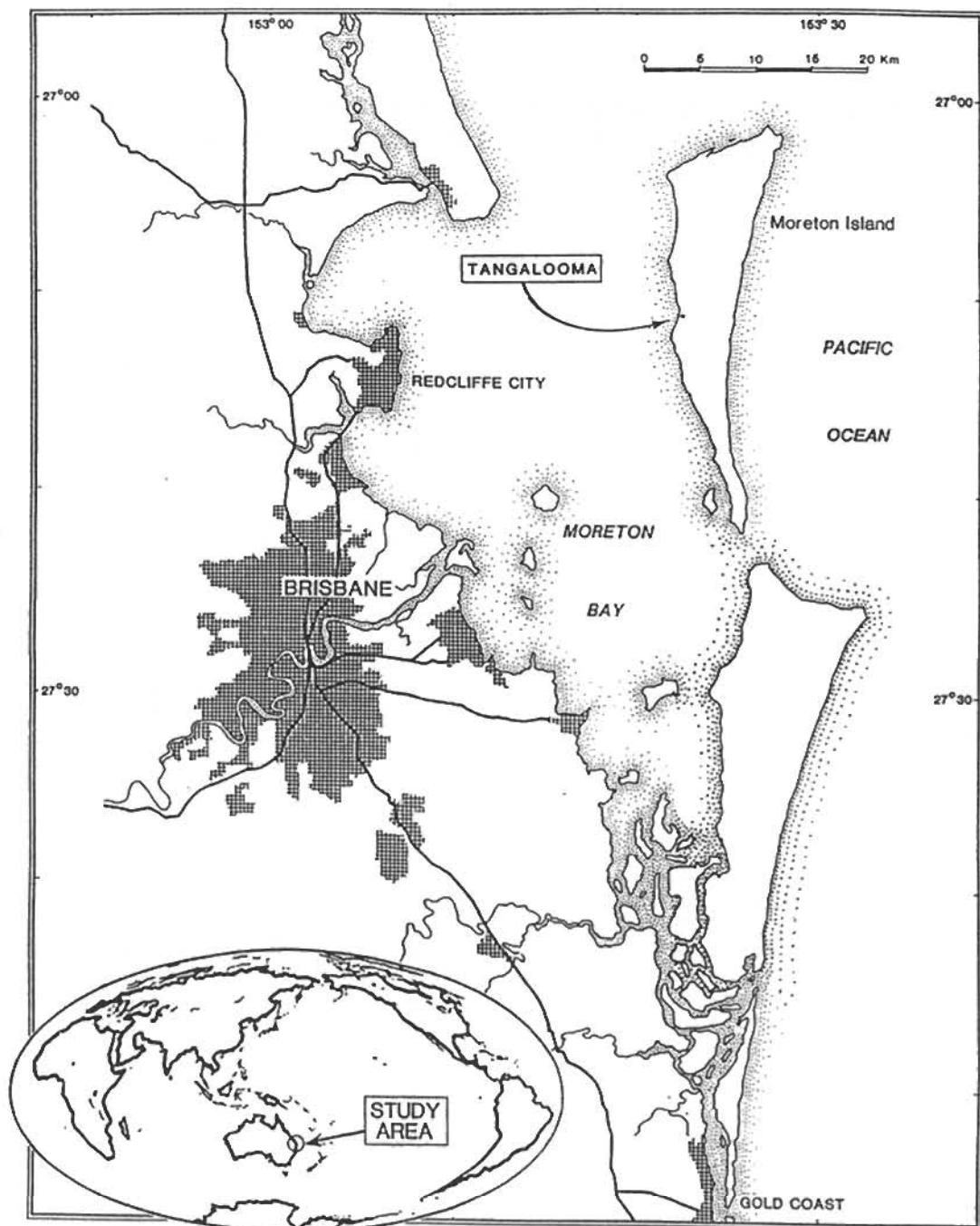


Figure 1. Location of Tangalooma.

to the station and it remained in operation long after most large shore-based whaling stations closed in the southern hemisphere (Jones, 1980). A total

of 6277 humpback whales were harvested at Tangalooma during its ten year operation. A rapidly falling catch level contributed to the closure

of the station in 1962 (Bryden, 1978). In 1963, the site was converted to a holiday resort, catering mainly for local recreational boaters. This resort is now involved in the dolphin feeding program.

Reports of contact with resident dolphins in Moreton Bay were common since European colonisation of the area in the nineteenth century. Fairholme (in a letter to the Zoological Society of London published in 1856) reported observing a cooperative fishing arrangement between local Aborigines and dolphins on the shores of North Stradbroke Island which borders the southern part of Moreton Bay. Hall (1984) investigated further and concluded that the account was accurate.

In more recent times, dolphins in the bay were commonly observed feeding behind commercial prawn (shrimp) trawlers which work the bay during the summer months (Corkeron, Bryden & Hedstrom, 1990). Corkeron (1990), together with other researchers from the University of Queensland, used this habit to identify individual dolphins and monitor their behaviour in Moreton Bay. This research found that both bottlenose and Indo-Pacific humpback species (*Sousa chinensis*) were long-term residents of the area and seldom ventured outside the confines of the bay.

It appears, therefore, that interaction between dolphins and humans in Moreton Bay is common and occurred over a significant period. Moreton Bay has also been a popular location for recreational boating for residents of the greater Brisbane area over the past three decades. As a result, many dolphins which reside in Moreton Bay are accustomed to humans' commercial and recreational use of the bay.

Employees of the Tangalooma Resort reported the frequent sighting of dolphins near the resort for over two decades (B. Osborne, pers. comm.). The resort wharf provided a location where guests closely viewed marine animals that frequented the area. In the 1980s, several bottlenose dolphins visited the waters surrounding the resort wharf and interacted with resort guests, responding to whistling and clapping (Dagg, 1983). One of these dolphins became known as 'Eric'. However, when Eric arrived in the late 1980s with a small calf she was renamed 'Erica'. It is possible that this animal and the calf were the first two dolphins to hand feed at Tangalooma in 1992.

#### Attempts to establish a dolphin feeding program at Tangalooma

Because of the regular interaction between dolphins and humans at Monkey Mia and the long-term association between humans and dolphins in Moreton Bay, an experiment was carried-out in 1989 to create a feeding station at the Tangalooma

resort. This experiment is more comprehensively discussed by Green & Corkeron (1991). Three methods, aimed at establishing a regular feeding adjacent to the wharf, were tried. The first used the University of Queensland research vessel which attempted to lead dolphins into the vicinity of the resort by feeding trawl catch to dolphins while steaming towards Tangalooma. A second technique attempted to establish human feeding of dolphins in the vicinity of the resort from a small inflatable boat, and a third attempted to feed fish to dolphins which frequented the waters around the resort wharf in the evenings. The experiment continued for approximately 40 days, but was unsuccessful in establishing regular feeding in the area of the resort.

Green & Corkeron (1991) hypothesized that recreational activity such as, swimming, boating, fishing and water skiing may have disturbed the dolphins making them reluctant to enter the area immediately adjacent to the resort. They concluded that additional time was needed to establish a feeding program in the area.

#### A feeding program begins

In early 1992, the management of Tangalooma resort initiated a second attempt to establish a dolphin feeding station. Efforts concentrated on offering fish to dolphins which visited the resort wharf in the evening. In addition, attempts to feed dolphins in Moreton Bay close by the resort were made from an inflatable dinghy. A variety of thawed, fresh and live small fish species were tried including fantail mullet (*Mogil georgi*), silver biddy's (*Gerres ovatus*), winter whiting (*Sillago maculata*), mackerel (*Scomber australasicus*), grinders (*Saurida* species) and yellowtail (*Trachurus novaezealandiae*). Of these species, only mullet and silver biddy's were taken by dolphins (all *Tursiops truncatus*). The dolphins appeared to have no preference for live, dead or thawed fish; however, they were reluctant to take fish that floated. This pattern also was reported by Corkeron *et al.* (1990) for dolphins feeding from prawn trawler catch discards on Moreton Bay.

Feeding from the inflatable dinghy had limited success; however, efforts to feed two dolphins which frequented the waters surrounding the resort wharf were successful. These dolphins were an adult named 'Beauty' and her young calf named 'Tinkerbell' (estimated age 12–18 months). Visits by these dolphins were usually in the evening and corresponded with the high tide. Possibly they were attracted to the small fishes which swam under the wharf lights. In March 1992, Beauty began taking an occasional fish thrown from the wharf. Beauty's confidence grew until she took hand held fish in April 1992. From this time, resort staff continued

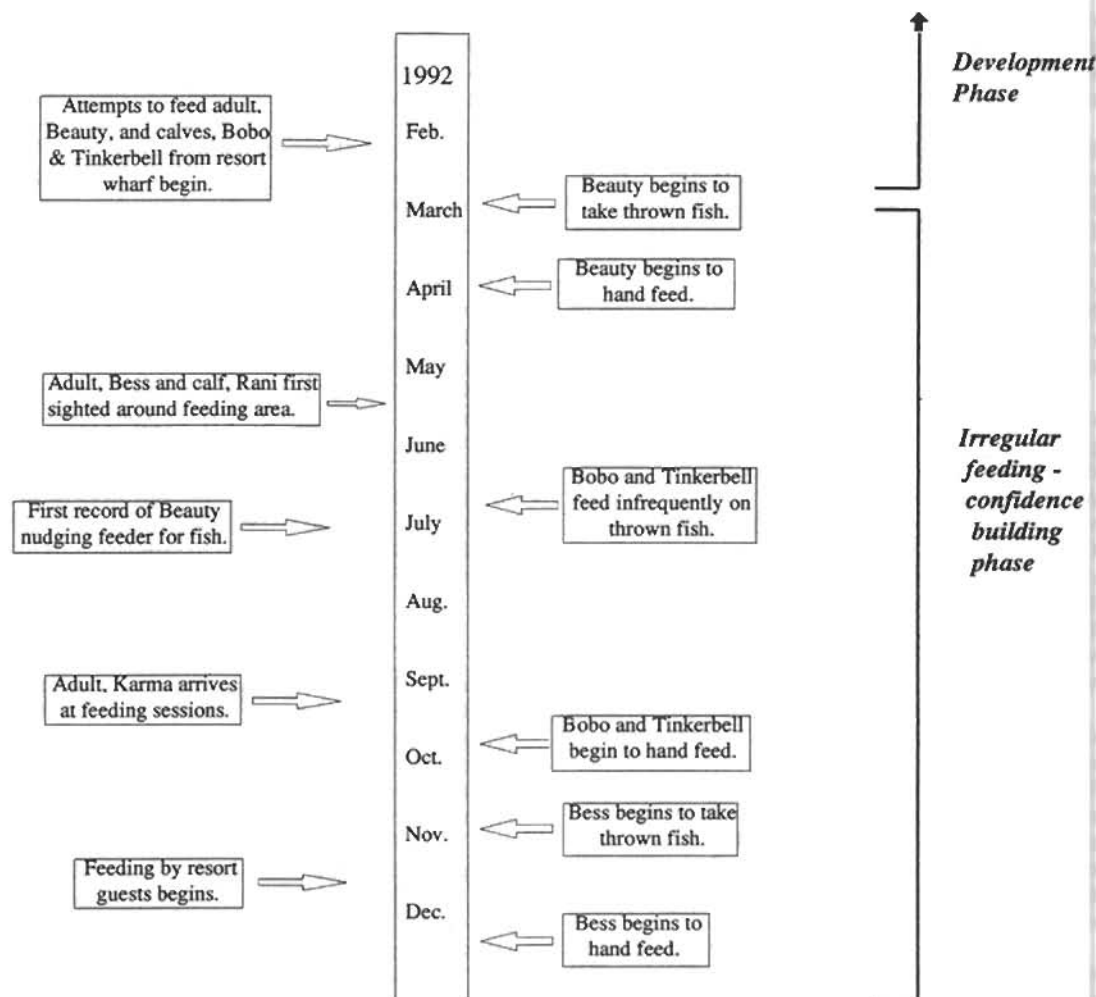


Figure 2. Chronology of important events in the development of the dolphin feeding program at Tangalooma.

feeding by hand. Progress was slow for several months, however, the frequency of hand feeding incidents gradually increased.

A sonic sound device (a 'pinger') was used to create an association between the sound signal and feed. The use of the pinger was infrequent, and is not thought to have contributed to the development of the feeding program (R. Deakin, pers. comm.). Its use was halted in December 1992.

Feeding of Beauty continued through the month of May 1992. An additional sub-adult male named 'Bobo' also frequented the area under the wharf and is thought to be a calf of Beauty's from a previous season. This assumption was made from observing the animal in close proximity to Beauty, often in the 'maternity position' alongside and

underneath her. Beauty was the only dolphin which 'hand fed' at this stage, both Bobo and Tinkerbell took fish thrown to them but would not hand feed. Tinkerbell seldom ate fish thrown to her, but often played with them instead. This behaviour was consistent with her age and reports of captive *Tursiops* at a similar stage of development (Schroeder, 1990).

Throughout the remainder of the winter, Beauty, Bobo and Tinkerbell regularly visited the wharf in the early evenings to receive food. Additional dolphins were seen over this time 'hanging around' outside the lighted areas; however, they appeared reluctant to venture into the 'feeding zone'.

By spring of 1992 (October–November), both Bobo and Tinkerbell took fish by hand and two additional animals, an adult female named 'Bess'

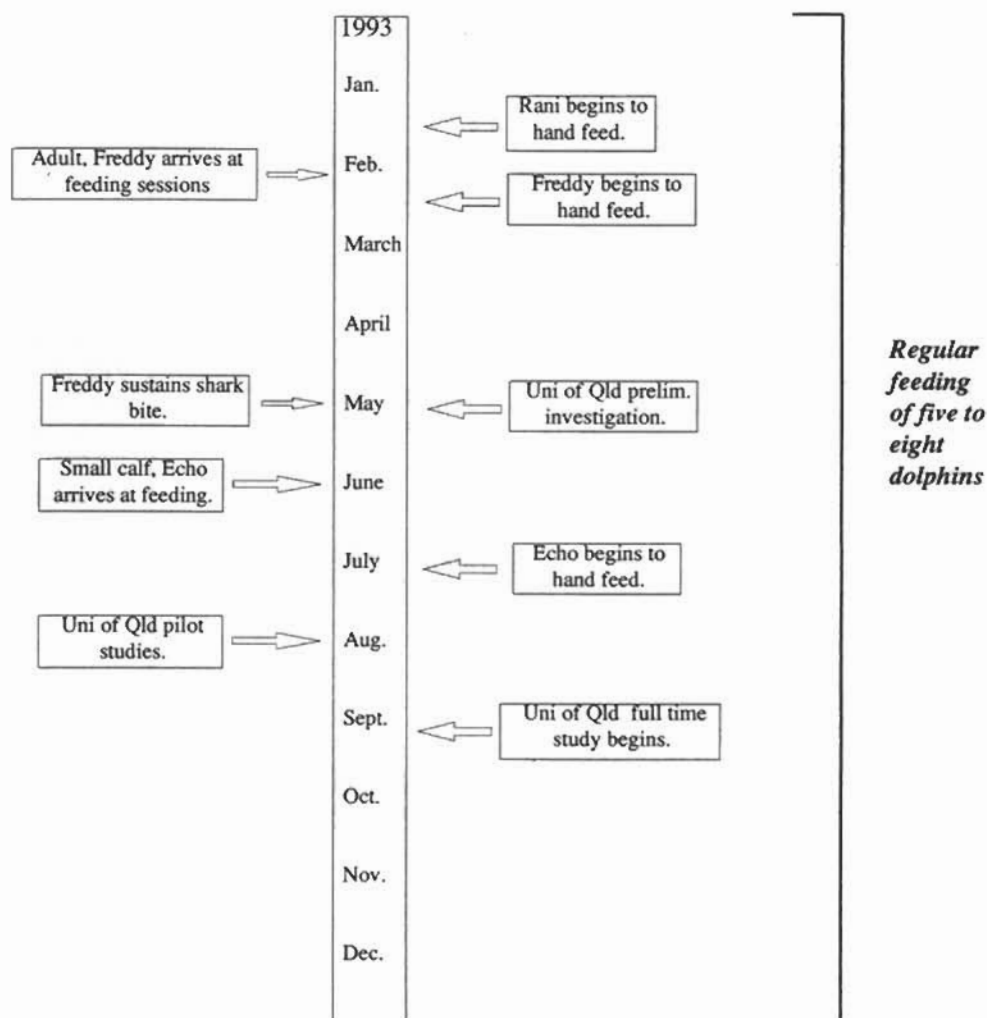


Figure 2. Continued.

and her calf (estimated age 4–6 months) named 'Rani' also frequented the feeding sessions. Subsequently, a number of other dolphins joined the feeding and it became a regular nightly occurrence at the resort. A more detailed chronology of the development of the feeding is shown in Figure 2. The increasing number of dolphins attending the feeding sessions is illustrated in Figure 3.

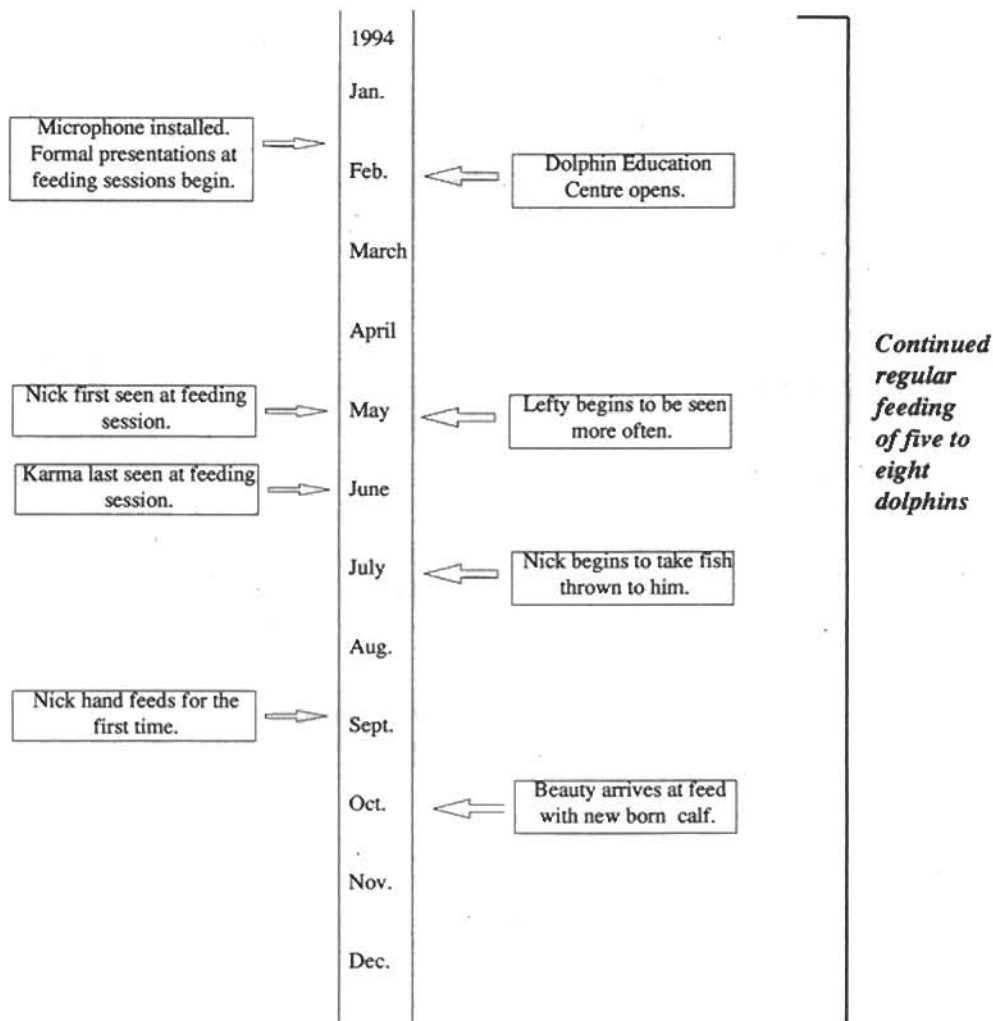
Now nine animals are known to resort staff identified by the presence of easily recognisable features such as rake marks, scarring, dorsal fin shape, size and coloration. Sexing of all animals has not been possible as there is seldom the opportunity to view the genital area; however, the observance of suckling and the close proximity of

calves to adults allowed the confirmation of two adult females.

The establishment of the dolphin feeding station at Tangalooma is a notable exception to other cases of interactive wild dolphins which are reviewed by Lockyer (1990: 338) who stated:

For this kind of sociability to evolve, human encouragement is essential, although nearly all reported cases of "sociability" in dolphins started as expressions of extreme natural inquisitiveness on the part of the dolphin.

The development at Tangalooma suggests that a deliberate attempt to establish a feeding program

Figure 2. *Continued.*

promoting regular interaction between humans and wild dolphins is possible.

#### Management regime

To control the hand feeding and protect dolphins from harm a number of strategies were adopted by the Tangalooma Resort. First, it was necessary to obtain a reliable source of fish. Local fish markets supplied the resort with a preferred locally caught 'Silver Bidy' (*Gerres ovatus*); a small (usually less than 260 mm) deep bodied fish with a high fat content. Fish were stored frozen and thawed several hours prior to the feeding times.

Second, an area was designated for the dolphin feeding and marked by signs and buoys (see Fig. 4).

This area is set aside exclusively for dolphin feeding and no recreational use of the site is permitted at any time. Recently it was lightly dredged to reduce rough wave action which causes difficulties when conducting feeding sessions. The feeding location is well lighted by a single flood light located on the wharf immediately above the feeding area.

Third, a regular time was established for the feeding sessions, soon after dusk at around 7.00 pm. However, the feeding area is shallow at low tides. As a result, feeding times were adjusted so that sufficient water existed (usually around one metre) for the dolphins to manoeuvre comfortably.

Fourth, the amount of fish offered to the dolphins is restricted to less than an estimated one third of their daily food intake. Fifth, strict procedures for

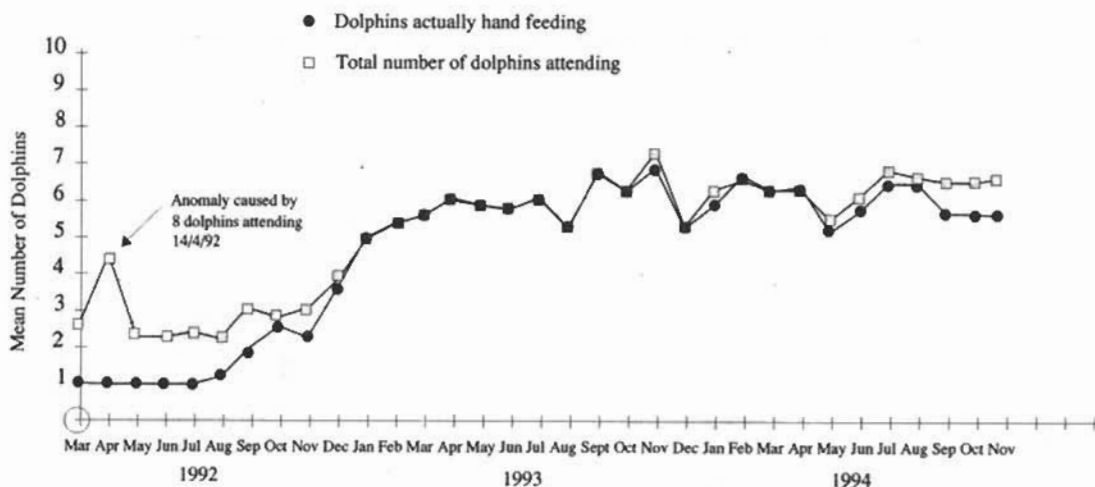


Figure 3. Development of Tangalooma dolphin feeding program.

tourists feeding the dolphins were established. Feeding dolphins was only permitted during the designated, resort controlled, evening feeding times. A minimum of two resort staff controlled feeding according to the following procedures:

- After dolphins arrived in the area a staff member entered the water with a feed bag and established the hand feed in a comfortable water depth (approximately 0.75 m).
- Resort guests wishing to hand feed were assembled in lines on the beach adjacent to the feed area.
- Resort guests were instructed not to touch the dolphins, to refrain from loud noises, to disinfect their hands in a bucket of anti-bacterial solution, take two to three fish from buckets provided and proceed out to the staff member feeding the dolphins.
- Three and four guests at a time were permitted to enter the water and were instructed to hold the fish, one at a time, under the water for the dolphins to take.
- After the fish were taken guests leave the water and the next group enter.

Currently, between six and eight dolphins regularly visit the feeding sessions. The largest number to date has been eleven animals. Between 10 and 25 kilograms of fish are offered at each session, depending on the number of dolphins present, and between 40 and 120 resort guests attend the feeding (many simply watch the feeding from the wharf). The procedures appear to be quite successful and the feeding has become more regular (e.g. fewer missed nights and more animals) (see Fig. 3).

### Behavioural observations

#### 'Pushy' behaviour

Data gathered by an observer, recorded by a video camera and in nightly feeding logs, show that the dolphins attending the feed at Tangalooma became increasingly assertive in their actions during feeding times. In the early stages of the program, during the confidence building period illustrated in Figure 2, the dolphins were wary of people in the water. They would swim slowly to take the fish held under the water by an outstretched arm. Typically, a dolphin would swim by in a 'pass' in order to take a fish and would maintain a distance of over half a metre from people. This behaviour changed so that most of the dolphins no longer swim past, but remain stationary in front of a person until a fish is placed underneath the water. During this time the dolphins shove and nudge people as they attempt to get at the fish. This kind of behaviour has been termed 'pushing', meaning dolphin initiated, deliberate and forceful contact between a dolphin's rostrum and a human.

This pushy behaviour was first observed in the latter part of 1992 when the adult female, Beauty, mildly nudged the feeder with her rostrum during feeding. Within a month, Beauty's behaviour escalated from mild nudging to pushing the feeder gently. In addition, indications of agitation, such as rigid, jerky body movements, rapid nodding of the rostrum and open and closing of the mouth, while waiting for fish became common. This contact between dolphins and the tourists became widespread amongst almost all of the dolphins during 1993. However, it did not occur all of the time and it varied in its frequency and intensity, although, at



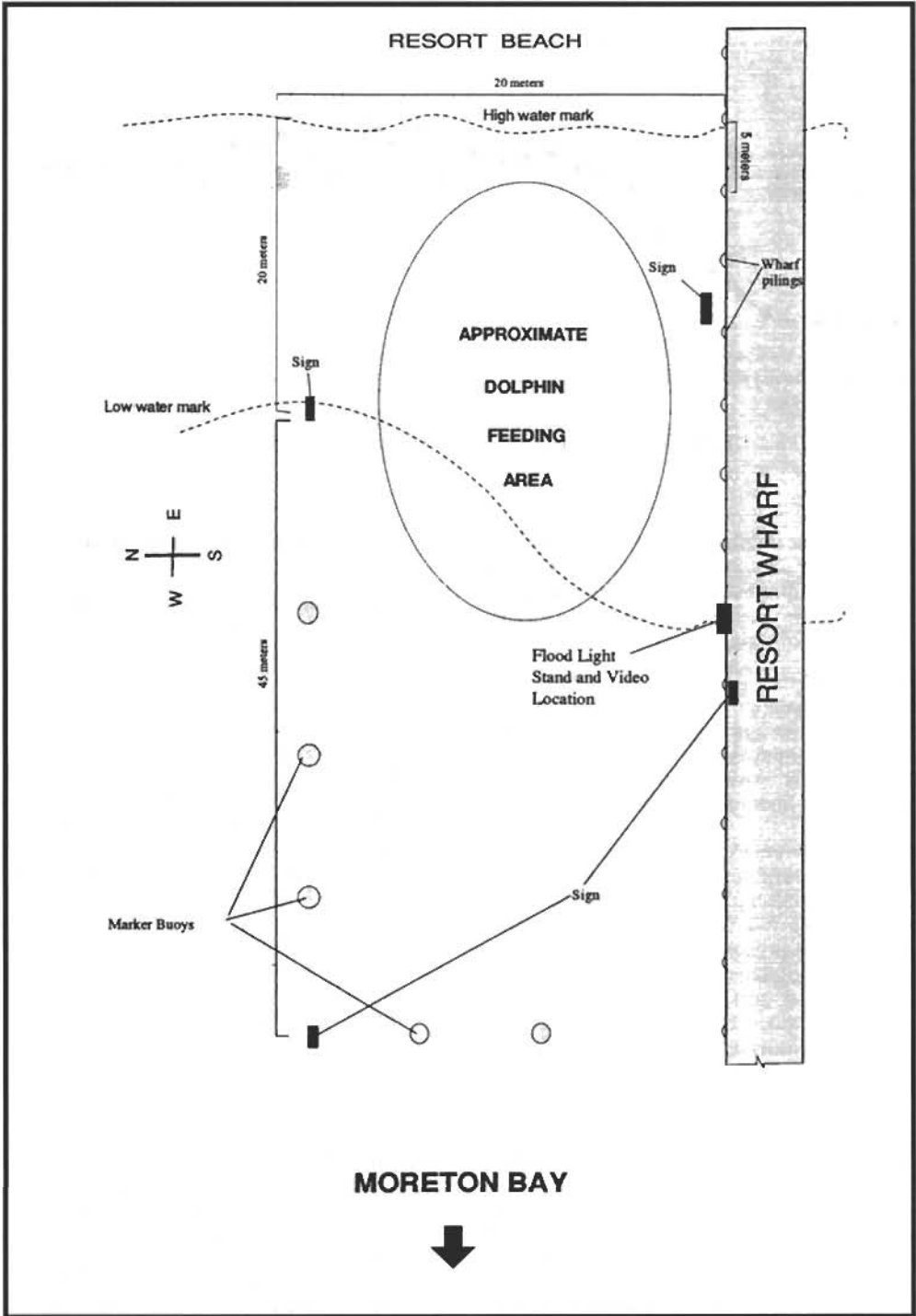


Figure 4. The Tangalooma dolphin feeding area.





times, the pushing was quite vigorous. In addition, on three occasions tourists were actually bitten by a dolphin. It is difficult to know if these bites were deliberate or accidental, however, on one occasion, a dolphin was observed following an individual when he was walking towards the beach and biting him on the calf.

The pushy behaviour is not particularly violent and the majority of feeds are conducted with minimal pushing. However, due to the sensitive nature and early stage of the development of the feeding program at Tangalooma, this behaviour is being monitored closely. A more detailed discussion of pushy behaviour is provided by Orams, Hill and Bagioni (in press).

#### *Response to shark attack*

Over one third of dolphins resident in Moreton Bay show evidence of shark attack (Corkeron, Morris & Bryden, 1987a). In examining the incidence and healing rates of shark attack on dolphins, Bruce-Allen & Geraci (1985) and Corkeron *et al.* (1987b) found that major wounds healed very rapidly.

On 20 May 1993 'Freddy', one of the Tangalooma dolphins, appeared at the evening feeding session with a new large open wound on his left side slightly forward of the pectoral flipper. This laceration was roughly circular and estimated at 45 centimetres in diameter. The top part of the wound was several centimetres deep and muscular tissue was visible. The bottom part showed evidence of teeth puncture marks likely to have been caused by a large shark.

Despite what appeared to be a traumatic injury, Freddy showed no obvious signs of discomfort or behavioural change. His food intake that evening was normal and he continued to attend subsequent feedings. To assist his recovery, resort staff hydrated a portion of his fish and administered a multi-vitamin supplement via his fish for two weeks after the wound was sustained. Healing of the wound was rapid, complete closure occurred after approximately 30 days and within 45 days all that remained was an opaque coloured de-pigmentation scar. This attack, the apparent lack of impact on behaviour or food intake, and the subsequent rapid healing provides additional support for the findings of previous research on shark wound healing (e.g. Corkeron *et al.*, 1987a,b; Bruce-Allen & Geraci, 1985).

#### **Conclusions**

In the United States in 1992, 20 commercial and 50 charter boat operators were running cruises which allowed tourists to feed wild dolphins (Wilson, 1994). As a result of concerns over the impacts of

these operations the United States National Marine Fisheries Service commissioned a report which analysed the effects of such cruises. This report concluded that regular feeding of wild dolphins alters natural behaviour patterns and places the dolphins at risk (Bryant, 1994). More specifically, in all cases where dolphins were regularly fed, the dolphins became habituated to accepting food from humans. This habituation 'substantially altered normal behaviour by creating dependency, negatively modifying foraging strategies and social behaviour and encouraging animals to approach vessels and humans where they beg for food' (Wilson, 1994: 4). As a result of this report, and a confirmation by the United States Circuit Court of the finding that feeding does place dolphins at risk, the United States' Marine Mammal Protection Act was amended to specifically prohibit human feeding of wild dolphins in United States waters.

Similar opinions have been expressed regarding the sociable dolphins at Bunbury, Western Australia. Changes in the behaviour of the provisioned dolphins have caused concern. Wilson (1994: 4) states:

The frequency of dolphins begging from fishing boats and stealing baits from fishing lines and crab nets increased markedly following the introduction of regular provisioning. Complaints from fishers also increased, sometimes accompanied by threats against the dolphins.

In addition to the United States and Bunbury experiences, evidence recently reported for provisioned dolphins at Monkey Mia suggests that this kind of interaction may increase calf mortality (Anderson, 1994).

In summary, the consensus appears to be that the regular feeding of wild dolphins has significant risks for the dolphins. Many Australian states and some countries have decided that these risks are not acceptable and have banned the practice (for example, the United States, New Zealand and the United Kingdom). There are also risks of deliberate and accidental harm to dolphins which become habituated to interacting with humans whether food is involved or not. Some humans have shown little regard for the welfare of interactive dolphins and, unfortunately, dolphins which allow close contact from humans will always be at greater risk of harm than those which do not.

Despite, or in ignorance, of these risks there are a growing number of operators who are promoting interaction with wild dolphins as a tourist attraction. In addition to Tangalooma, three other operators have established regular interaction opportunities in Australia in the past five

years. At Bunbury, in Western Australia, a group of bottlenose dolphins frequently visit the beach area and interact with people and this is being promoted as a tourist attraction. Tour buses often include this attraction as a stop on their itinerary. A few kilometres north of Bunbury, close to Rockingham, Terry Howson established regular contact with a group of bottlenose dolphins. He is now taking tourists out to visit and swim with these dolphins, often using an underwater motorised 'scooter' to move amongst the pod.

In Port Phillip Bay, Victoria, Australia a non-profit organisation called the Dolphin Research Project was established to promote 'ecotour' boat trips for tourists to see dolphins which reside in the bay. In addition, private operators are offering opportunities to swim and snorkel with Port Phillip Bay pods. A technique commonly used is to tow snorkellers on a line trailing from a motor boat through an area where a pod is found. In New Zealand, there are currently eight tourist operations which promote swimming with wild dolphins (Doak, 1994) and many more have applied to the Department of Conservation for permits to conduct dolphin oriented tours (W. Doak, pers. comm.). It does appear, therefore, that tourism based upon interaction with wild dolphins is becoming popular, at least in Australasia.

This recent growth of wild dolphin based tourism in Australasia may be an indicator of world-wide profusion of such operations. If this proves to be the case, the management of this interaction will need to be undertaken in a responsible and cautious manner. The experience gained and the lessons learned from Monkey Mia, and the development and management of the dolphin feeding program at Tangalooma, are important case studies which reinforce the need to proceed very carefully with these kinds of interactions. These operations may need to be tightly controlled and managed to ensure that the 'ecotourism' is not exploitive of cetaceans or dangerous for humans.

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