

DUGONG RESEARCH:

current status and opportunities

Most people have never heard of dugongs. Yet two very different groups of people find them fascinating. Dugong meat is the favourite food of many of the Torres Strait Islanders and coastal Aborigines who live in tropical Australia and for whom dugongs have great cultural and dietary significance. Mammalogists also regard the dugong as one of the great mammals, for it is the only herbivorous mammal that is strictly marine, and one of only ^{four} extant members of the obscure order Sirenia or seacows.

This professional fascination was the stimulus for the first modern research on dugongs in tropical Australia which began in 1969 when George Heinsohn, a lecturer in Zoology at James Cook University, started collecting samples from dugongs which drowned in shark nets set for bather protection near Townsville. However, it is the cultural significance of the dugong and Australia's perceived responsibility as the only developed country whose waters are known to support significant dugong stocks that have prompted the subsequent substantial research funding.

Dugongs are extremely cryptic and tend to occur in turbid waters. They have proved extremely difficult to study using conventional underwater observational techniques and are most effectively counted from light aircraft. During the 1970's, a series of qualitative aerial surveys established that dugongs are widely distributed throughout the coastal waters of northern Australia, and identified locations from Shark Bay in Western Australia to Moreton Bay in southern Queensland which support large numbers of animals. Dugongs are found in shallow, sheltered bays which support large stands of seagrasses, their major food. They also occur on large reefs such as those in Torres Strait and Princess Charlotte Bay.

Information on dugong life history and reproductive biology was obtained at James Cook University from the analysis of specimens from some 600 dugongs. These were not only obtained from animals drowning accidentally in nets, but also from native hunters at several communities. Most specimens were collected by the Papua New Guinea Division of Wildlife from dugongs which were sold in the market at Daru in Torres Strait. Each dugong was aged by counting the number of growth layers in its tusk; these are deposited annually rather like growth rings in a tree. This study indicated that dugongs have a life span rather similar to our own. Individuals may live for more than

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seventy years, but females do not have their first calf until they are at least 10 years old and sometimes not until they are 15 to 17 years old. A single calf is usually born and may be suckled for at least 18 months. The calving interval is very variable both in space and time, but is at least three years.

In the absence of reliable data on natural mortality, a series of mortality schedules were developed based on data from mammals with similar life histories. These schedules were used in conjunction with the empirical life history data in a simple population model. Hundred-year population simulations using this model indicated that, even with the most optimistic schedule of life history parameters, a low schedule of natural mortality, and no man-induced mortality, a dugong population was unlikely to increase at more than about five percent per year. Clearly, dugongs are highly susceptible to over-exploitation.

Although dugongs are protected by law in Australia, they can still be hunted legally by many Aboriginals and Islanders, and they are subject to incidental mortality in gill-nets. Scientists, including myself, were concerned that we had a 'dugong problem'. This concern was heightened by the dwindling traditional catch in Torres Strait; a catch that apparently declined despite sustained effort.

In order to determine the status of the dugong in tropical Australia, it was necessary to develop a quantitative aerial survey technique which would provide a precise index of dugong density as a basis for monitoring long-term trends. Surveys have now been conducted along these lines along much of the Northern Territory coast by staff of the Conservation Commission, and in most of the Great Barrier Reef Marine Park and in Torres Strait by the James Cook Group. The resultant population estimates indicate that there are far more dugongs in Australian waters than previously supposed. However, because of the errors inherent in the survey technique and the likely slow rate of change of a dugong population, it is estimated that it will be at least a decade before it is possible to confirm whether dugong numbers are increasing, decreasing or stable. Meanwhile, it would be prudent to introduce conservative management policies.

The Great Barrier Reef Marine Park Authority is using a system of zonal management to protect dugongs and has given a very high level of protection to inshore seagrass beds which are known to support large numbers of animals. The success of this approach depends on the dugongs actually spending a lot of their time in these areas. Very little is known of the movements and habitat usage of individual dugongs and the underwater techniques that have been attempted in the past are unsuitable for the turbid inshore waters of the Great Barrier Reef Region. In order to overcome these problems, it was decided to use radio-

tracking to obtain information on dugong movements and habitat usage.

This was a considerable technical challenge as radio signals attenuate in seawater. With the co-operation of the US Fish and Wildlife Service, a tethered floating radio-tag assembly has been developed for dugongs, and a conventional VHF transmitter and a satellite PTT compared in a pilot study. The study indicates that dugongs are more suitable for satellite tracking than most other marine mammals with up to five locations being obtained per day. Each location is accurate to within about 500 m. This technique is very applicable in the remote areas of northern Australia, as once the transmitter is on the animal, the information can be accessed by computer from anywhere in the world.

Future dugong research is going to rely more heavily on remote sensing techniques such as satellite tracking. It is also likely that research techniques developed in Australia will be applied in the other 42 Asian, African and Pacific countries that make up the dugong's wide range in order to provide a sound biological basis for dugong management in these areas.

Dugong research has come a long way from dead animals in shark nets.

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