

Encounters with Whales '93

**A conference to further explore
the management issues relating
to human/whale interactions**

Proceedings of a conference held at Lady Elliot Island,
Australia, 6-10 September 1993

Edited by Deb Postle and Mark Simmons



Great Barrier Reef Marine Park Authority

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INTRODUCTION

There is a certain fascination that people have always held for whales. People want to get close to them and, it sometimes seems, the whales actively choose to come to us. Possibly some of this fascination can be explained because of their considerable size, particularly for animals such as the humpbacks and right whales. They are so large that until you see one, it is quite difficult to imagine what they are really like - this being in spite of the countless books and films published about these fascinating creatures.

The smaller cetaceans are equally revered by the general public. The dolphins of Monkey Mia are a good example showing the lengths people will go to, in terms of travelling large distances to remote locations, just for the opportunity to see these animals up close and in the wild.

Only a few years ago the chance to get close to whales in the wild was largely in the domain of a handful of researchers or those fortunate few of the general public who happened across them while sailing or boating. The 'discovery' of areas such as Hervey Bay off the southern Queensland coast has changed all that. Now, large numbers of tourists can be transported daily, in both comfort and safety, to view the whales in their congregation areas, and sightings are virtually guaranteed.

Within the Great Barrier Reef Marine Park there has also been an increase over the past few years in the number of tourist operators applying for permits to run commercial whale watching activities. In the Whitsunday Islands region, which is already a heavily used recreational and commercial tourism area, dedicated whale watch tours commenced in 1990 and have become more popular each year. In the southern Great Barrier Reef the island resorts among the Capricorn/Bunker Group of islands have engaged in whale watching for many years, but largely as an incidental part of their operations.

An increase in the opportunities to view whales for the general public also brings with it the increased potential for harassment of these creatures. This is particularly significant when whale watching is occurring in the critical offshore breeding and nursery areas for these endangered species.

The Great Barrier Reef Marine Park Authority was aware of the need to discuss with other management agencies the requirement for updated guidelines for whale watching activities, together with a range of other important management issues.

CONFERENCE PROGRAM

Day 1 - 6 September

Arrival and registration

Day 2 - 7 September

- 8.45 am: *Introduction and welcoming address*
Mark Simmons - Great Barrier Reef Marine Park Authority
- 9.15 am: *Resource Managers and Field Researchers- "Allies or adversaries"*
Paul Forestell - Pacific Whale Foundation, Maui
- 10.00 am: Morning tea
- 10.30 am: *Conservation Plan for whales and dolphins in Queensland*
Margaret Gooch on behalf of Tim Stevens, Queensland Dept of Environment and Heritage, Brisbane
- 11.30 am: *An overview of the whale watching industry in Western Australia 1989-1992*
Doug Coughran - Dept of Conservation and Land Management, Western Australia
- 12.30 pm: Lunch
- 2.00 pm: *Development of an environmental code and community awareness campaign for whale watchers*
Dick Olesinski - Dept of Environment and Land Management, South Australia
- 3.00 pm: Afternoon Tea
- 3.15 pm: *A look to the future - issues facing whale watching in Australia*
Workshop session

Day 3 - 8 September

- 9.00 am: *A review of educational materials developed for the Queensland whale watching industry*
Mark Simmons - Great Barrier Reef Marine Park Authority
- 10.00 am: Morning Tea
- 10.30 am: *Development of whale watching and its implications for research*
Greg Kaufman - Pacific Whale Foundation, Maui
- 11.30 am: *The impacts of marine pollution on cetaceans*
Steve Raaymakers - Great Barrier Reef Marine Park Authority
- 12.30 pm: Lunch
- 2.00 pm: *South Australian Encounters*
Chris Halstead - South Australian Dept. of Environment and Natural Resources
- 3.00 pm: Afternoon tea

Day 4 - 9 September

- 9.00 am: *Beyond the Breach - Managing for whale watching and whale conservation in Hervey Bay Marine Park*
Alan Jeffery - Queensland Dept. of Environment and Heritage,
Maryborough
- 10.00 am: Morning tea
- 10.30 am: *Management of whale and dolphin watching, Kaikoura, New Zealand*
Andrew Baxter - Dept of Conservation, New Zealand
- 11.30 am: *Marine Mammal Strandings*
Brent Vincent - Queensland Dept. of Environment and Heritage,
Cairns
- 12.30 pm: Lunch
- 2.00 pm: *Whale observations from Australian Antarctic ships*
Ken Green - Australian Antarctic Division, Hobart
- 3.00 pm: Afternoon Tea
- 3.15 pm: *Assigning priorities*
Workshop session

Day 5 - 10 September

Depart Lady Elliot Island.

OBJECTIVES

The aims and objectives for the conference were:

- To provide a forum for delegates to discuss mutual concerns relating to whale watching activities.
- To review the current status of education, research and management programs concerning the control of whale watching activities in Australia.
- To identify future directions for whale watching in Australia to ensure the protection of whales from harassment whilst maintaining a viable and sustainable whale watching industry.

DISCUSSION GROUP RESULTS

Major issues identified and discussed at the conference workshops under the broad categories of Research, Education and Management were:

Research:

- Need for more baseline data, population recovery is presently not assured.
- Research efforts need to have a co-ordinated approach to avoid duplication of effort and waste of resources.
- Social research needed ie. what are people learning from their experience, can this information be used to change attitudes towards whaling.
- Scientific research needs its own guidelines to avoid harassment.

Education:

- Appropriate codes of behaviour need to be developed for commercial and recreational whale watchers.
- Realistic expectations about whale watching need to be set by operators amongst their clientele.
- Need for better staff training and accurate resource material so the public is getting the right information.

Management:

- Consistency in management strategies needed between the States.
- Need to realise that education, research and management strategies are interlinked i.e. education and research are the tools of management.
- Need to look at the logic behind present regulations - 'Who thought them up?', 'Do they work?' and 'Should they be changed?'.

CONFERENCE OUTCOMES

Major outcomes of the conference were:

- Support from all representative organisations for the conference. As an initial networking and information sharing exercise, it was a great success.
- Identified need for ongoing resource commitment from management agencies for development of whale management programs.
- Follow up conference to be held in Hervey Bay in August 94. Q.DEH to be primary organisers.

It is now time to build on the success of this program and continue working towards strategies that, primarily, provide for the conservation of these marine mammals but also allow opportunities for their appreciation and enjoyment by the general public through the development of a sustainable whale watching industry.

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ORGANISATION PROFILES

Dick Olesinski & Chris Halstead
Department of Environment and Natural Resources
Resource Conservation and Management Branch
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The Department of Environment and Natural Resources (DENR) through the Resource Conservation and Management Division has ultimate responsibility for Whale Management within SA.

The management of whales and whale watching is primarily delegated to districts within the DENR Regions. The Coastal Regions of West, South and Central are involved through District Managers at Fleurieu, Innes, Kangaroo Island and Far West.

The Fleurieu and Far West Districts are actively involved in monitoring, public education, managing whale watch operators and formulating new whale watching regulations. This is particularly relevant to the winter visits of Southern Right Whales.

Assistance is provided through Dick Olesinski's Public Communications Branch particularly the coordination of a community awareness campaign. Other assistance is provided by the Resource Protection Branch who are involved in the legislative side particularly in the amendments to the SA National Parks and Wildlife Act.

Community awareness campaign

The South Australian Department of Environment and Land Management through the department's Coastal Management Branch, National Parks and Wildlife Service and the Public Communications Branch have jointly coordinated the development and introduction of the community awareness campaign.

The campaign aims to minimise and where possible, eliminate environmental damage caused by persons involved in whale watching.

The situation in South Australia is unique compared to other states in Australia. The problems encountered are generally land based. Other states generally relate to water based problems associated with whale watching. The region is in easy reach of the general community, only being 60 kms away from metropolitan Adelaide.

Various organisations are eagerly awaiting the outcome of this community education approach to controlling and eliminating the environmental problems associated with whale watching.

Campaign objectives

The objectives of the campaign are to:

- increase the level of concern by whale watchers for the fragile vegetation, cliff areas and dune systems and to increase their level of understanding of the need for environmentally sensitive behaviour.
- minimise the environmental impact caused by whale watchers, and
- promote a whale watching code specifically for the state's Encounter coast area.

The environmental awareness code proposes to:

- educate the community regarding environmental damage caused by whale watchers,
- provide positive ways to protect the coastal dune system, and
- identify specific guidelines and safety issues associated with whale watching.

Dr Denise Russel
The University of Sydney
Department of General Philosophy
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Sydney NSW 2006

Dr Denise Russel is a Senior Lecturer in the Department of General Philosophy at the University of Sydney. The Department has an interest in pursuing theoretical research related to environmental philosophy and in teaching courses in this area to students primarily in the Faculty of Arts. Of particular interest is the ethical issues that arise in human-whale interaction, questions such as what sort of contract is ethically defensible, is whaling ever justifiable, what is the reason for placing limits on tourist interaction and scientific research? Are there good reasons for placing other curbs on other human activity to save whales from depletion (e.g. relating to pollution or oceans, fishing techniques)? In general it is the principles behind regulations rather than the regulations themselves which are the Departments focus. The conference, while focusing on actual practices and regulations did raise these questions in indirect ways and thus was enormously useful.

Ald Ken Bennett
Hervey Bay City Council
PO Box 45
Torquay QLD 4655

- Chairman of the Fraser Coast and South Burnett Tourism Board. This encompasses the Hervey Bay Marine Park area, and of the 300 or so members quite a number are involved in the Whale watching industry.
- Chairman of the H.B.C.C. Tourism sub-committee. This committee also defines the local tourist operators.
- Member Hervey Bay Marine Park Advisory Committee. Through this committee Whale Watching Permits are assessed.
- Member of Great Sandy Management Advisory Committee. This committee is involved in shaping the management of Fraser Island and the Great Sandy Straits for the future.
- Chairman of Hervey Bay Police/Community consultative committee. As police in Hervey Bay now have a strong presence on the waterways of the Great Sandy Straits they will probably take a greater part in control of water craft.

Doug Coughran
Department of Conservation and Land Management
Wildlife Protection Branch
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CALM's mission:

We conserve and manage Western Australia's wildlife and the lands, waters and resources entrusted to the Department for the benefit of present and future generations.

Western Australia has a beautiful, diverse and supportive natural environment which provides material, aesthetic and spiritual benefits. It is an essential part of Western Australians' livelihood and quality of life.

In keeping with our mission, the Department of Conservation and Land Management has the following objectives.

Conservation: To conserve indigenous plants, animals and ecological processes in natural habitats throughout the State.

Value and Use of Resources: To optimise the value and economic return to the community of wildlife, lands, waters and resources entrusted to the Department without compromising conservation and other management objectives.

Tourism and Recreation: To identify and provide opportunities and services to the community which allows them to enjoy the wildlife, lands, waters and resources entrusted to the Department without comprising conservation and other management objectives.

Knowledge: To seek and provide an up-to-date and sound scientific and information basis for the Department's conservation and land management activities.

Community Support: To promote community awareness and appreciation of the values of the wildlife, lands, waters and resources entrusted to the Department, and the develop community understanding and support for the Department's conservation and land management activities.

Human Resources: To recruit, develop, reward and retain knowledgeable and talented staff, and to provide a stimulating, safe, productive and supportive work environment where staff can pursue individual goals consistent with those of the Department.

Corporate Efficiency: To optimise the efficiency, effectiveness and responsiveness of the Department in the achievement of conservation and other management objectives.

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The Pacific Whale Foundation is a non profit research, education and conservation organisation whose purpose is to educate the public, from a scientific perspective, about marine animals and the ocean environment. Founded in 1980, Pacific Whale Foundation has conducted scientific field studies of humpback whales in Hawaii, Alaska, the Ogasawara Islands of Japan, Tonga, American Samoa, Queensland and Western Australia. Foundation scientists are also conducting studies of the status of tropical reef corals and coral fish communities in Hawaii. In addition to supporting studies carried out by Pacific Whale foundation personnel, funding support has also been provided for studies of endangered dolphins in New Zealand and South America.

Current research efforts include studies of the distribution and movement patterns of humpback whales along the east coast of Australia using aerial surveys and photo identification from small boats; abundance estimates of humpback whales near Perth, Western Australia, based on photo identification; distribution and behaviour of humpback whales wintering near Maui, Hawaii; assessment of human activity on diversity and abundance of coral reefs and coral fish species at selected sites in Hawaii; and determination of attitudes and values influencing public participation in structured programs to view marine mammals in the wild.

Pacific Whale Foundation's educational efforts are incorporated under the Ocean Outreach Program. Projects include the organ Adopt-a-Whale program; guided whalewatches and tide pool excursions for school children; school visits with the Ocean Van; an internship program to provide the general public exposure to field research opportunities; development of marine mammal educational materials; public awareness activities; and educational marine recreation programs. Pacific Whale Foundation has recently developed a Marine Mammal Naturalist Certification, which is offered through Maui Community College.

Conservation efforts have been directed at working with management agencies in Queensland and Hawaii to encourage public interest in whale watching, while managing activities to ensure long term protection of the resource. Pacific Whale Foundation has conducted workshops for whale watch boat operators in Hawaii and Japan, and participated in similar programs elsewhere in the United States and Australia. Currently, Foundation staff are working with state and federal agencies in Hawaii to develop a Management Plan for the newly designed Humpback Whale Sanctuary.

The Pacific Whale Foundation is a membership organisation of approximately 3,500 supporters. While these are primarily from the United States and Australia, we also have members from Canada, Japan, the United Kingdom, Germany, Austria and the Middle East. Our funding sources include memberships, internships, sales of merchandise, donations, and research grants. Pacific Whale Foundation's main office is in Kihei, Maui, with a satellite office in Brisbane, Australia.

Further information about Pacific Whale Foundation's programs, reprints of scientific articles, and copies of educational materials and brochures may be obtained by writing either the Hawaii or Queensland addresses.

**Margaret Gooch & Tim Stevens (Brisbane), Allan Jeffery (Maryborough),
Brent Vincent (Cairns)
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The Department is required to be the lead agency in all environmental management matters in Queensland. As such it is required to:

- monitor the quality of the natural environment
- manage the environmental impact assessment process in relation to the natural environment
- co-ordinate environmental management aspects of the activities of other Queensland government departments at a policy level and conduct appropriate environmental audits
- regulate environmental management matters generally
- report to government on the state of the natural environment and environmental management
- establish a consultation process which allows Government, industry, the public and all relevant client groups to participate and contribute to decision making processes.

Implementation of these requirements in most respects aligns closely with the Department's corporate strategies.

In accord with the Department's role, the Division of Environment has been active in promoting sustainable resource use practices and responsible environmental management across government. A close working relationship between Divisional offices, many agencies including the Departments of Business Industry and regional Development, Housing, Local Government and Planning has assisted all parties in achieving better environmental management.

In particular, the Division of Environment has played a major role in promoting the adoption and implementation of those actions detailed in the National Strategy for Ecologically Sustainable Development (ESD) and the National Greenhouse Response Strategy. Strategies endorsed in December contain about 400 actions designed to steer society onto a path of development which is sustainable in the long term.

The Department has promoted incorporation of the strategies' initiatives and policy directions into policies and programs of, in particular, the Department of Transport, Primary Industries, and Minerals and Energy. Areas of input have focussed on energy efficiency and conservation, greenhouse gas emissions, transport planning and water resources management.

As lead agency, it also provides policy advice on a range of environmental issues to the Office of Cabinet. This advice assists in the development of Government policy.

Regional planning particularly in the south-east corner of the State is one of the major issues facing the Government. The Division has played a key role in identifying environmental management issues at the earliest possible phase.

Andrew Baxter
The Department of Conservation
PMB 5
Nelson NEW ZEALAND

The Department of Conservation's (DOC) mission is to conserve the natural and historic heritage of New Zealand for the benefit of present and future generations. More specifically the Department is responsible for ensuring:

- Conservation of New Zealand's natural and historic resources
- Public awareness of, support for, and enhancement of a conservation ethic both within New Zealand and internationally
- Sensitive and sustainable use of New Zealand's natural and historic resources by the public.

New Zealand's Protected Heritage

Our protected heritage contains:

- Plants and animals found nowhere else on earth
- A remarkable variety of landscapes and landforms
- Sites of great historic and cultural significance
- Some of the world's most outstanding national parks, including two World Heritage Areas
- Island nature reserves which are internationally important havens for threatened birds and marine mammals.

Caring for Threatened Species

Environmental problems are complex, and the DOC works on many fronts, from the local to the global. New Zealand is home to some of the world's oldest plants and animals, including the beech forests, kauri trees, tuatara, native frogs, kiwi, kakapo, giant weta and land snails. Many of them are now at risk. Protection and recovery work includes special breeding programs; transferring endangered species to offshore islands without predators; and controlling cats, rats, possums and other introduced animals. Increasingly the focus is on protecting whole communities of interdependent plants, insects and animals.

Caring for the Coast

Coastal and marine ecosystems face growing problems of pollution and overuse. Ensuring that these often fragile environments are managed sustainably, and seeking greater protection for them, are priorities. The Department:

- Works to reduce coastal pollution
- Promotes better understanding of the coast and more effective coastal planning and management
- Prepares the New Zealand Coastal Policy Statement which guides regional councils in ensuring wise use of coastal resources
- Looks after marine mammals, sea birds and turtles in New Zealand's waters
- Maintains a record of New Zealand's coastal resources
- Is working with community and interest groups to set up a network of marine reserves around the coast
- Promotes the conservation of fisheries and the marine ecosystem

Involving the Community

Community support for conservation has grown rapidly, and increasingly the public are sharing the responsibility of conserving New Zealand's natural resources. Activities include visitor programs, information displays and education activities. Conservation volunteers and New Zealand Conservation Corps give 'hands on' experience. The community is also being given more of a voice in the department's decision making. DOC's regional conservation management strategies seek full public participation in deciding conservation priorities.

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The Great Barrier Reef Marine Park Authority (GBRMPA) is the principal adviser to the Commonwealth Government on the care and development of the Great Barrier Reef Marine Park. Australia's Great Barrier Reef is universally acknowledged as one of the natural wonders of the world, and proper management of the Reef is vital to its conservation for future generations. The Great Barrier Reef Marine Park and the Great Barrier Reef Marine Park Authority were established in 1975 to ensure the Great Barrier Reef's protection and wise use.

The Authority has an established national and international reputation for excellence in marine protected area planning and management, and regularly receives requests from Australian and overseas agencies for assistance in marine natural resource management.

The Authority is a Commonwealth statutory body consisting of a full time Chairman, Professor Graeme Kelleher, and two part time members, presently Professor Rhondda Jones of James Cook University of North Queensland, and Dr Craig Emerson, Director-General of the Queensland Department of Environment and Heritage.

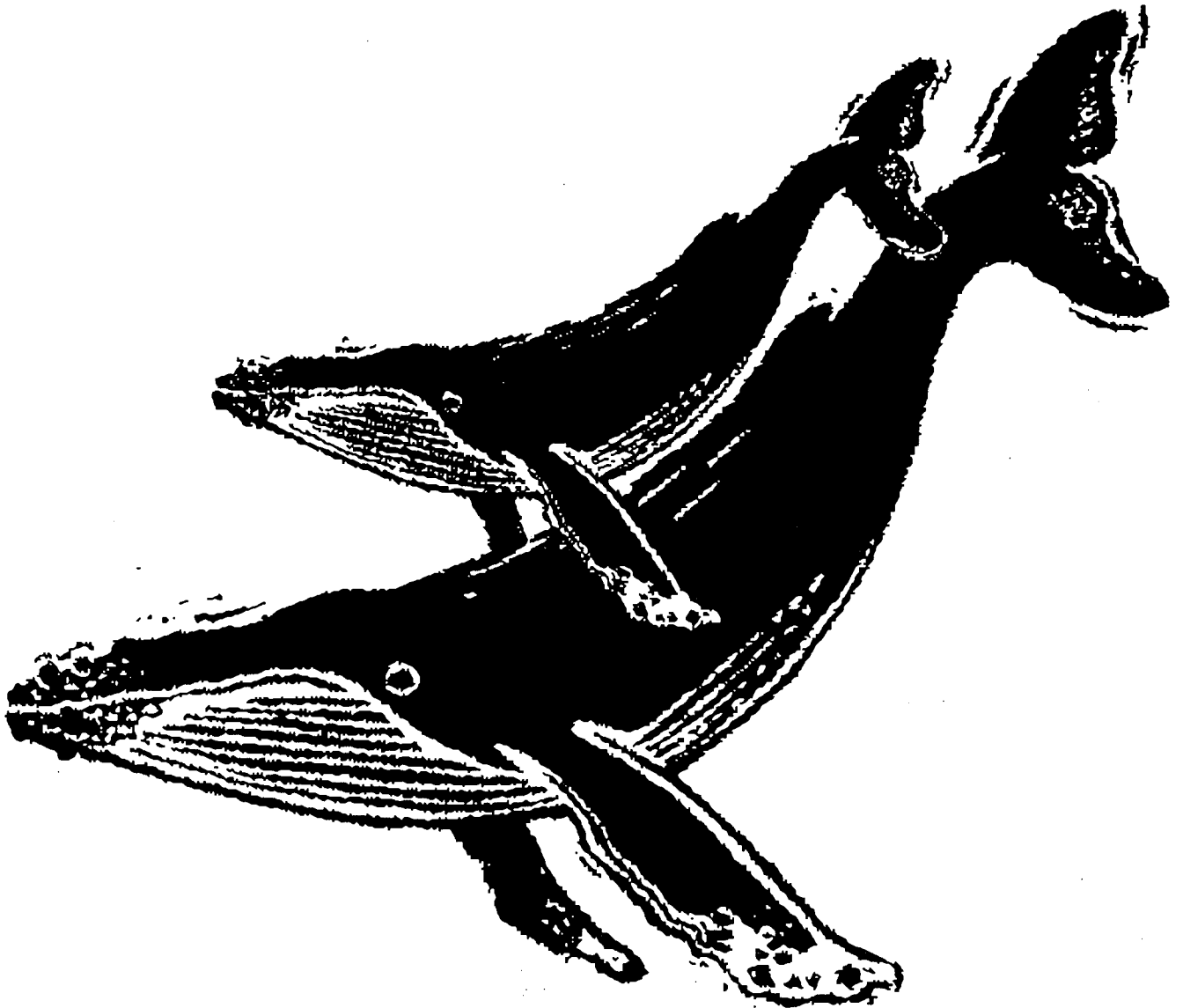
The Authority is part of the environment portfolio of the Minister for the Environment, Sport and Territories. The Authority's functions are specified in sections 7 and 7A of the *Great Barrier Reef Marine Park Act 1975*. In summary the Authority's functions are:

- to make recommendations to the Minister in relation to the care and development of the Great Barrier Reef Marine Park, including areas that should be declared as parts of the Marine Park and the regulations that should be made under the Act
- to carry out and arrange for other persons or institutions to carry out research and investigations relevant to the Marine Park
- to prepare zoning plans for the Marine Park
- to furnish advice and information to the Minister on matters relating to the Marine Park, including agreements and financial arrangements between the Commonwealth and Queensland
- to provide and arrange for the provision of educational, advisory and informational services relating to the Marine Park
- to provide assistance to other institutions and persons in matters relating to environmental management

The organisational structure of the Authority, which mirrors its areas of responsibility and expertise, is comprised of the following sections: Planning and Management, Research and Monitoring, Environmental Impact Management, Education and Information, Administration, External Services and Corporate and Strategic Projects. The Authority also runs the Great Barrier Reef Aquarium in Townsville, an important educational facility devoted to enhancing community understanding, appreciation, experience of and support for the Great Barrier Reef, the Marine Park and the Authority.

The Authority works cooperatively with other government agencies, to the maximum extent possible, in pursuing its goal of providing for the protection, wise use, understanding and enjoyment of the Great Barrier Reef Marine Park.

PAPERS PRESENTED



Resource Managers And Field Researchers : Allies Or Adversaries ?

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INTRODUCTION

The past twenty years have witnessed a growing worldwide fascination with observing marine mammals in their natural setting. In Australia, where there has been mounting public reaction against removing marine mammals from the wild for public display, the importance of natural habitat as a venue for humans to satisfy their apparent inherent interest in whales and dolphins will undoubtedly increase. As the demand for access to natural habitats and exposure to marine mammals grows, so will the challenges for resource managers to balance public appetite on the thin edge of ecosystem integrity. In coordinating frequently mis-matched agendas of the public, commercial interests, conservationists, endangered species, and threatened habitats, resource managers require input from many sources. This paper discusses ways in which marine mammal field researchers can facilitate the task of marine resource managers in permitting public participation in marine mammal excursions, while limiting the degree of negative impact on the animals and their environments.

In discussing possible contributions of field research to the general goals of resource management, reference will be made to efforts of the Pacific Whale Foundation during the past fourteen years to incorporate scientific inquiry, conservation, and public education into ongoing efforts to ensure the protection and recovery of humpback whales throughout the Pacific. Founded in 1980 in Hawaii, the Pacific Whale Foundation has carried out annual studies of humpback whales migrating along both coasts of Australia, with a pronounced concentration on the East Australia population, since 1984. East Australia humpback whales are known to migrate between Antarctic Area V (130°E and 170°W) and areas throughout the Great Barrier Reef and the Islands of Polynesia to an extent that has been as yet only incompletely documented (Dawbin, 1966; Osmond et al., 1989; Kaufman et al., 1993). Western Australia humpback whales migrate between Antarctic Area IV (70°E-130°E) and as far north as the Dampier Archipelago (Chittleborough, 1965; Bannister, 1991).

Humpback whales were hunted from coastal whaling stations along both the east and west coasts of Australia, with greatest numbers taken following the Second World War (Chittleborough, 1965). By the early 60's the industry collapsed when too few whales could be found. Shortly thereafter hunting of humpback whales throughout the South Pacific was prohibited by convention of the member nations of the International Whaling Commission. Limited hunting of humpback whales continued in Tonga until 1979, when the sole remaining whaling family ceased operations and a proclamation by the King banned further hunting (Kaufman, pers. obs.).

Following the cessation of hunting little interest was shown in humpback whales migrating along Australia's east and west coasts for approximately fifteen years. Beginning in the early 80's occasional aerial surveys were conducted to determine whether the two populations were showing evidence of recovery (Bryden, 1985; Bannister, 1991). Shore-based surveys from headlands near Brisbane, Queensland, were also initiated by Dr. Robert Paterson of the Queensland Museum, and Paul Hodda of Project Jonah. In the (austral) winter of 1984 Pacific Whale Foundation began identifying individual whales passing North Stradbroke Island during their northward and southward migrations. Identification was based on photographs of unique tail fluke and lateral body markings (Kaufman et al., 1987; 1993). Interest in humpback whales continued to grow, and there was evidence East

Australia humpbacks might be recovering from the depredation's of whaling (Simmons and Marsh, 1986; Chaloupka et al., 1989; Paterson and Paterson, 1989).

In 1987 a charter boat operator in Hervey Bay, Queensland first advertised excursions to view humpback whales along the west shoreline of Fraser Island. Within a year tourists were flocking to Hervey Bay to see the whales. Within two years, concerns about the potential harassment of whales by both private and commercial sightseeing operations led to the declaration of a marine park by the State of Queensland, with a limited-entry permit system for commercial whalewatch vessels (Stevens, 1990).

As the whalewatch industry has prospered in Hervey Bay, other areas along the Queensland coast have sought opportunities to benefit from the public's interest in observing whales in their natural habitat. Increasingly, sightings of whales within the Great Barrier Reef Marine Park have resulted in advertising campaigns by boat operators and resorts that are based on possibilities of seeing humpback whales. A resort at Tangalooma, once a shore-based whaling station, now offers whalewatch excursions in Moreton Bay (Orams, in Press).

Since 1990, humpback whales have also been the target of boat excursions operating offshore of Perth, Western Australia. During the period October through December each year, humpback whales may be observed on their southward migration, with many passing relatively close to shore, between Perth and Rottnest Island, approximately 18 km offshore (Burton, 1991; Kaufman et al., 1993). Whalewatching in Western Australia has been less of a dedicated enterprise than has occurred in Queensland (see Coughran, these proceedings).

The development of humpback whalewatching in Queensland and Western Australia has been matched by public interest in other species of whales (eg., right whales) and dolphins. Currently, a wide variety of experiences are being offered, ranging from conventional whalewatch excursions to trips during which passengers are towed behind a boat, while they hang onto a rope, through schools of wild dolphins (Orams, pers. com.). Management agencies must amass a great deal of information about the resource to be protected and the activities to be managed before effective and proactive programs can be put in place. Field researchers can play an important role in providing management agencies with such information.

POTENTIAL ROLE OF FIELD RESEARCH IN RESOURCE PROTECTION

Agencies responsible for protection of marine mammals are faced with the difficult task of defining the conditions which lead to enhanced protection, and those which interfere with protection. This requires an understanding of the natural history of given species of marine mammals, and recognition of the habitat needs which are most germane to the species' ongoing survival. In addition, the variables of importance must be understood well enough in advance to ensure that endangered species, already poised on the brink of extinction, are not wiped out while conditions required for their survival are scrutinised.

Pacific Whale Foundation's research efforts in Australia have focused on examining distribution patterns along the east and west coasts of Australia using shore-based, small boat, and aerial surveys; estimating abundance of whales from mark-recapture studies; and documenting migratory patterns of different age/sex groups. These studies have helped delineate the seasonal movements of humpback whales within Australia, as well as between East Australia and the Antarctic (Kaufman et al., 1990).

East Australia Studies. Using resight histories of East Australia humpback whales photographed from 1984 to 1988, Chaloupka et al. (1989) provided the first Jolly-Seber capture-recapture estimates of abundance of Group V whales. The Group V population was estimated to be 1203 +/- 70 whales (95% confidence level) in 1987. Of particular note was the finding that across the five years of the study, estimated size of the population from

which photo-identified animals were sampled grew abruptly from approximately 810 whales prior to 1987 to the estimated 1203 (+/- 70) whales thereafter.

Photo-identification efforts have also helped clarify migratory characteristics of adult females. Krutzikowsky et al. (1991) reported that the southward migration of mature females appears, in part, to be a function of whether or not they are accompanied by a calf. On the basis of 130 observations of photographically-identified females, they found that mature females were most frequently sighted in Hervey Bay from mid-August to early-September when not accompanied by a calf, and from late-September to early-October when accompanied by a calf. On average, females with a calf were observed an average 39 days later in the Bay than females without a calf.

The temporal difference in migratory movement of mature females may well be driven by differences in surface water temperature (Forestell et al., 1990). Dawbin (1966) suggested that differences in migratory timing could put females in warmer water than other females throughout much of the year. Krutzikowsky et al. (1989) documented surface water temperature near 287 pods of whales in Hervey Bay during 1988. A significantly greater proportion of calves than adults was found in waters ranging from 22 - 26°C, while significantly more adults than calves were found at lower temperature. Southward migration of mature females is significantly later when accompanied by a calf, and this phenomenon is strongly related to surface temperatures.

From August 11 - October 24, 1992 aerial surveys were conducted in Hervey Bay Marine Park to document distribution patterns of marine mammals. A total of 186 pods containing an estimated 317 humpback whales were observed during 41.5 hours of census effort across 17 flights (with a mean observation rate of 4.48 pods per hour, ranging from 0.0 to 7.75, STD = 2.07). In addition, 476 dolphins sightings (including an estimated 2626 animals), 182 dugong sightings (with an estimated 194 animals) and 392 boat observations were made.

In the early part of the observations, humpback whales appeared to travel south past Fraser Island on their way back to the Antarctic after wintering on the Great Barrier Reef. As the season progressed, a larger proportion of the whales moving south came into the Bay, remaining for two to three days. The general size and composition of pods suggested that Platypus Bay, in the north eastern part of the Park, may be an important resting area for mothers and their calves.

A variety of dolphin species were observed to be widely distributed through-out the park. Dugongs were found in areas not thought to be part of their normal range, perhaps due to destruction of seagrass beds by inordinate flooding earlier in the year. Overall, the aerial surveys provided a more comprehensive assessment of marine mammal activity in the Park than had previously been obtained.

Western Australia Studies. To date, we know far less about the population of whales observed off the west coast than those off the east coast. For example, while we have identified the sex of 80 of 911 east coast whales (9.1%), only three of 252 whales have been sexed off the west coast (1.1%). Off the east coast, we have identified 56 mothers (6.1%); off the west coast we have so far only identified one mother (<1%). We have identified 111 sub-adults (12.2%) off East Australia, but only 9 (3.6%) off Western Australia. There are two general reasons for this, and both have to do with differences in effort. During the seven years of effort in East Australia, we have successfully bracketed the migratory period, from early June through late October. As already discussed, the movement of whales along the east coast is nearshore during both the northward and southward migration.

In Western Australia, photo-identification efforts have concentrated on the southward migration off Perth during the months September through November, with somewhat limited effort further north (Shark Bay, Exmouth, and Dampier). Additional photo-

identification effort has been reported off the Dampier Archipelago during the southward phase of the migration (Bannister, 1991). The results of that work have not yet been published, or made available for comparison with the data presented in the Australia fluke catalogue developed by Kaufman et al. (1993).

Although the number of mothers photo-identified to date off Western Australia is low, Burton (1991) reported that 37 of 417 whales observed during opportunistic whalewatch cruises in 1989 were calves (8.9%). More than half of these were observed during three days in November. During our own field efforts, we note that mothers and calves are regularly observed, although data are not yet available on observation rates. As more is learned about the movement patterns of humpback whales along the west coast of Australia, the timing of photo-identification effort can be modified to better sample the population.

Serendipity and the White Whale. In addition to findings from systematic studies as an important source of information for better understanding the distribution and behaviour of humpback whales, there are occasional serendipitous occurrences which may also add to our general knowledge. One excellent example of such an opportunity is the remarkable appearance of a pure white humpback whale along the Queensland coast during the past three years. Although it has not yet been possible to confirm the animal is an albino, photographs taken during the past two years show an animal with no evidence of pigmentation. It has been observed from the surface and from the air, and has been photographed breaching. The photographs of the breaching whale shows hints of pinkish hues along the mouth line and in the vicinity of the eye, although the whale was too distant to allow the eye to be seen clearly.

The sighting of an all-white humpback whale is interesting because of its uniqueness, and is quite impressive from an aesthetic view. However, an additional importance from a resource management point of view is that it can serve as a "marker" to help clarify migratory characteristics of the population as a whole. Both the brilliant whiteness of the whale and its high media profile make it likely that any sightings will be reported as the whale moves along the coast. The timing and location of such sightings may provide important information about the timing of migratory patterns for the population as a whole. For example, in 1992 a confirmed sighting of the white whale was made in the Whitsunday Islands in late July. It came into Hervey Bay on September 13, where it spent the day and possibly the night. At approximately 9 o'clock the next morning, it was observed from the air off the north end of Fraser Island. A week later, a confirmed sighting was made in Moreton Bay. In 1993 the whale came into the Bay approximately two weeks earlier. Again, it stayed only for about a day, and then presumably moved further south. Interestingly, it was nearly a month before the next confirmed sighting off Cape Byron.

The difference in arrival times in Hervey Bay between 1992 and 1993 are consistent with a general impression that migratory movement may in part be determined by surface water temperature. Our data on surface water temperatures from Hervey Bay in 1993 indicate a warming trend approximately two weeks in advance of that which occurred in 1992. In addition, our observations of photo-identified whales observed more than once within a season suggest that mature females remain in Hervey Bay for as long as a week or more, while males may remain for only a day or two (Kaufman et al., 1993). The short period of time spent by the white whale in Hervey Bay in both 1992 and 1993 is consistent with our observations of males. Interestingly, in 1993, a Queensland Department of Environment and Heritage Park Ranger reported hearing singing while in a boat fairly close to the white whale, which was alone. It has been quite well established that only males sing. Although it cannot yet be concluded with certainty that the white whale is male, the point remains that it can serve to help us learn more about the movement and behaviour patterns of the species. It is recognised there may be limitations on the degree to which one can generalise from the anomalous white whale to the population as a whole. It is unclear how "normal" the whale may be considered by other humpbacks, but it is the case that the white whale has generally been seen in the company of normally-pigmented whales.

POTENTIAL ROLE OF FIELD RESEARCHERS IN ACTIVITY MANAGEMENT

A second aspect of managing for the protection of the resource is managing human activities in the presence of humpback whales. In spite of the difficulty in learning all we need to know about whales, and the ways in which they signal disturbance, or the long-term impacts of disturbance, steps must be taken to deal with the ever-increasing demand on behalf of the public to have access to marine mammal viewing opportunities. In the case of endangered species, it is often justifiable to "err on the side of caution", and limit human encroachment as severely as need be until there is undeniable evidence that such human impact is of an irreversible or long-term change. For example, near shore development or changes in the actual physical configuration of coastal areas, changes in water quality, or significant alterations to the ambient in-water noise level of particular areas constitute alterations that may be difficult, if not impossible, to remove should they be found detrimental to the protection or recovery of whales.

As whalewatching develops in a particular location, the kinds of management decisions to be made will certainly change as the level of activity changes, as the status of the target population of whales changes, and as our general knowledge of the natural history of the target population changes. With a healthy degree of collaboration existing between management agencies and field researchers, the need to "err on the side of caution" should eventually be replaced by an increasing ability to avoid erring at all. The Pacific Whale Foundation has conducted field studies in a number of areas where whalewatching has become an important part of the local economy. We have witnessed nearly 14 years of development of whalewatching in Hawaii; we conducted field studies in the Ogasawara Islands of Japan in 1989 when whalewatching entered its first official year; we have been a part of whalewatching in Hervey Bay since its beginning, and have participated in the development of whalewatching in Perth. Our field studies in the Whitsundays are directed at providing management agencies with information relevant to the potential for whalewatching in that area. In addition, we have studied the development of humpback whalewatching on the east coast of the United States, and gray whalewatching off the west coast.

Our observations of whalewatching as an industry have led us to recognise certain characteristics common across many different areas. It appears that the development of whalewatching as an industry has associated with it a number of stages that cut across locations, and which have certain definable aspects associated with them. While it would be a mistake to ignore the unique features of each particular location, understanding the developmental stages associated with whalewatching as an industry may provide important insight into strategies for coordinating proactive management plans which will ensure appropriate levels of protection for whales, high-quality experiences for the whalewatching public, and sufficient economic opportunity for professional whalewatching operations.

A description of the proposed stages follows. There are, of course, no hard and fast rules about human activities and enterprises. It should come as no surprise to find that a given location may not easily fit into the categories described here. Nonetheless, we think it instructive to provide a general framework based on our observations elsewhere, in the hopes that it might allow a better understanding of the ever-changing complexities of managing the sensitive interface between whales and humans. It may often appear that whalewatching is a chaotic and unpredictable endeavour. However, we believe there are important patterns of development and change which can be identified and which can signal new areas of collaboration between researchers and managers.

Phase One: Discovery. The first phase in the development of a whale-watching industry may be thought of as one of "Discovery". During this time operators spend a considerable amount of effort in determining the feasibility of taking paying passengers on a regular basis to view whales. There are many factors which must be considered, such as the ease with which the public can get to the departure point; the distance over water to be travelled;

prevailing weather and water conditions; and cost of vessel operation. Of paramount importance, of course, is the degree of certainty that whales will be seen. A related issue is the quality of the experience in terms of what the whales may be seen doing. For example, off North Stradbroke Island, whales are frequently travelling on a fairly determined course along what may be thought of as a migratory corridor. In contrast, whales in the Whitsunday's or in Hervey Bay are in areas that may be thought of more as a destination (at least temporarily). Although a wide range of behaviours might be viewed in any of the areas, there tends to be a higher rate of more socially-interactive behaviours in places like Hervey Bay or the Whitsunday's.

The general nature of the Discovery period can be seen by comparing the current venues for humpback whalewatching in Australia: Hervey Bay, the Whitsunday Islands, Moreton Bay, and Perth. In Hervey Bay, all the factors necessary for successful whalewatching came together relatively quickly once it was realised there was potential for a major enterprise. Hervey Bay was already a tourist destination (though of a different type than it has become since the advent of whalewatching), making it reasonably easy to accommodate visitors. It is within easy reach of a good-sized population base, yet remote enough to provide a natural setting. More importantly, whales can be found on a rather predictable basis over a three-month period, in a fairly circumscribed area that can be easily reached and generally experiences favourable water and weather conditions. The Whitsunday Islands are also a popular tourist destination. However, the predictability of where and when to find whales is less than is currently the case in Hervey Bay. In addition, the distance one must go to find whales, and the sea conditions in areas whales are found with the greatest certainty, are somewhat less favourable than in Hervey Bay. One might expect a more protracted Discovery period in the Whitsunday's.

In Moreton Bay, as whales are being observed with more regularity, the primary challenge is one of access. There are limited departure points within easy range of where whales are observed. In contrast, whalewatching in Perth takes place virtually right on the city's doorstep. Yet whalewatching has been a very sporadic endeavour. The annual variation in timing of whales arriving, and the influence of the highly variable Leeuwin Current on where the majority of whales pass by, has made it difficult for whalewatching operations to fully exploit opportunities in that area.

In each of these areas, results from systematic field studies can provide much-needed information to better assess the nature of the whalewatching experience that may be possible. As the number of whalewatching venues increase, field work will also be necessary to clarify cumulative impacts. Pacific Whale Foundation recently began a photo-identification study of humpback whales in the Whitsunday Islands, in part to determine the level of interchange of animals between that area and other areas such as Hervey Bay and Moreton Bay.

Phase Two: Competition. The second phase of development is one of "Competition". During this period operators strive to increase their attractiveness to potential customers. This phase can have either positive or negative implications. For example, on Maui in the early 80's as the whalewatch industry went through its "Competition" phase, the Pacific Whale Foundation worked with a small number of operators to develop on-board naturalist programs in return for donations to support field research. It soon became obvious that the public was more likely to go whalewatching with a company that supported humpback whale research and conservation efforts. By the late 80's virtually every major whalewatching company associated itself with a research or conservation group. At least three benefits have accrued: more research is conducted, thanks to public support; better programs are offered onboard whalewatch boats from professional naturalists; operators are playing a significant role in the protection and recovery of whales.

In contrast, many operators in Hervey Bay have responded to the Competition phase by emphasising their ability to either get closer to whales, or see more whales, or see whales faster, or see more exciting behaviours, than other operators. The result is often

inappropriate pressure on vessel operators to live up to the spectacular encounters pictured in brochures or advertising. Many of the operators are fairly small, and cannot afford to hire naturalists in addition to the required crew complement. Pacific Whale Foundation considers it an important part of its function to make itself available to operators to develop naturalist skills among crew members. In Hawaii, Foundation staff offer a naturalist certification program through the local Community College. In both Hawaii and Australia, the Foundation has worked with management agencies to develop informative brochures for the public, and additional educational materials are available upon request.

From a management perspective, perhaps the most important challenge during this period is to shape the use of advertising strategies that are resource friendly, and encourage product development that emphasises an enjoyable, informative, and conservation-oriented approach. This requires a degree of interaction and communication with those working in the field that is not always acted upon. Recently the Queensland Department of Environment and Heritage released an educational video about whalewatching in Hervey Bay called Breathing Space. The piece is extremely-well produced, factual and informative, and helps meet the need for educational materials in the area. Unfortunately, the piece also emphasises spectacular footage of close approaches and high energy behaviours that may serve to create false expectations on the part of the whalewatching public. Ensuring that the public maintains a realistic understanding of what most frequently occurs on a whalewatch trip, rather than emphasising the spectacular but infrequent experiences, may be the most important thing that can be accomplished during the Competition phase, and resource managers and field researchers should be prepared to work together to accomplish this.

Phase Three: Confrontation. As the industry passes through the competition phase, and long-term survival seems assured, a more complex set of forces takes over and leads to "Confrontation". Once whalewatching becomes established in a specific area, the activity attracts the attention of commercial operators, the public, resource managers, researchers, and conservationists. Given the range of agendas to be found within each of these groups, one might expect to find a number of areas for confrontation to develop.

In our experience Maui, Hawaii provides the best illustration of the nature of confrontations which can occur during this stage. At various times during the late 80's, having dealt with the Competition Phase in the early to mid 80's, Maui witnessed conflict between conservationists and commercial operators, commercial operators and resource managers, resource managers and researchers, researchers and the public, and a number of other combinations and permutations. At one time or another every facet of the community appeared to be in conflict with one or more other facets. The nature of the controversies ranged widely (eg., enforcement, harassment, exploitation, data interpretation), but they all served to pit various parts of the community against each other at one time or another.

It is difficult to generalise across all incidents, but the confrontations we have observed appear to be a by-product of over-enthusiastic vigilance. As whale-watching develops, greater attention is paid to whales; management institutes plans to ensure the whales are not disturbed, which may involve limiting commercial operations; research activities increase, causing commercial operators to grumble; conservationists begin to worry that management is not doing enough to protect whales from whalewatchers and researchers, putting management on the defensive; the public most often responds in favour of the group with the best PR capability.

It is unclear whether the Confrontation phase can be avoided, but it now seems that it can be shortened if there are effective public education programs in place, and if a productive relationship exists between resource managers and field researchers. The former is important to establish a well informed constituency among the public. The latter is necessary to ensure appropriate data are available to accurately assess the status of the target population, determine the level of human activity, and evaluate possible impacts.

Phase Four: Stabilisation. At a certain point it may be expected that a period of general "Stabilisation" emerges. This should follow from a resolution of the various confrontations experienced in Phase Three. Consequently, the move to Stabilisation may well be a direct function of the skill of resource managers in resolving conflict.

Stabilisation may itself be subject to change over time. For example, whalewatching for humpback whales off the east coast of the United States as an industry is nearly twenty years old, just a few years older than Maui. It appears that east coast whalewatching has been in Stabilisation at least for the past seven or eight years. Its ability to reach stabilisation fairly quickly may be due to the fact that whalewatching takes place quite far off shore (approximately 30-40 km) in the open sea, in an area where whales are feeding. Only a relatively few operations could make the necessary financial commitment to stay successful, providing a ready-made constraint on the number of vessels around whales.

Over time, however, a number of changes may result in a temporary destabilisation of the industry. In the past few years more and more private boaters are making their way out to the whalewatching areas, creating increasing concerns about harassment. National guidelines to control approach distances are being proposed, and these have been in place off the east coast. Many operators believe that limiting approach distances would unduly interfere with the quality of the whalewatch experience, and have begun to lobby against national approach regulations. Confrontations are beginning to develop between commercial operators, private boaters, and federal management agencies. One of the primary whalewatching areas, Stellwagen Bank, has recently been declared a National Marine Sanctuary, which will introduce a new management regime in the area. Additionally, the past few years have seen crashes in the sand lance population, which is the preferred prey species for feeding humpback whales in that area. With the reduction in prey, many fewer whales are being seen there. All of these factors place considerable stress on the "status quo" for whalewatching on Stellwagen Bank.

We would predict that, because there has been a good history of collaboration between field researchers and resource managers in this area in the past, conditions are in place that should lead to a relatively short period of destabilisation. Where such a relationship does not exist, we would expect destabilisation to last longer.

CONCLUSION

It is probably a misnomer to talk about management of whales. It is not the whales that need to be managed, but the humans that hang out with them (Atkinson and Lien, 1989). To ensure the long-term protection of humpback whales in areas where they are attractive to humans, resource managers require information about the nature and impact of human activities around whales, and the ability to prepare and disseminate accurate and relevant educational materials. Organisations like the Pacific Whale Foundation are able to assist in each of these areas.

With direction and funding support from management agencies, field researchers can carry out a wide range of studies to document the abundance, distribution patterns, and social dynamics of target populations of marine mammals. But the collaboration between resource managers and field researchers should not end there. Field researchers should be an excellent source of information for the preparation of educational materials. Field researchers should also provide important insights into the relationship between human activity and marine mammal responses.

An important insight in dealing with whalewatching is to develop a framework that recognises its stages of development as an industry. From an early Discovery phase, through later periods of Stabilisation, there are ever-changing demands on the skills and knowledge of resource managers. Recognising the stage of development, and working within the attendant context of perceptions and problems, a healthier growth may result for all concerned. By working together on a successful passage through each stage, managers

and researchers can enhance the probability that the ultimate goals of ensuring marine mammal protection while allowing public access to viewing opportunities in the natural environment will be achieved.

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Towards a Conservation Plan for Cetaceans in Queensland

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Disclaimer

This paper contains the thoughts and opinions of individual officers on a issues at an early stage of policy formulation. It does not represent any statement of Queensland Government policy or legislation, and should not be construed, quoted or referred to as such.

Abstract

The background to the introduction of specialist legislation for the protection and management of cetaceans in Queensland waters is discussed. The process for formulation of a conservation plan is explained. In considering the biology, population dynamics and conservation issues relating to cetaceans, a division into large and small whale species is utilised. This will probably be reflected in different management approaches to these two groups. A range of management options for improved protection of large whale species within Queensland and adjacent Commonwealth waters is canvassed. A discussion of some issues affecting the conservation of cetacean species is included.

Introduction

This paper is presented as a work in progress, rather than a definitive statement of regulations or policy. Our aim is to provide some background to the development of conservation plans, explain just what a conservation plan is, run through the process followed in framing the conservation plan and present some discussion of the issues and threats facing cetaceans, especially humpback whales, and the alternatives available to address them.

Nature Conservation Act 1992

This Act was passed in 1992, but at the time writing has yet to be fully proclaimed, for reasons we will touch on later. It is intended as a comprehensive piece of conservation legislation, covering the establishment and management of conservation reserves (principally on land), and the conservation of flora and fauna throughout the State, including its territorial seas. It replaces the existing National Parks and Wildlife Act, the Fauna Conservation Act and the Native Plants Protection Act (Nature Conservation Act, 1992, Schedule 1, page 104)

In the area of fauna protection, section 66 of the Act provides that fauna is assigned to one of a number of classes of wildlife (Figure 1). There are management principles contained in the Act that provide the basis or intent for management of protected species (Figure 2). These will be further amplified and detailed for each class of wildlife by statements of "Declared Management Intent" that will form part of the Regulations under the Act, which are still being developed. The process of assigning each taxon to a class of wildlife is a quantitative one adapted from work by Millsap *et al* (1990) and Mace and Lande (1991). Each taxon is ranked against a number of criteria incorporating best estimates of species range, population trends and dynamics, and the nature and extent of

Figure 1 (extract from *Nature Conservation Act 1992* - page 48)

Classes of wildlife to which Act Applies

66. The classes of wildlife to which this Act applies are—

- (a) protected wildlife, that is—
 - (i) presumed extinct wildlife; and
 - (ii) endangered wildlife; and
 - (iii) vulnerable wildlife; and
 - (iv) rare wildlife; and
 - (v) common wildlife; and
- (b) international wildlife; and
- (c) prohibited wildlife.

Management principles of protected wildlife

68. Protected wildlife is to be managed to—

- (a) conserve the wildlife and its values and, in particular to—
 - (i) ensure the survival and natural development of the wildlife in the wild; and
 - (ii) conserve the biological diversity of the wildlife to the greatest possible extent; and
 - (iii) identify, and reduce or remove, the effects of threatening processes relating to the wildlife; and
 - (iv) identify the wildlife's critical habitat and conserve it to the greatest possible extent; and
- (b) ensure that any use of the wildlife—
 - (i) for scientific study and monitoring; or
 - (ii) for educational, recreational, commercial and authorised purposes; or
 - (iii) by Aboriginal people under Aboriginal tradition or Torres Strait Islanders under Island custom;

is ecologically sustainable.

threatening processes. A derived score is then used to assign each taxon to a class of wildlife.

With regard to marine species such as turtles, sea snakes, dugong and cetaceans, provisions in the Act operate to remove any explicit reference to these species in Fisheries legislation in Queensland (eg. Figure 3). Further, the act of listing a taxon as a protected species in the regulations under the Nature Conservation Act will completely remove it from Fisheries jurisdiction. This change reflects the long held community view that the management of such species should be according to the principles of conservation of biodiversity, rather than from a resource management perspective. This does not imply any criticism of fisheries management agencies in this respect; it reflects a philosophical change in the community rather than a major practical one.

Major Provisions of the Act for use of Fauna

We have already discussed (above) section 66 of the Act, dealing with classes of wildlife. Section 81, however, provides the overriding protection for fauna within the Act (Figure 4). It means that the taking or use of protected wildlife species is illegal unless a conservation plan specifically provides for it. The penalty units referred to here are currently about \$60, so the maximum penalty is a hefty \$180,000. "Use" in this context includes whale watching.

This is one of the reasons that the Act has not yet been fully proclaimed. Until conservation plans for all species that are currently subject to some take or use (under existing law) are prepared, the Act cannot be proclaimed, otherwise that use would become illegal. Conservation plans for these taxa must therefore be ready before the Act can be proclaimed. It should also be noted that this section is subject to the operation of section 85.

Section 85 (Figure 5) provides that Aboriginals and Torres Strait Islanders may take or use protected wildlife as of right unless an approved conservation plan states otherwise. Therefore, conservation plans for wildlife subject to traditional use, but under some threat - for example dugong or turtles - must be ready before the Act is proclaimed, otherwise there would be no management controls available for those species. The complexities of issues relating to traditional use have proved to take much longer to negotiate through than anticipated, perhaps in part because of the current high profile of community discussion about the ramifications of the MABO decision. Such issues cannot be glossed over or ignored; the Government has made a commitment to fully negotiate these matters with traditional users (eg. Queensland Government, 1992, page 236).

What is a conservation plan and how do we get one?

The Act provides for 2 phases of public input into the development of a conservation plan (Figure 6). The first phase requires a notification of the Government's intent to prepare a conservation plan and a call for public submissions. The submissions are analysed and collated, and used as input for the development of a draft. Simultaneously, the process of classifying wildlife (above) is undertaken, and the relevant declared management intent contained in the Act is used as a guide in the development a draft conservation plan. The draft is circulated to the public for comment and further submissions which are considered during preparation of a final plan for approval by the Government.

Figure 3 (extract from *Nature Conservation Act 1992* - Schedule 2, Acts Amended)

FISHERIES ACT 1976

1. Section 6(1) (definition "fish")—

omit 'turtle, mammal,'.

2. Section 6(1) (definition "fish", after 'star sand')—

insert ', or a fish that is a protected animal under the *Nature Conservation Act 1992*'.

3. Section 6(1) (definition "marine product")—

omit, insert—

' "marine product" includes—

- (a) oyster, pearl oyster, trochus, green snail, coral, coral limestone, shell grit and star sand, wherever found; and
- (b) in a marine park—
 - (i) all forms of indigenous animal and plant life; and
 - (ii) Aboriginal remains, artifacts or handicrafts of Aboriginal origin; and
 - (iii) traces of Aboriginal remains, artifacts or handicrafts; and
 - (iv) wrecks, relics and traces of wrecks or relics; and
 - (v) all other materials comprising the tidal land of a marine park; .

but does not include protected wildlife, or cultural or natural resources, within the meaning of the *Nature Conservation Act 1992*;'.

Figure 4 (extract from *Nature Conservation Act 1992* - page 54)

Restriction on taking etc. protected animals

81.(1) Subject to section 85, a person must not take, use or keep a protected animal, other than under—

- (a) a conservation plan applicable to the animal; or
- (b) a licence, permit or other authority issued or given under a regulation.

Maximum penalty—3 000 penalty units, imprisonment for 2 years or both.

Figure 5 (extract from *Nature Conservation Act 1992* - pages 56 - 57)

Aborigines' and Torres Strait Islanders' rights to take etc. protected wildlife

85.(1) Despite any other Act, an Aborigine or Torres Strait Islander may take, use or keep protected wildlife under Aboriginal tradition or Island custom.

(2) Subsection (1) applies subject to any provision of a conservation plan that expressly applies to the taking, using or keeping of protected wildlife under Aboriginal tradition or Island custom.

(3) An Aborigine or Torres Strait Islander who takes, uses or keeps protected wildlife in contravention of a provision of a conservation plan that expressly prohibits the taking, using or keeping of protected wildlife under Aboriginal tradition or Island custom commits an offence against this Act.

Maximum penalty—3 000 penalty units, imprisonment for 2 years or both.

Figure 6 Process for Development of a Conservation Plan under the *Nature Conservation Act 1992*.

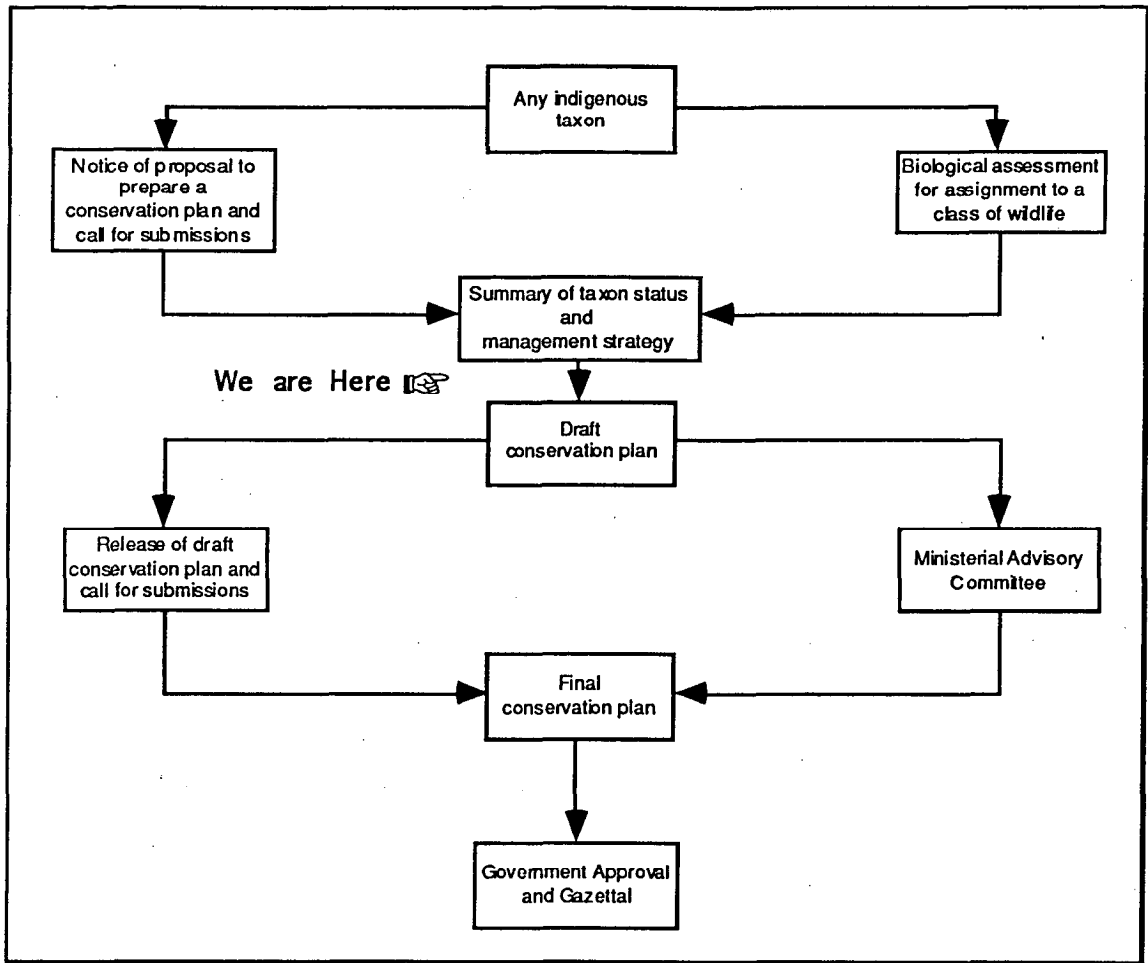


Figure 6 illustrates the current status of the conservation plan's development. The initial notice and call for submissions was published in major newspapers in December 1992 (Figure 7); the time for submissions was subsequently extended by another two months. We are now in the process of putting together a draft conservation plan to be released for public comment.

The documentation that is being prepared will have three parts (Figure 8). A background document summarises the current state of knowledge of the biology, distribution and conservation status of the taxon, and discusses the existing possible threats and impacts from human activities. A management strategies document sets out the principles and aims of management, with some discussion of the means by which they should be achieved. These two parts together form the instructions for the legal drafting of the conservation plan itself, which takes the form of a set of regulations under the Act.

Conservation Plan for Cetaceans

In drafting background documentation we realised that the range of species we had to consider covered quite a spectrum of issues, some of which were not relevant to all species. On the other hand, it was impractical to consider a separate conservation plan for each species. We have therefore taken the approach of considering two separate groups:

The first is comprised of large whale species that are more likely to be subject to harassment and associated issues on account of their size and relative sightability. The humpback is the best example of this type, of course, and we will talk primarily about that species, but the issues and management directions could apply equally to the occasional Minke, Fin, Sperm or even Blue whales that can occur along the Queensland coast (Baker, 1983). It also includes lesser known species including the strap-toothed whales.

The second group is comprised of smaller, faster, more mobile whale species, principally the dolphins such as bottlenose, common, spinner, striped, spotted, Indopacific humpbacked, and Irrawady river dolphins. It includes as well the smaller toothed whale species, such as killer, false killer, pygmy sperm, melon headed and pilot whales. In general, the better known inshore dolphin species are used as examples in the discussion of issues and threats.

The conservation plan will of course provide protection for all cetacean species occurring in or adjacent to Qld waters, but will cite specific information available for the above species.

An overriding principle of management is that species should be managed over the entirety of their range in or adjacent to Qld waters, rather than at isolated sites. In the case of humpbacks, this means from the Qld/NSW border, along the southern Qld coast, into the southern GBR as far as the Whitsundays and even up to Townsville or beyond, as well as Hervey Bay.

Issues and Threats

Harassment

Figure 7 Newspaper advertisement calling for submissions

NATURE CONSERVATION ACT 1992 S.104

Conservation plans

Submissions are invited from landholders, local authorities, interest groups, persons and members of the public to help prepare draft conservation plans for

- dugong • marine turtles (Families Cheloniidae and Dermochelyidae) • whales, dolphins and porpoises (Order Cetacea)* • sea snakes (Families Hydrophiidae and Laticaudidae) • crocodiles • cassowaries* • duck
- quail • bridled nailtail wallabies* • northern hairy-nosed wombats* • native wildlife: traditional use by Aboriginal and Torres Strait Islanders*
- cycads (Families Zamiaceae and Cycadaceae)*.

* species or taxon considered threatened or containing a threatened species or taxon

The purpose of these conservation plans is to ensure provisions are made to carry out and/or help the recovery process of the species or taxon listed whose survival is considered threatened, and to ensure that any commercial, non-commercial or traditional use of other species or taxon listed is ecologically sustainable.

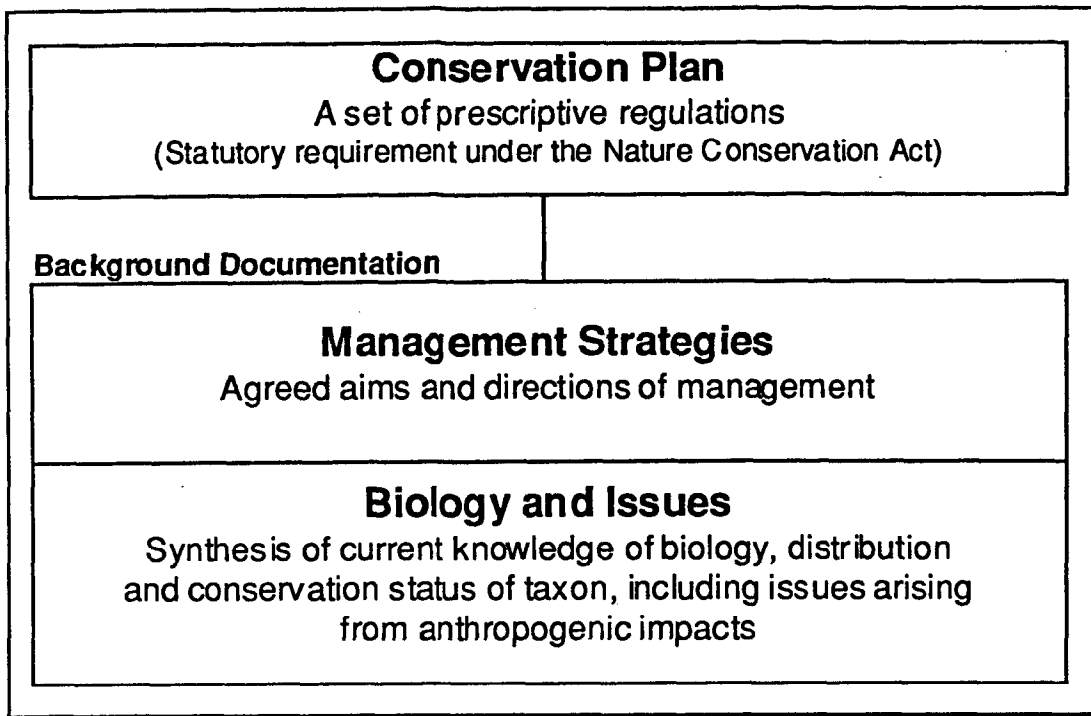
Submissions from Aboriginal and Torres Strait Islander groups are particularly encouraged.

Submissions must reach PO Box 155 BRISBANE ALBERT STREET QLD 4002 by 26 February 1993. Further information: Mr S. Phillips (07) 227 6530.

Dan Gillespie, Executive Director (Conservation)
Queensland Department of Environment and Heritage.

AD83 - 8 DEC 92

Figure 8 Components of the Conservation Plan and associated documentation



The primary threats to humpbacks and other large whales are from harassment by commercial and recreational whale watching vessels, and other vessel traffic, to the point that the animals may be driven from areas important to their continued recovery, with a resultant increased mortality. The background to these threats is discussed in Chaloupka (1990) and Stevens and Chaloupka (1992).

Current regulations on approach distances for whale watching are based on guidelines developed by the Australian National Parks and Wildlife Service, which were based in turn on the US experience, especially in the waters around Hawaii. Some of these regulations are out of date, unclear or inappropriate. They need to be altered or clarified. One example is a regulation that prohibits approaching a whale head-on. This is plainly unworkable when a vessel is 500 m or more from the animal. The intent of a revised regulation would be to avoid deliberately impeding the course of the animal, especially by the practise of "leap-frogging", and it would be clearly expressed, using graphic illustrations if necessary.

It is also doubtful that the application of the specified approach distances is appropriate for small, mobile inshore dolphin species. The application of the rule stating "no chasing cetaceans" is obviously pointless for bow-riding dolphins! Alternative measures need to be found to safeguard dolphins from harassment, and these need to be realistic and practical.

However, there appear to be no compelling reasons for the general principles of the existing approach distances as they apply to large whale species to be altered greatly.

As our state of knowledge about the importance of some areas to various demographic segments of large whale populations improves, it may be necessary to impose more restrictive regulations in particularly significant areas. It is intended that sufficient flexibility be retained in the conservation plan to enable the Director to impose such restrictions in specific areas. These may include areas which are, for example, restricted to a closest allowable approach of 300m, closed to whale watching during periods when cow-calf pairs are in the area, or even sanctuary areas completely closed to whale watching. This would obviously need to include a consultative process to ensure that the needs of all interested parties are addressed in making such decisions.

Consideration is being given to a number of management measures to deal with harassment pressures throughout the range of humpback distribution. These include:

- Limitations on whale watching along the southern Queensland coast, especially during the southward migration. Humpbacks remain very close inshore in this part of their migration, and a small number of vessels could effectively blockade the entire route. Because animals are usually travelling at speed in this area, vessels must either chase or leapfrog to remain in contact, neither of which are desirable. This is not so much of a concern on the northward migration but may be a problem during the southward migration, especially for cows with young calves.

It is also of concern that as coastal whale watching springs up from a number of ports, an individual animal will be accompanied by vessels almost all the time, as whales are "handed over" from vessel from one port to those from the next. With whale watching now being pursued from ports such as Eden, Byron Bay, Coffs

Harbour, at the Solitary Islands, off Moreton Bay, Hervey Bay, the Capricorn-Bunker group, Keppel Bay and the Whitsundays, we are rapidly approaching a situation where a large proportion of the Group V humpback whale population may be in contact with humans for almost all of the period of their migration in Australian coastal waters.

- The provision of some sanctuary areas and no close approach areas, as discussed above. Sites where it appears there may be a need (on current information) include the northern end of Hervey Bay and the sheltered waters within the Whitsunday islands chain.
- Special provision for cow-calf pairs. One alternative is to allow only one vessel within a 300m radius (and no closer than 100m) of a cow-calf pod, instead of the three vessels allowed within 300m under current laws.
- Special provisions to safeguard individual animals of special interest that risk unwitting harassment perhaps from curious recreational boat users and even news crews. Examples include the now famous white humpback or "emergency" situations such as a female about to give birth, a sick or injured whale lost up an estuary, trapped in a lagoon, or at risk of stranding (see Anderson, 1992).

Accidental Collision

With the continuing recovery of the Group V population, and increasing volume of shipping and commercial and recreational traffic along the Queensland Coast, it is apparent that the likelihood of collisions between whales and both large and small vessels must increase. There are concerns here from both whale conservation and public safety viewpoints. The extent to which this may threaten the recovery of the population cannot be estimated at present, but it would be prudent to assume that in certain critical areas (perhaps the same as those referred to above in discussing harassment) some restrictions may need to be placed on vessel speed, type or area of operations.

Accidental Capture

The collapse of the Taiwanese oceanic gillnet fishery in 1986 after stringent limitations were placed on net sizes in Australian waters has removed the major threat to cetaceans from fishing. However, incidental kills of cetaceans in Queensland waters still result from occasional entanglement in nets used in the barramundi fishery, the mackerel and shark gillnet fishery, and the shark meshing program (Tucker and Puddicombe, 1988).

We recognise that occasional accidental capture and sometimes death will inevitably occur associated with fishing operations. The Queensland Department of Environment and Heritage (Q.DEH) will continue to work with fishermen and fisheries agencies on gear technology to minimise this risk. The conservation plan will probably follow the approach taken in the Commonwealth's Whale Protection Act (1980) in obliging fishermen to report any occurrence of accidental capture, as well as programs to encourage and provide information to fishermen on how to limit the bycatch of cetaceans and how to free entangled animals.

A total of 520 dolphins were caught in shark nets as part of Queensland's anti shark program over the twenty year period from 1967 - 1987 (Paterson, 1990). Paterson (1990) identified Irrawaddy dolphins as the species which was generally caught in nets

north of Mackay while primarily bottlenose and indopacific humpback dolphins were caught in southern Queensland. The shark meshing program off Bundaberg and Townsville has been modified in recent years to reduce the catch of non-target species in nets. In other areas drumlines are replacing nets, but it is likely that nets will remain for the foreseeable future on the more popular surfing beaches of the southern Queensland coast.

The Queensland Department of Primary Industries (Q.DPI) is engaged in research with colleagues from north America in the use of sonar buoys and other repellent devices to avoid entrapment of cetaceans in nets. This is primarily aimed at migrating humpbacks and was triggered by a couple on instances of entanglement off the Gold Coast over the last two years. Q.DEH will examine the shark meshing program in co-operation with Q.DPI with a view to:

- continuing the research program to minimise meshing of cetaceans, as well as dugongs and turtles;
- making every effort to free entangled animals;
- ensuring all cetaceans captured are positively identified and any available information (eg. species, size, sex, condition) is accurately recorded;
- giving research into alternative shark deterrents a high priority; and
- producing an annual report on the cetacean bycatch.

Capture for live display

In 1985, a Commonwealth Government Select Committee on Animal Welfare recommended that no further permits for the capture of live cetaceans for public display be issued (Senate Select Committee on Animal Welfare, 1985). No permits have been issued in Commonwealth waters since that time. Further discussions have still to be held with oceanarium operators, but Q.DEH's initial position is that the conservation plan will probably follow the recommendations of the committee. In situations where a successful captive breeding program has been established, it is difficult to see any justification for further live capture. At the same time, we acknowledge the valuable role played by some oceanaria in the rescue and rehabilitation of sick and injured dolphins and other small whale species and would support the continuation of that role.

Traditional Hunting

Aboriginal or Torres Strait Islander people are not known to have hunted dolphins or other cetacea which were generally considered to be of spiritual significance (Bryden, 1978). It is not anticipated that traditional hunting will be a significant issue in the management of cetacea.

International Whaling

This is outside the consideration of the conservation plan but worth mentioning. Australia's membership of the International Whaling Commission ensures the continued international protection of most large whale species that can occur in Australian waters, with the exception of Minke whales. In addition, the Whale Protection Act prohibits any whaling in Australian waters, and interestingly, prohibits the involvement of any

Australian citizens, aircraft or vessels in whaling or associated activities worldwide (Whale Protection Act , 1980, Section 6).

Strandings

Stranding situations pose unique problems for management. The practicalities of handling whale stranding situations are discussed in detail in another paper presented at this conference; we will not elaborate further here (see also Anderson, 1992; Anon, undated; Robson, 1984).

However, there are a number of issues arising from strandings that a conservation plan will need to address. Some examples include:

- ensuring that the advice of a qualified veterinarian is obtained;
- identifying those officers who should have the authority to take decisions on euthanasia of animals;
- setting out the conditions under which euthanasia may be administered, and the most humane methods;
- ensuring that as much information as possible is obtained from stranded animals in collaboration with research organisations such as the Qld Museum;
- providing officers with the authority for necessary crowd, vehicle and vessel control at a stranding site.

Water Quality, Habitat Loss and Food Stock Reduction

High levels of organochlorins and heavy metals have been recorded in the tissues of toothed whales found stranded on south-eastern Australian coast and in dolphins in Moreton Bay (Corkeron, pers comm). These are assumed to be as a result of consuming contaminated prey species and the subsequent concentration of contaminants at higher trophic levels. As high order carnivores, toothed whales (including dolphins) are particularly susceptible to the effects of toxins which accumulate in the food chain. Populations of dolphins in the western Mediterranean and southern California are considered to be at risk from heavy metal and DDT/PCB contamination (Gaskin, 1982). While the long-term effects of contaminants in the tissues of cetaceans are not clear, it is obvious that animals with coastal distributions are most at risk.

Humpbacks feed only opportunistically in Australian waters, the bulk of their feeding occurring in Antarctic waters, which are as yet, relatively unpolluted. Moreover, humpbacks like the other baleen whales, feed on primarily on planktonic first order consumers such as krill, and on small schooling fish species. Thus only a small number of trophic levels are involved in the food chain, so that concentration on contaminants is less likely to be a problem than in toothed whales feeding on larger prey species. However, with the continued rise of levels of pollutants in coastal waters, the possibility of direct or indirect effects of declining water quality on migrating humpbacks cannot be discounted, particularly because humpbacks migratory route lies close inshore.

Coastal marine habitats and riverine habitats necessary to sustain populations of inshore dolphins are also primarily affected by development and pollution. A number of species

with close associations to coastal areas including Indopacific humpback and Irrawady dolphins may be put at risk from habitat degradation. Populations of bottlenose dolphins have diminished in some areas throughout the world principally through pollution of the environment and the significant reduction of their food stocks (Watson, 1981). Habitat degradation and destruction and overfishing are also threats to dolphins in Queensland waters.

The conservation plan can probably do little directly to halt the ongoing degradation of coastal environments or food stock reduction. However, if an area is considered particularly significant to the survival of a cetacean population, the general principles relating to conservation of cetaceans may be considered in evaluating development proposals. Food stock reduction is basically a fisheries issue and cannot be addressed by the conservation plan except in general terms.

Wild Feeding

The publicity surrounding the phenomenon of interaction between humans and wild dolphins at Monkey Mia in Western Australia has led to the development of similar operations in Eastern Australia, most notably at the Tangalooma Resort, Moreton Island (Green and Corkeron, 1991). Interest has been expressed in the development of further such feeding stations. In contrast to the situation at Monkey Mia, which stemmed from an unusual natural interaction between dolphins and humans, and took many years to evolve, commercial interests are behind efforts to establish other feeding stations.

The impacts of such practices on dolphins in areas such as Moreton Bay are equivocal. For instance, it can be argued that the Moreton Bay dolphin populations are already substantially modified by contact with humans, relying as they do on discarded by-catch from commercial fishing (Corkeron *et al*, 1990). Q.DEH at this stage does not wish to promote the further expansion of these practices until further public input has been obtained. The conservation plan will consider a range of criteria that should be considered, such as water quality in feeding areas, feed quality and quantity, risk of dependence of wild dolphins on supplied food, supervision of human activities in the area, and human safety issues.

Release of Captive-Bred Animals

In other States the closure of oceanaria has necessitated the relocation or release of captive cetacean species. The conservation plan will allow for such release subject to full assessment of the need for release, protection of wild stock from disease carried by the captive bred animal (and *vice versa*), other alternatives, and the conditions under which release would be carried out. Previous experience has indicated that the process of "weaning" a captive-bred animal into the wild is a lengthy and expensive one. Consideration of who will foot the bill for such an exercise will be essential.

General Principles for the take and use of cetaceans

There are a number of broad principles that will underlie the specifics of management of cetacean species.

- The conservation plan will reflect the wider community expectation that no cetaceans should be intentionally killed, except the humane euthanasia of doomed animals.

- Use of cetaceans can occur only where it can be reasonably demonstrated that it will not prejudice future survivorship of individuals, demographic segments or populations; and not prejudice future utilisation of areas by individuals, demographic segments or populations. "Use" in this context includes "to gain any benefit from" the taxon, and is distinct from "take" (see Nature Conservation Act 1992, Part 3 Interpretation).
- During the recovery of whale species depleted by human activities, populations will be (or continue to be) monitored and models developed to more accurately estimate initial population size, current size and recovery rate, and identify critical demographic segments. Restrictions on behaviour in the vicinity of whales will remain in place at least until pre-whaling populations are approached.

The likely timeline for the release of draft conservation plans is difficult to predict accurately, and to an extent is at the mercy of external factors. Based on the latest available information, it is probable that the draft conservation plan for cetaceans will be released early next year.

Conclusion

This account of the development of the conservation plan has been necessarily brief. Some issues that need to be considered have not yet been fully addressed. This is still very much a work in progress. It should also be reiterated that none of the measures we have mentioned in this paper are set in concrete; this is just an indication of current thinking. We encourage all interested parties to provide as much input as possible into the development of the conservation plan, both by formal submissions on the draft when it is released, and by informal contacts with Q.DEH staff.

Acknowledgments

The authors acknowledge the valuable contributions of many colleagues in the preparation of this paper, especially Margaret Gooch and Milani Chaloupka.

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MARINE MAMMAL INTERACTION

An Overview Of The Whale Watching Industry In Western Australia 1989 - 1992

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Western Australia

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ABSTRACT

In August 1989, a commercial whale watching industry was established in waters off Perth's north metropolitan coast between, Fremantle, Quinns Rocks and Rottnest Island Western Australia. This industry is based on southbound migrating Humpback Whales (*Megaptera novaeangliae*) of the Southern Hemisphere Group 1V stock for September through to late November. Humpback whales can be observed in this area during these months with great regularity, similar to the situation with Humpback whales in Hervey Bay, Queensland.

Since 1989 the whale watching industry has expanded and there are now commercial vessels operating from Albany, Broome, Exmouth, Denham and Karratha. The Albany based operation principally targets the Southern Right Whale (*Eubalaena australis*) a species which can also be observed in the Perth metropolitan waters during the early weeks of the whale watch season.

The Humpback Whale population off Western Australia was severely depleted by whaling following World War 11. Its recovery since protection from whaling in the 1960's has been monitored and recently researchers under permit have begun obtaining tail fluke photographs for individual identification of animals off Western Australia and in particular, the waters off metropolitan Perth and in the Dampier Archipelago. The work carried out by these researchers will contribute to information on stock identity, migration, distribution, reproduction and current population status to assist with ensuring appropriate conservation measures are taken.

In this paper I discuss strategies in place for the management of the commercial whale watching industry in Western Australian waters. The area of water between Fremantle, Quinns Rocks and Rottnest Island is subject to multiple use by navy and commercial shipping, recreational boaters, fishing industry and now commercial whale watch vessels. The Department of Conservation and Land Management (CALM) has the responsibility of protection of all marine mammals in State waters through the Wildlife Conservation Act.

A brief introduction to the development of the Whale Shark tourist industry and its management by CALM is included.

1. INTRODUCTION

In August 1989, a commercial whale watching industry was established in waters off Perth's north metropolitan coast between Fremantle, Quinns Rocks and Rottnest Island Western Australia. This industry is based on southbound migrating Humpback Whales (*Megaptera novaeangliae*) of the Southern Hemisphere Group 1 V stock from September through to late November. Humpback whales can be observed in this area during these months with great regularity, similar to the situation with Humpback whales in Hervey Bay, Queensland.

Since 1989 the whale watching industry has expanded and there are now commercial vessels operating from Albany, Broome, Exmouth, Denham and Karratha. The Albany based operation principally targets the Southern Right Whale (*Eubalaena australis*) a species which can also be observed in the Perth metropolitan waters during the early weeks of the whale watch season.

2. PROTECTION

The Department of Conservation and Land Management (CALM) has the responsibility of protection of all marine mammals (fauna) in State waters through the Wildlife Conservation Act. The said Act defines the key words "fauna" and "take" in relation to any fauna:-

"Fauna" means -

- (a) any animal indigenous to any State or Territory of the Commonwealth or the territorial waters of the Commonwealth;
- (b) any animal that periodically migrates to and lives in any State or Territory of the Commonwealth or the territorial waters of the Commonwealth; and
- (c) any animal declared as fauna pursuant to subsection (2) of this section of the said Act.

and includes in relation to any such animal -

- (d) any class or individual member thereof;
- (e) the eggs, larvae or semen;
- (f) the carcass, skin, plumage or fur thereof.

"to take" in relation to any fauna, includes to kill or capture any fauna by any means or to disturb or molest any fauna by any means or to use any method whatsoever to hunt or kill any fauna whether this results in killing or capturing any fauna or not; and also includes every attempt to take fauna and every act of assistance to another person to take fauna and derivatives and inflections have corresponding meanings.

Pursuant to the powers conferred by Section 14 (2)(ba) of the *Wildlife Conservation Act*, the Minister for the Environment declared the Humpback Whale (*Megaptera novaeangliae*) and Southern Right Whale (*Eubalaena australis*) as fauna that was likely to become extinct, or was rare.

Section 14(2)(ba) provides:

The Minister may, from time to time by notice published in the *Government Gazette*, declare that any fauna which is likely to become extinct, or is rare, or otherwise in need of special protection and while such declaration is in operation -

(1) such fauna is wholly protected throughout the whole State at all times; and

(11) a person who commits an offence under Section 16 (taking of protected fauna an offence) or Section 16 (unlawful possession of protected fauna) with respect to or in relation to such fauna is liable, notwithstanding any other provision of this Act, to a penalty of \$10,000.

3. LICENSING

CALM manages commercial operations by means of a Regulation 15, "Marine Mammal Interaction Licence". This is an open ended licensing system rather than one of a limited entry. Subject to the provisions of Sections 15 of the *Wildlife Conservation Act*, the Minister for Conservation **may** issue a prescribed licence. This power has been delegated to the Executive Director of CALM. The discretion as to whether a licence is issued rests with the Executive Director.

Scientific research covering the marine mammals is controlled through the provisions of a Regulation 17 licence issued by the Executive Director. Commercial and Scientific licensees must operate in accordance with the terms and conditions of those licences.

CALM has developed licence conditions based on the Australian Nature Conservation Agency (ANCA), formerly the Australian National Parks and Wildlife Service, whale watching guidelines.

The current set of conditions provide protection for the whales at a level which considers the commercial and scientific requirements of the licensees.

For example:-

Due to the need to collect accurate data for research, scientific licensees are permitted to approach whales no closer than 30 metres. However it is recognised that some whales approach vessels within the endorsed distance and the potential for conflict between commercial and scientific interests are addressed within the licence conditions.

- "Wherever possible and to promote public appreciation of whales, whale watch activities are to be undertaken on whales separate from those already under observation from research vessels, i.e. where research vessels have established prior contact. (A similar condition applies to research vessels under their licences. Licensed vessels are identified with signs labelled "research" and must, under their licence, obtain the permission of all whale watch vessels which have established prior contact with a whale before initially approaching the whale(s) inside the standard 100 metre limit. Whale watch vessels are under no compulsion to agree to research vessels having close access to whales, as research activities may impair public appreciation of whale behaviour.)".

Whale Watching Industry licences issued to surface vessels:
Regulation 15 Marine Mammal Interaction Licence:

Perth	- 20(NB 2 of these licences relate to 1 vessel)(4 vessels owned by one company)
Albany	- 3(NB 2 of these licences relate to 1 vessel)
Broome	- 2
Exmouth	- 1
Denham	- 2
Karratha	- 1

Aircraft - Regulation 15 Marine Mammal Interaction Licence

Perth - 1 Helicopter
Perth - 2 Fixed Wing
Denham - 1 Fixed Wing

Scientific Purposes - Regulation 17

Perth - 3
Dampier - 1

4. INDUSTRY EFFORT; ANALYSIS OF 1989 - 1992 LOGBOOK DATA

The information presented is based on Perth metropolitan based commercial vessels

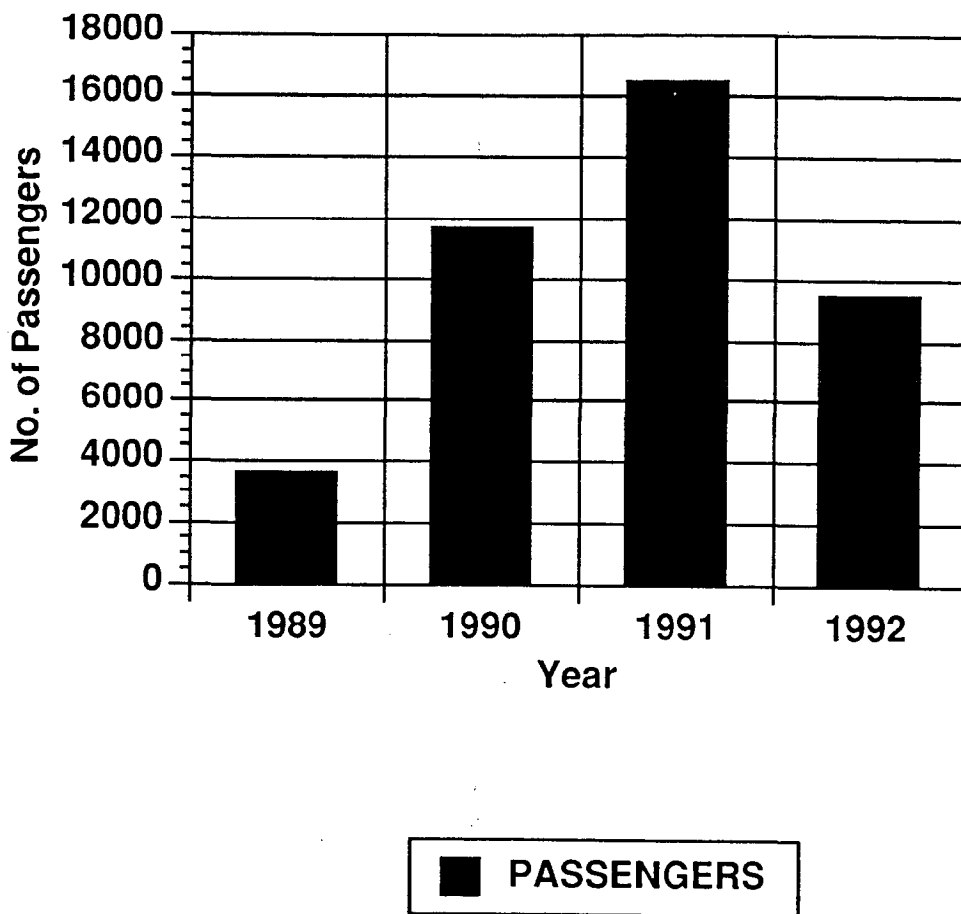


Figure 1. Passengers carried by season

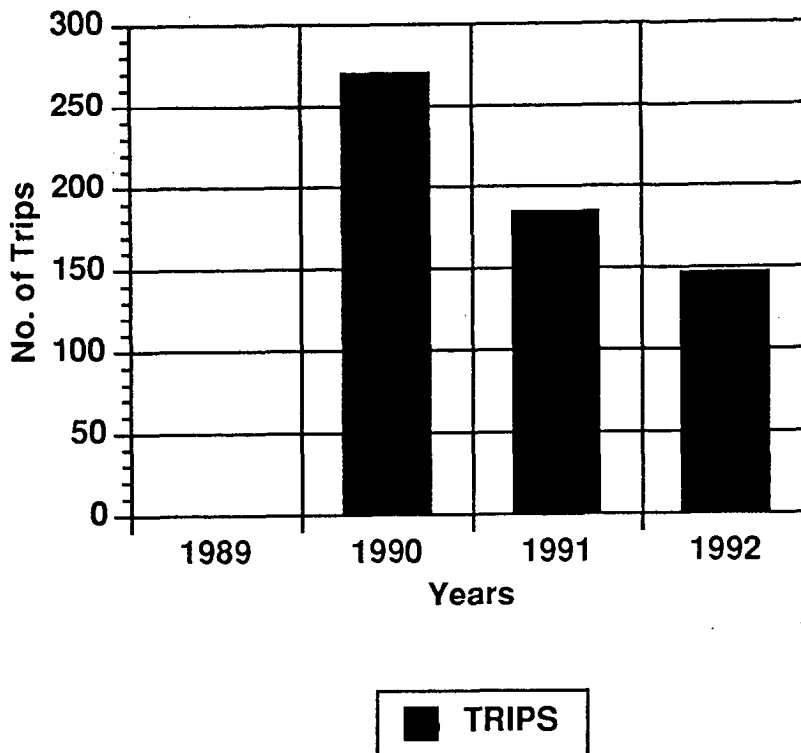


Figure 2. Trips by season
***1989 data on the number of trips not available**

Less trips were made during the 1992 season probably due to two main factors-

1. One of the major tour operators reduced its participation due to management restructure.
2. The arrival of Humpback Whales into the Perth waters on the southern migration was a month later than previous seasons and commercial whale watch vessels ceased charters in November although reliable numbers were being reported into December.

*** Less trips, more passengers in 1991 reflects the use of bigger boats.**

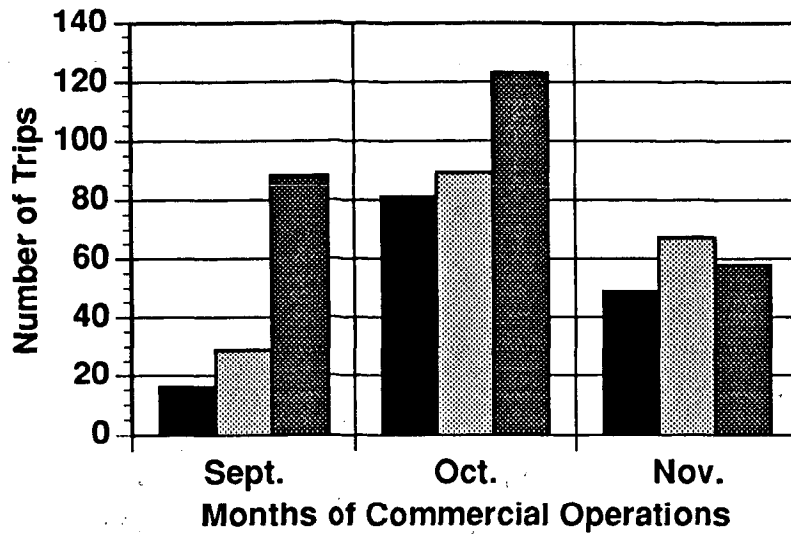


Figure 3.
Commercial Seasons
1990 - 1992

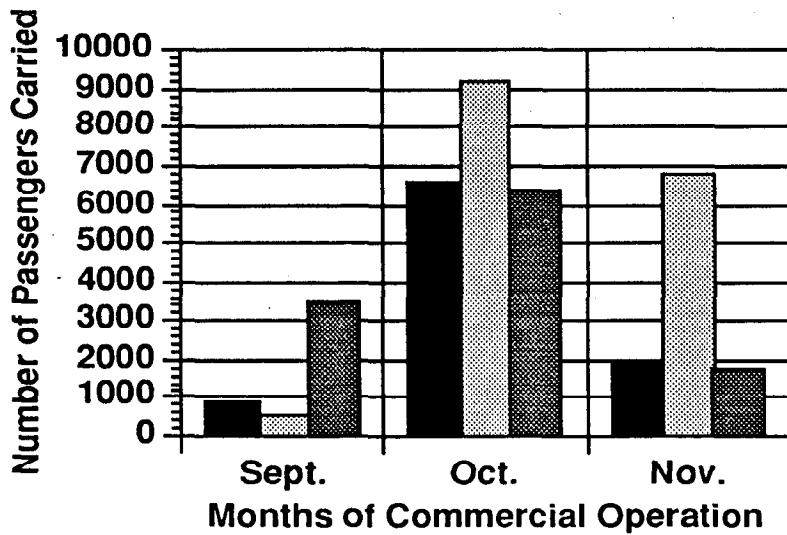
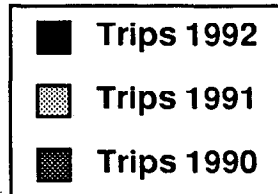
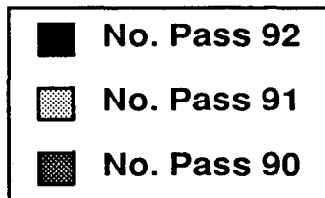


Figure 4.
Passengers Carried
Commercial Seasons
1990 - 1992



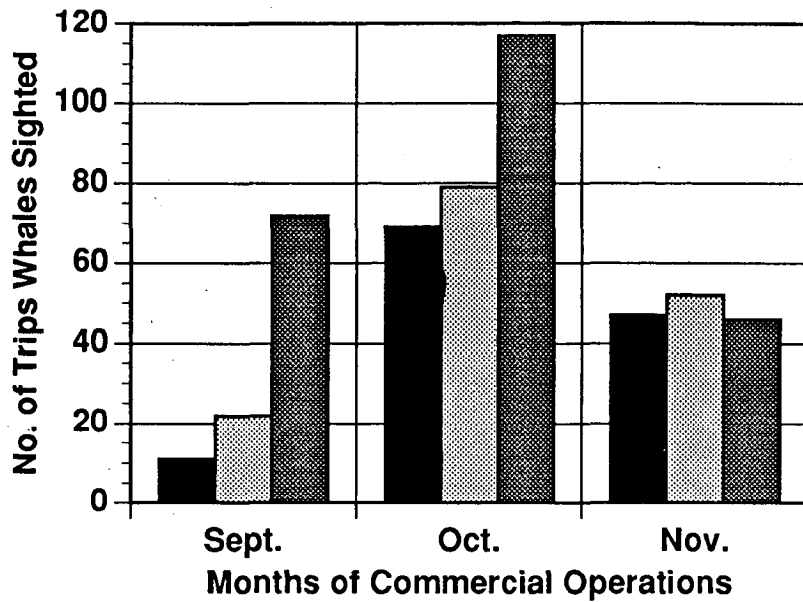


Figure 5
Number of Trips
Whales Sighted

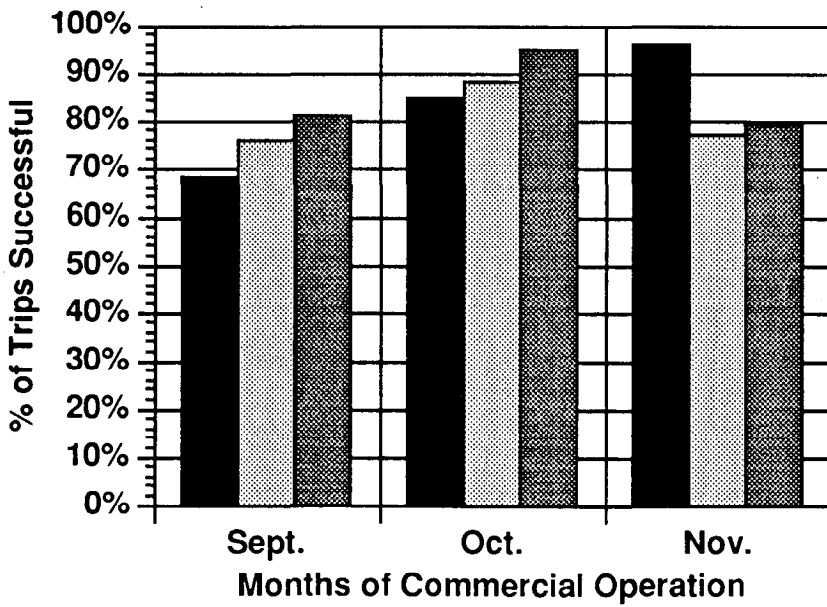
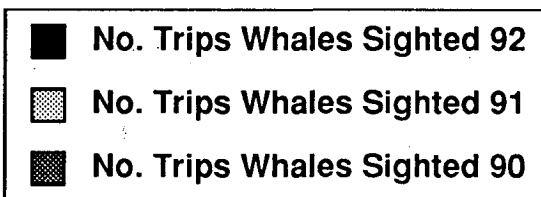
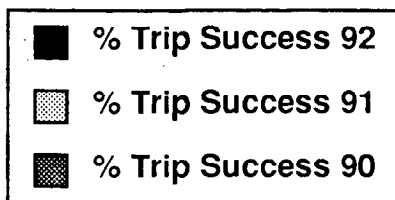


Figure 6
% of Trips Successful
Sighting Whales



MONTH	TOTAL TRIPS	NO. OF PASSENGERS	NO. OF TRIPS WHERE WHALES WERE SIGHTED	% OF TRIPS SUCCESSFUL	AVERAGE NO. OF WHALES OBSERVED ON EACH SUCCESSFUL TRIP
SEPTEMBER	16 (29; 88)	907 (524; 3476)	11 (22; 72)	68% (76; 81)	4.4 (4.0; 4.1)
OCTOBER	81 (89; 123)	6552 (9199; 6390)	69 (79; 117)	85% (88; 95)	4.7 (7.1; 4.0)
NOVEMBER	49 (67; 58)	2022 (6759; 1774)	47 (52; 46)	96% (77; 79)	6.8 (8.3; 4.5)

Table 1. Logbook data 1990-1992
(1992 figures outside brackets, 1991;1990 in brackets)

Logbook Data - Nursing Females/Calves

The return journey from the calving grounds (the location of which has not yet been established) in northern waters is possibly led by recently mated females, followed by adult males and resting females, immatures and lastly the nursing females with their calves, similar to what has been established in the migrating age structure of the Gray Whale (*Eschrichtius robustus*) of the northern hemisphere (Martin 1990).

The logbook data and field observations reflect the tapering off of overall sighting frequency when the frequency of nursing female/calf sightings increase, heralding the end of the procession of the southbound Humpback Whales through Perth waters is near (Table 2.).

MONTH	PERCENTAGE OF CALVES		
	1992	1991	1990
SEPTEMBER	0%	4%	2.7%
OCTOBER	10%	7.2%	7.7%
NOVEMBER	17.7%	5.9%	16.9%

**Table 2. % of Calves Sighted by Month/Year
From Logbook Data 1990 - 1992**

Field observations of Humpback Whales, suggest that perhaps mating behaviour is occurring in the Perth waters. However these observations are presently not supported by scientific data.

5. CALM MANAGEMENT PATROL EFFORT

As with all seasons to date, patrol responsibilities have been shared between Wildlife Protection and Swan Region Marine Operations.

The two CALM patrol vessels, "Pseudorca 11" and "Gandara" made contact with 293 private vessels during the 1992 season. The replaced CALM vessels "Pseudorca 1" and "BJ White" made contact with 346 private vessels during the 1990 season, at which time leaflets and information were passes to the public.

Contact with commercial operators and research vessels were frequent during all seasons.

Some minor complaints are usually received each year mostly relating to vessels getting too close to whales. It was noted that of those complaints received, most were on days when CALM did not have a presence on the water.

Figure 7 and 8 show patrol effort for the seasons 1990 - 1992.

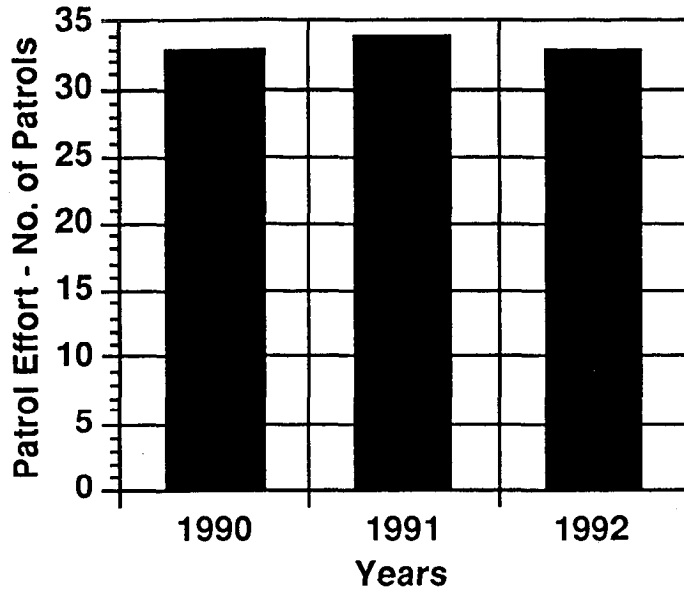


Figure 7
Patrol Effort 90 - 92

■ No. of Patrols

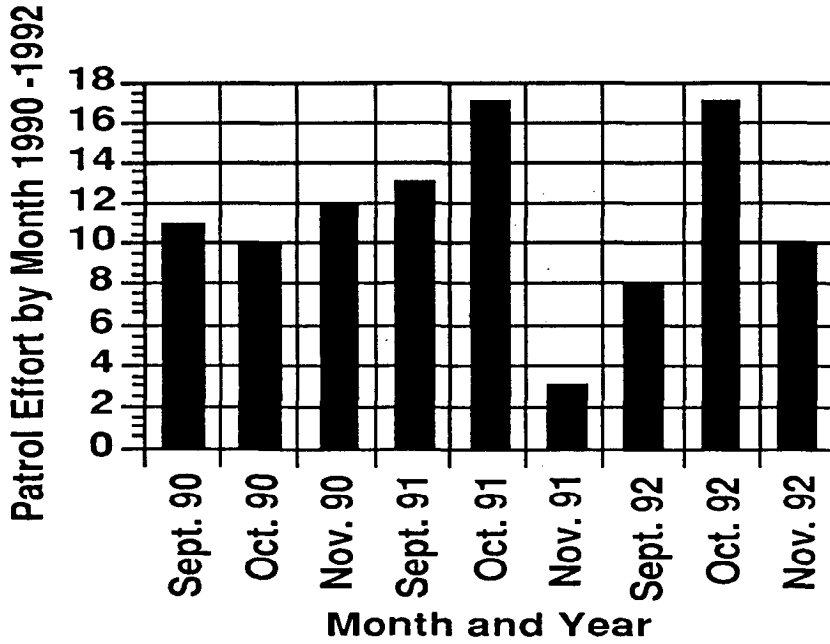


Figure 8
Patrol Effort by Month

■ No. of Patrols

6. EDUCATION and INFORMATION

Prior to the 1990 and 1991 commercial whale watch seasons, CALM hosted preseason seminars to discuss management strategy with commercial operators and this provided a forum to introduce the logbook and present logbook data feedback at the 1991 session.

Information and educational talks are delivered by CALM officers to schools and specialist groups each year on marine mammal management and the whale watch season.

Public interest in going out in private vessels to see Humpback Whales is generated through media coverage of the event and marketing by commercial operators. It is therefore essential that CALM maintain a high profile to provide information, education and prevent conflict between the public, commercial operators and researchers.

7. PROTECTING WHALE SHARKS

The protection of the Whale shark (*Rhiniodon typus*) is limited to the State waters of Ningaloo Marine Park. The Minister for the Environment declared the Whale shark to be fauna under the provisions of Section 14 of the *Wildlife Conservation Act* on 17 July 1992.

The Ningaloo Marine Park was declared in 1987 and is a very special part of Australia's natural estate. Its main feature is a magnificent coral reef stretching 260 km southward along the coast from the tip of North West Cape. There is no agriculture or industry in the adjacent land, and no rivers to bring polluted waters.

The coastal portion, encompassing State waters (area State waters 2240 km²), is declared under the *Conservation and Land Management Act* while the offshore waters out to the boundary, approximately 10 nautical miles offshore, are declared under Federal legislation.

Ningaloo is Australia's most accessible major coral reef. In some places it is possible to walk onto it from the shore; in others visitors need only a small boat for access across the shallow lagoon.

The mass spawning of more than 200 species of coral in March and April is part of a chain of biological events that heralds the arrival, in Ningaloo Marine Park, of the world's largest fish, the Whale shark (*Rhiniodon typus*) (CALM leaflet 1993)

CALM manages commercial operations in the same way as for the whale watching industry. A "Whale Shark Interaction Licence" is issued with appropriate conditions, being an open ended licensing system rather than one of a limited entry.

Whilst the licensing system is the same there are major differences in participation. Whale watching is carried out entirely from the surface of the water, watching Whale shark is a below water experience and therefore has its own set of rules. The following extract of text from a CALM information leaflet best summarises watching Whale sharks in Western Australian waters:-

"The increasing public interest in Whale shark watching has resulted in an emergence of commercial tours. To prevent the animals from being harmed or disturbed, the following code of conduct has been prepared.

CONTACT ZONE

- * An exclusive contact zone of 250 m radius applies around any Whale shark.
- * Only one vessel at a time may operate within the zone for no more than 90 minutes, at a speed of 8 knots or less.
- * The first vessel within that zone will be deemed to be "in contact". The second vessel to arrive must keep a distance of 250 m from the shark, and any others must be 400 m from the shark.

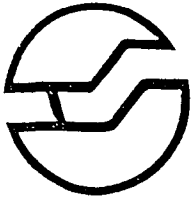
Boat Operators in the contact zone;

- * must not approach closer than 30 m from a shark,
- * should approach from ahead of the shark's direction of travel when dropping people in the water,
- * must display flags when divers are in the water.

Swimmers in the contact zone;

- * must not attempt to touch or ride on a Whale shark or approach closer than 1 m from the head or body and 4 m from its tail,
- * are limited to a maximum of 10 people in the water at any one time."

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT



STATE OPERATIONS HEADQUARTERS
50 HAYMAN ROAD COMO
WESTERN AUSTRALIA 6152
Phone (09) 334 0333
Facsimile (09) 334 0466
P.O. Box 104, Como 6152

PAGE 1

LICENCE NO.

WILDLIFE CONSERVATION ACT 1950
REGULATION 15
MARINE MAMMAL INTERACTION LICENCE

THE UNDERMENTIONED PERSON MAY INTERACT WITH MARINE MAMMALS SUBJECT TO THE CONDITIONS ENDORSED ON AND ATTACHED TO THIS LICENCE.

SYD SHEA

EXECUTIVE DIRECTOR

CONDITIONS

- 1 THE LICENSEE SHALL COMPLY WITH THE PROVISIONS OF THE CONSERVATION AND LAND MANAGEMENT ACT AND REGULATIONS, THE WILDLIFE CONSERVATION ACT AND REGULATIONS AND ALL MARINE LEGISLATIVE PROVISIONS WHICH RELATE TO OPERATIONS AT SEA.
- 2 THIS LICENCE SHALL BE DISPLAYED IN A PROMINENT POSITION ON THE VESSEL SPECIFIED ON THIS LICENCE AND CANNOT BE TRANSFERRED FROM ONE VESSEL TO ANOTHER. WHERE A VESSEL IS NOT INVOLVED, THE LICENSEE MUST PRODUCE THIS LICENCE ON DEMAND TO A WILDLIFE OFFICER.
- 3 THE LICENSEE SHALL MAINTAIN A RECORD OF MARINE MAMMAL SIGHTINGS INCLUDING SPECIES, NUMBERS AND LOCATION, THE NUMBER OF DAYS OPERATED AT SEA AND, IF APPLICABLE, THE NUMBER OF PASSENGERS CONVEYED.
- 4 THE LICENSEE SHALL FURNISH TO THE EXECUTIVE DIRECTOR, ON THE EXPIRATION OF THIS LICENCE, A RETURN SHOWING FULL DETAILS OF THE RECORD OF OPERATIONS FOR THE TERM OF THIS LICENCE.
- 5 THE LICENSEE SHALL COMPLY WITH ALL DIRECTIONS ISSUED TO HIM/HER BY A WILDLIFE OFFICER IN RESPECT OF MARINE MAMMAL INTERACTION ACTIVITIES.
- 6 FURTHER CONDITIONS ARE ATTACHED.

PURPOSE(S)

CONDUCT WHALE WATCHING TOURS FROM THE CHARTER VESSEL SPV

SPECIES

Whales (Mammalia Mammalia)

DATE OF ISSUE
DATE OF EXPIRY
VALID FROM

LICENSING OFFICE

LICENSEE:
ADDRESS :

G/L 54-84306-01A

WILDLIFE CONSERVATION ACT 1950

WILDLIFE CONSERVATION REGULATIONS

REGULATION 15 - MARINE MAMMAL INTERACTION (WHALE WATCH) LICENCE

FURTHER CONDITIONS (OF LICENCE NUMBER _____)

1. GENERAL

- 1.1 Do not restrict the normal movement or behaviour of whales.
- 1.2 Do not herd or chase whales.
- 1.3 Do not separate a group of whales or come between a mother and calf.
- 1.4 Do not attempt to feed whales or throw any rubbish in the water in the vicinity of whales.
- 1.5 No persons are to swim, dive or enter the water in the vicinity of whales.

2. VESSELS

- 2.1 Do not approach whales "head on" under power.
- 2.2 Do not approach a whale closer than **100 metres**. If a whale approaches you closer than this, either place the engine(s) in neutral or steer a straight course away from the whale.
- 2.3 Do not "box" whales in or cut off their path.
- 2.4 When within **300 metres** of a whale move at a slow speed and avoid sudden changes of direction and loud noise.
- 2.5 Abandon contact with the whale(s) at any sign of a whale becoming disturbed or alarmed, particularly if a whale slaps its tail on the water surface.
- 2.6 When leaving the vicinity of a whale or group of whales, move off slowly until at least **300 metres** from the closest whale before picking up speed.

3. INTERACTIONS WITH LICENSED RESEARCH VESSELS

- 3.1 For the purposes of this licence research vessels which are within **200 metres** of a whale(s) prior to other vessels can be recognised as observing and establishing "prior contact" with the whale(s).
- 3.2 Wherever possible and to promote public appreciation of whales, whale watch activities are to be undertaken on whales separate from those already under observation from research vessels, i.e. where research vessels have established prior contact. (A similar condition applies to research vessels under their licences. Licensed research vessels are identified with signs labelled "research" and must, under their licence conditions, obtain the permission of all whale watch vessels which have established prior contact with a whale before initially approaching the whale(s) inside the standard **100 metre** limit. Whale watch vessels are under no compulsion to agree to research vessels having close access to whales, as research activities may impair public appreciation of whale behaviour.)

4. AIRCRAFT

(Where authorised under the purpose(s) of this licence)

- 4.1 Fixed wing aircraft are not to fly lower than **300 metres** (1,000 ft) when within a horizontal distance of **300 metres** from a whale.
- 4.2 Helicopters are NOT to be used for whale observations under this licence.

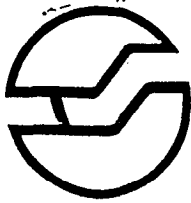
5. REPORTS AND PROVISION OF INFORMATION

- 5.1 The licensee will cooperate with the Department of Conservation and Land Management in gathering and providing any data which may be required for research and management purposes.

6. CAUTION

Whales are normally gentle but are capable of inflicting injury or death, particularly if harassed or distressed. The licensee is reminded that any vessel use must be undertaken in compliance with all standard legal requirements and safety guidelines pertaining to this activity.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT



STATE OPERATIONS HEADQUARTERS
50 HAYMAN ROAD COMO
WESTERN AUSTRALIA
Phone (09) 367 0333
Telex AA94616
Facsimile (09) 367 0466

HEAD OFFICE
HACKETT DRIVE CRAWLEY
WESTERN AUSTRALIA
Phone (09) 386 8811
Telex AA94585
Facsimile (09) 386 1578

PAGE 1

LICENCE NO.

WILDLIFE CONSERVATION ACT 1950
REGULATION 17

LICENCE TO STUDY FAUNA FOR
SCIENTIFIC PURPOSES

THE UNDERMENTIONED PERSON MAY STUDY FAUNA FOR RESEARCH OR OTHER SCIENTIFIC PURPOSES SUBJECT TO THE FOLLOWING AND ATTACHED CONDITIONS, WHICH MAY BE ADDED TO, SUSPENDED OR OTHERWISE VARIED AS CONSIDERED FIT.

SYD SHEA
EXECUTIVE DIRECTOR

CONDITIONS

- 1 THE LICENSEE SHALL COMPLY WITH THE PROVISIONS OF THE WILDLIFE CONSERVATION ACT AND REGULATIONS AND ANY NOTICES IN FORCE UNDER THIS ACT AND REGULATIONS.
- 2 THIS LICENCE MUST BE CARRIED BY THE LICENSEE AT ALL TIMES FOR THE PURPOSE OF PROVING THEIR AUTHORITY TO STUDY FAUNA WHEN QUESTIONED AS TO THEIR RIGHT TO DO SO BY A WILDLIFE OFFICER, ANY OTHER STATE OR LOCAL GOVERNMENT OFFICER OR ANY MEMBER OF THE PUBLIC.
- 3 FURTHER CONDITIONS (NUMBERED TO) ARE ATTACHED.

SPECIAL CONDITIONS

- 4 THE LICENSEE SHALL COMPLY WITH ALL DIRECTIONS ISSUED TO HIM/HER BY A WILDLIFE OFFICER IN RESPECT OF MARINE MAMMAL INTERACTION ACTIVITIES.
- 5 THIS LICENCE ALSO COVERS THE ACTIVITIES OF
- 6 VESSELS USED FOR THIS RESEARCH ARE TO BE IDENTIFIED AS RESEARCH VESSELS BY SIGNS VISIBLE TO A DISTANCE OF AT LEAST 50 METRES.
- 7 ALL MARINE MAMMAL OBSERVATIONS/STUDY TO BE CONDUCTED IN A MANNER WHICH IS NON INJURIOUS TO THOSE MAMMALS.

PURPOSE(S)

PASSIVE BEHAVIORAL OBSERVATION/ACOUSTIC RECORDING, DIVING & UNDERWATER PHOTOGRAPHY OF HUMPBACK WHALES

LOCATION/LOT NO.

COASTAL WATERS
ROCKINGHAM TO EXMOUTH

SPECIES

Humpback Whale

(Megaptera

novaeangliae

)

DATE OF ISSUE
DATE OF EXPIRY
VALID FROM

LICENSING OFFICER

LICENSEE:
ADDRESS :

G/L 54-84306-01A

WILDLIFE CONSERVATION ACT 1950
WILDLIFE CONSERVATION REGULATIONS

REGULATION 17 - SCIENTIFIC RESEARCH (PASSIVE OBSERVATION) OF WHALES

FURTHER CONDITIONS (OF LICENCE NUMBER _____)

1. GENERAL

- 1.2 Do not herd or chase whales.
- 1.3 Do not separate a group of whales or come between a mother and calf.
- 1.4 Do not attempt to tag or mark whales in any way.
- 1.5 No commercial activities are to be carried out on vessels conducting whale research under this licence nor is research to be undertaken from licensed commercial whale watch vessels.

2. VESSELS

- 2.1 Do not approach whales "head on" under power.
- 2.2 Do not approach a whale closer than **30 metres** when undertaking research observations. If a whale approaches you closer than this, either place the engine(s) in neutral or steer a straight course away from the whale.
- 2.3 Do not "box" whales in or cut off their path.
- 2.4 When within **300 metres** of a whale move at a slow speed and avoid sudden changes of direction and loud noise.
- 2.5 Abandon contact with the whale(s) at any sign of a whale becoming disturbed or alarmed, particularly if a whale slaps its tail on the water surface.
- 2.6 When leaving the vicinity of a whale or group of whales, move off slowly until at least **300 metres** from the closest whale before picking up speed.

3. INTERACTION WITH WHALE WATCH VESSELS

- 3.1 For the purposes of this licence, vessels which are within **200 metres** of a whale prior to the research vessel are recognised as observing and having "prior contact" with the whale.
- 3.2 Research observations are to be undertaken on whales separate from those under observation from commercial whale watch vessels, except where each of the attending commercial whale watch operators which have established prior contact with the whale(s) give their express permission for the research vessel to approach the watched whales to within the standard **100 metre** limit. (Whale watch vessels are under no compulsion to agree to research vessels having close access to whales in such circumstances.)

4. DIVING (SNORKELLING) and UNDERWATER PHOTOGRAPHY FOR RESEARCH PURPOSES
 (Where authorised under the purpose(s) of this licence)

- 4.1 All underwater photographic operations are to be undertaken on whales separate from those under observation from commercial whale watch vessels. (For the purposes of this condition, whale watch vessels **within 200 metres** of a whale will be viewed as observing the whale(s) in question.)
- 4.2 SCUBA equipment shall not be used in the vicinity of whales.
- 4.3 The minimum number of divers are to enter the water at one time, sufficient to allow safe diving procedures.
- 4.4 No diver is to approach a whale closer than **2 metres**.
- 4.5 Diver/s are not to enter the water when whales are within **30 metres** of the licensed vessel.
- 4.6 Fare paying passengers are not to be carried on the vessel during diving or underwater photographic operations.
- 4.7 The licensee retains full responsibility for actions by agents involved in diving or underwater photography.

5. REPORTS AND PROVISION OF INFORMATION

- 5.1 The licensee will cooperate with the Department of Conservation and Land Management in gathering and providing any data which may be required for research purposes.
- 5.2 Whale research in Western Australian State waters is to be conducted in cooperation with Mr John Bannister, Director of the WA Museum.
- 5.3 Within two months of the expiration of this licence (or at such other time or times as the Executive Director may determine) the holder shall furnish to the Executive Director a report detailing the activities undertaken under this licence. A copy of any paper or report resulting from this research should be lodged in due course with the Executive Director.

6. CAUTION

Whales are normally gentle but are capable of inflicting injury or death, particularly if harassed or distressed. The licensee is reminded that any vessel use, or diving if authorised under this licence, must be undertaken in compliance with all standard legal requirements and safety guidelines pertaining to those activities.

The CALM WHALE WATCHING LOG

VESSEL

DATE

No. of PASSENGERS

SEA STATE

WIND (Direction/Strength)/.....

Time	Species	Grid	Number of adults/calves	Moved off when approached	Contact	Comments

Where to watch whales

Whales can be seen almost anywhere along the Australian coastline at some time but their visits are infrequent and unpredictable. Humpback and Southern-right whales are the two species of large whales most likely to be seen by whale watchers. Accessible areas where whales have been seen over the last few years are:

NSW	Humpback whales	Cape Byron at Byron Bay, Korogoro Point at Hat Head National Park, Camden Head at Camden Haven.
	Southern-right whales	Sydney Harbour area.
Qld	Humpback whales	Hervey Bay, Point Lookout on Stradbroke Island, the waters between the Great Barrier Reef and the coast.
SA	Southern-right whales	Cliffs of the Great Australian Bight, Wilson's Bluff at Eucla, Merdayerrah Sand Patch east of Eucla, south coast of Kangaroo Island.
Tas	Southern-right whales	D'Entrecasteaux Channel, Storm Bay and generally along the east coast (humpback whales can also occasionally be seen from the east coast).
Vic	Southern-right whales	Otway coast including Warrnambool, Port Fairy and Portland Bay.
WA	Humpback whales	Dampier Archipelago; Point Quobba at Shark Bay; Ningaloo Marine Park.
	Southern-right whales	Cape Leeuwin and embayments along the south coast including Twilight Cove and Bremer Bay.
	Dolphins	Monkey Mia at Shark Bay.
NT	Large whales are not common in inshore tropical waters, however, several dolphin species are often seen in the Northern Territory including Darwin Harbour and the neighbouring coastline and river estuaries.	

Whales are protected

The whale watching guidelines have been written to help people watch whales safely without disturbing the whales and contravening the laws protecting them. Whale watchers should be aware that since 1979, the Australian Government has a policy of complete protection for all cetaceans (whales, dolphins and porpoises). The Whale Protection Act 1980 prohibits killing, taking, injuring and interfering with cetaceans in the waters of the Australian Fishing Zone (AFZ) i.e. approximately between 3 and 200 nautical miles offshore. Interference as defined in the Act, includes harassment, chasing and herding of whales. The Act also prohibits such actions by Australian citizens anywhere in the world and provides for substantial penalties.

Cetaceans are protected also in State and Territory waters (from the shoreline to some 3 nautical miles offshore) under various State and Territory legislation.

Note

While these guidelines apply primarily to species of large whales, they do have application to other cetaceans such as dolphins and porpoises. These small cetaceans may approach vessels very closely e.g. to ride in the bow wave.

Whale researchers who have appropriate permits may have to approach whales closer than recommended in these guidelines but should behave responsibly keeping in mind the intent of the guidelines.

These guidelines have been prepared in cooperation with State and Territory government conservation agencies and others. Further information can be obtained from the following agencies:

NSW National Parks and Wildlife Service
PO Box 1967
HORSTVILLE NSW 2220
Phone: (02) 585 6444

Conservation Commission of the Northern Territory
PO Box 496
PALMERSTON NT 0831
Phone: (089) 89 4411

Division of Conservation, Parks and Wildlife
Department of Environment and Conservation
PO Box 155
BRISBANE NORTH QUAY QLD 4002
Phone: (07) 227 7801

National Parks and Wildlife Service
PO Box 1782
ADELAIDE SA 5001
Phone: (08) 216 7777

Department of Parks, Wildlife and Heritage
GPO Box 44A
HOBART TAS 7001
Phone: (002) 30 8011

Department of Conservation, Forests & Lands
PO Box 41
EAST MELBOURNE VIC 3002
Phone: (03) 412 4364

Department of Conservation and Land Management
PO Box 104
COMO WA 6152
Phone: (09) 367 0333



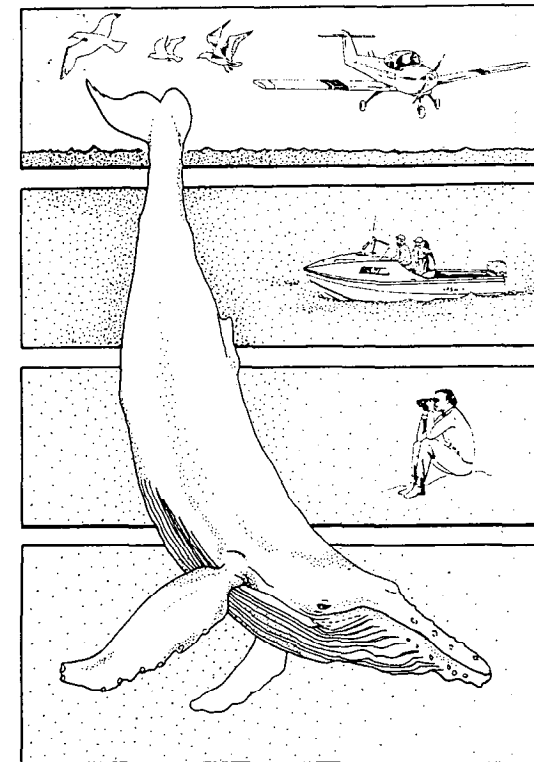
In order that these guidelines can be revised as experience accumulates, your comments and observations are welcome and should be sent to:

The Director
National Parks and Wildlife Service
GPO Box 636
CANNBERRA ACT AUSTRALIA 2601
Phone (062) 46 62211 Telex AA62971 Fax (062) 47 3528

P.S. 12/10000/Sept/89



WHALE WATCHING GUIDELINES



APPENDIX 6

Australian National Parks and Wildlife Service

Introduction

Whale watching can be an exciting and educational experience if done safely. Increasing numbers of whales are being seen in Australian waters in recent years. The reason for this is unclear, but one explanation is that with the cessation of commercial whaling in the seas around Australia, there are more whales and they are less wary of people.

Most species of large whales spend the summer feeding in Antarctic waters and migrate to more temperate and subtropical waters in winter where they give birth and mate. At this important time some species of whales come close to the Australian coastline and people need to be particularly careful not to disturb them. The following guidelines have been prepared to encourage enjoyable and safe whale watching without interference to the whales.

Please remember

- Operate your vessel or aircraft so that it does not disrupt the normal movement or behaviour of a whale. Disrupted behaviour may be shown by prolonged diving, evasive swimming with rapid changes in direction or speed and interruptions of breeding or nursing activities.
- Abandon contact with the whales at any sign of their becoming disturbed or alarmed. Whales may abandon an area if continually disturbed.
- Do not separate or scatter a group of whales. Whales often form groups for mutual support, reproduction and protection. Some groups may be tightly-knit extended family units. Disturbance which breaks up the groups may separate individuals and increase their vulnerability.
- Do not attempt to feed whales or throw rubbish into the water. Dumping rubbish, particularly plastics, can kill whales through accidental swallowing or entanglement.
- Avoid loud disturbing noises near whales. Whales have extremely sensitive hearing and are affected by sounds above and under the water.
- Observe general boating and aircraft regulations and restrictions.

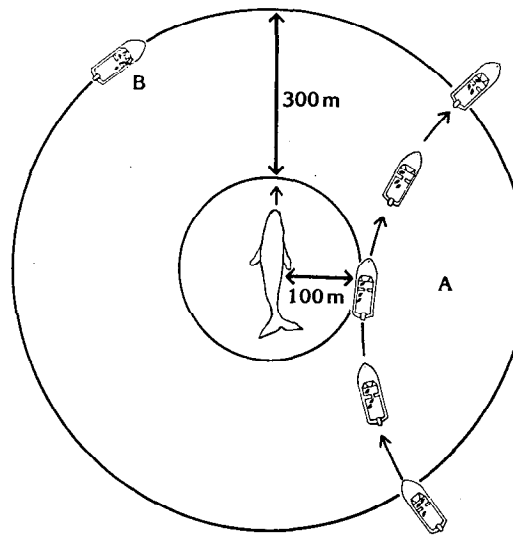
Aircraft

- Do not operate any aircraft including helicopters less than 300 metres (1,000ft) above or near a whale. The use of helicopters for whale watching should be avoided as they can cause considerable distress to whales because of the loud noise and down draught. If using a helicopter, under no circumstances fly directly above a whale and if the whale changes its behaviour, move away.

Swimmers and divers

- It is recommended that swimmers and divers do not enter the water when near whales because of the possibility of being injured. However, if you are in the water near a whale, do not approach closer than 30 metres.

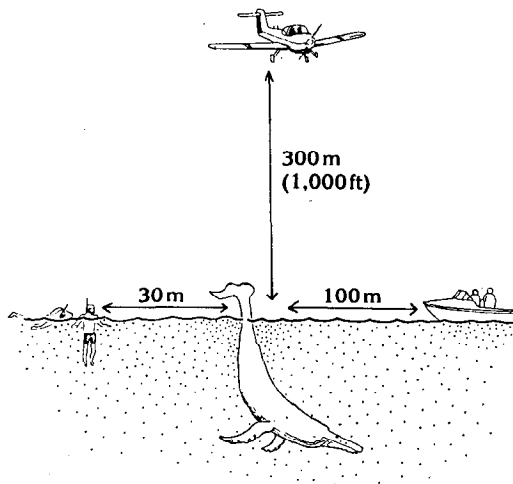
How to approach a whale



Caution

- When whale watching, accidents may occur, especially if the whales feel threatened or harassed. Active whales also require ample space particularly during the mating season when males competing for females may engage in rough physical contact.

Limits of approach



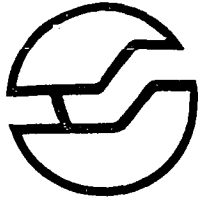
Powered and unpowered vessels

- Vessels should approach whales from a direction parallel and slightly to the rear (illustration A). Alternatively, position your vessel at least 300 metres ahead, well clear of the path of the whales and allow them to approach you (illustration B). Head on approaches can be threatening to a whale and should be avoided as should approaches from directly behind.
- Within 300 metres of a whale move at a constant slow speed no faster than the slowest whale or at idle, 'no wake' speed.
- Avoid sudden or repeated changes in speed or direction. Changes in speed or direction may alarm whales. If you continually need to change speed or direction to watch the whales, they are probably trying to avoid you, so it is best to leave them alone.
- Do not approach whales closer than 100 metres. If whales approach within 100 metres of your vessel, either slowly steer a straight course away from them or stay put and place the engines in neutral and let the whales come to you. Do not engage props while the whales are within 100 metres and do not chase the whales when they leave.
- When stopping to watch whales either place your engines in neutral or allow the motor to idle for a short period (1 minute) before turning it off. Whales can be alarmed not only by a sudden noise but also by a noise to which they have become accustomed suddenly ending.
- No more than three vessels should attempt to watch a whale or group of whales at one time. If people in a number of vessels wish to watch the whales, limit your time with the whales so that others may see them.
- When attempting to watch whales do not 'box' the whales in, cut off their path or prevent them from leaving, particularly when more than one vessel is present.
- Do not attempt to approach mothers with young calves. Should you mistakenly approach these whales, leave the immediate area at once at a constant slow 'no wake' speed. A whale with a young calf may protect her offspring aggressively if it feels the calf is threatened. Even an inadvertent separation of a calf from its mother e.g. because of the calf's natural curiosity of an observer vessel, can pose a risk to the vessel.
- When leaving the whales, move off slowly at idle, 'no wake' speed until at least 300 metres from the closest whale before picking up speed.

From land

- If whales come close to the shore, remain quiet and do not disturb them. Cliffs and headlands are good vantage points for watching whales. Whales can be more easily seen on clear calm days.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT



STATE OPERATIONS HEADQUARTERS
50 HAYMAN ROAD COMO
WESTERN AUSTRALIA
Phone (09) 367 0333
Telex AA94616
Facsimile (09) 367 0466

HEAD OFFICE
HACKETT DRIVE CRAWLEY
WESTERN AUSTRALIA
Phone (09) 386 8811
Telex AA94585
Facsimile (09) 386 1578

PAGE 1

LICENCE NO. WS

WILDLIFE CONSERVATION ACT 1950
REGULATION 15

WHALE SHARK INTERACTION LICENCE

THE UNDERMENTIONED PERSON MAY INTERACT WITH WHALE SHARKS SUBJECT TO THE CONDITIONS ENDORSED ON AND ATTACHED TO THIS LICENCE.

SYD SHEA
EXECUTIVE DIRECTOR

CONDITIONS

- 1 THE LICENSEE SHALL COMPLY WITH THE PROVISIONS OF THE CONSERVATION AND LAND MANAGEMENT ACT AND REGULATIONS, THE WILDLIFE CONSERVATION ACT AND REGULATIONS AND ALL MARINE LEGISLATIVE PROVISIONS WHICH RELATE TO OPERATIONS AT SEA.
- 2 THIS LICENCE SHALL BE DISPLAYED IN A PROMINENT POSITION ON THE VESSEL SPECIFIED ON THIS LICENCE AND CANNOT BE TRANSFERRED FROM ONE VESSEL TO ANOTHER.
- 3 THE LICENSEE SHALL MAINTAIN A RECORD OF WHALE SHARK SIGHTINGS INCLUDING NUMBERS AND LOCATION, THE NUMBER OF DAYS OPERATED AT SEA AND THE NUMBER OF PASSENGERS CONVEYED.
- 4 THE LICENSEE SHALL FURNISH TO THE EXECUTIVE DIRECTOR, ON THE EXPIRATION OF THIS LICENCE, A RETURN SHOWING FULL DETAILS OF THE RECORD OF OPERATIONS FOR THE TERM OF THIS LICENCE.
- 5 THE LICENSEE SHALL COMPLY WITH ALL DIRECTIONS ISSUED TO HIM BY A WILDLIFE OFFICER IN RESPECT OF WHALE SHARK ACTIVITIES.
- 6 THE LICENSEE SHALL ENSURE THAT ALL DUE CARE IS TAKEN TO AVOID STRESSING OR INJURING WHALE SHARKS AND INTERACTION OPERATIONS ARE TO CEASE IMMEDIATELY ANY STRESS OR INJURY IS APPARENT.
- 7 THIS LICENCE IS ISSUED SUBJECT TO ANY OTHER LICENCE, PERMIT OR OTHER REQUIREMENTS PURSUANT TO THE CONSERVATION AND LAND MANAGEMENT ACT 1984.

PURPOSE(S)

TO CONDUCT WHALE SHARK INTERACTION TOURS WITHIN NINGALOO MARINE PARK FROM _____, SPV

DATE OF ISSUE
DATE OF EXPIRY
VALID FROM

LICENSEE:
ADDRESS :

LICENSING OFFICER

G/L 54-84306-01A

WILDLIFE CONSERVATION ACT 1950
WILDLIFE CONSERVATION REGULATIONS

REGULATION 15: WHALE SHARK INTERACTION LICENCE

FURTHER CONDITIONS (OF LICENCE NUMBER _____)

Endorsed

Skippers:.....

1. GENERAL

- 1.1 Interactions will be limited to daylight hours only. (Research and special licences will be considered for night hours study.)
- 1.2 Licensees will be required to make available on request a position on their vessel for a CALM employee to monitor licence activities.
- 1.3 In these further conditions the term 'licensed vessel' is used to denote the vessel identified on the licence.

2. EXCLUSIVE CONTACT (EXCLUSION) ZONE

- 2.1 An exclusive contact zone of radius 250 metres will apply around any whale shark. Only 1 licensed vessel is to operate within the exclusive contact zone at any one time. All other licensed vessels are to use boat power as necessary to avoid any encroachment into any exclusive contact zone occupied by a licensed vessel.
- 2.2 The first vessel to encroach within a whale shark's 250m radius exclusive contact zone will be deemed to be "in contact" with a whale shark. Common sense should prevail in determining which vessel is first to make contact with a shark and other vessels should attempt to locate other sharks, with the exception that the second boat to arrive at the exclusive contact zone may queue to have access to the shark by maintaining a minimum distance of no less than 250m from the contacted shark. All other licensed vessels are to maintain a distance of at least 400 metres from the contacted shark.
- 2.3 The time that a vessel can spend "in contact" with a whale shark (i.e within the exclusive contact zone) will be limited to a maximum of 90 minutes, with a maximum time for swimmers* from a single licensed vessel to be in the water with a shark to be 60 minutes from the time of first entry into the water.
- 2.4 In the rare situations where there are 2 or more whale sharks in a group (within a 250m radius of each other) the limit of 1 contact vessel as described above shall still apply until the sharks separate by more than 250m, in which case boats will be able to be "in contact" with individual sharks.
- 2.5 In situations where 2 or more sharks that are being interacted with by separate charter boats come together within a 250m radius circle, common sense should prevail and skippers should cooperate with each other to protect the safety of their divers and the whale sharks.

3. LICENSED VESSELS AND THEIR DIVING TENDERS

- 3.1 Licensed vessels will be restricted to a maximum of 1 diving tender in addition to the licensed vessel.
- 3.2 Licensed vessels and diving tenders shall not approach a shark closer than 30 metres and shall move at a slow speed (8 knots or less) when within the exclusive contact zone.

3.3 Licensed vessels and tenders are to only approach sharks from ahead of the sharks direction of travel and to drop divers/snorkelers into the water no less than 30 metres ahead of the shark.

3.4 Licensed boats shall clearly display flags to show when divers are in the water and shall maintain radio contact with other approaching vessels to advise that diving/shark interactions are in progress.

4. SWIMMERS* (DIVERS/SNORKELERS)

Licensees will be required to ensure that the 'in water' activities of divers/snorkelers will be in compliance with the following requirements.

4.1 Swimmers are to treat all whale sharks with caution and to at all times recognise that while they appear to be 'gentle giants' they are wild animals which can inflict serious injury if they strike a swimmer with their body, tail or fins.

4.2 Swimmers must not touch a whale shark under any circumstances and must maintain a minimum distance of at least 1 metre from the head or body of a shark and 4 metres from its tail.

4.3 Swimmers must not attempt to block a shark from its chosen direction of movement.

4.4 Swimmers must not undertake flash photography.

4.5 The number of swimmers to be in the water with a whale shark at any time will be limited to a maximum of 10.

4.6 The number of swimmers to be carried by a licensed vessel will be limited to a maximum of 20 unless otherwise endorsed on the licence.

5. REPORTS AND PROVISION OF INFORMATION

5.1 The licensee will cooperate with the Department of Conservation and Land Management in gathering and providing any data which may be required for research and management purposes.

5.2 Licensed vessels will be required to maintain a diving/shark spotting log as supplied by CALM, to provide a return of this log to CALM at the end of the season and to make the log available to a CALM officer on request.

6. CAUTION

6.1 Whale sharks are normally gentle but are capable of inflicting injury or death, particularly if harassed or distressed.

6.2 The licensee is reminded that any vessel use must be undertaken in compliance with all standard legal requirements and safety guidelines pertaining to this activity.

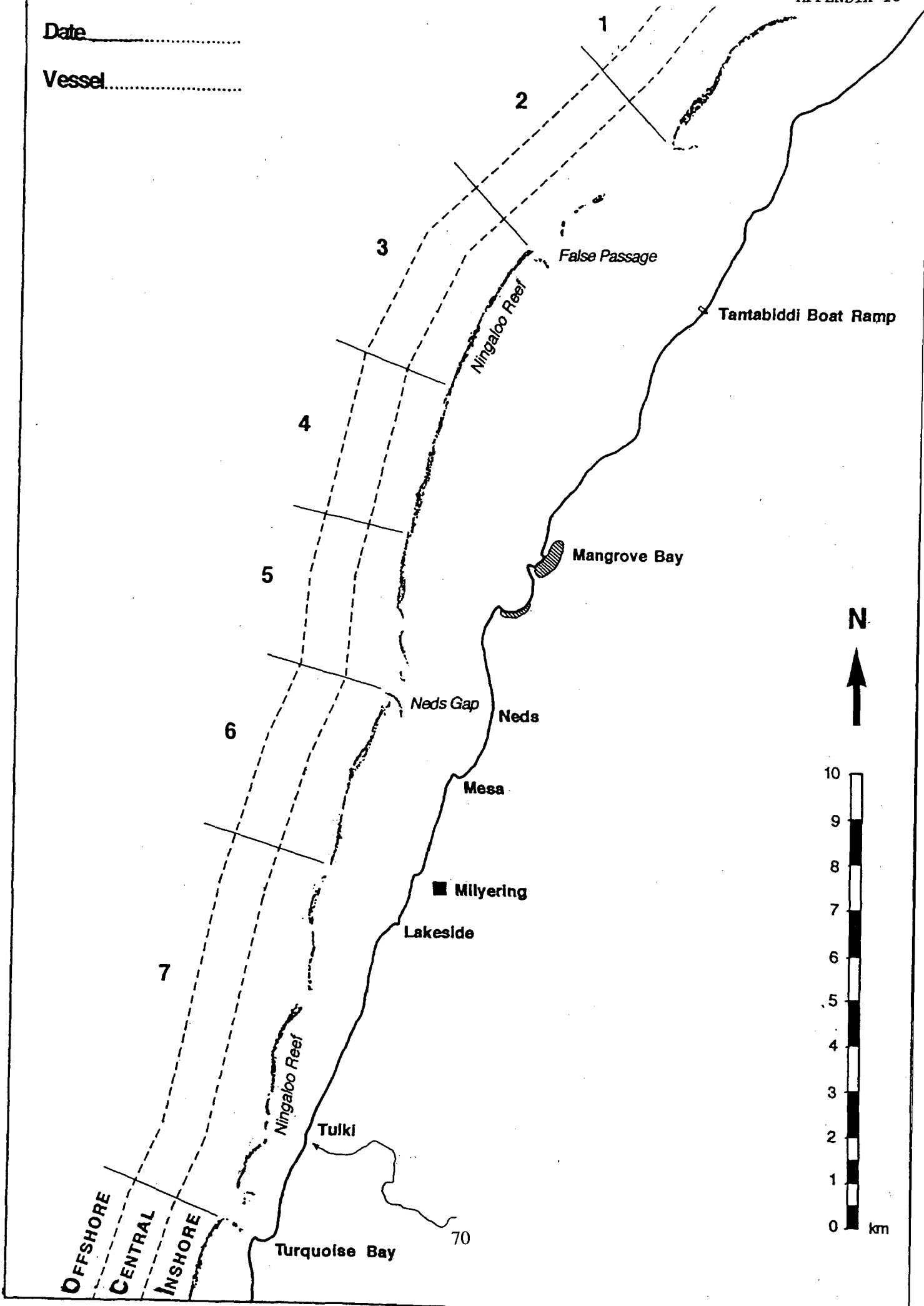
7. INDEMNITY

7.1 Licensees will be responsible for the safety of all passengers and divers/snorkelers under their charter operations, will indemnify the Executive Director of CALM and all staff against any legal actions arising from interactions and operations in the Marine Park, and will be fully insured for public and commercial liability.

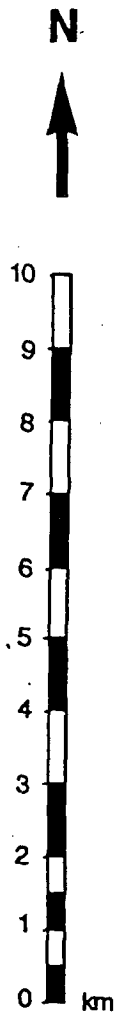
(* The term 'swimmers' should be read as including divers, snorkelers and any other persons in the water within the exclusive contact zone defined under further condition 2.1.)

Date

Vessel



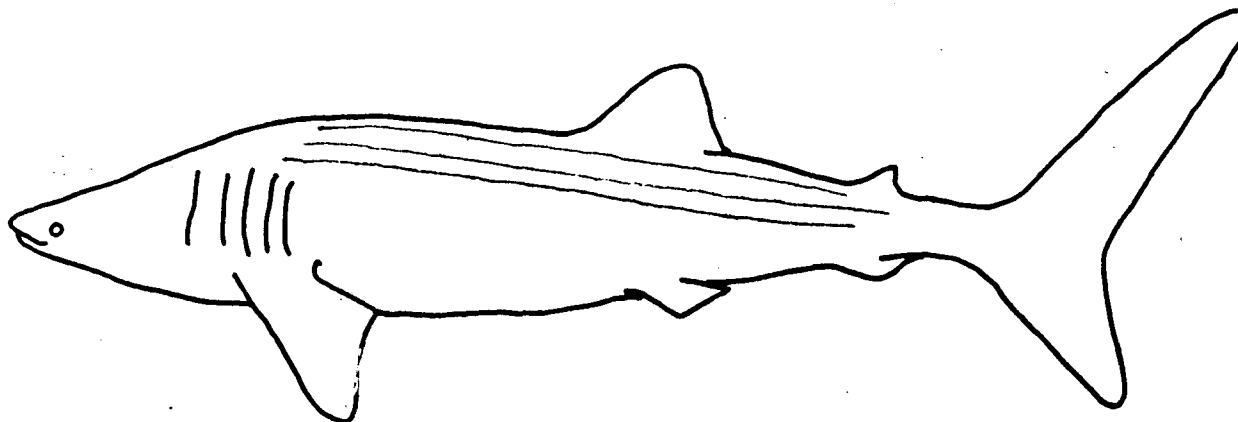
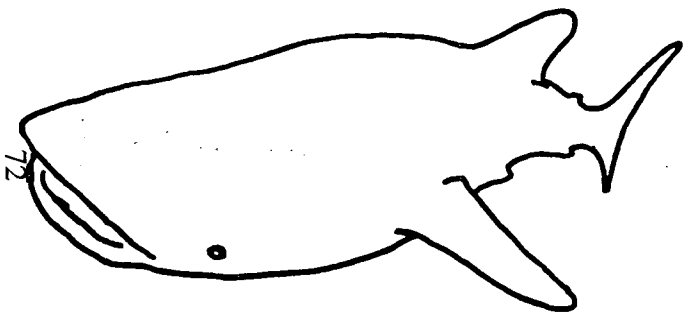
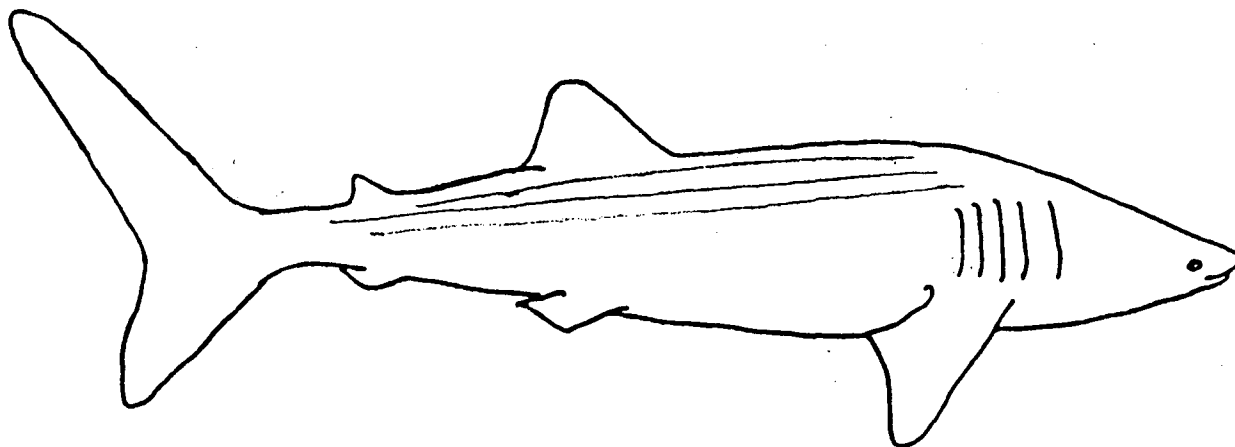
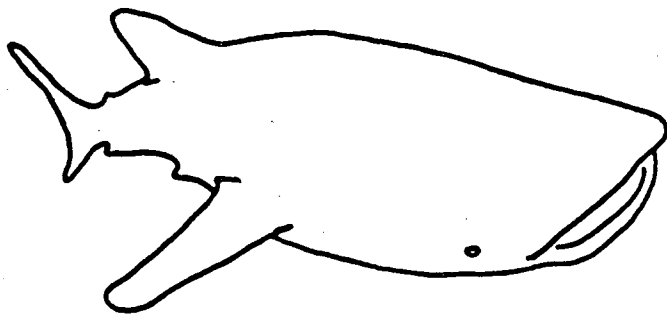
OFFSHORE
CENTRAL
INSHORE



WHALE SHARK DATA SHEET

VESSEL: _____ **DIVER NAMES:** _____
RECORDER: _____
DATE: _____ **START:** _____ **FINISH:** _____
WEATHER: _____
SEA CONDITIONS: _____

TIME	SHARK NO.	DIVE	DIVE QUALITY	TAGGED	PHOTOS	MARKS/SCARS, RESIGHTINGS & OTHER COMMENTS



WHALE SHARK INDIVIDUAL IDENTIFICATION SHEET

Date	Time	Location	S.N.	I C O	Behavioural Notes
Approx Length	Sex IM M	Tags Noted			
Confirmed Length	Verification	Photo(s) Attached			
Nickname		Confirmed Name			

HOW YOU CAN HELP?

The Department of Conservation and Land Management (CALM) is interested in any information you can obtain about whale sharks. You can help researchers by recording the following details when you next see a whale shark:

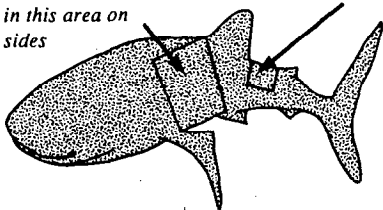
- ❖ date, time and location
- ❖ weather and sea conditions
- ❖ number of sharks seen
- ❖ sex of each animal
- ❖ their behaviour
- ❖ approximate length of each shark
- ❖ lateral markings and scars* (located 2 to 3 feet behind the gill slits. Note both sides if possible)
- ❖ tags* (these resemble marlin tags and are thin strips of plastic about 30 cm long, often covered in weed).

**Photographs provide a useful method of recording these details and assist in the identification of individual sharks. (Please do not use flash as this may upset the sharks)*

Where to look for tags and lateral markings

Scars and lateral markings can be seen in this area on both sides

Tag sites



WHO TO CONTACT

Details of whale shark observations can be left at:

Department of Conservation and Land Management

District Office

Thew Street
EXMOUTH WA 6707
PH (099) 491 676

Milyering Visitor Centre

Cape Range National Park
PH (099) 491 808

Regional Office

SGIO Building
Welcome Road
KARRATHA WA 6714

Fisheries Department of WA

District Office

Lot 375 Maidstone Crescent
EXMOUTH WA 6707
PH (099) 491 755

Head Office

108 Adelaide Terrace
EAST PERTH WA 6004
PH (09) 220 5333



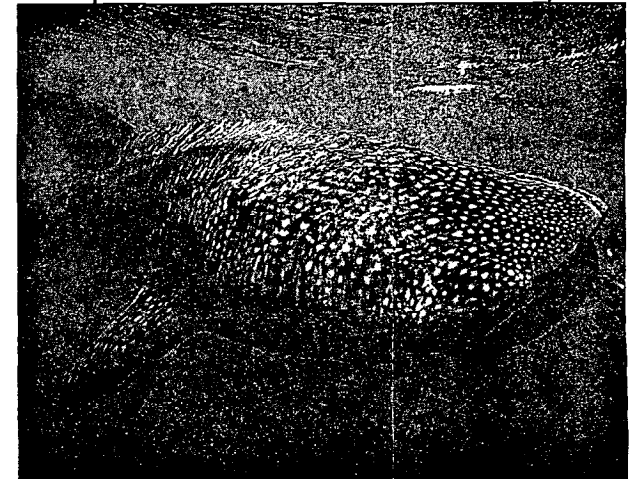
Department of Conservation
and Land Management
50 Hayman Road
COMO WA 6152

Photo - Geoff Taylor/Lochman Transparencies
3021 0393 2M

PROTECTING WHALE SHARKS

IN

NINGALOO MARINE PARK



Department of Conservation
and Land Management

WHALE SHARKS

The mass spawning of more than 200 species of coral in March and April is part of a chain of biological events that heralds the arrival, in Ningaloo Marine Park, of the world's largest fish, the whale shark (*Rhiniodon typus*).

These gentle giants cruise the world's oceans in search of concentrations of zooplankton. They have thousands of tiny teeth arranged in more than 300 rows, but they neither bite nor chew their food. Water is drawn into their large mouths and strained through gills, where a fine mesh of gill rakers extract the tiny plankton. They are also thought to supplement their diet periodically with squid and small fish such as anchovies and sardines.

Whale sharks are found in a band around the equator between about 30° north and 35° south. They prefer surface water temperatures between 22° and 27°C, where cool, nutrient-rich currents mingle with warm plankton-laden waters. Their backs are darker in colour than their bellies, but both have white spots almost two inches in diameter. They have been known to reach 18 metres in length, but are more commonly between 4 and 12 metres. They can weigh up to 40 tonnes and are long-lived, but just how old they get is unknown.

Ningaloo Reef is the only place in the world where whale sharks are known to appear regularly, in any numbers, in near-shore waters, easily accessible to observers.

WATCHING WHALE SHARKS

Whale sharks are fully protected under the Wildlife Conservation Act. The increasing public interest in whale shark watching has resulted in an emergence of commercial tours. To prevent the animals from being harmed or disturbed, the following code of conduct has been prepared.

CONTACT ZONE

- ❖ An exclusive contact zone of 250 m radius applies around any whale shark.
- ❖ Only one vessel at a time may operate within the zone for no more than 90 minutes, at a speed of 8 knots or less.
- ❖ The first vessel within that zone will be deemed to be 'in contact'. The second vessel to arrive must keep a distance of 250 m from the shark, and any others must be 400 m from the shark.

Boat Operators in the contact zone;

- ❖ must not approach closer than 30 m from a shark,
- ❖ should approach from ahead of the shark's direction of travel when dropping people in the water,
- ❖ must display flags when divers are in the water.

Swimmers in the contact zone;

- ❖ must not attempt to touch or ride on a whale shark or approach closer than 1 m from the head or body and 4 m from its tail,
- ❖ are limited to a maximum of 10 people in the water at any one time.

RESEARCH

Very little is known about whale shark numbers, their behaviour patterns, or how much human contact they will tolerate before being disturbed and perhaps leaving the area. Care must be taken to ensure that we do not lose the best known whale shark observation area in the world.

There is almost no scientific information about whale sharks' migratory patterns, breeding behaviour or even precisely what species of zooplankton they eat.

During the past ten years, information on whale sharks has been collected at Ningaloo Reef by researchers, including former Exmouth medical practitioner, Dr Geoff Taylor. One of the very interesting things to have been discovered is that most of the whale sharks that visit the area during March and April are immature males.

In the past, researchers have looked at whale shark distribution and abundance patterns along the Ningaloo Reef. Plankton sampling has been carried out to try and identify the shark's food species further. New initiatives include identification programs to help recognise individual sharks through their lateral markings and scar patterns. Further research is required to determine whether, like finger prints, these varied white spots and lines on their backs, along with distinctive scars, help to identify individuals. If so, this will help to determine population sizes and shark growth rates.

Development of an Environmental Code and Community Awareness Campaign for Whale Watchers in South Australia

Dick Olesinski,
Community Education Officer
Department of Environment and Land Management
GPO Box 1047, Adelaide SA 5000

Introduction

Over the past two years, Southern Right whales have been a common sight within South Australia's Encounter Bay waters (situated about 60 kms south of Adelaide) between the months of May and October. They mate, give birth and nurse their young, often in shallow waters and quite near to the coast.

Background

In a recent whale watch season in the Encounter Coast area, it was estimated in excess of 70 000 people travelled to the region over a period of 15 days specifically to watch whales.

A local resident who normally take 15 minutes to conduct their daily business, when whales are in the area it takes 90 minutes.

Front page full colour photos and editorial on whales in the statewide South Australian press.

These examples show the impact and interest of whales that has prompted the development of whale watching community awareness campaign in South Australia, particularly for the Encounter Coast region but also relevant to anywhere land based whale activities take place.

With the large influx of visitors to the area, various environmental problems have been the result. These have included:

- Severe damage caused to cliff areas, beaches, coastal dunes and fragile vegetation by the public endeavouring to gain best vantage points to view whales.
- In many cases, a lack of respect of local residents' property - farm gates being left open, rubbish left on site and damage caused to fences and gates.
- Safety issues ignored - people endangering themselves while watching whales from cliff faces and others just not being aware of surging surf on slippery rock faces and the potential for being swept out to sea.
- Whale watchers in their enthusiasm making loud and unexpected noises, boats, planes and helicopters all trying to get the best view of these magnificent mammals.

Community awareness campaign

The South Australian Department of Environment and Land Management through the department's, Coastal Management Branch, National Parks and Wildlife Service and the Public Communications Branch have jointly coordinated the development and introduction of the community awareness campaign.

The campaign aims to minimise and where possible, eliminate environmental damage caused by persons involved in whale watching.

It resulted from input from not only government agencies including the Department of Environment and Land Management, South Australian Museum, Police Department and the South Australian Tourist Commission, but also local government organisations such as the District Councils of Port Elliot & Goolwa and Victor Harbour as well as commercial community organisations including the Whale Information Network and the Whale Watch Centre.

This forum meets regularly in the local whale region and their role is to review and discuss all aspects of the impact of whale watching to the area. The Encounter Coast region is where the most environmental damage has been caused.

The situation in South Australia is unique compared to other states in Australia. The problems encountered are generally land based. Other states generally relate to water based problems associated with whale watching. The region is in easy reach of the general community, only being 60 kms away from metropolitan Adelaide.

Various organisations are eagerly awaiting the outcome of this community education approach to controlling and eliminating the environmental problems associated with whale watching.

Campaign objectives

The objectives of the campaign are to:

- increase the level of concern by whale watchers for the fragile vegetation, cliff areas and dune systems and to increase their level of understanding of the need for environmentally sensitive behaviour,
- minimise the environmental impact caused by whale watchers, and
- promote a whale watching code specifically for the state's Encounter coast area.

The environmental awareness code proposes to:

- educate the community regarding environmental damage caused by whale watchers,
- provide positive ways to protect the coastal dune system, and
- identify specific guidelines and safety issues associated with whale watching.

Campaign Elements

Whale watchers Information kit

Included in the kit are:

- **4 Information sheets:-**

- | | |
|------------------------------|---|
| Protecting sand dunes - | how and why dunes are important to the beach system and how people can assist in protecting them. |
| Welcome to Whale Watching - | a general description of the environmental code. |
| Southern Right Whale Story - | background information and history on the Southern Right Whale. |

Whale behaviour -

describes the various aspects of what people can expect to see while whale watching.

- **'Encounter Coast Whale Watching Guidelines'**

These guidelines explain the limits of approaches to whales, best viewing areas, whale protection regulations and other relevant information.

- **Southern Right Whales**

This brochure is an informative biological and behavioural guide on the Southern Right Whale. It details historical background and other interesting information required by the avid whale watcher.

- **SA Museum whale report form**

This form is included for use when whales are sighted. Information gathered by the Museum is used for scientific purposes.

These kits are available for free. A distribution network has been established for easy public access. They are available from the department's Information Centre within Adelaide's central business area, the regional office on the Encounter Coast and the SA Museum shop also situated in the city.

Information display

A colourful information display has been produced for use in shopping centre displays, information centres, National parks exhibitions, school talks and other promotions. Photos of whales and purposely chosen positive images of people watching whales from beaches and walkways, complement the educational display information.

The display, of which 3 copies were produced, has already had a great deal of exposure over the past months. Adelaide's Myer Remm centre visited by over 10000 people each day, the department's city Information Centre as well as regional shopping centre displays and Whale Information Network and Wha'e Watch centres on the Encounter Coast.

Supporter network

A network of over 60 supporters has been established along the whole Encounter Coast from Goolwa, Middleton, Port Elliot, Victor Harbour, the Bluff around Cape Jervis to Second Valley - all well known whale watching sites.

The network includes delis, surf shops, tourist information offices, petrol stations and hotels, anywhere an unsuspecting whale watcher will congregate!

Colourful counter cards are used to distribute the code leaflets as well as for easy access and recognition by the public. The message "Essential information for whale watchers" encourages the public to take their own copy of the code and it directs them to gain further information on whale watching, if required.

Posters have been produced for display in shop windows to encourage people to go in to inquire about the code if interested.

The network of supporters have been contacted twice during the current whale watch season. Personal contact was made initially to gain support for the campaign and then by mail half way through the season.

A covering letter reinforced what the objectives of the campaign were and to thank them for their continuing support. It also gave them an opportunity to provide feedback to the department. A supply of code leaflets were also included to ensure counter card stocks were replenished.

Further contact with the network is proposed at the completion of the season. It will provide an "on the ground", honest local opinion of how the campaign has progressed.

Advertising campaign

An advertising campaign and various public relations activities have been conducted to promote the availability of the environmental code for whale watchers.

Radio and print media, used over the course of the season, ensure the general community is aware of the environmental implications of whale watching.

The media campaign encourages whale watchers to help protect the sand dune system as well as being aware of their own safety, respecting local residents' property and welcoming the whales.

Public Relation activities

Various activities arranged to generate publicity and community interest include:-

- distribution of the code leaflets through high rating local radio station's SAFM's Black Thunder promotional vehicles,
- a whales education page published in statewide print media, 'The Advertiser',
- feature support from 'The Advertiser's' environmental writers,
- interviews on ABC talk back radio segment,
- Community Service Announcements on local and regional radio,
- Community service ads have been prepared for use as filler spots in 'The Advertiser' as well as local and regional press.
- Various magazines ave reviewed the campaign information including 'Wildlife Australia', 'FreeSurf Australia', 'GREENWEEK' and internationally distributed, SA tourism publication, 'The World around'. The Queensland Whale Preservation Society has also been contacted to assist in promoting the code and awareness campaign through the 'SCRIMSHAW' publication.
- The Department of Environment and Land Management jointly co-hosts an Ecotalk series in conjunction with the Adelaide University's Mawson Centre for Environmental Studies. A joint presentation on the development of the code and community education campaign was made together with SA Museum, Curator of Mammals, Dr Cath Kemper. This provided not only an ideal opportunity to recognise the technical advice give by the Museum to the development of the whale watchers kit, but to also promote the campaign to an interested audience.

National Parks Whale Information caravan

A bonus or the whale watch season in South Australia has been the introduction of a whale information caravan. The van is used when whales are sighted in the region and positioned on the site.

A variety of whale watch information is available to the public including the code and kits. Two trained information officers staff the caravan, distribute material and direct crowds, if needed.

This component is jointly funded by the two local government councils. National Parks supply the caravan and make necessary arrangements to position and staff the information van.

Whale watchers survey

A student from the Adelaide University's Mawson Graduate Centre for Environmental Studies is currently conducting a survey on whale watchers. The information gained is to be used for a thesis on the social behaviour of whale watchers.

This survey information (5 pages of questions) provides details which include where whale watchers live, how they found out about the whale sightings, how they got to the viewing site, whether they are aware of the environmental code and other watching guidelines, facilities they suggest should be provided to whale watch and a whole range of information relevant to the environmental implications and social aspects of whale watching.

An evaluation of the information gathered will enable strategic decisions to be made regarding advertising, distribution networks for whale watch information, facility improvement and if additional education programs are needed to be introduced.

Future opportunities

Sites of National Tourism Significance grant

A proposal to the Federal Government is intended for funding under the Sites of National Tourism Significance grant.

The submission will be jointly arranged through state and local government level in conjunction with community organisations such as the Whale Information Network and Whale Watch Centre.

The need for board walks, whale watching platforms, control of sand dune erosion and other works to reduce the environmental impact of tourists/whale watchers will be the major thrust of the proposal.

Intense lobbying has been conducted within the South Australian Tourist Commission to ensure the whale watching proposal is a high priority within the state's submission to Canberra.

Proposed Whale Interpretive Centre

In order to service the two main tourism markets in the region, Ecotourism and Cultural tourism, a Whale Interpretive Centre is proposed for Encounter Coast whale watch region.

The proposed centre will include an information and interpretation centre, whaling and heritage displays, a year round statewide whale watch centre together with theatre/lecture room and opportunity for retail sales through the information area.

A centre of this kind will provide a central focus for current and potential whale watchers. It also provides an opportunity to interactively communicate with the public to ensure awareness is raised and to encourage whale watchers to meet their environmental obligations.

Conclusion

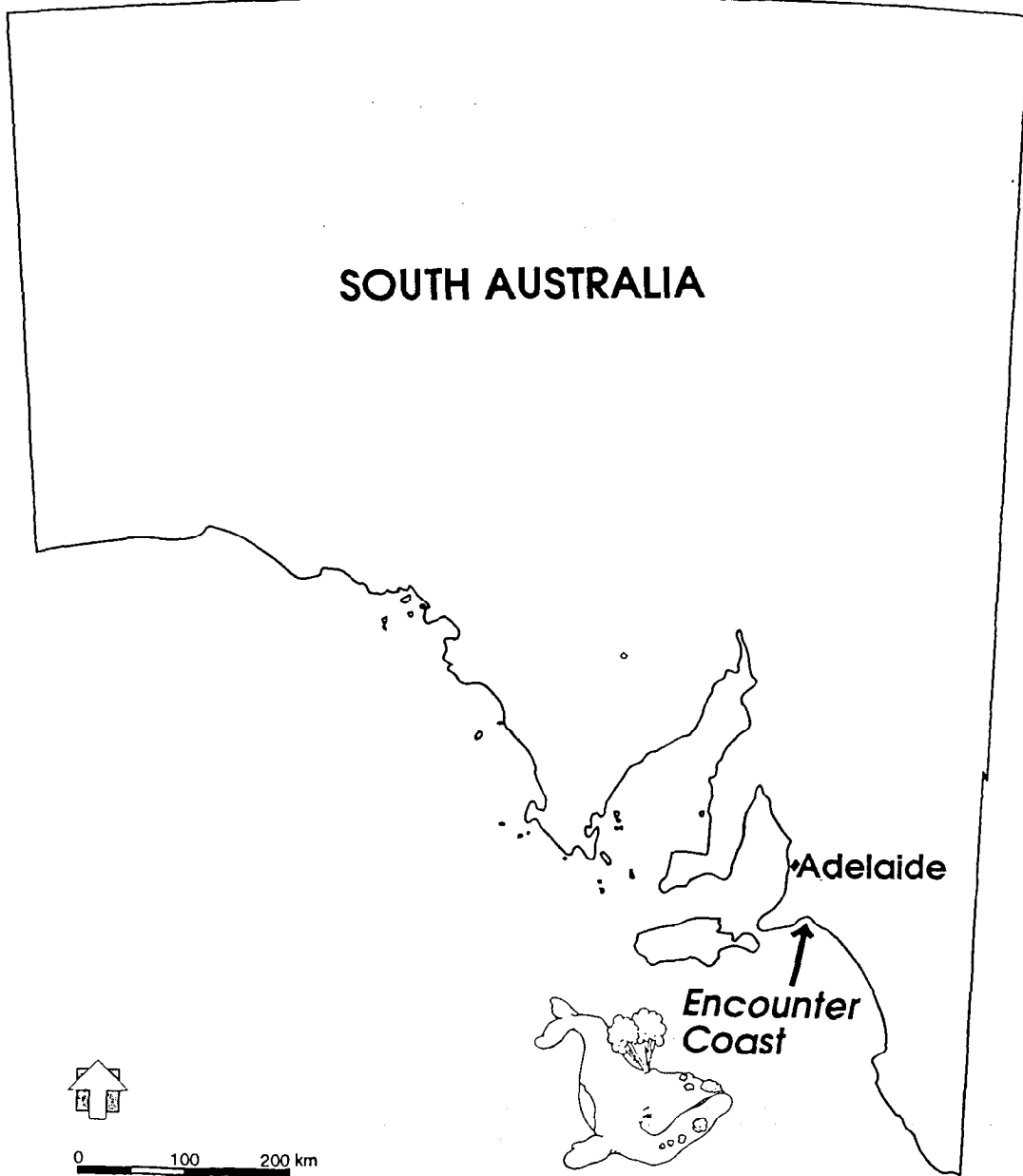
With the introduction of the community awareness campaign and promotion of the whale watchers environmental code, visitors' experiences will be enhanced. There is no intention to limit enjoyment.

The campaign aims to:

- educate the community in being aware that the coastal environment is fragile, and that we must 'tread lightly' to protect it for future generations.
- It encourages the public to be aware of their responsibility to local residents and their property.
- Most importantly by encouraging people to welcome the whales and not disturb them, it will hopefully assist in the whales staying longer in the area so even more people can enjoy and share this memorable experience.

The campaign's no frills message is -

**Do the right thing by
the coastal environment,
yourself,
the locals
and finally,
do the right thing by whales.**



Location of Encounter Coast, South Australia

Marine Pollution & Cetaceans - Implications for Management

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"... as the whales go, so go the oceans, and as the oceans go, so goes the environment, causing the whales to become the symbol of the international environment movement". (Governor of Colorado, 1976).

Introduction

Over the last eighty million years or so a number of separate groups of mammals, originally terrestrial animals, returned to the oceans to live. Although the oceans posed special problems for air-breathing, warm-blooded mammals, they also presented numerous advantages as a habitat. Environmental perturbations associated with climatic change, which so stress terrestrial animals, are buffered by the oceans, and the continuous, buoyant medium offers far greater support, mobility and access to abundant food supplies. Such factors, coupled with the possibility of escape from terrestrial predators, were perhaps the driving evolutionary forces behind the re-entry of mammals to the Earth's seas.

Early humans were probably familiar with some of their aquatic relatives. They realised that the whales and dolphins were different from the fishes, and also learned that these animals were good sources of food, clothing, fuel and other useful things. For at least five thousand years, human societies developed which both hunted and revered them. Dolphins were among the first symbolic animals of the maritime cultures of western civilisation, and the large whales have stimulated imagination, awe and myth since before biblical times.

Humans had, at first, little power to affect the marine mammals. Then, gradually, as the range of vessels was extended, whaling began to affect populations in ways visible to the hunters themselves. With the advent of mechanical power, the muscle of explosives and freezing, extraction and reduction methods, accompanied by the opening up of world markets, drastic reductions in the numbers and ranges of many species had occurred by the mid 20th century. This seriously threatened the very survival of some species of large whales, and even caused extinctions amongst some smaller species.

Fortunately, the ongoing developments in technology which allowed increasingly more "efficient" exploitation of whale resources, was accompanied by an increasing interest, concern and action by environmental and ethical lobby groups, the general community and some governments. This resulted in the gradual introduction of controls and scientific management of whaling through the International Whaling Commission (IWC), which culminated in a complete moratorium on whaling in 1986, with some allowance for "research" kills and indigenous/traditional hunting.

In general, the state of the Earth's whale populations has significantly improved since the introduction of management regimes by the IWC. However, unfortunately, human population, industrial development and production of wastes and pollutants has continued to grow at an exponential rate. This growth is posing a new, indirect threat to the Earth's marine mammals, a threat far more ominous and insidious, but just as real, as that presented by direct exploitation. This threat is marine pollution.

The very aspect of the marine environment that offered so many advantages to those early terrestrial mammals re-entering the sea, its continuity, may also be a great disadvantage. Pollutants are carried throughout the seas with no respect for boundaries drawn on maps by marine managers.

This paper provides a brief overview of some of the effects of marine pollution on whales and dolphins, with comments on implications for cetacean management. It does not purport to be a thorough scientific treatment of the subject, but simply attempts to demonstrate and reinforce, through a limited number of examples, some general concepts and principals that are vital to the successful conservation of whales as part of the broader global biosphere.

What is Marine Pollution?

Clark (1992) states "Everybody knows that pollution is a 'bad' thing, but in what way is it bad? Bad for what and for who? How bad?" The words 'marine pollution' are commonly used with a variety of meanings, including:

- . the environmental damage caused by wastes in the sea
- . the occurrence of wastes in the sea
- . the wastes themselves

Such multiplicity of meanings is confusing and does not allow for a clear analysis of the issue. It is therefore necessary to first provide a precise definition of 'marine pollution'. The United Nations Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) has recommended that the wastes themselves be referred to as 'inputs', the occurrence of them in the sea to be referred to as 'contamination', with the damaging effect that they have being defined as 'pollution'. Marine pollution may therefore be defined as:

"deleterious effects resulting, either directly or indirectly, from the introduction by humans of substances or energy to the marine environment".

Sources of Marine Pollution

Sources of marine pollution (inputs) can be divided into three main categories; terrestrial sources, atmospheric sources and ship sources.

Terrestrial sources

There are a number of inputs that come from terrestrial sources. These include:

- . point-source sewage discharges from urban areas (includes degradable organic wastes, nutrients such as phosphates and nitrates, heavy metals and other chemicals)
- . point-source waste discharges from industrial facilities (includes dioxins, cyanide, heavy metals, radioactivity and heat)
- . diffuse source stormwater run-off from urban areas (usually discharged at point source and includes heavy metals, hydrocarbons, other chemicals and garbage)
- . runoff of sediment, fertilisers and agricultural chemicals from rural areas (includes nutrients such as phosphates and nitrates, and herbicides and pesticides containing DDT, polychlorinated biphenyls (PCBs) etc)

Atmospheric sources

Wastes that are discharged to the atmosphere such as emissions from industrial facilities and vehicle exhausts are eventually returned to the sea via rain (eg. acid rain), or if particulate, as fallout. Atmospheric inputs are believed to be a fairly significant source of marine pollution. For example it is estimated that half of the total input of lead to the marine environment comes from vehicle exhausts (Clark, 1992).

Ship sources

Shipping generates a range of wastes that may be input to the marine environment:

- . sewage
- . garbage (including plastics, loss of fishing nets and other marine debris)
- . waste oil
- . accidental spills of cargo (including oil and hazardous chemicals from tankers)
- . disposal of spoil from dredging

Although public attention is often galvanised by shipping accidents that cause major, acute pollution incidents such as oil spills, shipping constitutes a minor source of marine pollution in comparison with terrestrial and atmospheric sources.

With so many inputs of wastes to the world's oceans there are numerous areas where examples of both low-level and severe marine pollution are evident. Enclosed bays and waterways adjacent to all major cities now exhibit levels of pollution that in many cases even affect human health, and enclosed seas such as the Baltic and Mediterranean today suffer severe chronic pollution.

The Effects on Cetaceans

Research into marine pollution and cetaceans did not seriously begin until the mid 1970's, and even today relatively little work is done in this area. Most studies concentrate on fisheries-type stock assessments, broad ecological studies or detailed work on ethology and physiology. However the work that has been done has revealed a number of serious actual and potential impacts of marine pollution on cetaceans.

Effects on Distribution and Range

Although many species of cetaceans range over large areas of the ocean in search of food, and undertake large migrations for reproductive and other purposes, some depend critically on the continued existence of certain limited habitats for their survival, and re-visit the same areas as part of regular, cyclic migration patterns. Such areas may be bays and lagoons used for feeding, mating and calving. An outstanding example is Hervey Bay in Queensland and parts of the inner route of the Great Barrier Reef that are used annually by humpback whales (*Megaptera novaeangliae*). While conventional scientific thought is that humpbacks do not feed during the annual, winter mating and calving visits to tropical waters, anecdotal observations from big-game boats report what appear to be humpbacks feeding on the large schools of bait-fish that congregate off Cape Bowling Green, south of Townsville, during the game-fishing season. Such coastal areas are the most easily affected by marine pollution. Should low-trophic order organisms such as baitfish ever become contaminated, they may cause pollution of whales feeding on them. Any reduction in food sources caused by marine pollution can force whales to go elsewhere in search of food.

Decreases in the abundances of certain species of whales have been clearly documented in correlation with increasing pollution in several areas around the world, notably the North Sea, the Sea of Azov, the Bay of Fundy and Tokyo Bay. It is not known whether these decreases are the result of an actual decrease in the total numbers of whales, or whether the whales have altered their range to avoid the polluted areas.

A classic example of cetacean numbers fluctuating in relation to pollution levels can be found in San Diego Bay, California. Until the mid-1960's, herds of bottlenose dolphins (*Tursiops truncatus*) were seen on almost a daily basis riding ferry bow-waves. However, between the 1950's and mid 1960's pollution levels in San Diego Bay rose dramatically, and by 1966 bottlenose dolphins were only sighted twice just inside the entrance to the Bay. By 1970, discharge of sewage and dredging in the Bay had stopped, and by 1972 bottlenose dolphins were again seen on a regular basis (FAO, 1978).

Such apparent effects of pollution are not only of significance to the cetaceans themselves, but also to human industries such as whale-watching that rely on the presence of the animals.

Effects on Reproduction

A direct effect of marine pollution on reproduction has been identified in the Californian sea lion (not a cetacean), where increased levels of DDT and PCB's correlated with increased numbers of premature births and mortality of new-born pups. PCB's are known to induce pathological changes in the reproductive organs and interfere with reproductive hormones in mammals in general. While data is unavailable on similar effects in whales and dolphins, small cetaceans have been shown to have a very poor capability to metabolise PCBs compared to birds and terrestrial mammals, and very high levels of DDT, PCBs and other chemicals have been found in the environment and tissues and organs of many small cetaceans (Borrel, 1993).

Any interference with the reproductive capability of cetaceans can have serious implications for the overall population. The reproductive cycle of cetaceans is basically adapted to environments which undergo seasonal change but are, in general, otherwise relatively constant. Populations of cetaceans are vulnerable to unnatural disturbances such as pollution by virtue of their universally low birth rates, late sexual maturity and relatively close and prolonged dependence of the young on adults (FAO, 1978).

Increased Susceptibility to Disease

PCB's are a recognised immuno-depressant and many researchers believe that high levels of these and other pollutants can significantly reduce the resistance of cetaceans to disease. Widespread and often unexplained dolphin deaths have been recorded throughout the world in recent years, a notable example being the large numbers of dead and dying striped dolphins (*Stenella coeruleoalba*) found on Mediterranean beaches during the summer of 1990 (Jones, 1991).

Direct Mortalities

Should contamination levels be high enough, it is possible for marine pollution to cause outright death of whales and dolphins. In the St Lawrence Estuary, Canada, where a marine reserve has been established to protect a resident population of the unusual beluga whales (*Delphinapterus leucas*), about one beluga corpse a week is being washed up. The dead whales are showing symptoms of depressed immune systems, complications with digestive systems and carcinogenic tumours. Testing of the whales' flesh has revealed levels of contamination so high that the corpses must be treated as toxic waste under Canadian legislation (Jones, 1991).

The St Lawrence flows through the industrial heartland of North America, and contains a cocktail of chemicals including PCBs, DDT and a range of polycyclic aromatic hydrocarbons (PAHs). This tragedy clearly demonstrates the inadequacy of attempting to manage populations for conservation based on artificial marine reserve boundaries and management regimes that do not recognise "upstream" sources of impact.

Oil spills

Although major marine oil spills receive significant media and public attention, their impacts on cetaceans are not believed to be severe, mainly due to the high mobility of these animals and the fact that oil floats on the surface of the ocean and is biodegradable. Whales and dolphins inadvertently surfacing through an oil slick to breathe may become oiled and inhale hydrocarbon vapours. This may result in eye irritation, possible short-term baleen fouling, possible blowhole fouling, respiratory stress and lung damage, especially in young, and oil ingestion. A review of the literature indicates that mortality due to an oil spill has not been verified for any cetacean. Indirect impacts may occur should oil pollution contaminate or reduce food sources.

Marine Debris

In the last thirty years, the use of plastics and other synthetic materials has expanded at a rapid pace, and the quantity of plastic debris entering the marine environment has undergone a corresponding increase. Many of these products degrade extremely slowly, and can persist in the marine environment for long periods, posing significant threats to marine mammals and other sea-life. The threats are straightforward and primarily mechanical, with animals either becoming entangled, trapped or somehow fouled in the debris, or ingesting it. This can retard mobility and/or feeding and can eventually result in death.

In addition to general plastic debris, lost and discarded fishing gear is a major problem in many areas. In the North Pacific, for example, there is an estimated 380 000 kilometres of fishing net and associated gear available for use in the major fisheries (Laist, 1987).

There is obviously potential for small cetaceans, especially dolphins, to become entangled in such marine debris. Detailed data does not exist on dolphin mortalities from such causes.

Conclusion and Recommendations - Implications for Cetacean Management

Marine pollution represents a significant threat to cetaceans. While the human species may applaud itself for having reversed the downward slide of major whale populations caused by direct exploitation through hunting, we still have a long way to go to ensure the continued existence of these magnificent creatures through maintenance of clean, healthy seas.

The future of whales does not depend upon whether whale watchers keep their boats 300 or 500 metres from the animals, but on whether continuing exponential growth in human population, and the spiralling increase in consumption of resources and production of wastes, can be managed sustainably.

Conservation plans for whales and dolphins, such as that being developed by the Queensland Department of Environment and Heritage, must include reference to the need for sound management of the marine environment as a whole. The tragic failure of the St Lawrence Estuary marine reserve to safeguard the conservation of its resident population of beluga whales, exemplifies the need to take a whole-systems approach where management regimes extend to the very boundaries of catchments.

The problem of protecting the whales is the problem of protecting the health of the ocean itself.

It is recommended that:

- Long-term, ongoing marine pollution monitoring programs be developed and implemented, including adequate sampling of significant cetacean habitat areas
- sampling for chemical contamination of blubber, flesh, organs and blood, and analysis of gut content for marine debris, be included as standard procedure during autopsies of dead stranded cetaceans,
- the data from the above two programs be recorded and maintained on a readily accessible centrally coordinated national/regional database,
- cetacean management plans recognise and identify inputs of pollution to the environment, adopt a whole ecosystem approach and extend to the boundaries of catchments, linking wherever possible with other environmental management plans and seeking to eliminate pollution at source.

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South Australian Encounters

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In recent years there has been a marked increase in cetacean sightings off the South Australian coast. This increase relates to an increase in whale numbers but also indicates heightened public awareness to whales, whale watching and reporting of sightings.

There are 25 species of cetaceans recorded in S.A. waters varying from the cryptic Straptooth and Beaked whales to the more obvious large baleen whales such as Humpbacks and Southern Right whales.

The most commonly encountered whale in the sheltered coastal bays and inlets is the Southern Right. Approximately 100 individuals visit South Australian waters of a possible world wide population of 3000. These whales are often seen during winter months in the Encounter Bay area South of Adelaide, Kangaroo Island, gulf waters and the West Coast where warmer water provides the attraction for pregnant females to give birth. The head of the Bight area on the states west coast is the area of greatest activity. On the 12th August 1993 56 Southern Right whales and 23 calves were counted. Observations of courting, mating, giving birth and other behavioural studies are currently being undertaken at the head of the Bight by Steve Burnell from the University of Sydney, Veterinary Anatomy Department, providing valuable information on this little known species.

Whale watching activities by the public are concentrated around the head of the Bight and Encounter Bay and opportunistically around the state. The sheer remoteness of the Bight area provides protection to the Southern Rights. The area is accessible through Yalata Aboriginal land and high cliffs above the bays and inlets provide protection to the Whales from human activity and interference.

The Encounter Bay area centred around the popular Victor Harbour holiday town provides for good whale watching through the winter months. the sheltered bays along this coast provide ideal waters for giving birth, these shallow sheltered and relatively warm waters were once south by large numbers of Whales prior to intensive whaling in the 19th century. In excess of 26,000 Southern Right whales were taken in Australian and New Zealand waters with Encounter Bay operations being a major centre of this industry.

Southern Right whales have returned to this area in low numbers, however the accessibility of the area and the whales habit of hugging the coast provides many rewarding experiences to south coast Whale watchers. Numbers of watchers vary depending on whale visits. The 1991 season attracted an estimated 70,000 - 100,000 whale watchers. Peak viewing is encountered when the animals occasionally remain in the bay for up to two weeks at a time.

The winter months whale watching generally involves very few whales. Perhaps 6 whales can provide the whale watching to large numbers of people. These few whales tend to remain within the area bounded by Encounter Bay, Gulf St. Vincent and Kangaroo Island during the whole whale season often returning to Encounter Bay on several occasions.

The benefit to the economy of the Encounter Bay area is obvious and this in itself provides a degree of protection for the whales. The major impacts of this shore based whale watching is on the coastal environment with damage caused to coastal dunes in the past has been excessive.

Within the local area a co-operative approach to the management of Whale watching has been taken. Consultation between the two shore based whale watching operators, local government, tourism departments, S.A. Police and Department of Environment and Natural Resources officers has resulted in a concerted effort to protect the whales, whale watchers and the coastal environment whilst enhancing whale watching experiences.

Strategies such as media bans on whale sightings in environmentally sensitive sand dune areas, a mobile Department of Environment and Natural Resources information service on site, and concerted education campaigns outlined by Dick Olesinski are achieving the desired aim. Amendments to the National Parks and Wildlife Act have provided a more appropriate legislative approach to whale protection. Previously Section 68 of the National Parks and Wildlife Act referred only to injuring or molesting protected animals which did not address the issue uncontrolled access to whales by swimmers, boats or aircraft. To provide guidance to whale watchers guidelines were formulated based on existing Australian National Parks and Wildlife Service whale watching guidelines. These guidelines were modified to incorporate Encounter Bay management objectives. The Encounter Bay area was zoned to cover inshore and offshore waters. The inshore protection area required modifications of the Australian National Parks and Wildlife Service guidelines resulting in boats and swimmers being restricted to 300 metres from whales within the inshore zone whilst aircraft are restricted to the recognised 300m height above whales, with helicopters to avoid flying directly over whales.

FUTURE DIRECTIONS

The major emphasis to the management of whale watching along the South Australian coastline is through public education and awareness with information being directed state wide and within the Encounter Bay area.

To provide legislative backing to the protection of whales within south Australian waters Amendments to the South Australian National Parks and Wildlife Act were required. Previously the only relevant section of the Act (apart from taking of protected fauna) was Section 68 which prohibits the injury or molesting of protected animals.

Recent Amendments to the National Parks and Wildlife Act have provided additional protection for Whales by including powers to wardens to direct persons not to undertake or continue acts or activities that is or is likely to be detrimental to the welfare of protected animals.

The Amendments also allow for the development of specific whale watching regulations. These regulations being formulated at present will provide for the management of whale watching within South Australian waters. These regulations will follow closely existing guidelines with some modifications such as ability to provide permits for scientific research and whale watching activities.

The future management of whales within South Australian is somewhat reliant on the on-going research by the South Australian Museum and behavioural studies being undertaken at the head of the Bight. The museum undertakes monitoring of whales through photographic records of head callosities patterns. Much of this work is undertaken from the air with regular flights through South Eastern Australia. This research is undertaken with sponsorship forthcoming from B.H.P.

Whale watching in South Australia should continue to develop. The public interest in the Southern Right whale will continue to grow. The current public awareness campaign should be further developed to minimise impacts on the coastal environment and provide the protection against disturbance required for whale numbers to increase.

The issue of boat and aerial whale watching activities will be watched closely. Future regulations will address this issue within areas such as Encounter Bay and the head of the Bight. This activity is minimal at present and is to be managed closely to avoid disturbance to Whales and the Whale watching public.

The future looks positive for whale watching in South Australia and hopefully the coming years will provide more encounters as the Southern Right whale returns to south Australian waters.

**Beyond the breach -
Managing for whale conservation and whale
watching in Hervey Bay Marine Park, Qld**

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A Whale Management and Monitoring Area (WMMA) was designated in conjunction with declaration of the Hervey Bay Marine Park in September 1989. The objective of the designated area is:

To manage human activities in the vicinity of Humpback whales (*Megaptera novaeangliae*) and monitor the effects of such activities to ensure the protection of the whales.

Between 1 August and 30 November each year conditions apply to the use of and entry to the designated area in relation to:

- the conduct of tourist, research, and commercial photography/film making programs (permits required for these programs); and,
- activities in the vicinity of Humpback whales.

The WMMA is part of the area considered in the Commission of Inquiry into the Conservation, Management and Use of Fraser Island and the Great Sandy Region. In accordance with the inquiry a draft management plan (Qld. Govt. 1993) has been prepared to address planning, management and control of the region. The draft plan has recently been released for public comment.

Following inscription of Fraser Island on the World Heritage List in December 1992, part of the WMMA now falls within the Fraser Island World Heritage Property which comprises an area bounded by and including 500 metres seaward of Fraser Island and a number of small adjacent islands. The Queensland Government is committed to protecting the outstanding values of the remaining areas of the Great Sandy Region, as defined by the Commission of Inquiry, and will continue to press for World Heritage Listing of Cooloola National Park, the Great Sandy Strait and Hervey Bay.

This paper reports on the use of and entry to the WMMA during the 1992 season and follows similar reports for previous seasons (Stevens 1991, Stevens and Paton 1992).

TOURIST PROGRAMS BASED ON HUMPBACK WHALES.

Permitted operations

Twenty permits were issued in 1990 and reissued in 1991 for the conduct of tourist programs based on Humpback whales and associated vessel use. These permits are valid for a three year period, to 30 November 1993.

Permits are divided into six classifications based on vessel size and speed. The classification scheme is summarised below.

Table 1.

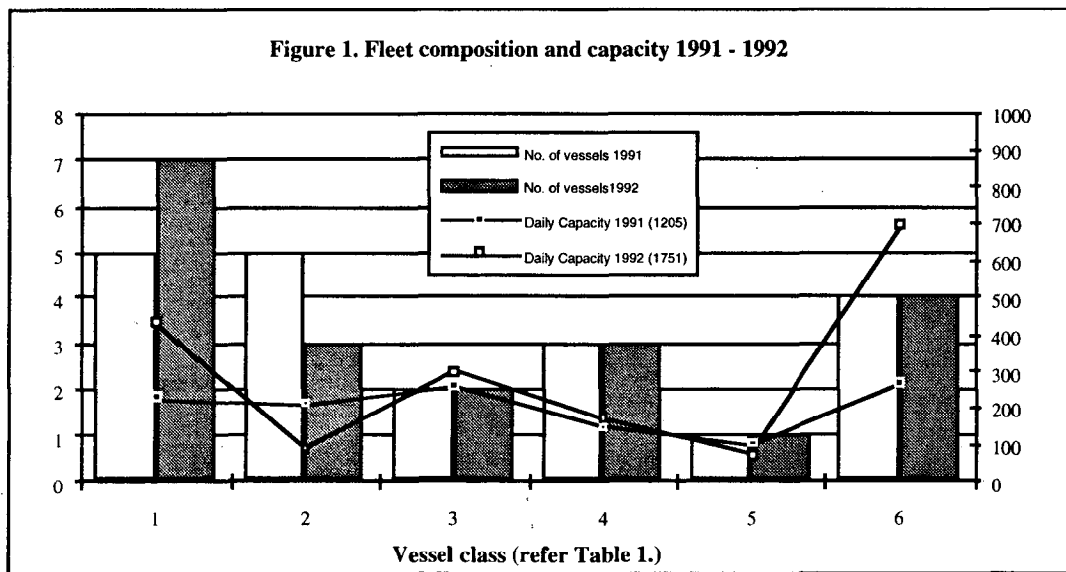
WHALE MANAGEMENT AND MONITORING AREA
VESSEL CLASSIFICATION SCHEME - 1992

		LENGTH OVER ALL (metres)			
SPEED		15m or less	>15m to 20m	>20m to 30m	
More than 15 knots	Class 1 (7)	Class 3 (2)	Class 5 (1)		FAST
15 knots or less	Class 2 (3)	Class 4 (3)	Class 6 (4)		SLOW
Number of vessels ()		SMALL <-----> LARGE			

Fleet configuration, operation and capacity in 1992 altered from the 1991 season due to:

- permit transfers resulting in two new operators;
- two operations transferred between class (from Class 2 to Class 1);
- four vessels were replaced or upgraded;
- one permittee granted an exemption from operating in 1991 returned in 1992;
- one permittee did not operate throughout the season.

The net result of these changes has been an increase in both potential trip frequency (transfers to a faster Class) and in passenger capacity (vessel replacement/upgrade). Figure 1 shows changes in the fleet composition and capacity from 1991 to 1992. Capacity increases reflecting the changes described above are evident in Classes 1 and 6.



19 vessels operated a variety of tours, from half-day to extended overnight trips during the 1992 season.

A fee is payable, based on vessel size, for the issue or continuation of a permit for a commercial whale watching programme (<15 metres - \$500, >15 to 20 metres - \$800, >20 to 30 metres - \$1500). A fee is also payable for each person carried on permitted commercial whale watching programmes (<5 years - \$0, 5 to 14 years - \$1, >14 years - \$2). These fees are applied to the management of the WMMA. Charges have remained the same since the advent of the permit system in 1990. Fees will be considered in conjunction with the review of permitted operations.

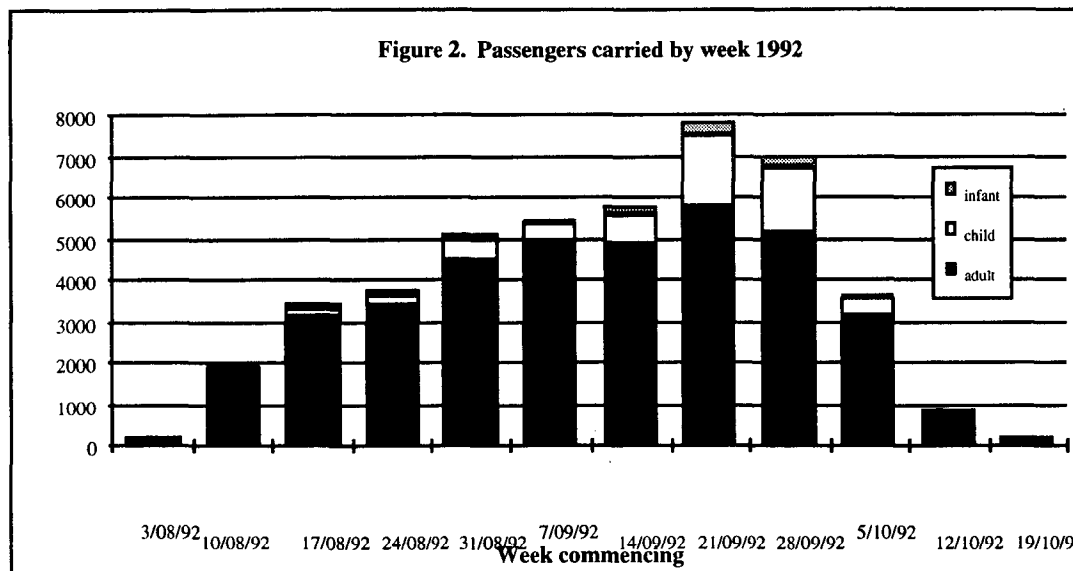
Analysis of 1992 season from data returns.

Permit operators are required to submit information relating to the number of clients who participate in the tourist program; trip duration; locations visited ; whale pods contacted; and details of notable incidents.

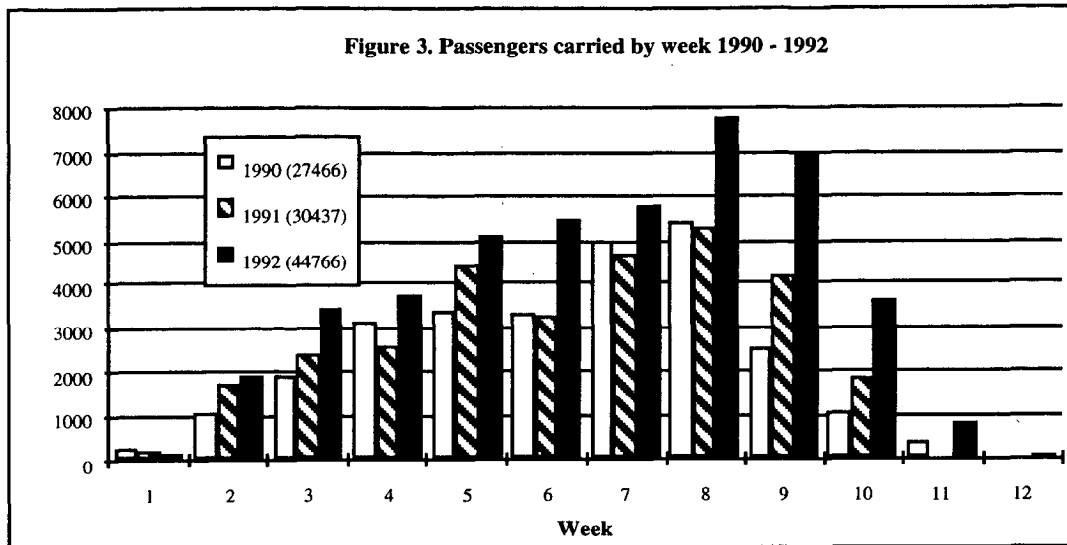
The 1992 whale watching season was characterised by moderate weather conditions with only 3 - 4 days of potential whale watching lost to bad weather.

Whale watching trips were conducted from August 5 to October 19. A total of 44766 passengers were carried on 964 trips. This represents an increase of 47.5% on passengers carried in the 1991 season and 63% on the corresponding 1990 season (Table 2.).

Figure 2 illustrates the weekly distribution of passengers carried throughout the 1992 season .



Rather than an even distribution across the fleet, the increased visitation over 1992 was largely sustained by two Class 6 vessels - one operating following an exemption in 1991, and the other a new vessel upgraded from within its class (Figure 4.).



The comparison between years shown in Figure 3 highlights the increased level and extent of visitation during 1992. Increased visitation during the school holiday period (weeks 8 and 9) is readily apparent. Increased passenger numbers in 1992 were sustained over a longer period than in previous seasons.

An examination of equivalent net change in passengers carried by the fleet from 1991 to 1992 reveals only 4 operations showed an increase of more than 10% in passengers carried over the period. Six operations showed an increase in the number of passengers carried of less than 6%, while the remaining 9 operations recorded a net decline.

Table 2 outlines summary information from the 1992 season (comparative figures for 1990 and 1991 are also included).

Commercial whale watching trips have increased in frequency, duration and extent in recent seasons as operators upgrade vessels and exploit market niches. Data from the period 1990 to 1992 indicate a 16% increase in vessel trips; 14% more total hours spent in the Marine Park; and a 14% rise in total pod contact. Anecdotal information suggests that recreational vessel use has also increased particularly during peak periods (school holidays and weekends).

Associated with the increased numbers of passengers has been an increase in fleet capacity over the corresponding period. Fleet capacity - the maximum number of passenger seats available over time - increased during 1992 by 49% on 1991 capacity; and 26% on 1990 capacity, to 1751 per day (Figure 1, Table 2.).

**Table 2. Whale Management and Monitoring Program
Summary information* 1990 - 1992**

	1992	1991	1990
Passengers carried	44766	30437	27466
Trips undertaken	964	784	832
Hours in Marine Park	4758	3880	4172
Whale pod contacts(1)	2609	1644	2291
Number of vessels operating(2)	19	19	20
Daily fleet capacity(3)	1751	1205	1429
Theoretical daily fleet capacity	2915	1906	N/A

* data from permittee returns

(1) Refers to the total number of pods contacted through the season by all vessels.

Note: Some permittees do not record pods contacted -
these numbers underestimate total season contacts

(2) Commercial whale watch vessels -

configuration (vessel speed and length) may vary between years.

(3) Actual number of passenger seats available per day

Fleet capacity may vary due to an alteration in one or more of the following factors:

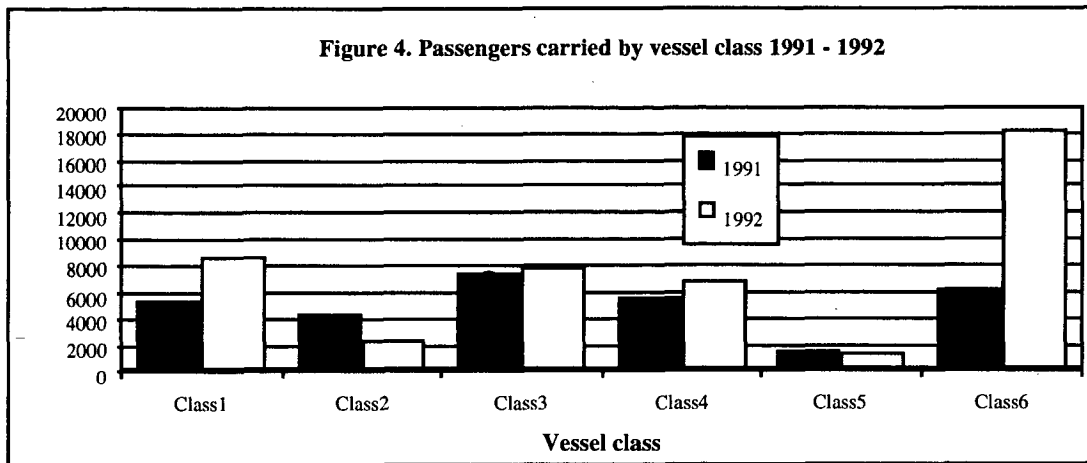
- change to the actual number of vessels operating,
- upgrading vessel passenger capacity within the vessel classification scheme,
- movement between vessel classes (effectively altering trip frequency).

Each of these factors has come into play during the period.

Theoretical fleet capacity - a measure of estimated capacity if the limits of the classification scheme were exploited - when compared with actual capacity, allows an indication of potential growth in the fleet. Refining the conservative approach described by Stevens (1992), and adopting a high passenger capacity estimate (based on the largest carrier within each class) the theoretical capacity is 2915 passengers per day. This figure assumes Class 1 and 2 vessels will carry 65 passengers; Class 3 and 4, 100 passengers; and Class 5 and 6, 300 passengers.

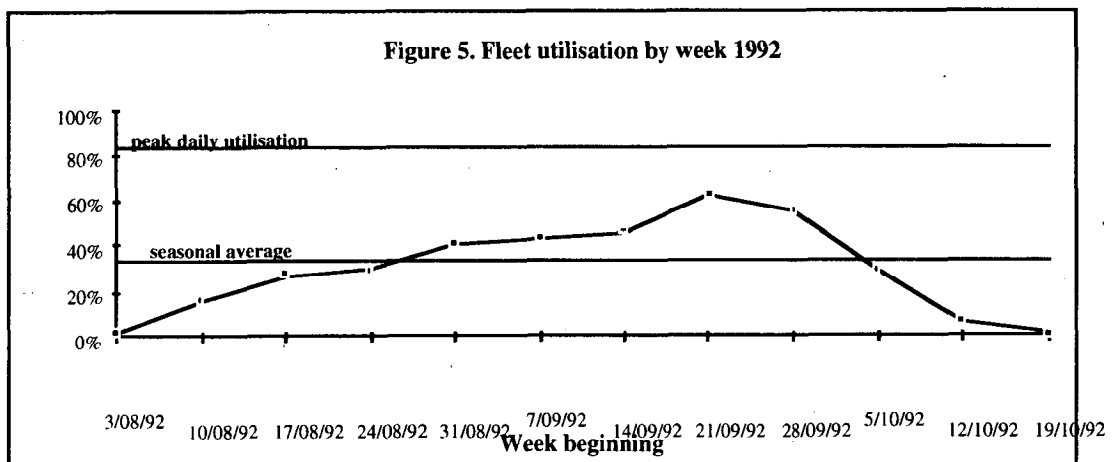
It should be noted that while maximising passenger numbers and minimising vessels is a key objective of the management model (Chaloupka 1990), and serves to maximise whale protection objectives, the pursuit of maximum capacity may come at the expense of the whale watching experience. Clearly a suitable fleet capacity, in terms of passenger experience, would fall somewhere short of the theoretical capacity described above. Surveying visitor preference with respect to crowding may assist in determining an appropriate fleet capacity from the whale watchers' perspective and give a better indication of potential industry growth within the vessel classification scheme.

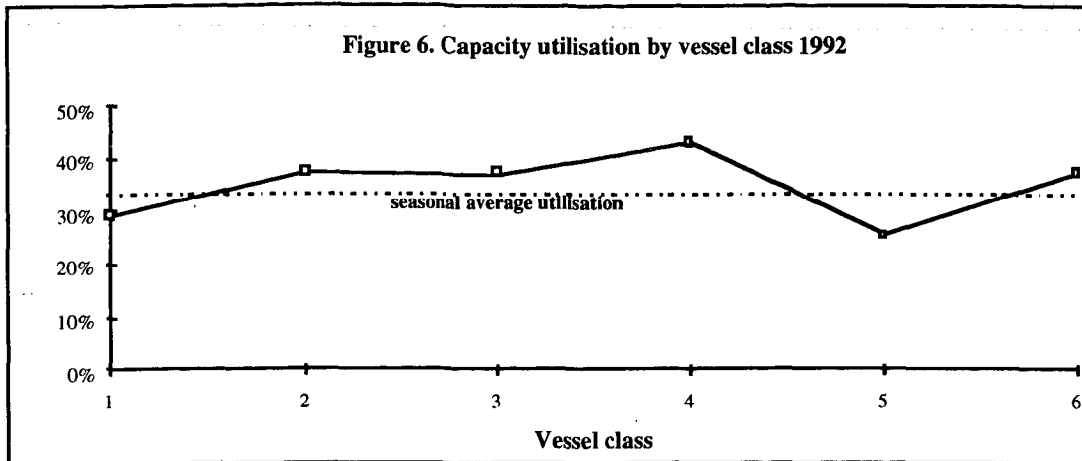
The breakdown of passengers carried, by vessel class, shown in Figure 4 indicates that approximately 40% of all passengers were carried by Class 6 - large/slow vessels (90% of these passengers were carried by two vessels referred to above). 60% of all passengers were carried on *slow* vessels and 40% on *fast* vessels.



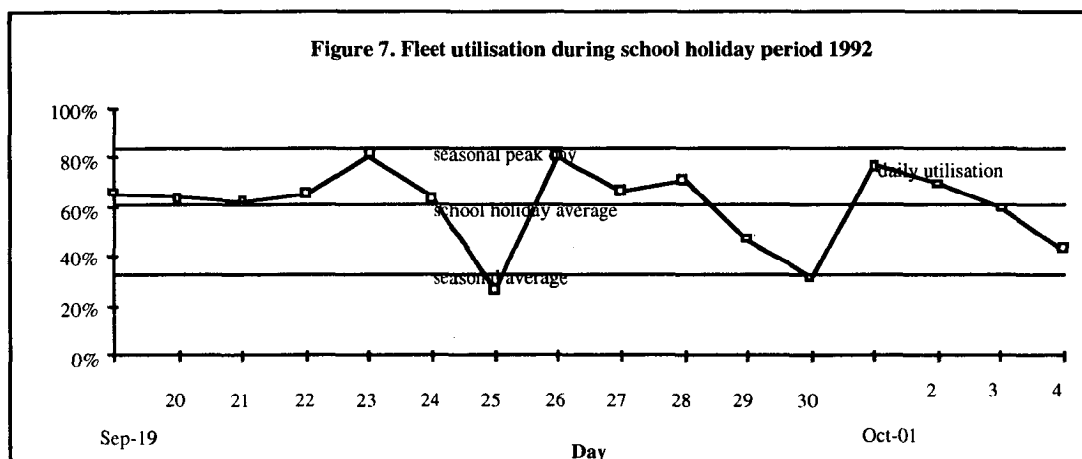
Fleet utilisation - the number of available passenger seats actually filled - averaged over the season has increased by only 4.6% over the period 1990 - 1992.

Figure 5 shows the percentage of available seats filled throughout the season. Figure 6 illustrates the actual number of available seats used in each vessel class.





Fleet utilisation during the 1992 school holiday period, historically a high visitor demand period, is shown in Figure 7. An average of 62% of available seats were filled during this period. Interestingly the peak day in terms of visitation for the season fell outside this period when 1453 people (83% of capacity) went whale watching on commercial vessels on Saturday 5 September (the Father's Day weekend).



There remains considerable latent capacity within the fleet to satisfy future growth in visitor numbers both throughout the season and during high visitation periods. In addition there are significant opportunities to convert potential and as yet unrealised capacity, through vessels upgrading within the vessel classification system.

Incidents reported.

Notable incidents reported by the whale watch fleet during the 1992 season included:

- the first Humpback calf sighted on September 1;
- an all-white Humpback sighted on September 13;
- a collision with a whale reported by a commercial whale watch vessel returning to Urangan Harbour; minor injury was sustained by the whale, identification photographs were taken of the animal and accompanying pod members. No damage was sustained by the vessel;
- high recreational boat traffic during the middle of the season; and,
- whale song recorded throughout the season by a number of vessels.

Issues raised by Commercial Tour Operators.

On completion of the 1992 season, and at a meeting to review the season, commercial tour permittees were invited to forward reports on the season. Four written reports were received. The following points represent issues of concern raised:

- Private vessel activity appears to have increased.
 - ..some operators felt that further restrictions should be imposed on private vessel use, and that management effort be directed toward increasing awareness amongst private boat operators about the regulations applied to whale watching.
- Research access to whales is too liberal.
 - ..some operators considered research organisations were given too much access to the whales in terms of approach distance and time spent with whales.
 - ..concern was expressed at the apparently excessive amount of time spent with the white whale in particular.
- Regulations should be adequate, fair, achievable, and realistic.
- The white whale as a special case.
 - ..operators were concerned that access to this animal be maintained but that potential harassment be minimised. Suggestions were put forward relating to possible revised approach distances and contact times with this animal.
- Potential whale/vessel collisions and near misses.
 - ..some operators reported on the increasing risk of collisions during the season. A number of suggestions were forwarded relating to vessel speed limits, the establishment of transit corridors, and the need to increase awareness of the risk of such events in Hervey Bay.

In addition to these issues some operators provided feedback on other aspects of the season including:

- a high degree of cooperation was developed amongst permittees;
- travelling time to whales appeared to be less than in previous years (particularly compared with 1991);
- mother/calf pods appeared earlier, and in larger numbers than in previous years. These pods apparently showed a greater tendency to remain in the vicinity of vessels than in previous years;
- a substantial increase in passenger numbers was noted;
- fleet occupancy was reduced due to the introduction of larger vessels;
- lower profitability was reported due to increased competition; and,
- a marked reduction of passengers was noted following the school holiday period.

RESEARCH PROGRAMS BASED ON HUMPBACK WHALES.

Calls for expressions of interest for research permits in the Hervey Bay Marine Park were sought in April 1992. Individuals and organisations who had previously conducted research were contacted and an advertisement was placed in the bulletin of the Australian Marine Science Association outlining assessment criteria and identified research needs.

The following criteria were used to assess research applications:

- research must be of a bona fide scientific nature;
- justification must be provided for the research to be undertaken in the Marine Park, as opposed to other marine areas; and,
- preference will be given to research of an applied nature which will assist with ongoing management of the Park and the future conservation of whales.

Research needs identified included:

- vessel/whale interaction
 - .. acoustic impacts
 - .. whale behaviour
- spatial and temporal use of Hervey Bay by the migrating Humpback whale population
 - .. aerial survey
 - .. photo-identification

Seven proposals were received from four research groups/individuals addressing a wide range of projects including:

- photographic identification;
- aerial survey;
- radio telemetric studies;
- seasonal distribution and abundance patterns;
- interspecies communication; and,
- structured data collection.

Six proposals were submitted for peer review. The remaining proposal did not address identified research needs and did not meet the assessment criteria. One proposal (structured data collection) did not require a permit.

Following consideration of reviewer comments one permit was issued for the conduct of boat based surveys to:

- undertake photographic identification of individual animals;
- document distribution and movement patterns;
- describe behavioural characteristics associated with different social groupings;
- document surface temperature and turbidity characteristics; and,
- opportunistically collect acoustic data.

Initial results from this research project reveal that 216 whales were uniquely identified by tail fluke markings. Thirty-one whales were observed on more than one occasion, from one to thirty days following initial identification - 80% of these resights occurred within three days of the original sighting (Forestell and Kaufman, 1993).

In addition two commercial whale watch vessels devoted extensive effort to structured data gathering - recording and compiling information including whale locations, behaviours and song, and physical conditions.

A number of vessels undertook incidental recording or used the data return forms to provide anecdotal information on the 1992 migration.

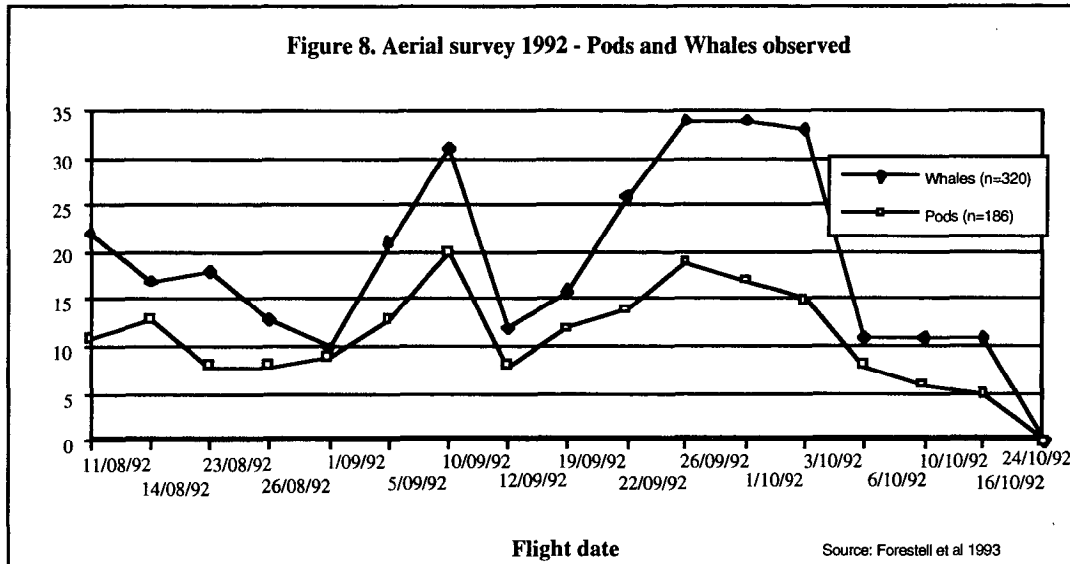
Aerial Survey.

Aerial surveys have been conducted by external organisations and by DEH, from 1988 to 1992 (Bryden et al 1988, Bryden and Corkeron 1989, Bryden 1990, Forestell et al 1993), in an attempt to:

- determine patterns of spatial and temporal distribution of Humpback whales and vessels;
- determine whale pod composition;
- document the behaviour of whales adjacent to and remote from vessels;
- determine the proportion and nature of the migratory Humpback whale population that uses Hervey Bay; and,
- obtain incidental information on the distribution of other marine mammals and marine turtles.

The information gathered is fundamental to decision making and management in the Whale Management and Monitoring Area and can provide valuable information on the use of the Marine Park within and between years.

Summary results from 1992 survey data indicate that 186 pods representing 320 animals were observed over 17 flights undertaken between August 10 and October 24. Figure 8 shows the pattern of whale pod observation recorded during 1992.



While very useful data has been gathered to date, there has been some inconsistency in methodology used, timing of surveys, and observer experience applied, which may compromise integrity of the data and limit useful analysis. A review of aerial survey methodology is currently underway to address these inconsistencies and to propose aerial survey design to assist future management of the area.

A research permit was also issued for a project to examine the importance of deep water seagrass meadows to Dugongs (*Dugong dugon*) in Hervey Bay. Project work was limited due to the decline in Dugong numbers in the Bay as an apparent response to the loss of extensive areas of seagrass meadows following significant flood events in the region early in 1992. A collaborative project to map remaining seagrass in the area was undertaken by researchers from James Cook University and the Queensland Department of Primary Industries with support from the Department of Environment and Heritage.

It is apparent that there are few groups or individuals with the expertise and availability to undertake long-term Humpback whale research in Hervey Bay. There are significant conservation management and whale watching issues which remain unresolved, including:

- the significance of Hervey Bay for Humpback whales;
- the proportion and nature of the migratory population using Hervey Bay;
- critical habitat for age/sex cohorts within the embayment;
- behavioural response to vessel activity and noise;
- impacts of vessels on the migratory whale population;
- adequacy of current legislative measures;
- visitor satisfaction levels; and,
- adequacy of current management initiatives.

Ironically, the developing trend of whale watching along Australia's east coast may provide the impetus to addressing some of these issues through the commitment of management resources and long-term funded research programs. The application of some passenger levy fees to research projects should be continued and, where appropriate, extended. The

potential benefits to both whale conservation and the whale watching industry are significant

Appropriate research efforts will continue to be encouraged and supported, to assist management in meeting the objectives of the Whale Management and Monitoring Area.

Visitor surveys.

No visitor surveys were undertaken during the 1992 season. A detailed visitor survey is being considered for 1993 to gather information on visitor demographics and preferences. Input from the whale watch industry will be sought in developing and administering the survey.

COMMERCIAL PHOTOGRAPHY, FILM MAKING/VIDEO MAKING

Five applications were received requesting permission to approach inside the minimum regulated distance (100 metres) for photography and film making. One permit was issued to facilitate sketching and photography of whales.

The approach adopted in the issue of such permits has been to consider:

- the contribution such activities will make to the protection and conservation of Humpback whales in Hervey Bay;
- experience of the proponent as a natural history photographer/film maker, with particular relevance to whales;
- justification, if sought, for approach closer than that allowed under regulation;
- vessel to be used and activities to be undertaken; and,
- the specific nature and type of photography or film sought.

With regard to the considerations above, proponents were encouraged to undertake activities in accordance with the regulations for whale watching.

DEH will continue to develop a photographic record of the use of Hervey Bay by whales and vessels, to limit the need for approach closer than that allowed by regulations. The photographic library will be available for use by commercial organisations and individuals in conjunction with departmental policy.

MANAGEMENT ACTIVITIES

DEH management responsibilities referred to in the Hervey Bay Marine Park Zoning Plan involve measures to protect, permit, monitor, advise and consult, to achieve the objective of the Whale Management and Monitoring Area referred to above. Departmental activities focus on user group liaison, patrol activities, enforcement, interpretation and education, coordination of monitoring and research activities, and permit administration.

Other organisations with functional roles relating to the area include the Queensland Boating and Fisheries Patrol (QBFP) with responsibilities for Marine and Fisheries legislation, and the Queensland Department of Transport with responsibilities for vessel survey certification.

In accordance with the *Nature Conservation Act 1992*, protected wildlife is to be managed to conserve the wildlife and its values, and to ensure that any use of the wildlife for (amongst other uses) scientific study, recreational or commercial purposes, is ecologically sustainable. The Act has three broad outcomes - the security of nature, the sustainable use of nature, and access to nature. In conjunction with full proclamation of the *Nature Conservation Act 1992* a conservation plan and associated strategic plan is being prepared for all cetaceans, including Humpback whales. Public comment will be invited during the preparation of these plans .

Management planning initiatives

The Draft Great Sandy Region Management Plan (Qld. Govt. 1993) has been prepared to protect natural, cultural and economic values and to provide a framework for decision making so that the following outcomes may be achieved by or before the year 2010:

- a secure future for the natural and cultural environment;
- a secure community setting for residents;
- community access to resources and opportunities; and,
- a basis for sustainable use of renewable resources.

The plan proposes guidelines and actions with implications for the Whale Management and Monitoring Program included within the following strategies:

- Marine and terrestrial wildlife;
- Research, monitoring and scientific sites;
- Recreation tourism and visitor use;
- Charges for access and use;
- Recreation research and monitoring;
- Public contact;
- Nature Tourism;
- Whale watching; and ,
- Motorised water activities.

Efforts to attract visitors earlier in the season may prove beneficial to whale conservation and to the whale watch industry by exploiting a poorly patronised time when relatively high numbers of whale pods have been reported in Hervey Bay (see Figure 8.), and by limiting impacts on the more vulnerable mother and calf component of the population.

Nature tourism to the Great Sandy Region is to be promoted via a \$500 000 Tourism Promotion Strategy for Fraser Island, Hervey Bay and Maryborough. Specific funding is to be allocated from the strategy for the promotion of whale watching. Interest in and visitation during the whale watch season is expected to increase as a result.

It remains important to generate a realistic expectation for whale watchers through focussing on the opportunity for viewing wild animals in the wild. It is also important to educate Park visitors about the biology and ecology of Humpback whales and the marine environment in general. In this regard tour operators have an important role to play. In accordance with recommendations in the Draft Great Sandy Region Management Plan (Qld. Govt 1993) consideration will be given to the development of a tour operator accreditation program whereby the tourism industry is provided with training in quality interpretation to increase visitor enjoyment and understanding of Humpback whales and the marine environment.

Liaison

A seminar attended by approximately sixty people representing permit holders, vessel skippers and crew, booking agents, management agencies, researchers and film makers was conducted as a preliminary to the 1992 season, addressing the following program:

- An introduction to the 1992 season;*
- DEH operations in Hervey Bay Marine Park;*
- Australian research and management - Hervey Bay's Humpback whales in a national perspective;*
- Humpback whale population interchange;*

-A commercial tour operator's perspective on Humpback whale research and management;

-Research and filming in the Hervey Bay Marine Park 1992.

A meeting was held with three tour operators and their crews, representing operations which had been transferred since 1991, to explain in detail the regulations applying to whale watching; the Hervey Bay Marine Park Zoning Plan; tour operator permit conditions; the code of ethics and appropriate practices for whale watching; and DEH roles and responsibilities in the area. This process will be a standard requirement for the transfer or issue of any permitted operation.

Patrol activities/enforcement

Field operations involved use of the Departmental vessel **MV Prion**, supported by surveillance flights and undercover operations. 57 patrol days proceeded between August 16 and October 20. The patrol vessel undertook both enforcement and education duties throughout the season making contact with 51 private vessels (Table 3.).

Prosecutions resulting from alleged breaches of the Hervey Bay Marine Park Zoning Plan in 1991, were brought before the courts in 1992/93. Two persons were convicted; one case was dismissed; and three cases were withdrawn. An investigation from an alleged breach of the whale watch regulations during the 1992 season is proceeding.

Table 3. Patrol and enforcement outcomes

USER GROUP	CONTACTS	CAUTIONS	INVESTIGATIONS
Private	51	5	-
Research	Frequent	-	-
Commercial Operator	Frequent	4	1

Field operations conducted throughout the year continue to support the value of patrol presence and covert operations in the Marine Park as effective management tools.

The commercial whale watch fleet offers a diverse range of opportunities for passengers including early morning departures and late afternoon cruises. Management activities need to be flexible enough to allow coverage in conjunction with all user group activities.

The lack of a locally based designated vessel and crew for use in Hervey Bay continues to impact on the efficiency and effectiveness of the DEH management program in the area, and on other areas from where vessels are withdrawn.

Interpretation and education

In addition to seminars and meetings, and field operations described above, a program of public contact/interpretation, and education was undertaken involving the following elements:

- **publications** : park guides and information brochures
- ***Breathing Space*** : an educational video prepared by DEH and distributed to commercial tour permittees and sectors of the regional tourism industry. The video is for sale through DEH outlets. A short community service announcement targeted at private vessel operators, outlining the whale watching regulations was prepared in conjunction with this video and broadcast by local television stations during the season.
- **media liaison** : promotional, educational and current issues exposure amongst local and regional media outlets
- **on vessel interpretation** : assessment of educational programs across the whale watch fleet, and extension services to provide assistance with information and techniques
- **schools and community groups** : presentations and support information for curriculum programs and community group meetings

Permits administration

In conjunction with departmental regionalisation, administration and assessment of activities relevant to the Whale Management and Monitoring Area were undertaken from the Maryborough Office to assist with program delivery and to enhance the opportunities for contact with user groups. Significant assistance was provided by Head Office staff to support the transfer of management arrangements.

HERVEY BAY MARINE PARK PERMITS ADVISORY COMMITTEE.

This committee provides advice on issues concerning Humpback whales in the Marine Park and comprises representatives of:

- persons experienced in the conduct of tourist programs based on Humpback whales;
- persons having expertise in the conservation and management of Humpback whales;
- persons having scientific knowledge of the conservation status and biology of whales and of whale behaviour; and,
- the Hervey Bay City Council.

In addition persons nominated by committee members as observers, and representatives of DEH involved in coordination of the Whale Management and Monitoring Program attended meetings.

The committee met on three occasions 14 February 1992, 12 June 1992, and 22 January 1993, in Maryborough.

SUMMARY.

The 1992 Whale Management and Monitoring Program was characterised by a significant increase in the number of visitors travelling on commercial vessels to observe the migrating Humpback whales in Hervey Bay Marine Park.

Total visitor numbers increased by 47% on 1991 figures to 44,766. The majority of this increase was sustained by two of the larger fleet vessels.

Commercial whale watching trips have increased in frequency, duration and extent in recent seasons as operators upgrade vessels and exploit market niches. Data from the period 1990 to 1992 indicate a 16% increase in vessel trips; 14% more total hours spent in the Marine Park; and a 14% rise in total pod contact. Anecdotal information suggests that recreational vessel use has also increased, particularly during peak periods (school holidays and weekends). Favourable weather conditions throughout the 1992 season allowed greater access to whales than previous years.

However, there is still considerable under-utilisation of passenger capacity both throughout the season and during peak periods, allowing for substantial industry growth within existing management guidelines.

An all-white Humpback whale, which had been previously sighted along the east coast - East Gippsland (Vic.), Eden (NSW), and the Whitsunday Islands - appeared in Hervey Bay on 13 September in the company of a large pod of whales. Considerable interest was generated in this animal. There have been suggestions that specific guidelines may be necessary for interaction with such 'special' animals.

Management effort in 1992 focussed on field patrol and user group liaison. The Department of Environment and Heritage produced a video - *Breathing Space* - outlining aspects of Humpback whale ecology and biology, and the regulatory measures in place to ensure whale protection.

Prosecutions resulting from alleged breaches of the Hervey Bay Marine Park Zoning Plan in 1991, were brought before the courts in 1992. Two persons were convicted, one case was dismissed, and three cases were withdrawn. An investigation from an alleged breach of the whale watch regulations during the 1992 season is proceeding.

Long-term research programs were continued in the fields of whale photo-identification, and aerial survey. Valuable information is being gathered on the seasonal use of the embayment over time by components of the migrating population. However, significant conservation management and whale watching issues remain unresolved.

It is problematical whether sustained increases in vessel activity (numbers of trips, pod contacts) will have effects on individual whales; sex/age cohorts; or the portion of the migratory population which enters Hervey Bay, in the short or long term. There are inherent difficulties in characterising, documenting, and analysing whale behaviours in the presence or absence of vessels. Confounding factors include unknown acoustic impacts on whales over frequency and distance ranges, and the significance of surface activity relative to sub-surface behaviour.

Under current circumstances legislation in the form of regulations under the Marine Parks Act, provides the basis for managing human activities in the vicinity of Humpback whales. This legislation has been developed from guidelines prepared by the Australian Nature Conservation Agency. Additional protection for whales and other marine mammals in State and Commonwealth waters, outside Hervey Bay Marine Park, is provided for under the Fisheries Act and the Whale Protection Act respectively.

A detailed management model developed by Chaloupka (1990) formed the basis for the permit management system operating in Hervey Bay.

The notion of a special management area to assist whale protection, particularly in response to the need to provide greater protective measures for the vulnerable mother/calf component of the population, and to allow research into whale behaviour, by excluding vessels spatially or temporally has been raised by research groups, conservation organisations, and DEH. Consultation should be conducted with user groups and interest groups with a view to establishing additional protective measures.

The current whale watch permits expire at the end of the 1993 season. A review of the permit system relating to all aspects of the Whale Management and Monitoring Area will be conducted prior to the completion of the 1993 season. Consultation with existing permittees, user groups and interest groups will be undertaken as part of the review process.

Recommendations.

- (i)** A review of the permit system relating to all aspects of the Whale Management and Monitoring Area will be conducted prior to the completion of the 1993 season. Consultation with existing permittees, user groups and interest groups will be undertaken as part of the review process. This will include consideration of the adequacy of protective measures for the whales.
- (ii)** The full cost to DEH of management of whale watching will be compiled and related to operator fees.
- (iii)** In accordance with recommendations in the Draft Great Sandy Region Management Plan consideration will be given to the development of a tour operator accreditation program whereby the tourism industry is provided with training in quality interpretation to increase visitor enjoyment and understanding of Humpback whales and the marine environment.
- (iv)** Additional management effort will be directed towards increasing awareness amongst private boat operators about the regulations applying to whale watching through the use of advertising, signage and patrols.
- (v)** Appropriate research efforts will continue to be encouraged and supported, to assist management in meeting the objective of the Whale Management and Monitoring Area. The application of research funds from passenger levy fees will be continued and, where appropriate, extended - by increasing passenger levy fees if necessary.
- (vi)** A detailed visitor survey is highly desirable to gather information on visitor demographics and preferences. Input from the whale watch industry will be sought in developing and administering the survey.
- (vii)** DEH will continue to develop a photographic record of the use of Hervey Bay by whales and vessels, to limit the need for approach closer than that allowed by regulations
- (viii)** In the event of permit transfers, new permittees and their crews will be required to meet with officers of DEH to discuss in detail the regulations applying to whale watching; the Hervey Bay Marine Park Zoning Plan; tour operator permit conditions; the code of ethics and appropriate practices for whale watching; and DEH roles and responsibilities in the area.
- (ix)** Consideration will be given to partial funding of a dedicated vessel to be used in this and other DEH programs in the Great Sandy Management Area.

Acknowledgments

The development of this paper has been assisted by contributions from and discussions with Department of Environment and Heritage officers, commercial tour operators and researchers in Hervey Bay Marine Park, and members of the Hervey Bay Marine Park Permit Advisory Committee

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The Management Of Whale And Dolphin Watching Kaikoura, New Zealand

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Abstract

Commercial whale and dolphin watching began at Kaikoura in 1988 and is now a popular tourist activity. Considerable interest has been expressed by others eager to enter the industry. Aspects of the biology and behaviour of cetaceans, however, makes them vulnerable to disturbance and the need for adequate control of the industry was realised soon after marine mammal watching began to expand. Regulations were introduced, establishing a permit system and a set of operating conditions governing the behaviour of people, boats and aircraft in the vicinity of marine mammals.

The operating conditions are based on the known biology and behaviour of marine mammals, and characteristics of the tourist operations. In particular, they regulate approach speeds and distances, and orientation of approach. The conditions aim to protect cetaceans from the day to day effects of marine mammal watching. They have been recently reviewed following research into the impact of commercial operations. The assessment of long-term cumulative impacts remains a challenge for future research.

Introduction

Whale and dolphin watching is a rapidly expanding tourist industry in New Zealand. Such ventures offer people the opportunity to view marine mammals in the wild. The benefit for conservation is raising public awareness about marine mammals in their natural environment. Tourist operations, however, have the potential to disturb marine mammals, and the need for adequate control over the activities of boats and aircraft is generally accepted.

This paper discusses the management of whale and dolphin watching at Kaikoura, New Zealand, with particular emphasis on the development of regulations controlling the activities of tourist operations.

Background

Whale and dolphin watching in New Zealand began in early 1988 at Kaikoura, a small coastal township on the South Island's east coast (Figure 1). From a tentative beginning involving two people, a single boat, and an uncertain clientele base, the industry quickly expanded and diversified.

There are now two closely affiliated 'whale watch' companies based at Kaikoura, each with two boats. They offer up to four trips per day per boat, depending on demand, time of year and sea conditions. Sperm whales (*Physeter macrocephalus*) are the focus of these whale watch trips, though several other marine mammal species are observed when time and opportunity permits. Dusky dolphins (*Lagenorhynchus obscurus*), Hector's dolphins (*Cephalorhynchus hectori*), as well as New Zealand fur seals (*Arctocephalus forsteri*) are regularly approached by the four whale watch boats. Other species that are seen along the Kaikoura coast include Orca's, Pilot whales, Humpback whales, and occasionally Southern Right, Minke, Sei, and Fin whales, and Southern Right Whale dolphins.

Several other companies have also set up in Kaikoura offering tourists alternatives to 'traditional' whale watching. Swimming with dusky dolphins and seals is now very popular, especially with younger tourists. Three boats regularly offer trips of this nature from November to April when dusky dolphins are abundant (pods in excess of 1,000 individuals are not uncommon) and sea temperatures are the warmest.

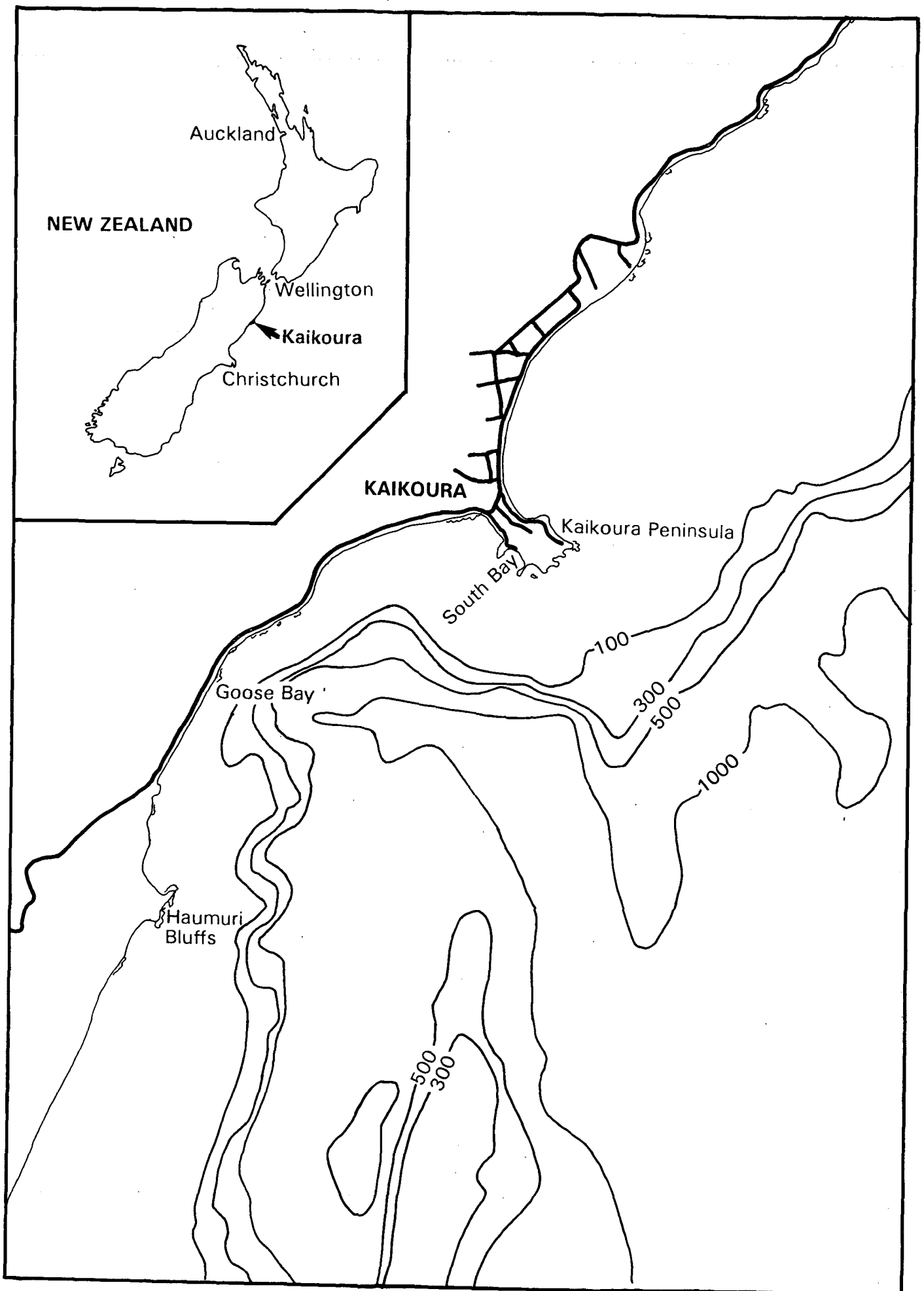


Figure 1 Bathymetric contours in the vicinity of Kaikoura

Four operations offer scenic flights to view whales and dolphins along the Kaikoura Coast. These provide a totally different view of the marine mammals and are an alternative for those with limited time or who are less inclined to brave the open sea. Fixed-wing aircraft or helicopters are available.

Boats operated from Kaikoura are typically fast and highly manoeuvrable, ranging from 6 to 13 metres in length. The exposed and changeable nature of the Kaikoura coast, coupled with the need to trailer the vessels each night, dictates the use of such vessels. Aircraft are similarly small in size.

The success of marine mammal watching at Kaikoura has resulted in considerable interest by others eager to enter the industry. It has also prompted several other operators to set up around New Zealand, ranging from Fiordland in the south to the Bay of Islands in the north. These operators concentrate principally on dolphins. Seals are also watched, although to a lesser extent, and whales are targeted when the opportunity arises. Regular sightings of Bryde's whales (*Balaenoptera edeni*) in the Bay of Islands recently may mark the beginning of a new centre for whale watching in New Zealand. Interestingly, this is the species that supports a rapidly growing whale watching industry in Japan. Kaikoura remains the 'marine mammal watching capital' of New Zealand, despite these other initiatives around New Zealand. Kaikoura will probably retain this title, given its geographic location on a major tourist route, the variety of species found along this coast and the high probability of successful encounters.

There are two principal reasons for the abundance and variety of marine mammals observed along the Kaikoura coast. The convergence of offshore currents in the vicinity of Kaikoura maintains a relatively constant upwelling of nutrient rich waters, supporting a rich and abundant coastal ecosystem. It is not surprising, therefore, that Kaikoura has long been a significant fishing port. It is this same productivity that makes the Kaikoura coast such an attractive place for marine mammals.

The bathymetry of the Kaikoura coast provides further insight into why so many marine mammals are observed in this area. Around New Zealand the continental shelf is typically found well offshore. Immediately south of Kaikoura Peninsula, however, the Hikurangi Trench moves close into shore and depths of 800 to 1,000 metres are found within one kilometre of the rocky coast (Figure 1). Whales and dolphins which feed along the edge of the continental shelf are, therefore, readily accessible to the marine mammal watching fleet.

The Role Of The Department Of Conservation

All marine mammals around New Zealand are fully protected under the Marine Mammals Protection Act 1978. The Department of Conservation administers this Act and is the Government agency responsible for marine mammal welfare in New Zealand.

When marine mammal watching began in New Zealand, it was realised that regular and repeated approaches to whales and dolphins could have a detrimental impact on them. In 1990, regulations were introduced specifically for the control and management of marine mammal watching. These were reviewed in 1992.

The Marine Mammals Protection Act and its regulations are specifically for the protection of marine mammals. The regulations do not address other issues relating to marine mammal watching, notably the promotion of tourism, tourism quality control, people safety and the commercial viability of tourist operations. Consequently, unlike some other resource management agencies that can have conflicting responsibilities, the Department of Conservation is not required to balance commercial development against the protection of marine mammals. Neither is it embroiled in issues that are peripheral to the issue of marine mammal protection.

Regulations

The Marine Mammal Protection Regulations 1992 aim to protect marine mammals from the day to day effects of marine mammal watching. They take cognisance of the known biology and behaviour of marine mammals and have been developed through a lengthy process of consultation with commercial operators and specialists in the fields of marine mammal biology and acoustic science. The Department of Conservation has also commissioned research to investigate the impact of tourist operations and this has been used to test the effectiveness of the regulations. Copies of these regulations are available on request from the author.

The regulations provide two principal mechanisms for managing the level and type of activity around marine mammals. Firstly, they establish a permit system for commercial marine mammal watching. This system allows for commercial effort to be controlled through restrictions on the number of operations and the amount and type of activity undertaken by each commercial operator. Secondly, they list operating conditions for commercial operators, or anyone else, when in the vicinity of marine mammals. These are a minimum set of conditions and are applicable for all encounters with marine mammals. They are divided into those applying generally to all marine mammals and those specific to whales and to dolphins and seals. This division into very broad categories partially recognises the fact that different marine mammal species respond differently to human encounters.

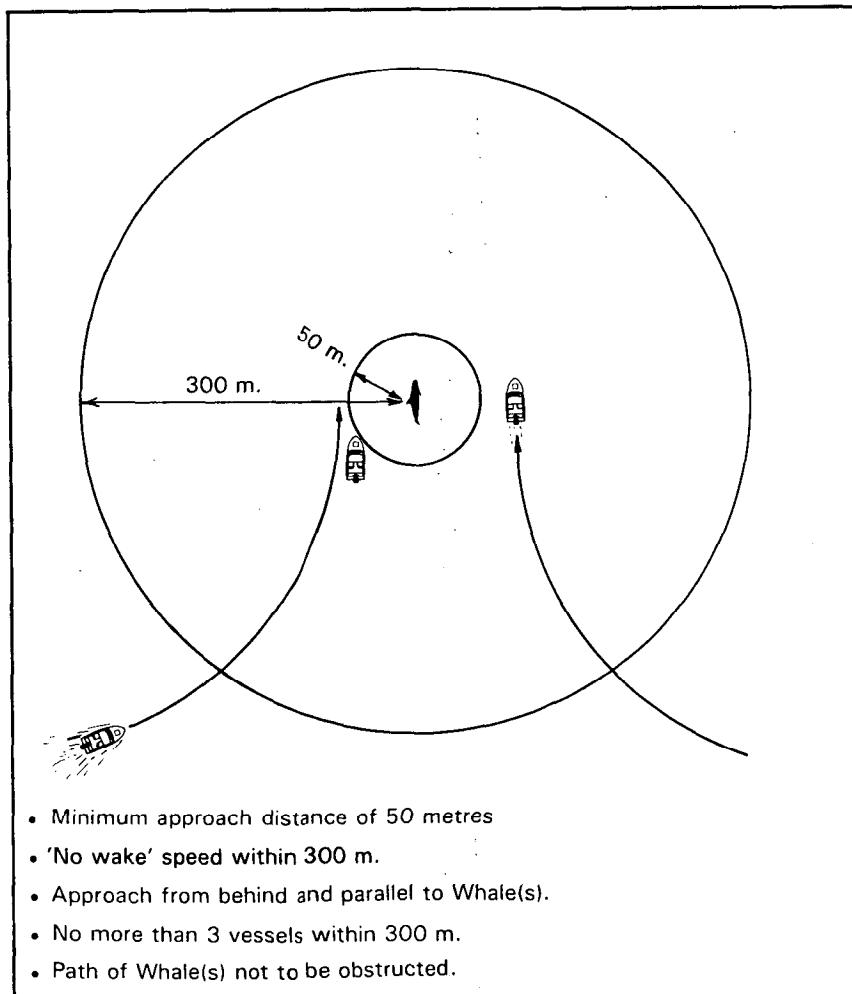


Figure 2 Regulations governing vessel operation around whales.

Most of the operating conditions in the Marine Mammal Protection Regulations pertain to approach speeds and distances, and orientation of approach. As shown in Figure 2, vessels are required to approach a whale from a direction that is parallel to, and slightly to the rear of, the whale. No more than three vessels are allowed within 300 metres of a whale and vessels are required to travel at a 'no-wake' speed inside this distance. A minimum approach distance of 50 metres has also been set and vessels are required to keep out of the path of any whale. Most of these rules were introduced with sperm whales in mind, but they apply equally to all whales in New Zealand waters.

The need for particular care in the vicinity of large whales accompanied by their young has also been recognised in the regulations. Although sperm whale calves are not encountered at Kaikoura, large baleen whales with calves are occasionally seen. In such circumstances, the minimum approach distance is 200 metres.

Similar rules apply to dolphins as to whales, the major difference being that there is no minimum approach distance for dolphins and vessels can depart at greater speeds to allow the dolphins to be out-distanced (Figure 3). Vessels are also restricted from cutting through and dispersing pods of dolphins.

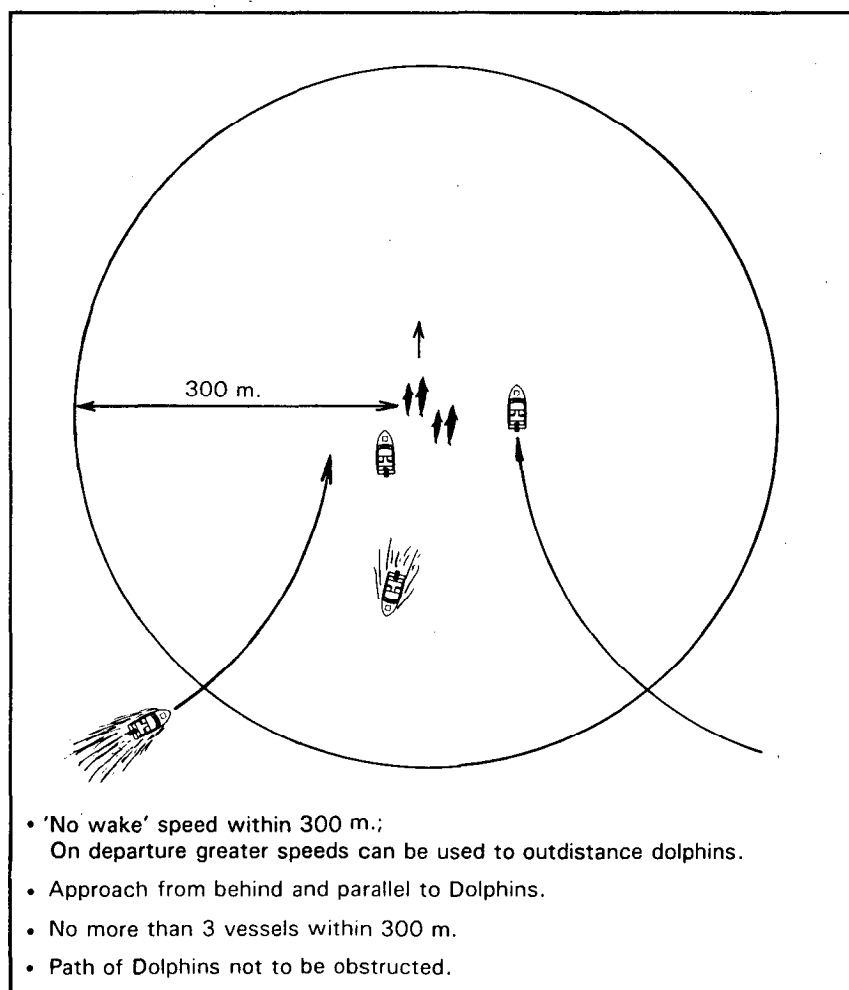


Figure 3 Regulations governing vessel operation around dolphins.

Aircraft are not permitted to overfly marine mammals, but are required to maintain a minimum horizontal approach distance of 150 metres (Figure 4). In reality, aircraft circle at a much wider distance for reasons of air safety and passenger comfort.

Species Specific Regulations

As more is learnt about the responses of different marine mammals to close observation, it may be possible to fine tune the regulations to be more species specific. The current regulations, for example, require contact to be abandoned if a sperm whale abruptly changes its orientation or starts to make short dives of one to five minutes duration without showing its tail flukes. Such behaviour has been identified as a sign of distress for sperm whales. The short dives, in particular, are believed to be an evasive response.

However, while species specific regulations have a number of apparent advantages and are possible in theory, their practicability may be limited. They may make the regulations confusing and unwieldy, and, therefore, less effective. Further, species specific regulations will probably be unworkable for most recreational viewers who cannot positively identify one species from another. General restrictions that apply to readily identifiable groups of marine mammals and that err on the conservative are probably the only practical solution. These protective measures can be reinforced where necessary through specific conditions on commercial permits.

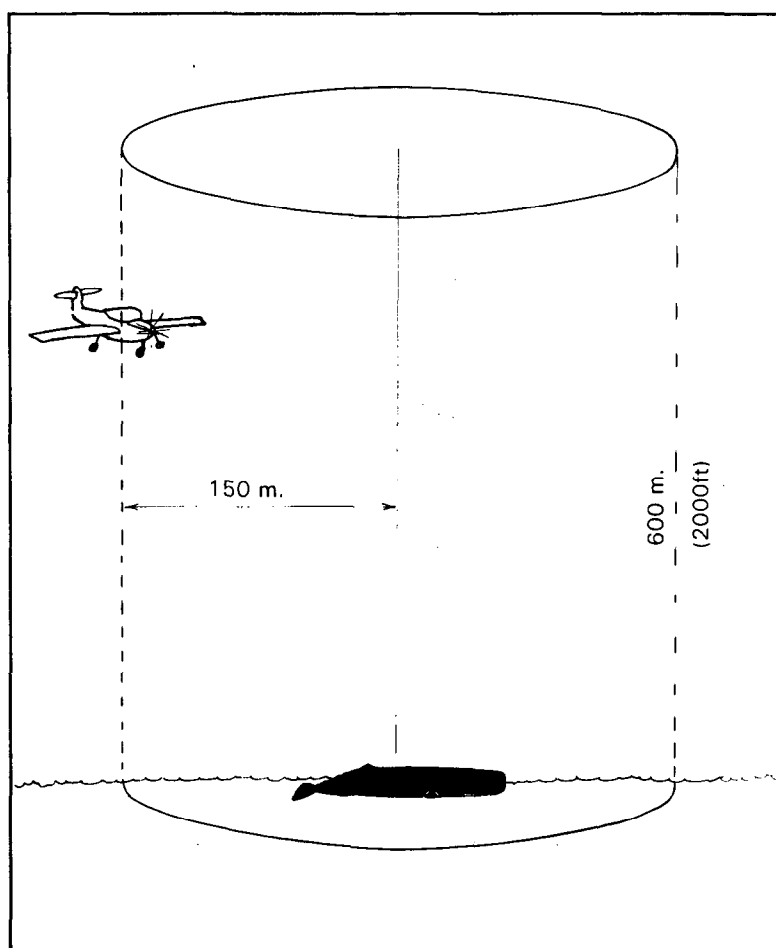


Figure 4 Aircraft approach distances to marine mammals

Sperm Whales

Sperm whales are present all year round at Kaikoura, though their distribution and abundance varies seasonally. There also appears to be two distinct categories of whales; a group of 'resident' individuals along the edge of the continental shelf which seem more

tolerant of whale watching vessels, and a more dispersed group ('non-resident' whales) thought to be passing through the area. The whales are almost exclusively young males, ranging between 12 and 16 metres. Females and larger bulls are only rare visitors to Kaikoura.

The whales are undoubtedly attracted to the Kaikoura coast because of the rich food resources of the area. Squid forms their staple diet, though sharks, ling and other deep water fishes are also taken. Groper, in particular, appears to be an important component of the sperm whale diet at Kaikoura, with whales moving closer to shore over autumn and winter when spawning groper are migrating along the edge of the continental shelf.

Sperm whales spend much of their time below the surface feeding. They dive to depths of 600 to 1,600 metres, though occasionally to depths in excess of 2,000 metres. Dive times vary, with an average of 40 to 45 minutes. Time spent on the surface is also variable, with an average of about 9.5 minutes (Gordon *et al.* 1992; MacGibbon 1991).

This period on the surface is a critical time for sperm whales. The whales show little movement on the surface, being intent on resting and recharging oxygen reserves in preparation for the next dive. Any disruption to this rest period is likely to have a direct bearing on the depth and duration of the next dive, and, therefore, feeding success.

One of the Department's first research priorities was to undertake a comprehensive review of the international literature on whale responses to anthropogenic sounds. This review (Reeves 1992) confirmed that most overseas studies have focused on baleen whales and some small toothed whales and that very little information is available on sperm whales.

Two field investigations were commissioned by the Department of Conservation to assess the impact of marine mammal watching on sperm whales at Kaikoura. In 1990, a post graduate student from Canterbury University spent several months monitoring sperm whale surface behaviour in the presence and absence of whale watch boats (MacGibbon 1991). A further study was undertaken in 1992 by a team of researchers from Oxford University led by Dr Jonathan Gordon (Gordon *et al.* 1992). The latter study investigated surface behaviour as well as underwater acoustic behaviour. Gordon *et al.* (1992) confirmed MacGibbon's earlier findings with respect to the surface response of sperm whales to whale watch boats. Responses are highly variable between individuals. On average, however, whales spend shorter periods on the surface and have shorter ventilation intervals when boats are around. Ventilation rates also appear to be more variable when boats are present.

Gordon *et al.* (1992) also found that the acoustic behaviour of sperm whales immediately after diving was significantly different when boats were present, although, overall, sperm whale vocalisations appeared to be unaffected by the presence or absence of boats.

Some very obvious signs of whales being disturbed by whale watch boats were observed, notably whales diving without 'fluking-up' (Figure 5) (MacGibbon 1991; Gordon *et al.* 1992). As noted earlier, such shallow dives are thought to be evasive manoeuvres and generally occurred when boats failed to follow the regulations.

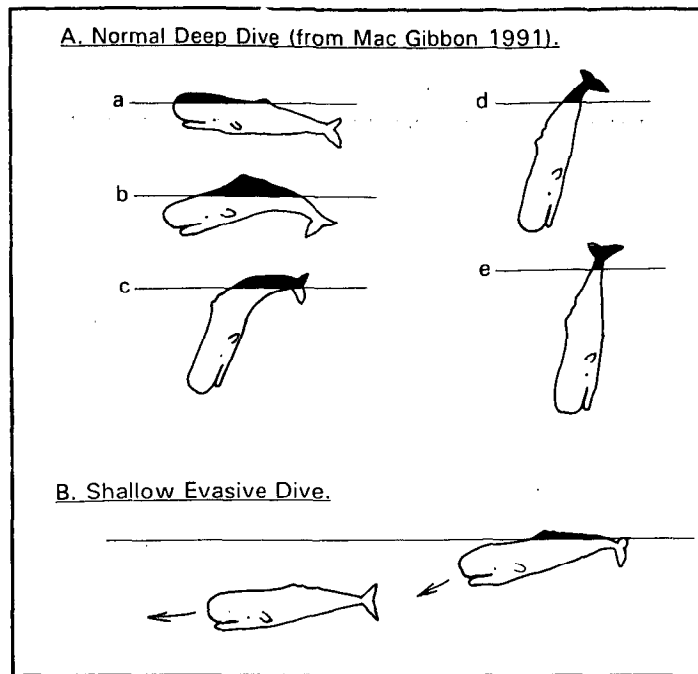


Figure 5 Submergence of sperm whales.

The sperm whale research to date has only been able to answer some of the questions relating to the impact of whale watching vessels at Kaikoura. It has demonstrated that whale watching causes some changes in the surface behaviour of sperm whales. Provided the regulations are adhered to, the impacts seem to be relatively undramatic (Gordon *et al.* 1992), suggesting the current regulations are providing sperm whales with a reasonable degree of protection from whale watching vessels. However, as noted by Gordon *et al.* (1992), it may be premature to assume that these effects have little biological significance particularly in the long term.

The research has not investigated cumulative impacts in the longer-term. It is very difficult to determine the long-term effects of a disturbance on population viability in the best of circumstances. For sperm whales which are long lived, highly dispersed, and spend much of their lives hundreds of metres below the surface of the ocean, the problem is accentuated. Long-term monitoring of whales at Kaikoura may provide some insight, but such a programme would be very costly and potentially unrewarding. In the meantime, the effect of whale watching on the long-term biological fitness of sperm whales remains a matter of judgement.

In view of the uncertainties about the long-term impacts of whale watching, the Department has continued to adopt a very precautionary approach to the issue of increased whale watching effort at Kaikoura. No further permits have been granted since 1989, despite numerous applications, nor have the existing operators been allowed to increase their number of trips. The possibility of issuing one further whale watching permit at Kaikoura is currently being reconsidered by the Department in light of the research completed in 1992.

Dolphins

Research on the impacts of marine mammal watching has focused on sperm whales at Kaikoura. There has been no comparable research on any other cetaceans in New Zealand, though Otago University is soon to commence a study on dusky dolphin watching at Kaikoura.

A workshop was convened in Kaikoura in February 1992 to discuss the impact of dolphin watching and provide direction for management. Professor Bernd Würsig of Texas A & M University attended the workshop and provided valuable input on the biology and

behaviour of dusky dolphins at Kaikoura and elsewhere in the world. The major conclusion reached at the workshop is that dusky dolphin behaviour and social structure makes them vulnerable to disturbance on the surface. While dusky dolphins are seen close to shore during the day, sometimes feeding on mackerel, most feeding is done at night in deeper water off-shore. Activity during the day appears to be more social with resting, playing and sexual behaviour being very important facets of normal daytime behaviour. Dusky dolphins alternate between the various behaviour phases during the day, being most receptive to human interaction during their periods of play. At other times, notably when they are resting or feeding, they are reluctant to interact with boats or people in the water. Nursery pods (groups with mothers and young calves) are a special case as they usually react very negatively to the presence of boats.

The regulations pertaining to dolphins are general restrictions that apply equally to all species and at all times. Although it would be desirable to differentiate between the various behavioural phases of dolphins in the regulations, this has not been possible in the absence of good workable definitions for these phases. Similarly, a workable definition of 'nursery pod' has not been found. A voluntary code of conduct which has been adopted by a commercial operators offers a partial solution to this problem.

The regulations do not distinguish between the different species of dolphin. They were nevertheless written primarily to deal with dusky dolphin watching and are not always adequate for other species. In such circumstances it has been necessary to supplement the regulations by way of conditions on commercial permits. For example, commercial swimming with Hector's dolphins has only been allowed at Banks Peninsula where there are reasonable numbers of dolphins. Elsewhere Hector's dolphins are generally found in small scattered family groups which are territorial and usually wary of people in the water, and commercial swimming has not been permitted. In the Bay of Islands, bottlenose dolphins occur in relatively small pods (average 8-20 individuals) and only one commercial vessel is permitted to approach a pod at a time.

Underwater Noise

The Royal New Zealand Navy has provided technical advice to the Department of Conservation on the issue of underwater noise from tourist operations (Defence Scientific Establishment 1992, Trial Analysis Unit 1992 a, b).

Background noise is an important consideration. The ocean is not a quiet place; waves, rain, storms, biological processes, seismic events and coastal shipping contribute towards a surprisingly high level of ambient noise, averaging around 60 decibels in New Zealand waters and well over 70 decibels in north-eastern Pacific waters. Noise generated from tourist boats and aircraft is not expected to be too dissimilar to the levels that cetaceans normally have to cope with (Figure 6) (Defence Scientific Establishment 1992).

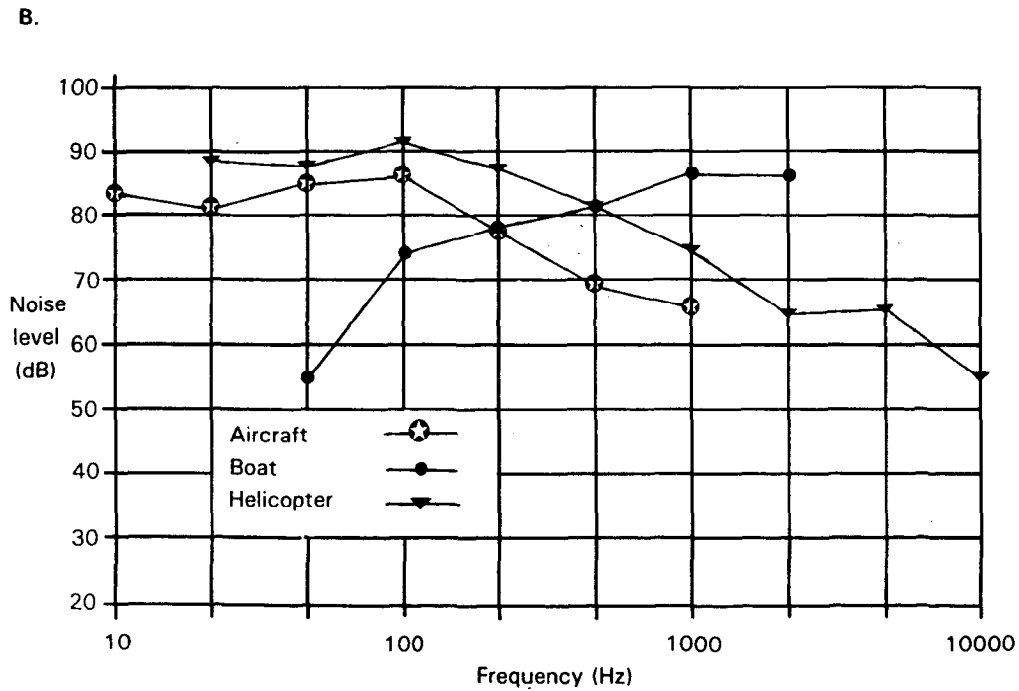
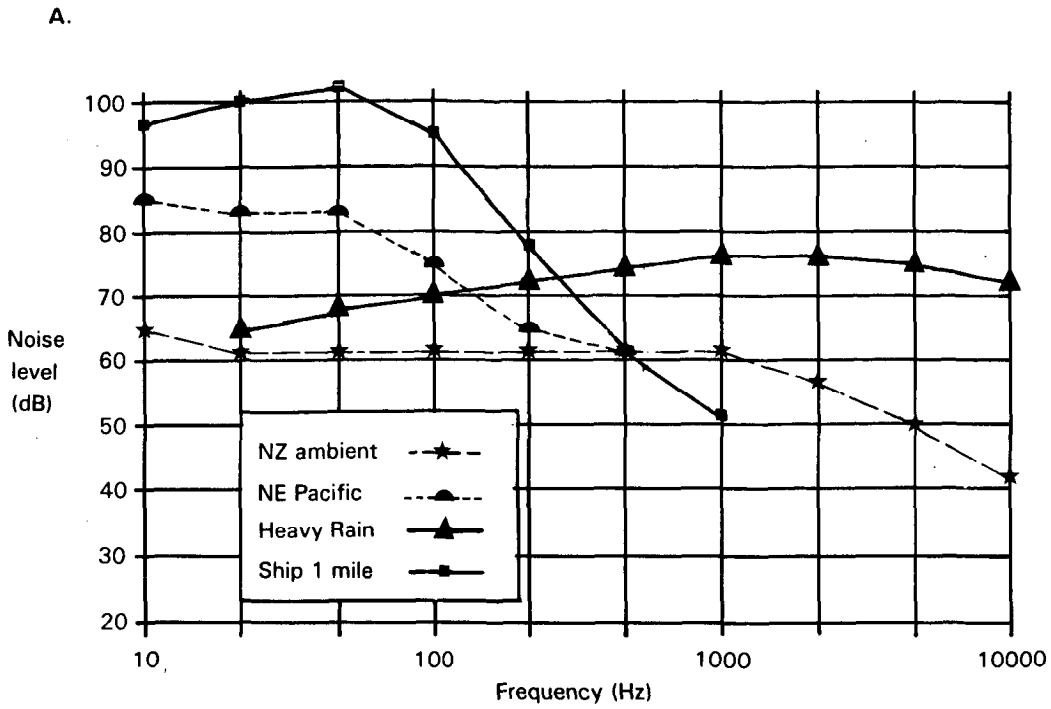


Figure 6 Underwater noise A. Background levels 75 m. below the surface; B. From tourist operations (aircraft 75 m. overhead and boats 75 m. away) measured 1 m. below the surface (source: Defence Scientific Establishment, 1992).

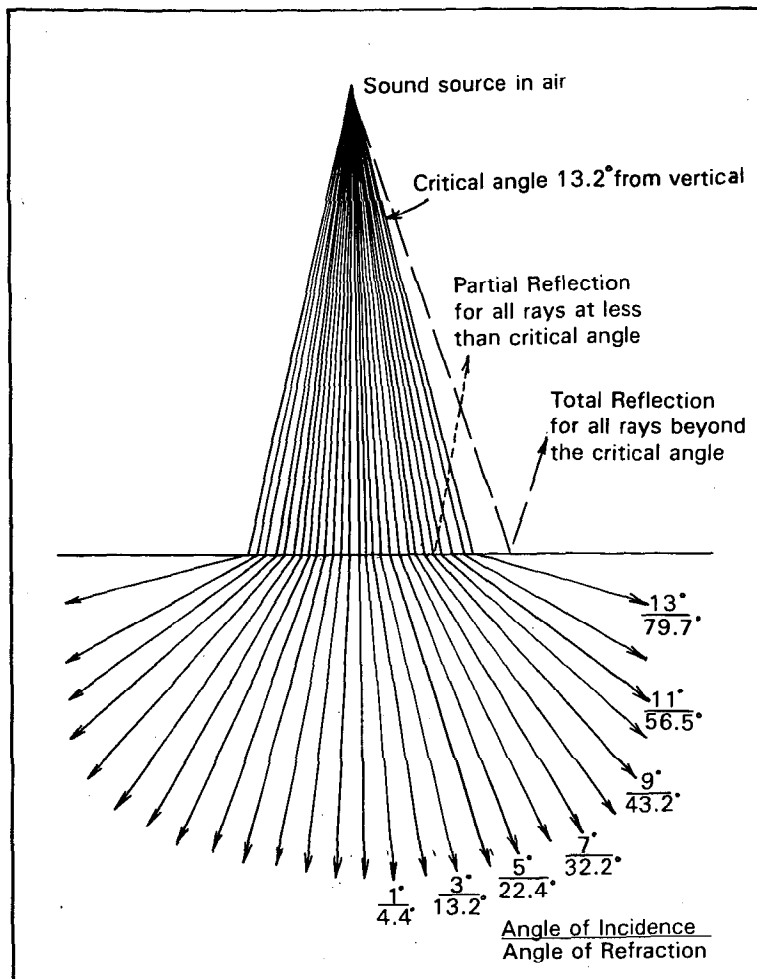


Figure 7 Sound transmission from air to water. (source Defence Scientific Establishment, Auckland, New Zealand.)

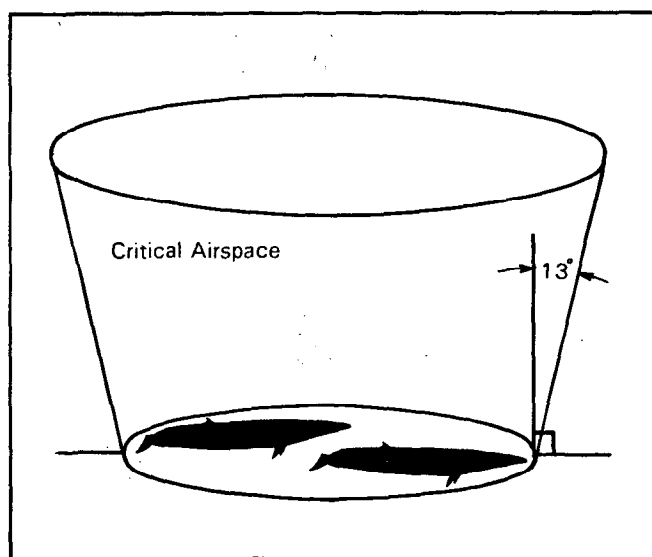


Figure 8 Airspace over marine mammals which aircraft should avoid. (Adapted from Defence Scientific Establishment, 1992.)

One of the most significant conclusions reached by the Navy's acoustic specialists relates to the transmission of noise from air to water. Noise arrives at the sea's surface radiating out from its source (Figure 7). Inside an angle of approximately 13° sound penetrates the water with some reflection from the surface. Refraction at the air-water interface disperses the sound as shown in Figure 7. Beyond 13° , however, sound is mostly reflected from the sea's surface and sound transmission into water is considerably reduced. Although sea conditions will influence sound transmission into water, the model described above shows that aircraft noise should not generally be a problem for whales and dolphins provided aircraft keep clear of an envelope shaped like an inverted 13° cone above the animals (Figure 8). In other words, aircraft should not fly directly over marine mammals, but rather circle them at a distance. This model, with built-in safety margins, has been used to determine the minimum aircraft approach distances in the regulations.

Figure 7 also demonstrates that marine mammals will probably not be able to hear an aircraft approaching until it is suddenly overhead. Sudden noises can startle cetaceans, reinforcing the need for aircraft not to fly directly over pods of dolphins or whales.

Sudden noise is similarly a concern with respect to the operation of vessels in the vicinity of cetaceans. Noise can travel considerable distances underwater and whales and dolphins will be aware of an approaching boat from a long distance away. Sudden noise changes through boats abruptly altering course or speed are known to startle sperm whales at Kaikoura. Even placing motors in and out of gear can elicit a negative reaction. Accordingly, the regulations prohibit vessels from making sudden or repeated changes in speed or direction.

Compliance

Compliance with the regulations is clearly in the commercial operators' long-term interests; they do not wish to 'kill the goose that lays the golden eggs'.

There is, nevertheless, a need to monitor operators to ensure the regulations are being adhered to. The Department has its own vessel based at Kaikoura which is available for enforcement duties. This is a relatively costly option, however, and its usefulness is probably limited in practical terms. The Department's approach to date has been to randomly place staff incognito on boats and aircraft. This has proven to be a reasonably cheap and effective means of monitoring operators' compliance with the regulations.

Compliance by recreational viewers is a much more difficult problem to address. An upsurge in interest in marine mammals by recreational boaties and other casual visitors to the coast has quickly followed in the wake of the success of commercial marine mammal watching. Marine mammals are found all around New Zealand and are regularly encountered by recreational boaties. Most people, however, have little idea about how they should be behaving around marine mammals. Most boaties would consider high speed manoeuvres through pods of dolphins to be totally acceptable and appropriate.

Uncontrolled recreational viewing probably presents a greater threat to marine mammals in some areas than commercial operations. Although some on-water enforcement will always be possible, in view of the large, diverse and unorganised nature of the target audience, public education is probably the only practicable compliance option for the Department to adopt with respect to recreational viewing of marine mammals.

Conclusion

Management of marine mammal watching at Kaikoura, and the associated development of the Marine Mammals Protection Regulations 1992, have highlighted the value of quality information, either in the form of expert advice or specifically targeted research. The regulations have evolved through a long process of consultation, research and review. As further research is undertaken and more is learnt about the interactions of humans and marine mammals, further fine tuning of the regulations will undoubtedly occur.

The operating conditions outlined in the regulations help protect cetaceans from the short-term, day-to-day effects of marine mammal watching. Many questions remain unanswered, however, about the long-term effects of marine mammal watching at Kaikoura. The assessment of longer-term, cumulative impacts remains a challenge for the future.

Acknowledgments

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I am grateful to Peter Lawless and Mike Donoghue for their comments and advice.

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Marine Mammal Strandings

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This guide is intended to help the uninitiated and those with some experience in the best ways to handle strandings of cetaceans. The notes are designed primarily to give direction about crowd control and live animal strandings. Much information is available on the collection, measuring and sampling of data from dead specimens.

In addition to information in this paper those interested in cetacean strandings should be conversant with the "**National Contingency Plan For Cetaceans Strandings**", and the "**Queensland Contingency Plan For Dealing With Stranded Marine Mammals**". The Queensland Fisheries Management Authority is responsible for marine mammal strandings in this State.

Phone numbers for district offices and after hours numbers are given on the back of the Queensland plan.

Introduction

Biologist William Conway said (and I quote) "**In my lifetime, the world has changed drastically. From a place where the people were surrounded by wild animals, the world has become a place where wild animals are surrounded by people.**"

In July this year, Sir Crispin Tickell a noted British environmentalist, delivered a paper entitled "The Human Species A Suicidal Success".

There is a clear message in Conways quote and the title of Sir Crispin Tickell's paper.

As we become more environmentally aware and better educated we realise the importance of cetaceans and all the other creatures in assisting in the natural balance of life, may well govern our own survival chances in an ever-diminishing world.

The stranding of cetaceans is an emotive issue for many people. The empathy which people feel for these creatures goes beyond the normal human animal relationship. In all decisions relating to cetacean strandings this should be a consideration.

Strandings fall into two general categories.

Stranding Categories

- (A) **Single strandings:** Non-social species are most commonly involved in single strandings, especially Baleen Whales (Mysticeti), although Pygmy and Dwarf Sperm Whales and many species of Beaked Whales may strand singularly. For reasons such as old age, gregarious species of toothed whales also strand individually when they are no longer able to keep up with their pod. This category "Single strandings", may include up to three animals such as a female with calf and could include an attendant aunt.
- (B) **Mass strandings:** Usually involve gregarious species of the Odontoceti such as Pilot Whales, False Killer Whales, Orca, and Great Sperm Whales and occasionally Bottle-nosed Dolphins.

Why do whales strand?

There has been much conjecture about the reasons for this phenomenon. A list of possibilities was published in book form by the late Mr Frank Robson of Taradale in New Zealand. (STRANDINGS, Ways Top Save Whales, by Frank D Robson)

He suggested one or more of the following factors may be involved in strandings:

- (1) In old age they may no longer be able to keep up with the pod. Like all other mammals they may have a fear of drowning. When the end is near they move into shallow water to reduce this fear.
- (2) Animals escaping from predators may enter water too shallow to support their bulk. On a receding tide this will invariably lead to a stranding.
- (3) Parasitic worms boring in sensitive areas around their ears and brain cavities may cause great discomfort and disorientation.
- (4) Calving where the foetus is ejected head first would be cause for concern by the mother. In normal births the calf appears tail first so that the blowhole is one of the last things exposed to the new environment. In shallow water the parent has plenty of time to assist the newborn calf to the surface. A breach birth calf may be close to the surface and less likely to drown.
- (5) Land forms close to migratory routes have altered, due to earthquake, storm or tempest.
- (6) Severe electrical storms may interfere with magnetic lines of parallel. Areas where there is known magnetic anomaly may also interfere with the whales ability to navigate.
- (7) Gently shelving sea floors with soft mud or sandy substrates may interfere with the whales echolocation.
- (8) Some areas are natural whale traps that work so successfully that cetaceans entering are unable to find their way out.
- (9) A member of a gregarious species may be rejected from its herd. Normal functions break down as a result of the fear experienced at finding itself alone. Such animals may beach, unable to survive in this predicament.
- (10) Lightning strikes and severe sea conditions may also be an important factor.

As research throws more light on cetacean ecology, the reasons for whale strandings may become clearer.

It is important to remember that many species are endangered because of human exploitation on this planet. The animal's environment, their food sources and such things as pollution, drift nets, purse seiners and other fishing efforts by man, all interfere with their long-term survival. Any efforts which result in the successful return of healthy animals to their natural environment are worth the effort and cost expended.

Before a stranding

Before a whale strands on a beach often there are obvious signs that all is not well. These include swimming in circles in a small area, remaining on the surface for long periods, and banging a section of the head or anatomy as if in pain. This behaviour may continue for days or even weeks. Any of these behaviours may lead to a stranding.

As soon as unusual behaviour is noted try to ensure that the authorities are alerted.

In many instances, if the problem animal is alone, nothing might be done until a thorough external examination has been carried out. If you are without resources this may be performed in shallow water. If the authorities are notified and resources are sent to the area, divers may be able to assist in an examination before stranding occurs.

After stranding

In many instances whale strandings draw considerable interest from the general public. If the strandings are publicised through the media you could end up with hundreds of sightseers and people wishing to assist the animal(s).

In this situation it is important to have an experienced Stranding Coordinator to supervise the operation.

The role of the Stranding Coordinator

The Stranding Coordinator is responsible for the entire rescue operation and as such should have previous experience in this field. Any euthanasying of animals will be decided by that person. The Stranding Coordinator will probably be someone in authority with a Government Department with a role in whale conservation, or a person appointed by a whale watchers group such as Project Jonah or Greenpeace.

Once the Stranding Coordinator is on site it is important to control the people and channel their assistance in the best possible directions.

In all strandings which I have attended the animals have responded positively to quiet talk and a gentle touch. Shouting and loud noises should be discouraged. There is no room for the people who wish to place their children on the backs of the animals or interfere with the animals eyes of blowholes. This is a definite no! no and should not be tolerated. Marine mammals are protected under conservation legislation in Australia and New Zealand .

In a mass stranding situation it will be impossible for one person to control the activities of a large number of people, especially where the whales are spread over two or three kilometres of beach.

At such times it is best to gather a number of people around you and explain what needs to be done. These people will be your lieutenants. Through these lieutenants, people can be coordinated and instructed in the rescue procedure.

You and your lieutenants should be easily recognisable . To this end fluorescent pullovers, such as basket ball players and road gangs wear; with "Whale Stranding Coordinator" or "Whale Stranding Assistant" prominently displayed should be available for distribution at the site.

Getting help to the stranding site

A mobile telephone or long range radio may well prove to be your greatest asset in getting other people to the site in the shortest time. The more people with previous experience you can rally to assist the better.

Remember time is of the essence and speed in response is paramount in order to reduce suffering. This cannot be overstated.

In mass strandings it may be necessary to advise the media to ensure help is available. The more people you can get to isolated strandings the greater your chances of a successful operation. If asking for assistance through the media consider the locality and the things the public will have to guard against to ensure their own safety. Wetsuits will help people keep warm if they are in cold water for long periods.

Stingers suits are essential to prevent loss of life for people assisting with strandings in tropical waters during the Box Jellyfish season. (Nov-May.)

Helpers should be warned to stay clear of the animals tails. Stranded whales will often thrash their tails violently while still in the water to help cool their bodies and those of close neighbours. Tail thrashing is not a sign of aggression but volunteers need to be careful as they could be injured, especially where the animal is unable to see them. Always approach the animals from a direction where you can be seen by the animal.

Stranded whales never attempt to bite.

Rescue equipment:

You should have access to a whale stranding kit which would/should include the following:

- 1 A manual on cetaceans which would aid in identification of the species stranded. Such a manual should give average and maximum sizes and lengths of both sexes, and size of newly-born calves. World distribution, numbers of teeth, and position in the jaw, or the length and colour of baleen if the animals falls into this category.
- 2 A set of tide tables for the local area. Most important when trying to determine what can be done to assist. If the whales came in on a spring tide and there is no heavy machinery capable of returning them to the water because of receding tides some drastic action may be required to reduce suffering.
- 3 Wide flagging tape, which can be used in conjunction with a waterproof marker pen to identify a sequence in mass strandings. The first animal to strand may be the one holding the rest of the pod or herd in the stranding area. If this animal is seriously incapacitated and euthanased the rest of the herd may quietly and quickly leave the danger area.
- 4 Data sheets for recording as much information on the stranding conditions, animal's health etc., as can be gleaned from the site. Water-proof paper, writing boards and pencils are a very good idea.
- 5 Tape measures. A number of these may be necessary to record individuals in a mass stranding.
- 6 Flensing tools preferably with a hooked tip for opening stomach cavities for autopsy or prior to burial, a lance for euthanasia, a number of good quality knives together with steels, files and stones to sharpen these tools.

- 7 At least three flying gaffs or specially-made large meat hooks for assisting with the removal of flesh.
- 8 At least three 20 metre lengths of 20mm terylene rope. (Not nylon rope)
- 9 At least two blackboards and a quantity of chalk. (Instructions can be written advising new arrivals at the stranding site on how to assist and what not to do.)
- 10 A quantity of plastic bags, sterile bottles and formalin. (For preserving specimens.)
- 11 Plastic fishing aprons, light and heavy rubber gloves and a good quality scrubbing brush.
- 12 Photographic equipment and a number of rolls of film. Include flashlight gear. A couple of spray cans of yellow and black paint for marking dead whales for photographic purposes.
- 13 A heavy calibre firearm e.g. .303 .308 or similar.
- 14 A quality first aid kit. (For the rescuers use, not the whales.)
- 15 Portable generator, electrical leads, lighting, torches and batteries. This also gives you a means of heating food and providing hot soups and brews for the rescuers. (Remember it could be a lengthy operation.)
- 16 Tarpaulins and knotless nets which can be use to transport small animals either by hand, machinery or helicopter to the water.
- 17 A number of collapsible rope and canvas buckets, ropes and car and truck inner tubes. Shovels for digging to assist in getting the animals into a more comfortable position.
- 18 Sheets and blankets, hessian and newspapers. Or anything else that will absorb water and reject sunlight allowing the cooling of the animals bodies. Remember thick blubber is designed to stop the animal from cooling down, so it will never be too cold. The enemy of a stranded cetacean is heat and sunshine.

The outer dermis of skin and blubber on the animals which is naturally lubricated by water, breaks down very quickly when exposed to heat and the drying effects of wind. Very quickly the skin cracks and deep pits may appear even in cool climates in the south of New Zealand. I would compare the effect as similar to the cracking of the earth around a billabong as the last of the moisture is drained from the soil. In such situations one can well imagine the pain and suffering an animal is subjected to. Blankets, hessian, newspaper, sheets or anything similar capable of deflecting sunlight and wind and retaining water will be of great assistance in such situations.

Because of an affinity that many people feel towards cetaceans, actually getting what you need to a stranding is often achieved very quickly, provided the general public are made aware of what is required and what needs to be done. This is not the case in remote situations.

Sunlight and wind are the greatest dangers confronting cetaceans at a stranding.

ACTION AT A STRANDING SITE

The following is a recommended course of action which should be taken at a stranding site regardless of the position of the person discovering the stranding. **Remember speed and accuracy in notifying the authorities is important in order to reduce suffering.**

- 1 Check the time and type of stranding, whether or not the animals are alive or dead. If there is only a single animal on the beach but more milling just off shore or in shallow water a means of identifying the individual first beached is very important. Tie something around the base of the animals tail. Ribbon, string, rope or a plastic bag would suffice.
- 2 If there is more than one already beached and others still offshore it may be necessary to identify a number. (One of the first beach animals will be the key whale holding the rest in that area.)
- 3 Take a good look at the state of the tide the prevailing wind and wind strength, cloud cover and the state of the sea. (Rough, moderate or calm)
- 4 If you are familiar with cetaceans note the time, species, number and position of the animals in relation to the area. If you are unable to identify the animal be prepared to give the authorities an accurate description i.e. Approximate size and colour of the animal/s, whether there are teeth and their position, or baleen in the mouth, one blowhole or two, ridges on the top of the head, large or small flippers. Such information will help the authorities decide on the course of action to be taken and the type of equipment required at the site.
- 5 Notify the Police, a Wildlife Ranger or a Fisheries Officer of your discovery, being prepared to give the details you have collected. These should include your name, address and phone number. If you are able to remain in the area, advise the authorities of this and ask how soon you could expect some help. You may be asked to give some direction to the people on site while a Stranding Coordinator is being rushed to the area. If the site is hard to find, arrange for someone to wait at the nearest road head to ensure no time is lost in getting help to the stranding site.
- 6 If there are other people in the vicinity willing to assist and the animal/s are capable of being moved (not so far up the beach as to make the task impossible with the assistance available) move the animals into an upright swimming position facing the waves and the prevailing wind. Do not attempt to push them into deep water unless you have identified the key whale and have solved the problem of why stranding took place in the first place. **Do not allow people to enter the water to assist the animals if they are not adequately protected against envenomation during the stinger season.** Record this on your beach blackboard if necessary.
- 7 Animals which have been laying on one side will require gentle rocking from side to side to regain their equilibrium. They become like cast sheep with blood rushing to one side of the body. Unless they are given a chance to restore blood evenly throughout the body they will just tip over onto their sides again as soon as they move out from the shallows. This may require a minimum of five to ten minutes per animal. **Do not use the flippers or dorsal fins as levers with which to push the animal upright.** These appendages may be easily damaged in such situations. Always approach from a direction where the animal can see you and before stroking gently, talk quietly and soothingly to the animal.
- 8 If you believe a stranding is imminent and it is caused by an area previously known to trap whales, it may be possible to keep the animals from the shore. You need help and the help must be informed of what you are trying to do. Such strandings can be avoided by making a noise underwater to show the whales that there is danger in the

direction in which they are proceeding. The best way to achieve this is to spread your helpers around the shallow danger area of the bay with something capable of producing a sharp metallic sound under water. This can be achieved by banging two fist sized stones together underwater or placing a metal bar or metal fence post in the water and banging it with another metal object. Tyre lever and wheel braces would work well.

- 9 Do not continue to make underwater noises if the animals remain on a course for the beach. The problem is obviously not caused by a loss of direction. Animals which continue to move toward the beach in such situation have more serious problems to contend with such as injuries, or parasitic worm infestation as mentioned earlier. Such animals may well have to be euthanased and will certainly need close evaluation.
- 10 Face all animals out to sea and keep them in close proximity to one another. Move them seaward if the tide is falling only as far as is necessary to ensure they do not become stuck. Assist them toward the shore without beaching them if the tide is rising.
- 11 An inspection of beached animals should help identify the key whale. Action regarding this animal may include euthanasia to ensure that the majority of the herd returns to deep water. Do not hesitate if this is your prognosis. The longer you stall the more you may have to put down, especially if the animals are large.
- 12 Having euthanased or returned the beached animals to the water, the next thing is to encourage them to swim out to sea. This can be achieved by swimming or taking a couple of the bulls or large females out to deep water using Zodiacs or boats with the animals held in mats alongside. The people holding the other animals, (cows, juveniles and calves) should have rocked them sufficiently to ensure free circulation. They would then release them gently at the same time guiding them to swim toward the bulls or large cows offshore.
- 13 Never attempt to take small animals as the catalyst for moving the herd. They will only swim back to their parents as soon as they are released. It is widely believed that the members of a group or pod of toothed whales will be related. The maternal instinct will be strongest between related calves and cows and for this reason it is important to swim these animals off the beach together.
- 14 Provided you have identified and rectified the problem in relation to the key whale you will almost invariably save the group. Healthy animals are not likely to remain in shallow water,
- 15 Remember with single strandings involving a cow and calf, if the little one is not capable of fending for itself it is best to put that down at the same time as the mother. Calves less than half the adult size are not likely to survive. Lactating calves have no chance at all.

Do not fall into the trap of thinking you can achieve the impossible and spend hours administering to the animal/s when logistics of size and weight, remoteness of area and condition at the stranding site (falling tides etc.) make it impossible to get them off a beach. Do not attempt to minister to an animal which has reached the end of its natural life span and has come into shallow water to die. Every living creature is entitled to some dignity at such a time.

Assessing an animal's condition

At times assessing an animal's condition may be quite difficult, and on occasion the reasons for a stranding may remain a mystery. As a general rule older animals in poor condition will be thin to emaciated. There may be considerable scarring and there may be fresh bite marks from predators on the animal's body.

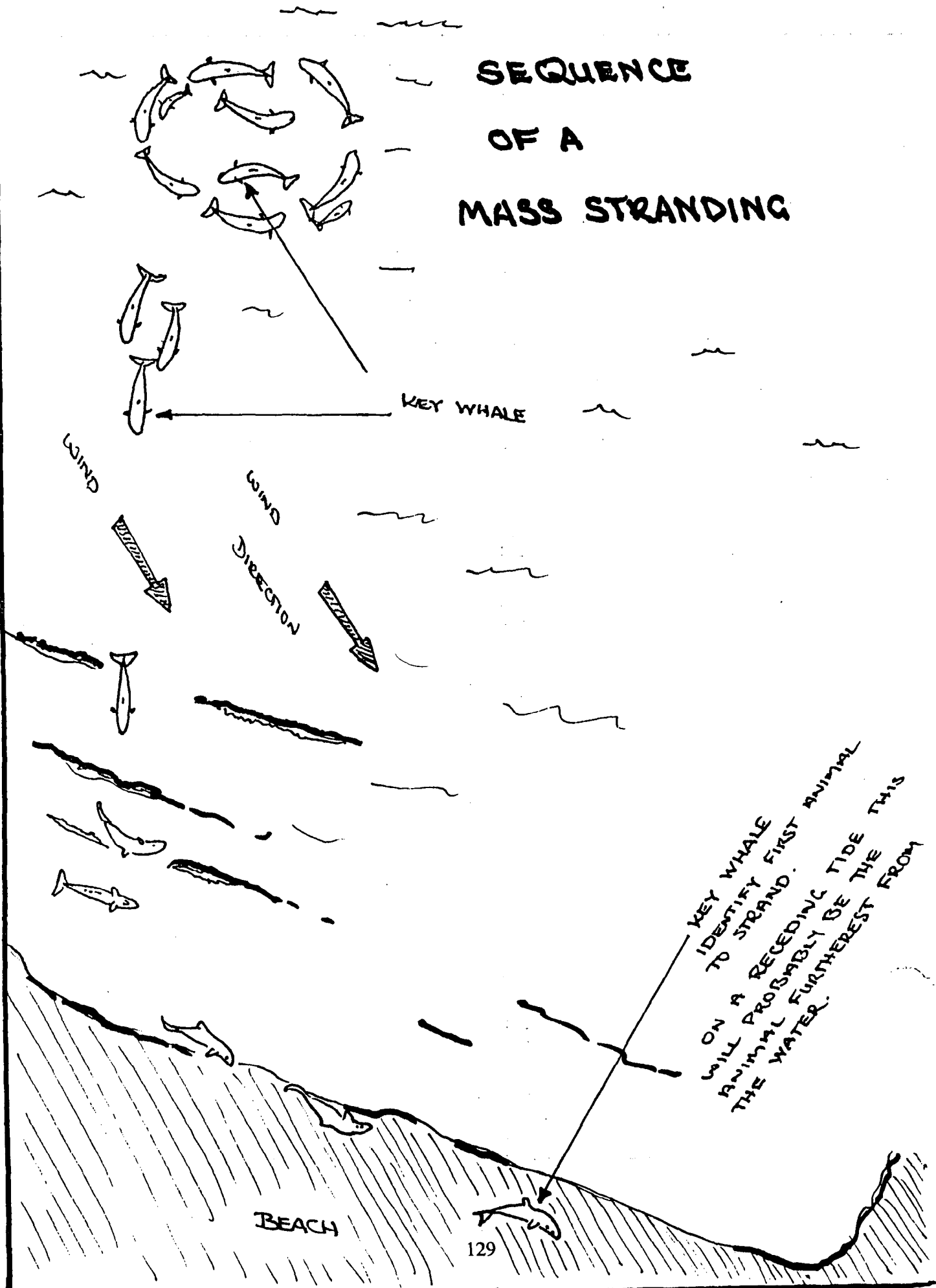
Large shark bites may be present in almost any area. Small bites from Cookie Cutter sharks, which normally appear behind the dorsal fins in healthy animals, may be present in the head area. (These small sharks usually come from behind to ambush their victims, grab a mouthful and race away to avoid retaliation.) Where the whale is slowed by old age and unable to defend itself the bites may appear anywhere on the body.

Vertebrae may be noticed beneath the skin of the animal and in severely emaciated cases it may be possible to see the vertebrae from the central body region to the tail stock.

Teeth may be flattened and worn. This is not always obvious but if there are a number of animals as in a mass stranding and you are not sure which animal is the key animal, this may be an indication of the oldest members.

There may be bruising in the neck and head area if the animal is affected by parasites. As mentioned earlier, pain associated with such parasitisation could be a major factor in many strandings.

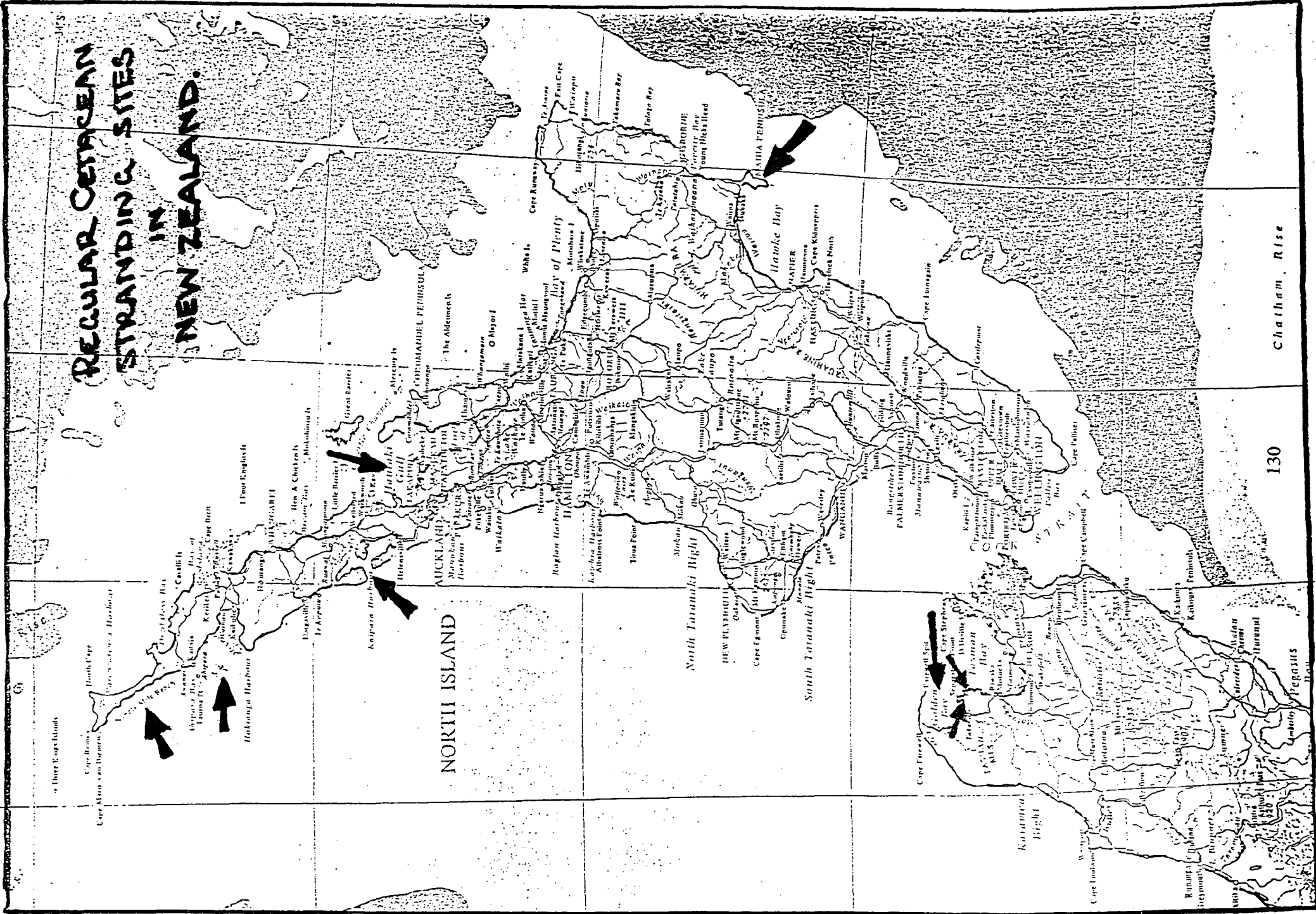
SEQUENCE OF A MASS STRANDING



KEY WHALE
IDENTIFY FIRST ANIMAL
TO STRAND.
ON A RECEDING TIDE THIS
ANIMAL PROBABLY BE THE THIS
FURTHEREST FROM
THE WATER.

BEACH

REGULAR CEPHALEAN STRANDING SITES IN NEW ZEALAND.



Whale observations from ANARE ships

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INTRODUCTION

Australia's interest and involvement in Antarctic whale research can be traced back to the first Australian Antarctic explorers. Douglas Mawson emphasised the need for scientific exploration as a response to the growth of the whaling industry and the territorial ambitions it aroused as whalers increased profits by applying new technology. Mawson viewed the whale observation data he collected as a quantitative indicator of the region's "richness in economically valuable products" (Price 1962). The log books of the 1929-31 British Australian New Zealand Antarctic Research Expeditions (BANZARE) voyages recorded frequent sightings of blue whales and fin whales suggesting plentiful populations and thus encouraging the spread of pelagic whaling in the Southern Ocean.

Over one million whales have been taken in Antarctic waters since the beginning of the twentieth century resulting in drastic reductions in the population sizes of the larger whale species. Assessment of whale populations has been difficult, with the majority of data being collected by commercial whaling fleets. Whaling vessels, however, usually concentrate their efforts in regions where previous experience indicates that whales will be abundant. This results in calculated densities which are significantly higher than the real mean (Gaskin 1982). Commercial bias and the need for information on protected or unexploited species prompted the Australian National Antarctic Research Expeditions (ANARE) to begin a regular whale survey. Since 1948 ANARE ships have been voyaging to the subantarctic islands and Antarctic continent each summer's shipping season providing an opportunity for the independent monitoring of whale population densities. The lack of success in this and the reasons for it are a major theme of this paper.

PREVIOUS ANARE STUDIES

ANARE voyages to the Antarctic are scheduled for the summer months. In most years they begin in October and finish in March. The ANARE ships follow similar transects each year between the Australian Antarctic stations, subantarctic islands and Tasmania between 60° to 160° east and 40° to 69° south.

From 1948 through 1960 no specific whale logs were kept but sightings made during bird observations and incidental sightings made by crew members or ANARE expeditioners were recorded.

Between 1961 and 1972 a detailed whale log was maintained by the ships' officers from the bridge and included hourly scans of the horizon with binoculars as well as incidental whale sightings. During this time a total of 1523 whales was sighted. However Parker (1978) noted that there was much yearly variation in the number of observations due to varying effort by different expeditioners and varying weather conditions.

Again from 1973 through 1976 the only whale sightings recorded were incidental sightings made by the ships' crews or interested expeditioners.

In the 1976/77 season another detailed whale log was kept. During some of these voyages a continuous watch was maintained for 4 hours per day by Parker with the aid of binoculars from the observation deck of the *M V Nella Dan*. Parker (1978) discussed the variable nature of the data noting that the methods used in 1977 produced considerably more sightings of whales than earlier ANARE methods. During 1976/77 a total of 532 whale sightings was recorded. Low numbers of blue, fin, humpback and right whales were sighted compared to the relatively high numbers of sei and minke whales.

Ensor (1989) presented whale observation data collected during the ANARE seal survey cruises in the pack ice zone of eastern Antarctica from October to December 1985 (off Enderby Land) and October to November 1987 (off Prydz Bay). Routine shipboard observations were conducted while cruising in the pack ice and an aerial survey was conducted from helicopters on line transects ranging up to 30 nautical miles from the vessel. Minke whales, killer whales and southern bottlenose whales were the principal whale species sighted within or near the pack ice zone during these months in both areas. In 1985 off Enderby Land the total number of whales observed was lower (no whales were observed during the aerial surveys) than the number seen during the 1987 cruise off Prydz Bay. The whales observed from the air were all in relatively open water in compact groups swimming slowly near the surface. Ensor (1989) suggested that a reason for the difference in whale sightings between the years and areas could be differences in the abundance of euphausiids (mainly Antarctic krill). In 1985 the abundance of euphausiids was apparently low off Enderby Land whereas in 1987 areas where euphausiids were observed on overturned ice floes coincided with areas where minke whales were most commonly encountered (Ensor 1989).

RECENT DATA

The whale logs maintained on recent ANARE voyages have not been supported by an organised whale observing program and are based on incidental sightings made by biologists, bird observers and other interested expeditioners. The vessels *Lady Franklin*, *Polar Queen*, *Nella Dan*, *Ice Bird*, and *Aurora Australis* (main voyaging vessels used by ANARE since 1977) each had a warm, comfortable, glassed observation deck where the whale, seal, and bird log books were maintained.

Analysis of the whale observation data collected during ANARE voyages over the last 16 years shows a dramatic decrease in the number of whale sightings recorded. The log books record a total of 1023 sightings in the period 1977 to 1993, an average of 64 whales per year. However, in the past two seasons (1991/92 and 1992/93) a total of 252 sightings was recorded (Table 1).

The reasons for the decrease in sightings between the report by Parker (1978) and the present are varied. There are annual differences in the effort made by different observing parties, weather conditions, number of days spent at sea, voyage path (differences in the amount of time spent in the open ocean and near the pack ice) and speed of the ship (variable depending on the weather and schedule dates).

Inconsistency is the biggest obstacle to the systematic collection of data. The amount of time and effort spent on the observation deck collecting the data depends on the enthusiasm of the changing expeditioners. As the ship moves further south the scenery becomes more dramatic (pack ice and icebergs), more people visit the bridge for longer periods of time thus increasing the probability of whale sightings. Information collected in the whale logs however gives no indication of these variations.

An example of the consequences of differing cruise tracks and search efforts is best illustrated by comparing seasons 1984/85 and 1988/89. As well as the usual resupply voyages, a marine science cruise extensively surveyed the area south of 57°S during the summer of 1984/85. Much of this cruise time was spent close to the pack ice. A total of 256 whale sightings was recorded for the year of which 114 were recorded during this one marine science cruise. By comparison in 1988/89 only 52 sightings were logged in all voyages as the ships traversed almost directly between Hobart and the Antarctic continent.

Analysis of the data from 1977 to 1993 is also hampered by the difficulties involved in accurate identification of whale species from brief sightings at sea. This is very difficult even for experts thus the data collected are in many cases unreliable. The distance of the whales from the ship and the visibility were seldom recorded.

The two major problems that are evident from attempting to analyse past data are:

The inability to calculate sighting effort in different years.

The problem with identification. When an identification is made it is impossible to tell how competent or sure the observer was. The second problem of identification occurs when the observer cannot decide between two possible identifications and puts the observation down as unidentified whale.

FUTURE DIRECTIONS AND DATA COLLECTION

In July 1992 at the 44th Annual Meeting of the IWC the government of France put forward proposals to designate all waters south of 40°S as a whale sanctuary in accordance with article V(1)(c) of the 1946 Convention for the Regulation of Whaling. The aim of this was to protect all southern hemisphere species and populations of baleen whales and sperm whales on their feeding grounds. The French proposal was based on the feeling that in the very damaged ecosystem of the Southern Ocean the IWC's Revised Management Procedure (proposed to be implemented on a species by species, stock by stock basis and theoretically allowing some whaling) should not apply but instead a more cautious policy looking at the whole ecosystem should be adopted.

The French proposal for a southern Ocean Whale sanctuary suggested that the Scientific Committee of the IWC be asked to draw up a long-term program for research into, and monitoring of, the southern hemisphere whale populations. They recommended that such a program should be coordinated with relevant studies sponsored by the Scientific Committee of CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources) in the area south of the Antarctic Convergence and by national research organisations in the more northerly latitudes of the sanctuary. ANARE ships are the only government vessels regularly plying those waters and therefore many of the questions asked will be referred to the Antarctic Division.

What then is the role of the Antarctic Division? Regardless of any decisions about whether the Antarctic Division should or should not become involved in whale research, the simple monitoring of whales should be put on a more professional basis. The optimal amount of information collected for each sighting on ANARE voyages is suggested in Table 2 and will become the basis of whale observations on future voyages.

The question to be asked in regard to whale observations is whether to persist with observations by inexperienced observers or whether experienced observers should be engaged to improve the reliability of the data, but possibly at the expense of reduced coverage. If it is decided to continue with inexperienced observers, how is the reliability of the data to be increased?

To improve the reliability of species identification by inexperienced observers it may be beneficial to use a coded format such as the one described by Frost and Best (1976). Most methods provide a key or photographic index from which positive identifications are expected of the observer. The major problem with this method is that the criteria by which a whale is identified are not retained so that a suspect identification will always be suspect and an unidentified whale will always remain in this category. Frost and Best (1976) devised a method whereby the most useful identifying features are looked for preferentially and are recorded in a standard and systematic manner with no real need for the observer to make an identification. These data can then be used by an expert either to identify the whale or at least to narrow down the possibilities. Features recorded include the general body shape, blow shape, blow frequency and synchronisation within the group, swimming behaviour and reaction to the vessel, exposure of the tail flukes, dorsal fin position, height, shape and colour, head shape, body colour and colour pattern and flipper shape and colour. The implementation of this scheme, together with the collection of photographs of each sighting, could reduce the whales in the unidentified category and make the data set more reliable.

Australian and foreign government vessels usually operate in Antarctica on fixed transects with tight schedules and little time for deviating off track for whale investigations. The placement of experienced observers on these ships therefore restricts the time and space over which data on whales can be collected (however accurate those data may be). However, there is a vast potential for spatial and temporal coverage of Antarctic waters in the number of cruise ships visiting Antarctic water each year.

The tourism potential of the Antarctic and Southern Ocean has resulted in an increasing public interest and awareness in the area and its ecology. Gradually more and more tourist ships have visited during the summer months, each providing potential for whale observation data collection. In the summer of 1992/93, for example, 59 tourist ships visited the Antarctic and the expected number for 1993/94 is 64 ships. The area traversed by these ships will be outside the usual ANARE resupply routes, thus providing the opportunity to increase the area surveyed for whale sightings.

This is a resource that could be tapped because ecotourists tend to be enthusiasts and are often accompanied by experts who can demonstrate the identification points of whales.

CONCLUSION

Up until now whale research in the Southern Ocean has played a minor role in the ANARE scientific research effort. The lack of knowledge of whale biology, distribution patterns, feeding grounds, population numbers and life cycles will become evident when decisions are made to manage a whale sanctuary or if commercial whaling is to continue. The cheapest and easiest way to begin collecting distribution data on Southern Ocean whales is by using existing voyages under the auspices of either government or private enterprise, to collect data on the distribution of whales, perhaps in association with marine science cruises or together with some other indication of food abundance such as bird sightings (Hodges and Woehler in press).

TABLE 1 Whale sightings over sixteen shipping seasons.

Season	Whales	Days	Whales/day
77/78	61	53	1.15
78/79	32	22	1.45
79/80	45	33	1.36
80/81	19	27	0.70
81/82	56	42	1.33
82/83	29	46	0.63
83/84	7	21	0.33
84/85	256	165	1.55
85/86	34	112	0.30
86/87	79	120	0.66
87/88	28	184	0.15
88/89	52	40	1.30
89/90	61	188	0.32
90/91	16	16	1.00
91/92	132	194	0.68
92/93	122	218	0.56

In an attempt to standardise effort the number of days for each voyage was calculated from the first to the last sighting of a whale. These were then summed for the season.

TABLE 2 Proposed whale sighting sheet

Name of observer making entry			
Vessel	Voyage	Season	Date
Time whale observation effort began		Lat.	Long.
Time whale observation effort finished		Lat.	Long.
Observing conditions			
Ship activity	Speed	Course	
Cloud	Windforce	Winddir	
Airtemp	Airpress	Precip	
Sea state	Sea temp		
Icebergs	Seaice	Vis	
Salinity	Depth		
Whale details			
Species code		Swimming past	
Distance		Surfacing	
Pod number	of	Breaching	
Total count		Blowing	
		Moving thru ice	
		Following	
		Porpoising	
		Frolicking	
		No record	

All details will be coded, this to appear on the reverse side of sightings sheets.

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The principal organiser of the conference was Mark Simmons of the Great Barrier Reef Marine Park Authority. Further information on any aspect of the conference may be obtained from him at:

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