



**United Nations
University**

International Network on Water, Environment and Health

Connectivity of Mesoamerican Reefs

17th to 21st September 2006

Rosenstiel School for Marine and Atmospheric Sciences

University of Miami

**Annual Meeting of the Connectivity Working Group
and
A Workshop for Management Agency and NGO Personnel
with members of the Connectivity program**

Final Report



Overview

This event combined the annual meeting of the Connectivity Working Group with the first workshop of the Working Group with senior environmental managers and NGO personnel from the Mesoamerican region. The Working Group meeting, on days 1 and 2 included 35 participants: 10 members, 8 associate members, 13 graduate students, and 4 other participants. They were joined, on days 2 and 3 by 15 management and NGO personnel from the region. Three additional participants had to cancel late for personal reasons.

The Working Group meeting commenced with summary presentations on the progress being made on each of the research projects. These were followed, late on the afternoon of Day 1, by a consideration of how best to proceed during Years 3-5. Included here was a presentation on a possible new project, the development of a higher-resolution hydrodynamic model for the Mesoamerican region.

The morning of Day 2 included discussions of several other topics that must be considered in finalizing the program for Year 3 and onwards. New science topics such as global warming effects and resilience were briefly mentioned. Capacity building, the need to relate effectively to the management community in order to transfer technology and new knowledge effectively, and the need to bridge across to the Pacific were other important topics. The afternoon of Day 2 was spent considering a plan for Years 3 to 5, before an early break, before the start of the workshop with managers. That plan is summarized below.

Following a late afternoon welcome reception, the workshop with managers commenced on the evening of Day 2, and continued through Day 3. The first session included an overview of the Connectivity program and its relationship to the wider Coral Reef targeted Research program, and a presentation on the way in which connectivity issues might interface with critical management issues in Mesoamerica. Day 3 commenced with several presentations outlining the science of connectivity and describing the kinds of work being done within the Connectivity program. Following discussion of these, the afternoon of Day 3 was devoted to consideration of how to bring scientists and managers together more effectively than generally has been the case in the past. A number of good suggestions resulted from the discussion, and these will be followed up over future months.

Outcome of the meeting

Revised work plan for Years 3-5

In order to bring the goals into line with existing funding, the Working Group agreed to make several changes to the program. The most important of these are:

- 1) to put Project 1, dealing with the dispersal of grouper larvae from a spawning aggregation, into suspension mode until Phase Two of the CRTR project in 2009,

- unless outside funding is secured to complete it sooner. Some pilot components will continue with existing parallel funding through WHOI. The rationale for this is that this project will be expensive to complete, and with no source of funding to support it clearly in sight, putting additional GEF funds into it simply removes them from other projects that need them for completion.
- 2) To delay any move into Pacific sites until Phase 2. We had previously planned to begin replicate studies of fish and coral connectivity at Philippine and/or Palau sites as early as Year 3.
 - 3) To consolidate other existing projects, trimming back on objectives and amalgamating where that makes sense. Thus the science program will consist of project a) dealing with connectivity in the bicolor damselfish as a convenient model reef fish, project b) dealing with post-settlement demography of corals, project c) using several approaches to tackle connectivity in corals (primarily *Montastrea faveolata*), and project d) to model larval dispersal in Caribbean Spiny Lobster.
 - 4) To consolidate, and emphasize, the capacity-building and outreach components of the program into a new project e). This will maintain the annual training workshops on recruitment monitoring, but scale back the collection of recruitment data to those locations where individuals have proved capable and interested, and will include other mechanisms for better communication with the management community including the production of written material other than papers in technical journals, and further workshops.

As part of this revised program, the Working Group also agreed that the development of a quadruply-nested hydrodynamic model for Mesoamerica would be our highest priority for securing new funding, and that securing funding for the suspended Project 1 was also a very high priority.

Clarification of the recruitment monitoring project

The recruitment monitoring project, which involves data collection at a number of the managed areas overseen by participants at the workshop, has proceeded haltingly, perhaps because the attempt was made to take a 'bottom-up' approach, working almost entirely with the junior personnel who would be collecting the data. The data being collected are compatible with the Synoptic Monitoring Program of the MBRS project, which is using many of the same locations, and, except in the case of the lobster recruitment data, the methods used are in the MBRS Monitoring Manual. An agreement in principle exists for these data to be lodged permanently in the MBRS database (following the same rules regarding access as accorded to any of the SMP data). Nevertheless, it is clear that some additional discussion must take place with managers concerning the continuation of this program, ensuring that all participants understand the goals and scope of the project. With the retrenchments to the science program now agreed to, some components of the data being collected are no longer of use for the research being done, however they remain useful as measures of the dynamics of the local communities, and an effort to demonstrate the use of such data,

locally as well as regionally, should be a high priority for the 2007 training workshop on recruitment monitoring.

Documents for managers

Discussion during the workshop identified two documents that would be of immediate value in the region, and it was agreed that production of these will be a first priority for Year 3 within the capacity-building and outreach component. The first of these, of very general value to managers and NGO personnel both in the Mesoamerican region and elsewhere, is an appropriately written version of the technical article published in *Trends in Ecology and Evolution* in 2005, detailing the critical gaps in the science that underpins the use of no-take reserves as a fishery management and conservation tool. The second, perhaps targeted more specifically to the Mesoamerican region will be a short document outlining the important connectivity implications of improperly planned coastal development. Both documents will be prepared as both English and Spanish versions.

Results of questionnaire following workshop

A questionnaire was circulated to all participants following the workshop, seeking comment that would enable improvements to be made in future meetings.

Sixteen individuals have replied to date, and their comments provide some clear guidance for future meetings. All respondents thought the workshop was useful, but all but one stated that the agenda was over-crowded. As a result there was insufficient time for full discussion. In particular, there was no time provided to obtain from the managers and NGO personnel a considered statement of their major management concerns, and particularly concerns that might be ameliorated by better information on connectivity.

Another common thread in the responses concerned the lack of provision for Spanish – spoken or written. While respondents stated that they personally were able to work entirely in English, one admitted that participation in the discussions was difficult, and several suggested that others in the group had some difficulties. This is a serious deficiency that will be remedied in future meetings with the management community. The provision, in advance, of more extensive written material in both languages, and a better organized effort to provide for translation during discussions are both useful here.

Among the many useful suggestions for future workshops, and comments on important topics that had not been covered, several items were repeated by several respondents. Most respondents were sensitive to the fact that we had not succeeded in learning from the managers what the critical topics were for them, but there was some divergence of views concerning the role of the Connectivity working group. Obviously, there are many issues of concern to managers in the region, and a

discussion with scientists about these issues could be very informative to the scientists and might result in useful science solutions being brought forward. On the other hand, the connectivity program deals with one particular set of science questions, and it will be unlikely to be able to address a broad range of important management issues.

Many respondents suggested a greater effort should have been made to apply the science to specific problems in specific places. One suggested progressing towards a committee of scientists and managers who would work together over a sustained period to identify problems, seek funding and implement solutions in specific locations. This is an excellent framework for adaptive management, and one with which several of the scientists present would be very sympathetic, although perhaps beyond the scope of the program at the present time.

Other suggestions concerned discussion of the ways in which the science findings from the connectivity program could be used to achieve solutions to specific problems: specific tools that could be applied, development of an on-going dialog between science and management, setting of specific goals in building a collaboration of scientists and managers in the region. All of these should be explored.

Within the science, there was a call by several respondents for more attention to those components of connectivity due to movement by juveniles among mangrove, seagrass and reef habitats. Finally, there were a number of suggestions for other ways to make future meetings more effective, and the clear overall message was that meetings between scientists and managers in which management issues are discussed are a real need in this region, and a vital first step towards greater integration of science into management.

Future workshops

No date was set for a follow-up workshop between members of the Connectivity Working Group and managers and NGO personnel in the Mesoamerican region. Nevertheless, it is clear that one or more follow-up meetings must occur over the next three years. The Working Group will ensure that this happens.

Peter F. Sale
Chair, Connectivity Working Group
October 24, 2006

Agenda

Meeting of the Connectivity Working Group

Sunday 17th September

6:30pm: **Welcome Reception.**
Double Tree Hotel at Coconut Grove
2649 S. Bayshore Drive, Miami Florida

Monday 18th September

8:00am: **Shuttle bus departs hotel for RSMAS**
(Assemble in hotel lobby before 8:00am)

8:30am: **Registration, continental breakfast, at RSMAS**

9:00am: **Introduction -- Welcoming remarks, logistics, goals.**
Peter Sale, UNU-INWEH

Part One -- What we have been doing:

9:30am **Project One -- Grouper connectivity**
Simon Thorrold, WHOI

9:50am **Project Two -- Bicolor connectivity**
Derek Hogan, Univ. of Windsor

10:10am **Project Three -- Recruitment dynamics of corals**
Bob Steneck, Univ. of Maine

10:30am **Discussion**

10:45am **Coffee Break**

11:10am **Project Four – Dispersal of coral larvae**
Alina Szmant, UNC Wilmington

11:30am **Project Five – Genetic connectivity in corals**
Tonya Shearer, Georgia Tech

11:50am **Discussion**

12:05pm **Lunch**

1:30pm **Project Six – A recruitment monitoring program**
Mark Butler, Old Dominion University

1:50pm **Project Seven – Modeling dispersal of larvae**
Claire Paris, RSMAS, U. Miami

2:10pm **Discussion**

2:25pm **Coffee Break**

Part Two -- Where we might go next:

- 3:00pm** **Introduction – Topics, goals, budgets**
Peter Sale, UNU-INWEH
- 3:20pm** **Hydrodynamics – Microbead tracers of larvae**
Chris Taggart, Dalhousie University
- 3:40pm** **Hydrodynamics –Building a model for the region**
Jinyu Sheng, Dalhousie University
- 4:00pm** **Discussion**

Part Three -- Critical Evaluation of Our Progress

- 4:10-5:10pm** **Split into three groups** to look critically at how we are doing, identifying any course corrections that are needed or useful (group composition not fixed, movement between is possible)
Group A -- Dispersal – modeling and measuring it
Possible participants: Cowen, Butler, Sheng, Taggart, Thorrold, Paris, others
Group B -- Coral connectivity – approaches to use
Possible participants: Arias, Coffroth, Shearer, Steneck, Szmant, Alvarado, Arnold, Porto, Zubillaga, others
Group C -- Tagging studies using fish
Possible participants: Heath, Fryer, Jones, Lindeman, Molina, Hogan, Salas, Thiessen, Villegas, Williamson, others
- 5.10pm** **Shuttle returns to the hotel.**
Free for the evening.

Tuesday, 19th September:

- 8.30am** **Shuttle departs hotel for RSMAS**

Part Three, continued: Discussion groups report back to meeting:

- 9:00am** **Dispersal studies**
- 9:10am** **Discussion**
- 9:20am** **Coral connectivity**
- 9:30am** **Discussion**
- 9:40am** **Tagging studies**
- 9.50am** **Discussion**
- 10:00am** **Additional topics to consider for the program**
Hydrodynamics – Can we ignore the need?
Discussion (15 min)

- 10:15am** **Global warming and coral connectivity**
Alina Szmant, UNC Wilmington (10 min)
- 10:25am** **Resilience and connectivity**
Bob Steneck, Univ. of Maine (10 min)
- 10:35am** **General discussion**
- 10:45am** **Coffee Break**
- 11:10am** **Capacity building**
Comments by Sale, Lindeman, Discussion (10 min)
- 11:20am** **Engaging the Pacific**
Comments by Jones, Hooten, Discussion (15 min)
- 11:35am** **Connectivity and MPA management**
Comments by Lindeman, Kritzer, Discussion (15 min)
- 11:50am** **General discussion**
Our priorities for the next three years (20 min)
- 12:10pm** **Lunch**
("Executive" of Thorrold, Heath, Steneck, Szmant,
Coffroth, Butler, Cowen, Sale to meet over lunch)

Part Four -- A Plan for the Next Three Years

- 2:00pm** **Presentation of how the seven existing projects may
grow, metamorphose, or stay the same**
Peter Sale, UNU-INWEH (30 min or less)
- 2:30pm** **General discussion of the plan**
(A finalized plan will inform the proposal for funding for
2007 due 1 October 2006) (45 min)
- 3:15pm** **Other business**
Close of meeting

Connectivity of Mesoamerican Reefs
A Workshop for Management Agency and NGO Personnel
with Members of the Connectivity Program

Tuesday 19th September

4:30pm

Welcome Reception for all participants
RSMAS Cafeteria

6:00pm

Welcome and Introduction -- Goals for the meeting
Peter Sale, UNU-INWEH

Part One: Connectivity and Management in the Mesoamerican Context

6:10pm

Setting the scene – A description of the connectivity program

Peter Sale, UNU-INWEH

6:30pm

MPAs in Mesoamerica – History and management

Ken Lindeman, Environmental Defense

6:50pm

Discussion

What are the constraints on management? How do we build an effective science of management? How do we build lasting bridges between scientists and managers?

7:30pm

Shuttle returns to the Double-Tree Hotel, participants are free for the evening.

Wednesday, 20th September:

8.00am

Shuttle departs hotel for RSMAS

Please assemble in the hotel lobby prior to 8:00am

A continental breakfast will be provided at RSMAS

Part Two: The Science of Connectivity

9:00am

Connectivity – What it is and why it is important for management

Peter F. Sale, UNU-INWEH, Canada

9:10am

Modeling dispersal

Robert K. Cowen, RSMAS, U. Miami, USA

9:30am

Tagging fish larvae: potential for direct estimates of retention and connectivity

G.P. Jones, James Cook University, Australia

10:00am

Coffee Break

10:30am

Genetic approaches to connectivity

Daniel Heath, University of Windsor, Canada

- 10:50am** **Why we need connectivity information for lobster**
Mark J. Butler IV, Old Dominion University, USA
- 11:10am** **Difficulties with studying connectivity of corals**
Mary Alice Coffroth, SUNY Buffalo, USA
- 11:30am** **Recruitment monitoring as one glimpse of connectivity**
Robert S. Steneck, University of Maine, USA
- 11:50am** **General discussion**
- 12:10pm** **Lunch**

Part Three: Building Effective Partnerships

- 2:00pm** **Building science and scientists into large-scale management of marine resources**
Jake Kritzer, Environmental Defense
- 2:15pm** **Adaptive management as a way of doing useful science.**
Andy Hooten, AJH Environmental Services
- 2:30pm** **Discussion**
- 2:45pm** **Coffee Break**
- 3:15pm** **Break into four groups to discuss:**
How do managers and scientists build the partnerships necessary for adaptive management to take place? *What* is the role for the NGO community in this process? *How* can we ensure the Connectivity program is useful for management in Mesoamerica? *What* opportunities are there for managers to participate in building the science of connectivity? *How* can we build strong and sustainable scientist/manager partnerships in this region?
- (You will be assigned to groups so that each holds a mix of managers, scientists, NGO personnel, students – each group will consider the same set of questions, and return with some specific proposals.)
- 4:00pm** **Reports from the discussion groups (10 min each)**
- 4:40pm** **General discussion**
Recommendations from the meeting – how to make the Connectivity program better
- 5:10pm** **Close of meeting**
- 5:15pm** **Shuttle buses return to hotel**
- 7:00pm** **Farewell Dinner**
Double Tree Hotel at Coconut Grove

Connectivity of Mesoamerican Reefs
17-20 September, RSMAS, University of Miami, Miami, Florida
List of participants

List is alphabetical, showing first the scientists associated with the program as Members or Associate Members of the Connectivity Working Group, then the students at the meeting who are working on the project, and finally the Managers and NGO personnel who attended the meeting. Also included are names of four individuals who had to cancel at the last minute and were unable to attend.



Name	Organization	e-mail
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