

ENABLING MANAGEMENT – A POLICY REVIEW

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Implementing management measures for mass bleaching will require a mandate from decision-makers as well as additional resources

This guide has aimed to identify and describe actions that managers can take in response to mass coral bleaching events. However, in almost all cases, implementing these ideas will require a mandate from decision-makers as well as additional resources. Clear

policies that articulate the need for, and value of, managing reefs in the context of an increased frequency of mass bleaching events will raise the profile of this issue, and so assist management. Ultimately, management for mass bleaching will require that the demand for these activities be reflected in national and local policies and resource budgets.

Currently, there are three policy areas of mass bleaching research and discussion: coral reefs, climate science, and biological diversity. Over the last five years, all three have demonstrated two trends: (1) recognition of a need for research followed by recognition of a need for management and (2) a call for international action followed by a call for national action and, in some cases, local action. These trends are positive signs for managers wanting support to implement the activities in this guide. This section reviews international policy related to mass coral bleaching, and provides information on the types of mandates that currently support management for mass bleaching.

5.1 Coral reefs

Through the International Coral Reef Initiative (ICRI), three important policy statements have called for international action in relation to mass coral bleaching events and climate change (www.icriforum.org). Initiated in 1995, ICRI is a partnership among nations and organisations authorised to implement Chapter 17 of Agenda 21 (adopted at the Earth Summit, 1992) and other international agreements relevant to the conservation and management of coral reefs.

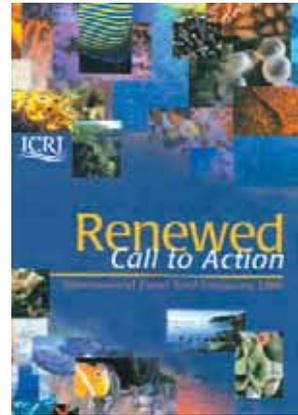
In 1995, ICRI issued a 'Call to Action' that identified as one of four key threats to coral reefs 'the potential adverse effects of climate change, including temperature and sea-level changes, alteration of natural patterns of precipitation, tropical storms and ocean circulation'. Three years later, recognition of mass bleaching as a major threat to coral reefs had become much stronger. An ICRI-sponsored event, the International Tropical Marine Ecosystem Management Symposium (ITMEMS), issued a 'Statement on Coral Bleaching' that noted the severity of the 1997-98 event, observing that resulting coral mortality reached as high as 90 per cent in some areas. The statement expressed concern that projected increases in temperature are likely to lead to an increase in the frequency of coral bleaching events and associated ecological and socioeconomic consequences. The statement identified a need for cross-disciplinary research and, specifically, establishment of 'a multi-disciplinary taskforce...to thoroughly inform the IPCC [Intergovernmental Panel on Climate Change] on coral reef issues prior to their next report due in 2001'.

By 2003, ITMEMS 2 recognised the need and ability to manage reefs for mass coral bleaching. The conference statement concluded that 'coral reefs of the world have been deteriorating from coral bleaching and mortality due to warming seas' and that managers can 'address these trends by adopting a number of risk minimising strategies'. The statement recommends six strategies, summarised as:

- support resilience by managing threats within management control
- factor risk of bleaching impacts into representative MPA networks
- incorporate flexibility to respond to mass bleaching into coral reef management plans
- influence policy related to climate change
- document and raise awareness about bleaching impacts
- promote documentation and mitigation of other negative effects of climate change on tropical marine species and ecosystems, including turtles, seabirds, mangroves, etc.

ICRI policy statements have been effective in catalysing national and local coral reef management around the world. In response to recommendations in the 1995 Call to Action, many countries have developed national coral reef initiatives, including Indonesia, the Philippines, Thailand, the United States, Mexico, and Netherlands Antilles. Furthermore, the International Coral Reef Action Network (ICRAN) was formed as an action-oriented response and partnership to ICRI's call. ICRAN continues to work to halt the global decline in the health of coral reefs.

In the United States, efforts originating from the 1995 ICRI Call to Action have resulted in national policies calling for management of mass coral bleaching, even at the local level (www.coralreef.gov). In 2000, the US National Action Plan for Coral Reef Conservation called for increased research and monitoring to strengthen understanding of and response to mass bleaching events. Two years later, the US Coral Reef Task Force passed two resolutions calling for the incorporation of mass bleaching events into management policy. The first called for a public-private partnership to comprehensively address research into and management of bleaching-related impacts to reefs. The second called on individual US states and territories, with their federal partners, to develop local action strategies for responding to key threats to reefs, including climate change and coral bleaching. While it is too soon to judge the success of these initiatives, such local level approaches to managing mass bleaching may be well-suited to other decentralised coral reef management regimes, such as those of Indonesia and the Philippines.



In 1998, the coral reef management community, through ICRI, issued a "Statement on Coral Bleaching" in its *Renewed Call to Action* (shown here) that raised concern about mass bleaching and called for research to evaluate its consequences. By 2003, that call went further by recognizing both the need and the ability to manage coral reefs for mass bleaching, in a conference statement adopted at ITMEMS 2. Several policy forums related to mass bleaching demonstrate this trend—of moving from a call for research to a call for management. They also move from a call for international action to a call for national action, and sometimes, local action.

5.2 Climate science

Unlike coral reef policy, climate science forums do not issue prescriptive policies. However, they do aim to be policy relevant, and the technical synthesis documents they produce are important for establishing the accepted state of knowledge and describing priority knowledge gaps in existing information. Several important climate science documents have issued findings that articulate the importance of mass bleaching as a serious threat to coral reefs, the links between increased sea temperatures and mass bleaching, and the priority for additional research into coral reef management options in the face of climate change.

In its third assessment (2001), the Intergovernmental Panel on Climate Change (IPCC) identified coral reefs as one of the natural systems especially vulnerable to climate change. This suggests that coral reefs are among the ecosystems that, due to their limited adaptive capacity, may undergo significant and irreversible damage because of climate change. The assessment considered what type of climate-related impacts will most affect reefs, finding that increases in the frequency of extreme temperature events and consequent bleaching events, and changing CO₂ levels that reduce the rate of reef calcification will be more significant than impacts associated with sea-level rise. Quoting several studies, the IPCC Working Group II technical review noted, 'rising SST [sea surface temperature] will create progressively more hostile conditions for many reefs. This effect, along with decreased CaCO₃ saturation state, represents two of the most serious threats to reefs in the 21st century'.

The Strategic Plan for the US Climate Change Science Program is similar to the IPCC in recognising coral reefs as particularly vulnerable, and calling for research to strengthen coral reef management options. The plan indicates that, while bleaching events prior to the 1980s were generally attributed to local phenomena, a direct relationship between bleaching events and elevated ocean temperature has since been found (US Climate Change Science Program, 2003). The plan emphasises that management practices can be used to sustain ecologically related goods and services. Specifically, it identifies as a priority research question: 'How can coral reefs be managed for tourism, erosion protection, and biodiversity, considering potential global changes?'. Research needs listed under this question include assessments of the direct and indirect ecological effects and economic costs of management practices through regular monitoring, evaluation, and experimentation—the overarching goal being to enable adaptive shifts in management.

5.3 Biological diversity

The Convention on Biological Diversity (CBD) has called for management, research, capacity building and financing of activities that address mass coral bleaching. Additionally, the CBD has catalysed national efforts to consider climate change-related impacts on biodiversity. One example of such an effort is Australia's Biodiversity and Climate Change Action Plan, which includes sections on the mass coral bleaching issue.

In 1998, the CBD formed a Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) for assistance in developing policies on mass coral bleaching. After issuing initial findings in an Expert's Meeting report, a Specific Work Plan on Coral Bleaching was developed (www.biodiv.org). Recommended actions in the first work plan included targeted research, monitoring and assessment, stakeholder engagement, the development of case studies, technical capacity, and Integrated Coastal Management (ICM) plans. The work plan also called for increased recognition of coral bleaching in related international conventions and the mobilisation of financial and technical assistance to address the issue.

At the 2004 CBD Conference of Parties, the Specific Work Plan on Coral Bleaching was updated, adding a category for 'Management Actions and Strategies'. Recommended management actions included: (a) identification and management of areas of demonstrated resilience; (b) assistance for focused management activities; (c) development of pilot projects for management interventions to increase short- and long-term reef resilience; (d) integration of resilience principles into MPA design and (e) increased efforts to reduce localised stressors to promote resilience. Management concepts were also integrated into the other sections during the 2004 update, including a recommendation to support training managers in the tools necessary to respond to mass bleaching events.

Countries that are signatories to the CBD are to complete national level assessments of biological diversity. In Australia, a partnership of federal and state governments has recently completed a National Biodiversity and Climate Change Action Plan (NBCCAP) that specifically calls for management efforts to minimise the impacts of coral bleaching events. This plan calls for the integration of climate change concerns into standard management operations, and includes research, communication, and management components. The section on marine and coastal ecosystems recommends:

- building capacity to predict the effects of climate change on coastal and marine ecosystems in ecological and socioeconomic terms
- identifying and implementing strategies that minimise the impacts of climate change on vulnerable coastal and marine ecosystems and, particularly, for acute impacts from climate change, such as coral bleaching
- maximising the resilience of coastal and marine ecosystems to climate change
- considering the impacts of climate change when selecting new Marine Protected Areas.

International policy forums related to coral reefs, climate science, and biological diversity have all recognised the need for management action to respond to mass coral bleaching. These international statements offer support to managers who want to implement the strategies described in this guide

Summary. Many countries with coral reefs are participants in ICRI, signatories to the CBD, and involved with the IPCC. Policies and statements issued in these international forums may help managers develop the political will and acquire the resources to implement their own plans to respond to mass bleaching events and to build coral reef resilience. As discussed here, there are already examples of the ways these international policies can and have influenced the development of policies that incorporate mass coral bleaching into management at both national and local levels. *A Reef Manager's Guide to Coral Bleaching* is intended to provide the knowledge and tools that will enable managers to take the actions required by these policy initiatives.