Visitors and carrying capacity

J2

MPA personnel may devote a large part of their time to management of visitors and recreational activities. An MPA manager may want to quantify or predict at what point environmental damage may occur from this and so needs to understand the concept of carrying capacity. This sheet provides information on some of the key issues to consider.

Promoting recreation and tourism so that visitors can learn about and appreciate an MPA, without damaging the values for which it was established, can be challenging. Visitors potentially have many negative impacts including disturbing wildlife, trampling vegetation, eroding trails, leaving rubbish, removing 'souvenirs' and damaging reefs. Tourists may also unknowingly offend cultural standards, for example through improper dress or by taking photographs of people or traditional sites.

Visitors to an MPA have different expectations of facilities and recreational and learning opportunities depending on their backgrounds and experiences. They also differ in their spending patterns and preferred activities. The main activities of interest are wildlife viewing, SCUBA diving and snorkelling, other water-based activities (e.g. swimm--ing, sailing, windsurfing), recreational and sport fishing, and hiking. It is rarely feasible to meet all requirements, and some expectations may be inconsistent with the objectives of the MPA. But it is important to understand the main characteristics of different types of visitor, so that at least some of their interests can be matched with what the MPA can provide. Many tourists visiting an MPA want to increase their understanding of marine life and what the MPA is doing to reduce threats. Education and interpretation programmes, materials and facilities are therefore very important (see sheets J1 and J5) and can greatly increase visitors' enjoyment and appreciation.

CARRYING CAPACITY

An MPA manager often wants to know how much use the MPA can withstand. The optimum number of visitors or of any particular activity within an area (i.e. how much is possible before damage occurs or the visitors' enjoyment is substantially decreased) is known as 'carrying capacity'. Quantifying carrying capacity is very difficult, and it will vary for each MPA depending on ecological conditions, the resilience of ecosystems to recover from disturbance (which may vary over time) and the behaviour of the visitors. Often the information needed to estimate this is not available.

Most published studies concern the carrying capacity of coral reefs for divers. Research in the Red Sea and Bonaire (in the Caribbean) indicate a maximum of 5,000-6,000 divers per dive site per year but there is great variation between reefs. Large numbers of divers and snorkellers may in fact cause less damage than fishers using unsound fishing methods. Few studies have measured the number of fishers that a reef can support, although figures on sustainable yields (i.e. kg of fish per hectare per year) provide one estimate.

Thus, carrying capacity may have limited practical application. In the case of diving, it assumes that the amount of diving is a reliable indicator of damage to the reef, whereas the behaviour of divers, the activities they carry out, and the physical and ecological characteristics of a reef all affect this. Spending resources on trying to quantify carrying capacity may therefore not be useful, as figures generated would not be applicable indefinitely and would vary in different parts of an MPA. However, it is important to be aware of the concept and to recognise that too much use will ultimately damage the habitats or species within an MPA, the cultural and heritage values, social customs and the visitor experience itself.

The concept of Limits of Acceptable Change (LAC) may be a more practical approach in that standards are set for the minimum acceptable conditions (note that these are not the desired conditions, but they are also not unacceptable). This involves defining the limit of ecological or sociological change (which may involve some degradation) that will be allowed at a site. The management actions needed to prevent change beyond the limit can then be identified. Monitoring is essential to indicate the point at which management should intervene i.e. when the minimum acceptable condition is reached. The LAC approach has been applied in Saba Marine Park, Netherlands Antilles. South African National Parks have

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A crowded beach bordering Diani Marine Reserve in Kenya. Visitors in such numbers need careful management.

developed another method, based on what is termed 'Thresholds for Potential Concern' for determining when management intervention is needed in a certain situation.

MINIMISING VISITOR IMPACT

If it seems that an MPA is suffering from too many visitors, actions that can be taken include:

- Seasonal or temporal limits on use, e.g. limiting visiting times, or restricting car parking, accommodation facilities or public transport.
- Regulating group size, particularly for specialist activities, or requiring pre-registration (visits only by prior arrangement), and providing guided tours that allow for more control, ensure visiting occurs at appropriate times of day (which may vary diurnally and seasonally), and maximise enjoyment for visitors by increasing wildlife viewing opportunities.
- Ensuring that visitors stay on specified routes and do not trample vegetation or disturb animals, and that noise and the use of light at night (e.g. during visits to turtle nesting beaches) is minimised.
- Using zonation e.g. closing areas to visitors, or reducing visits to ecologically important areas.
- Increasing entrance fees at peak periods.
- 'Site-hardening' – i.e. constructing facilities and trails that reduce impact but allow more visitors and help them to see the wildlife, e.g. boardwalks (see sheet J8), hides and pontoons.
- Providing rubbish bins and information boards, to encourage visitors not to leave litter.

KEY POINTS FOR THE MPA

- ❑ **Make sure all staff know how to welcome and deal with visitors through appropriate training, particularly for those who will act as guides; enforce regulations in a friendly manner.**
- ❑ **Make available codes of conduct for particular activities, and ensure that MPA personnel are familiar with them and can explain why certain activities and behaviours are not allowed.**
- ❑ **Provide details on when and under what circumstances photography is appropriate and how visitors can best interact with local communities.**
- ❑ **Ensure impact and benefits of visitors are monitored; bring the LAC approach into the planning framework for the MPA if appropriate; if doubt exists that damage may be occurring due to visitors, use the precautionary approach and limit numbers.**
- ❑ **Provide activities to involve visitors and opportunities for them to help either financially or in kind; provide a guest book and ask for suggestions.**
- ❑ **If appropriate, consider developing a Visitor Risk Management Programme as part of the emergency procedures for the MPA (see sheet D4).**

Visitor guidelines and codes-of-conduct can be made available at the MPA or distributed through tourism facilities. The standard advice of 'take only photographs, leave only footprints/bubbles' is always valid. Good guides can make a big difference to a visitor's experience and willingness to return. A good guide should be able to help tourists understand the best way to view wildlife, be well informed of global and local environmental issues and preferably have some knowledge of the languages of the most common visitors. Guides should provide a briefing on safety and appropriate behaviour before a visit starts, and ensure that the MPA regulations are observed. Fields guides, maps, charts, checklists, first aid, and drinking water should be made available as appropriate. A guide should be able to say 'I don't know' if that is the case when asked a question, should never offer an experience that is not feasible and should explain that some species may be difficult to see. It may be necessary to adjust interpretation programmes to match the abilities of tourists.

Sources of further information

(see also J1 and J6)

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Coral Reef Alliance (CORAL) – **www.coral.org** - fact sheet on carrying capacity.

Saba Marine Park Management Plan: **www.sabapark.org/studies/lac_plan.pdf**