

Management of Anchorages in Marine Parks

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Summary

Anchorages, are the aquatic equivalent to car parks, showing problems associated with the concentration of activities - conflict between users, overcrowding, pollution, habitat destruction and wildlife disturbance - yet at the same time providing managers with positive opportunities for contacting users, monitoring and regulating impacts, and supplying facilities and services to enhance the site's use and enjoyment.

A preliminary analysis is given of anchoring and mooring within the Cairns Section of the Great Barrier Reef Marine Park. The concluding sections outline a strategy for the management of anchorages in the Marine Park, including the active promotion of CARE, a Code for Anchoring on the Reef, and propose a set of guidelines for Low Impact Moorings.

Introduction

The key to the management of most parks is access - **where people** go and, are allowed to carry out different activities.

In **terrestrial parks** the science and art of controlling access **and movement** of people and vehicles are highly developed. Considerable attention **is given** to the **planning and** design of parking areas, **ticket** booths, and barriers, and to the alignment and grading of roads and walking tracks. These constraints facilitate **cost-effective management by** concentrating aid segregating visitors' **activities; they** provide "bottlenecks." at which to educate, regulate and monitor.

In Marine Parks, it is more difficult physically to control access : boat access channels are definable in some areas, but barriers to movement are generally **impractical**; "off-road driving" is the norm. However, there are two **areas** which are particularly **relevant to** management - one is the boat launching ramp or jetty from which the park user leaves the land for the marine park, and to **which** he returns, and at which he can be assailed by managers plying information or questions; the second is the anchorage - the safe haven for the **user's** boat while in the park.

Anchorage are the aquatic equivalent to car parks. As with car parks, anchorages need to be planned and managed properly, if attendant problems are to be avoided. This paper is concerned with Marine Park anchorages, and how they are important to **management**.

Anchorage, Anchoring and Mooring

In this discussion, use **of** the **terms anchorage, anchoring and mooring** is as follows : an **anchorage** is an area where vessels can anchor or moor with some degree of safety, as **a result** of the area's topography providing shelter from wind, wave action and tidal currents. **Anchoring** is the action **of** using an anchor to hold a vessel at a spot; all the gear is taken with **the** boat when it moves. A **mooring** is the tackle placed at a site to provide a more-or-less permanent facility.

Impacts at Anchorages

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Boats and **boaties** have various effects upon the areas they frequent. These may include physical damage by anchoring; pollution by spillage of fuel or littering; and direct effects on the marine life such as fishing or fish feeding. Some of these impacts are listed in Table 1.

These impacts become concentrated at anchorage sites, so that there is a danger that the sites most frequently seen by visitors become degraded. Some effects may be exacerbated by the sheltered nature of anchorages, pollution for example, because of reduced water flushing rates, or physical bottom disturbance because the substrate tends to be finer silts, more easily disturbed and transported before settling out again.

Management Opportunities

Anchorages provide managers with some positive opportunities as well as problems. The Concentration of user activity - the "bottleneck effect"- makes **it more** cost-effective to provide facilities and services, such as vessel moorings, ranger presence, informative or regulatory signs, interpretive trails, swimming pontoons, garbage collection, etc., and to monitor and **regulate** activities and -impacts.

Anchoring and Mooring in the GBRMP Cairns Section

Boat skippers seek anchoring sites which are suitable for their diverse purposes - sleeping, fishing, diving, etc - and are reasonably sure to provide safety and comfort for the duration of the stay, allowing for tidal changes of current and depth, and for possible changes in wind direction and strength. Obviously, a dive site anchorage need not be so secure or comfortable as an overnight anchorage or where a vessel is to be left untended for a time.

Examination of one of the most heavily-used areas of the Marine Park - off Cairns- Port Douglas - indicates that, even in the extensive, relatively-shallow and sheltered waters of the Great Barrier Reef, good anchorages are scarce. In an area of over 4600 square kilometres which contains 90 reefs, there are only 40 anchorages suitable for overnight stays, 26 in southerlies and 14 in northerly wind conditions. This results in a great deal of activity being concentrated at these sites.

An estimate has been made of the "anchoring pressure" in the Cairns Section by calculating the numbers of anchors set and weighed in a year (see Table 2.). The preliminary survey of various categories of boat operations in the area indicated that private pleasure craft and commercial fishing boats generate the greatest anchoring pressures, followed by charter boats for diving and recreational and, game fishing. This is with allowance made for the percentage frequency with which fixed moorings are used instead of anchors and for the relative size of the anchor gear. The total number of anchor drops and retrievals without moorings is estimated at roughly 183,000 a year in the Cairns Section. The survey indicated also that 117 reef sites are used frequently (3 times per month or more) by particular operations and that at present only 30 moorings are installed at these sites.

Management of Marine Park Anchorages

Within any area of the Marine Park used regularly by boat operations, attention must be paid to the rational management of anchorages.

Preliminary, work to be done includes identifying all current and potential anchorage sites and assessing the current boat operations in the area. From this dual base it is possible to identify the anchorage sites which are used by large numbers of boats on an occasional or once-only basis, and the boat operations which are frequent users of particular sites.

It is important to know also the sites which are most vulnerable to boat-associated impacts, by surveying for such components as physically fragile stands of coral, fine sediment areas and sea-grass beds; marine biota sensitive to pollutants; sites which are prone to congestion, or where there are conflicts between activities.

Four complementary areas of management action are proposed :

- . promotion of CARE - the Code for Anchoring on the Reef;
- . prohibition of anchoring at certain, vulnerable sites;
- . encouragement, or requirement for site-faithful operators to install or upgrade their own moorings; under management supervision to meet the guidelines for Low Impact Moorings;

active management of the most heavily used anchorages, including, as appropriate, agency-installed moorings, separation of activities, user information, higher routine presence, and site condition monitoring.

Low Impact Moorings

Moorings are permanent facilities; used instead of anchoring for convenience or security, for vessels to return to exactly the same site, to provide a permanent mark, or to avoid anchoring damage. A mooring's hardware comprises ground tackle, cable to the surface, and floats.

There are three main types of ground tackle used in mooring installations :

1. cable fastened round rock or massive coral outcrops;
2. cable fastened to large weights in such a way that there is some movement of cable against the seabed; the loose cable is the shock absorber between vessel and ground weight.
3. large weights with cable to the surface in such a way ~~that there is no moveable ground tackle.~~
4. an auger or bolt embedded into the substrate.

At present, approximately half of the 30 moorings in the GBRMP Cairns Section are type 1 and half are type 2. In addition, there are some type 4 auger anchors installed on trial by Queensland National Parks & Wildlife. Both type 1 and 2 can cause substantial damage : the ground chains or wires are heavy-duty and, with the movement of the moored vessel or pontoon, 'can saw continually against the seabed, wearing away rock, crushing coral and raising clouds of sediment into suspension.

At present, most mooring sites are selected for operational convenience, safety and comfort; most mooring system designs and hardware are chosen for security, economy and durability. For moorings in the Marine Park, **low environmental impact** must be added to this list of criteria.

It is suggested that adherence to the following guidelines when installing and using a mooring would ensure that the environmental impacts are reduced. The guidelines relate to the mooring's location, placement, operation, maintenance and materials.

Guidelines for Low Impact Moorings

Location and placement

1. The mooring's location and placement must not detract from the use of the area by others, with particular reference to existing operations and on-site facilities.
2. The mooring site must be located carefully in relation to sites to be accessed from the mooring; and to any ecologically-sensitive sites in the area.
3. The mooring should be placed so that no coral reef" will be-shaded by any pontoon or similar facility".

Installation and operation

4. The ground tackle design and fastening should be such that there is no movement of any cable (chain, wire or rope) or any other component, on or close to any part of the seabed.
5. No part of the mooring system should be within 5 metres of any outcrop of coral or rock.
6. The water depth at low tide must be sufficient to ensure no impact on any part of the seabed or reef from the moored vessel's hull or propeller thrust.
7. There should be no cables within 3 metres of the, water surface at low tide, other than those directly beneath the surface flotation device.
8. The surface flotation device must be clearly visible to other users of the area; light- and RADAR-reflective surfaces should be used where practicable.
9. No toxic or noxious materials should, be, used; in particular, certain paints, anti-fouling and metal components should not be used.

, Maintenance

10. A routine visual check of all components should be carried out each day the mooring is used; a thorough service and re-fit should be carried out annually.
11. During installation and annual overhaul operations, great care must be taken to ensure that no damage is done to the site by service vessels, tools or underwater work.

C A R E for Marine Parks

Code of Anchoring on the Reef

- . use moorings where provided; check condition before use
- . do not anchor at fragile sites
- . use a suitable anchor and chain length to prevent dragging
- . anchor in sand or silt away from coral
- . ensure that anchor chain and rope do not foul coral
- . **allow for** a good depth of water beneath the boat through a full 360 swing
- ~~.. if coral anchoring is unavoidable, for short periods use a~~
lightweight pick or a sand-bag, with no chain;
protect the rope with plastic tube

/TABLE 1 Summary of Possible Impacts at Anchorages

Loss of amenity

"overcrowding"

spoilt seascape due to, **moorings, pontoons, boats, signs**, etc
conflict between incompatible activities, such as

| | |
|--------------------|-------------------------------|
| snorkelling | - water-skiing |
| anchoring | - reef appreciation |
| large boat mooring | - small boat anchoring |
| boat mooring | - boat access channel |
| fishing | - fish watching; |

Physical effects

impacts associated **with** anchoring :

sedimentation; bottom disturbance; coral breakage

impacts associated with moorings :

bottom, disturbance; artificial reef; fish attractant

propellor or hull damage to substrates

diver damage to substrates

Biological impacts

fishing

collecting **marine** specimens

dispersal of hull fouling organisms

feeding of fish, gulls and other **scavengers**

scaring away of marine animals

fish aggregation

bird'roosting

Pollution

littering - biodegradable, degradable, durable

waste and sewage disposal

fuel oil spillage - accidental and deliberate

anti-fouling chemical concentration

TABLE 2 Boat Operations in the GBRP Cairns Section

| | TYPES OF BOAT OPERATION (see Note 2) | | | | | | | G TOTALS |
|---|--------------------------------------|------|------|------|------|-------|--------|-----------|
| | A | B | C | D | E | F | | |
| No.boat operations in area | 12 | 2 | 5 | 21 | 22 | 27 | 80 | 6000 6187 |
| Av.no. reef trip-days/year | 300 | 150 | 150 | 350 | 150 | 200 | 10 | |
| Av.no. stops/trip-day | 1.5 | 1.5 | 3 | 5 | 2 | 1 | 3 | |
| % stops not on moorings | 1 | 98 | 70 | 5 | 100 | 100 | 98 | |
| No. anchorings/year | 54 | 5500 | 6600 | 2000 | 8100 | 16000 | 145000 | 183000 |
| Anchor gear size factor | x3 | x1 | x0.5 | x0.1 | x0.5 | x1 | x0.2 | |
| Annual "anchoring pressure" | 162 | 5500 | 3300 | 200 | 4050 | 16000 | 29000 | 58000 |
| No. stopping sites used frequently by particular boats (Note 1) | 8 | 38 | 48 | 21 | 0 | 0 | 2 | 117 |
| No. sites with moorings | 8 | 1 | 10 | 9 | 0 | 0 | 2 | 30 |
| No. permitted moorings | 8 | 15 | | 9 | 0 | 0 | 0 | 23 |

Note 1 "Frequently" = 3 times per month or more

Note 2
 A = large regular tourist ferries;
 B = charter, extended tour operators, (diving);
 C = day-dive tour operators;
 D = glass-bottomed boats, semi-subs, etc.;
 E = recreation and game fishing charter boats;
 F = commercial fishing vessels;
 G = private pleasure boats (sail and motor);