

# **APPENDIX 1: MEMBERSHIP OF THE CROWN OF THORNS STARFISH ADVISORY COMMITTEE (COTSAC) AND THE CROWN OF THORNS STARFISH ADVISORY REVIEW COMMITTEE (COTSARC)**

## **COTSAC**

Professor K.J.C. Back (Chairman)	
Dr C. Birkeland	University of Guam
Dr R. Bradbury	Australian Institute of Marine Science
Dr J.S. Bunt	Australian Institute of Marine Science (Director)
Professor R. Carter	James Cook University (Geology Department)
Dr R. Endean	University of Queensland (Zoology Department)
Dr B. Goldman	Lizard Island Research Station (Director)
Mr G. Kelleher	Great Barrier Reef Marine Park Authority (Chairman)
Dr J. Lucas	James Cook University (Zoology Department)
Mr R.G. Pearson	Queensland Department of Primary Industries
Dr P. Sale	Australian Coral Reef Society (Chairman)
Professor K.P. Stark	Great Barrier Reef Consultative Committee (Chairman)
Professor J.M. Thomson	University of Queensland (Zoology Department)
Mr R.A. Kenchington (Secretariat)	Great Barrier Reef Marine Park Authority

## **COTSARC**

Professor J.M. Swan (Chairman)	
Dr J.T. Baker	Australian Institute of Marine Science (Director)
Dr C. Birkeland	University of Guam
Professor R. Carter	James Cook University (Geology Department)
Professor J.H. Choat	James Cook University (Marine Biology Department)
Dr R. Endean	University of Queensland (Zoology Department)
Mrs P. Hayles	Hayles Holdings Pty. Ltd.
Dr T. Hundloe	Griffith University (Australian Environmental Studies)
Dr R.A. Hynes	Queensland National Parks & Wildlife Service
Mr G. Kelleher	Great Barrier Reef Marine Park Authority (Chairman)
Dr J. Lucas	James Cook University (Zoology Department)
Mr R.G. Pearson	Queensland Department of Primary Industries
Senator M. Reynolds	Australian Government
Dr P. Sale	Australian Coral Reef Society (Chairman)
Professor K.P. Stark	Great Barrier Reef Consultative Committee (Chairman)
Professor M. Yamaguchi	University of the Ryukyus
Dr L. Zann (Secretariat)	Great Barrier Reef Marine Park Authority

## APPENDIX 2: SUMMARY OF THE REPORT OF THE CROWN OF THORNS STARFISH ADVISORY COMMITTEE

- S.1 Since 1966 there has been public concern about the long-term risk to the Great Barrier Reef as a consequence of large populations of the crown-of-thorns starfish *Acanthaster planci*. The view of the committee is that the destruction of hard coral by aggregations of *A. planci* poses a serious threat to the organisation and functional relationships within some reef communities within the Great Barrier Reef, at least in the short term.
- S.2 Large numbers of crown-of-thorns starfish have been reported from many of the major reefs lying between Princess Charlotte Bay (latitude 14°S) and Townsville (latitude 19°30'S) since 1979. In addition, some reefs outside this region have also carried large numbers of *A. planci* since 1979. In the absence of detailed information on the condition of the hard coral cover of each affected reef there is a difference of opinion among Committee members about the actual extent of coral destruction that has occurred. Many of the reefs carrying major *A. planci* populations during the last five years are known to have carried large populations during the 1960s and early 1970s.
- S.3 Present evidence is inadequate for scientists to agree on the nature and significance of the phenomenon of aggregations of large numbers of crown-of-thorns starfish and thus on the extent of any consequent risk. However the Committee recognises that the presence of very large numbers of crown-of-thorns starfish is a major management problem in some areas of the Great Barrier Reef.
- S.4 The Great Barrier Reef has been included on the World Heritage List. In view of this, effective countering of any established threat to the integrity of the Great Barrier Reef should be regarded as a national priority.
- S.5 Until more information is available direct management intervention in the crown-of-thorns starfish phenomenon should continue to be limited to tactical control measures designed to protect corals at specific sites of importance for tourism or scientific research. The Committee supports the position and the actions taken by the Authority in this regard so far. The view was expressed by one Committee member that there was a need for more extensive measures. Nevertheless experience in Japan and the US Trust Territories is that attempted large scale eradication programs have limited value in controlling major populations. In the absence of a more efficient technique, control even on a local scale is often not achievable.
- S.6 The current level of research activity is unlikely to lead to a short term (3-5 years) resolution of the questions raised by the presence of very large populations of crown-of-thorns starfish on the Great Barrier Reef.
- S.7 The Committee recognises the need for further research and has identified a number of specific research areas which, if addressed now should help within 3-5 years to improve understanding of the degree of threat to the Great Barrier Reef. Nevertheless the committee stresses that such research cannot be guaranteed to answer questions relating to the desirability or feasibility of control measures.
- S.8 The Committee identified a number of research initiatives which should be taken immediately and considers that there is an urgent need for a coordinated program of crown-of-thorns starfish research in Australia. This is addressed in the Recommendations.

### **APPENDIX 3: RECOMMENDATIONS OF THE CROWN OF THORNS STARFISH ADVISORY COMMITTEE**

- R1      The Committee recommends a risk analysis study be undertaken by the Authority to contribute to assessment of the need for control of crown-of-thorns starfish.
- R2      The Committee recommends that the Authority continue to monitor the effectiveness of current control techniques and notes that the Authority has budgeted approximately \$7,000 for this purpose in the 1984/85 financial year.
- R3      The Committee recommends assessment of the feasibility of developing more efficient techniques such as biological control by predators or pathogenic organisms (estimated cost \$55,000 per annum over three years).
- R4      The Committee recommends that a workshop be held to review techniques for monitoring crown-of-thorns starfish and coral condition (estimated cost approximately \$25,000).
- R5      The Committee recommends that the Authority continue its survey based upon general user reports and supervised surveys of a selected sample of reefs using the most appropriate available techniques. The Committee notes that the Authority has allocated approximately \$63,000 in its 1984/85 budget for such surveys.
- R6      The Committee recommends a study of oral history of human use and of experience of the Great Barrier Reef (estimated cost \$30,000).
- R7      The Committee recommends a study of surface sediments and soft sediment cores to evaluate evidence of prior major occurrences of crown-of-thorns starfish populations (estimated cost approximately \$70,000 per annum over three years).
- R8      The Committee recommends that priority be given to analysis of existing data and modelling studies (estimated cost approximately \$55,000 per year over four years).
- R9      The Committee recommends that research funding at an estimated cost of \$500,000 per year over 3 years, be allocated to support high priority projects, including any identified during the modelling studies.
- R10     The Committee recommends research, including modelling, to test hypotheses regarding human factors which may trigger or exacerbate population outbreaks of crown-of-thorns starfish (estimated cost \$250,000 over three years).
- R11     The Committee recommends an investigation to determine whether use of geological techniques of climate reconstruction can identify the frequency of occurrence of periods when factors including temperature and salinity resemble those prevailing at the outbreak of recent major crown-of-thorns starfish populations (estimated cost \$50,000 per annum over three years).
- R12     The Committee recommends research to evaluate the economic and social consequences of major populations of the crown-of-thorns starfish (estimated cost \$50,000 per annum for three years).
- R13     The Committee recommends that the Great Barrier Reef Marine Park Authority be recognised as the government agency responsible for reporting on and coordinating research and monitoring results on the crown-of-thorns in the Great Barrier Reef Region, with a responsibility to interact with funding agencies and research institutions to maximise efficiency in use of available funds and resources.

- R14 The Committee recommends that a senior scientist be appointed by the Great Barrier Reef Marine Park Authority on a five-year contract and supported with adequate funding (approximately \$85,000 per annum) to develop and coordinate a major program of research recommended in this report.
- R15 The Committee recommends that the Great Barrier Reef Marine Park Authority appoint an advisory committee to provide guidance to the research coordinator and advice to the Authority on development and coordination of research.
- R16 The Committee recommends that the various relevant research funding agencies be advised that crown-of-thorns starfish research is an area of national priority which should be taken into account in the funding of research.
- R17 The Committee recommends that the research questions identified by the Committee be publicised through the national and international scientific community.
- R18 The Committee recommends that specific research projects identified in this report and those defined in R8 and R9 be supported by allocation of an amount of approximately \$3 million over five years to the Great Barrier Reef Marine Park Authority to support a coordinated research program. This amount to be additional to funds available to crown-of-thorns starfish research through existing sources such as the Australian Research Grants Scheme, Marine Science and Technologies Grants and the program of the Australian Institute of Marine Science.
- R19 The Committee recommends that the Authority should continue its present information program and keep the public and the media informed on the situation regarding distribution and research relating to crown-of-thorns starfish.

#### **APPENDIX 4. SUMMARY OF FINDINGS AND RECOMMENDATIONS BY PROFESSOR D.T. ANDERSON**

1. The current management policy of the Great Barrier Reef Marine Park Authority for crown of thorns starfish control is soundly based and takes account of current knowledge of crown of thorns starfish populations on the Great Barrier Reef. The policy could be applied more extensively only if special funds were made available for this purpose.
2. The Great Barrier Reef Marine Park Authority has promoted appropriate research into crown of thorns management under the COTSAC research program and has fully evaluated the results of this research in relation to its current management policy. The causes of outbreaks of crown of thorns starfish are still unknown.
3. Ecological research and management-related research under the COTSAC program both support the view that local control techniques are available and could be effective, even though expensive, but large scale control or eradication is impracticable and unaffordable.
4. The COTSAC research program indicates that population fluctuations of the crown of thorns starfish have occurred in the past, but the scale of such fluctuations cannot be analysed in detail. The present phenomenon appears to have a long history.
5. The COTSAC research program has been defined, reviewed and operated in an efficient and productive manner, within the limits allowed by annual funding. A high degree of dedication is evident among the research workers and research managers involved in the program.
6. The provision of Federal funds for the COTSAC program on an annual basis has disadvantaged the program in various ways, primarily through the imposition of a need for rapid decision making and the corollary that the review committee for the program (COTSARC) has been unduly constrained by time considerations. Despite this, COTSARC has carried out its task as effectively as possible.
7. The COTSAC research program has led to significant advances in the understanding of the ecology of the crown of thorns starfish. As a result of this program, opportunities have now been created to investigate the broadscale ecology of the species in the Great Barrier Reef more deeply, and to better analyse its reproduction, dispersal, settlement and recruitment processes. Understanding of the causes and management of the crown of thorns starfish depends critically on the outcome of this research. Areas of future research should include:
  - \* predation at all levels;
  - \* population dynamics;
  - \* effects of human activities, including agricultural run-off and fisheries; and
  - \* biological control.
8. The research would benefit from an injection of supplementary research workers with suitable skills, especially in experimental biology. This could be obtained through 4-5 suitable post-doctoral appointments guaranteed for 3 years, and is critical to progress in the investigation of predation and population dynamics.
9. The crown of thorns starfish research program on the Great Barrier Reef should be continued for another 3-5 years at a dedicated and committed funding level of at least \$A1 million a year.

10. For the GBRMPA to run the program effectively, it needs the support of a review committee that could be active in determining the initial funding and annual renewal of all projects. Composition of the committee should include Professor Swan, 2 experts from GBRMPA, 2 experts from AIMS and 3 external (Australian-based) experts.
11. The review committee should meet at least 3 times each year, to review applications for funds, to receive and deliberate upon the reports of assessors on these applications, and to review progress of the program before the next round of applications.
12. In order to maintain a flow of information about the program to the wider community, Professor Swan should also be asked to chair a coordinating committee. This committee, meeting annually, could be informed about the progress of the program with a view to allowing input from other interest groups (e.g. tourism and state government). If comprised of 2 members of the scientific review committee and 4 members chosen from the Great Barrier Reef Consultative committee (GBRCC), the coordinating committee could report to the GBRCC annually on the research program.
13. A full time coordinator of the program should be appointed. This person would need to be ex officio a member of the scientific review committee and the coordinating committee. In anticipation of a continuation of a major part of the research program at AIMS, and the obvious need for coordination of this component within AIMS, the GBRMPA appointed coordinator would need to work closely with the responsible staff member(s) at AIMS.
14. The facilities and expertise of the Australian Institute of Marine Science are essential to the completion of the ecological research now required, but control of the program should remain with the Great Barrier Reef Marine Park Authority.
15. All projects funded under the cots research program should carry contractual obligations, including strict identification of the application of the funds within the project and an annual report of progress to the GBRMPA.