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NOTICE OF WORKSHOP

Biological Diversity : Causes and Maintenance

Como Training Centre
Monday 10 October 1988
1-5 pm

Maintenance of biological diversity is an objective specified in the CALM Corporate Plan and in the various Conservation Strategies. What does this mean in practical terms - how can this be translated into achievable goals, how is it measured and what management actions are required?

This Workshop is to provide a forum for discussion of these issues. It is timed to coincide with the visit to Perth of a group of international scientists who work on biological diversity. In particular, Dr Géma Maury-Lechon has been convenor of the International Union of Biological Sciences (IUBS) Working Group on Species Diversity, a component of the Decade of the Tropics Programme.

Program

1300 Mr R. Underwood	Welcome and introductory remark
1310 Dr B.R. Wilson	Maintenance of diversity - a manager's perspective
1330 Mr A. Hopkins	Definitions and measures
1400 Prof A.R. Main	Diversity as a conservation issue
1430 Prof J. Kikkawa	Life is tough for animals in a diverse community
1515 Afternoon Tea	
1540 Dr G. Maury-Lechon	Achievements in the rainforest studies
1615 Open Discussion	
1730 Close	

BIOLOGICAL DIVERSITY : CAUSES AND MAINTENANCE

REPORT OF THE IUBS PRE-ASSEMBLY WORKSHOP
PERTH. 10-13 OCTOBER 1988

INTRODUCTION

1. As a part of the activities prior to the XXIII General Assembly of the International Union of Biological Sciences (Canberra, 16-22 October 1988) a series of workshops was held to deal with aspects of current or proposed IUBS Scientific Programs.

2. The Workshop on Biological Diversity attracted 2 IUBS delegates and a further 7 people from the Australian scientific community. A list of participants is given in Appendix 1. A copy of the program is also attached.

3. The principal objective of the workshop was to develop proposals for a new, international, collaborative research and communication program to be established under the auspices of IUBS.

4. The workshop was aware of the activities of the IUBS Working Group on Species Diversity on Tropical Forests established at the XXI General Assembly (Ottawa, August 1982) to deal with one of the five themes of the Decade of the Tropics Program. In October 1987, the Executive Committee of IUBS resolved to suspend this Working Group but to consider proposals for a new project/program outside the framework of the Decade of the Tropics Program.

5. The workshop noted the interests of IUCN, UNESCO/MAB, Scope and other international bodies in studies of biological diversity and genetic resources. Any new IUBS program on biological diversity should be integrated as far as possible with existing studies. In addition, the program should provide a practical

means for testing hypotheses generated in the IUBS Biological Complexity program.

6. The International Council for Scientific Unions is currently planning a major international scientific program to deal with global change (IGBP). Maintenance of biological diversity is one of the important objectives being considered as part of this program. It is desirable that any new program on biological diversity under the auspices of IUBS be formulated to take account of likely consequences of global change.

7. The workshop agreed that any new program should have an obvious, practical orientation. This is not to exclude studies aimed at documenting patterns of diversity and elucidating causal relationships; indeed these remain fundamental to the program. Rather, it is to ensure that the program provides some practical outcomes which can be applied to major global environmental problems.

8. The workshop considered two proposals already submitted to IUBS. The first proposal, from the U.S. National Committee for IUBS (Professor Beryl Simpson) is entitled

"Biological Diversity in the Context of Ecosystem Structure and Function".

The second proposal is from the French Comité National; des Sciences Biologiques (Dr Gema Maury Lechon) is entitled

"Reconstitution of Tropical Forests. Control of Development in Juvenile Stages".

EVALUATION OF EXISTING PROPOSALS.

9. The USNC/IUBS Proposal. The workshop noted that this proposal has already been the subject of detailed

discussions, that it has been published in Biology International and that it must now have considerable support.

The workshop agreed that the proposal has considerable merit particularly in that it is of global scope and that it addresses the major conservation and living resource management problem facing humankind but expressed concern that, as presently formulated, it is perhaps too general, too all embracing to be readily implemented. Two specific comments were that the present proposal does not contain a clear framework that would facilitate collaborative research and that it deals with a range of levels (scales) of organization without indicating how the gaps between them are to be bridged.

In the light of the reservations indicated above, and noting the suggestion included within the proposal that there be an international committee to refine the proposal the workshop resolved to give its qualified support for the USNC/IUBS proposal and recommended that IUBS adopt a new program on biological diversity focussing on the issue on the context of global change.

10. The French CNSB Proposal.

This proposal addresses two critical aspects of management of tropical forests - regeneration of those forests and development of a practical solution to the underlying social and ecological problem associated with the forests. The workshop agreed that the proposal has appeal because it deals with important, specific issues, and that it it grows out of an established research effort (including the work of the previous Species Diversity Working Group) but expressed concern that the proposal is too specific to be adopted as a program in its own right. Accordingly the workshop recommended that the French CNSB proposal be

taken up as a part of a larger program on biological diversity.

The workshop also noted that tropical forests are difficult systems to study and proposed that consideration be given to conducting studies in parallel of three or four different species-rich communities. Since patterns of species richness differ between trees and herbs it might be appropriate to study tropical rainforests, species rich shrublands and one type of species rich grass and herb community (e.g. prairie). Specific communities and specific sites should be chosen to take into account the sociological needs identified above as well as the biological issues. The workshop also noted that there is considerable scope to learn about important processes operating in species-rich systems through the study of species-poor systems.

One suitable method for integrating study from very different systems is to develop classifications of organisms based on functional characteristics such as their roles in nutrient cycling processes and their responses to various disturbance factors.

CONCLUSIONS AND RECOMMENDATIONS

11. The workshop concluded that species diversity is a critical issue particularly in the context of impending global environmental problems.

12. The workshop <u>recommends</u> that the XXXIII General Assembly of IUBS adopt a new program dealing with biological diversity which takes cognisance of the need to maintain and restore diversity and at the same time to meet the social needs of people. The program should focus on rehabilitation and reconstruction following disturbance and degradation but should also embrace studies which document in detail patterns of diversity

as well as studies aimed at elucidating mechanisms whereby diversity is maintained in relatively undisturbed communities and ecosystems. In addition, the program should deal with practical aspects of environmental management including education and training.

The workshop considers that a suitable title for such a program would be:

"Maintenance and Reconstitution of Biological Diversity"

13. The workshop endorses the suggestion put by the USNC/IUBS that IUBS convene a committee to develop the details of the new program. The committee should look at appropriate hypotheses and coordinated approaches to test the hypotheses and develop a timetable for both the studies and the extension program.

14. Recommendations were made on a number of specific points. These are given overleaf.

1. A critical point in the regeneration process is when establishing seedlings exhaust the seed nutrient stores. At this point the effective functioning of the rhizosphere is essential if regeneration is to be successful.

   The workshop recommends that studies within the proposed Biological Diversity program include studies of the rhizosphere with emphasis on the role of rhizosphere organisms (including microbes) and processes (nutrient and energy cycling particularly) on the regeneration process.

2. Sound taxonomy and knowledge of genetic resources underpin all efforts to maintain and reconstitute biological diversity. These aspects together with good biogeographic data will be increasingly important in the face of global climate change.

   The workshop recommends that taxonomic studies and studies of population genetics and biology continue. Where there is a need to select organisms to study, this should be done rising criteria which include functional aspects (e.g. particularly role in the regeneration process) as well as conservation status (vulnerability) and practical considerations.

3. Within any program that has a practical orientation it is important to develop measures of success (and to set clear objectives).

   The workshop recommends that attention be given to establishment of useful measures of success in the process of maintenance and reconstitution of diversity. In the light of comments in No. 1 above, a suitable measure might be found through studies of the rhizosphere. For example, it could be that a community is restored when the rhizosphere is operating to sustain the nutrient cycling processes.

4. In the proposed program it will be necessary to develop a framework for comparing different organisms and groups of organisms. A suitable approach to this problem involves classifying organisms according to functional attributes. Three important attribute groups are role in Nitrogen cycling, mechanisms for introducing carbohydrates into the rhizosphere and responses to disturbances.

The workshop recommends that consideration be given to development of functional classifications along the lines suggested here.

5. Plant-animal interactions are important in the all functioning communities and ecosystems but particularly in the regeneration phases where animals have important roles in dispersal and they have the potential to deflect regeneration.

The workshop recommends that studies of plant-animal interactions be included within the proposed program and that these focus on the implications of the interaction in maintaining functional aspects of the systems.

6. The workshop recognized that predicted global changes are likely to have major consequences for the maintenance and reconstitution of biological diversity. There is a need now to develop techniques to be applied to new areas where degradation is likely to be intensified by global change.

The workshop recommends that the new program take account of the likely problems arising from global change and maintain a close liaison with IGBP.

7. While it is possible to gain considerable insight into the various factors involved in the maintenance and reconstitution of biological diversity it is likely

that some large scale experimental manipulations will be necessary as part of the proposed program. Therefore it is recommended that the program include potential for such experiments from the outset.

8. Education and training should be important aspects of the proposed new program. Both are necessary at the social level in order to gain community acceptance of what is being attempted and to provide professional training for field operations. The workshop recommended that consideration be given to the following factors when establishing this component of the program:

i) There should be training centres which use common approaches based on the research work. Priority should be given to establishing training centres in places where regeneration work is planned (i.e. where degradation is greatest).

ii) There should be formal programs for communication amongst researchers and between researchers and managers.

iii) Because rehabilitation solutions will be implemented by a range of people with diverse backgrounds, those solutions should be practical and economic and easily communciated.

iv) An important aspect of the communication process is the necessity of continuing liaison with decision makers.

9. Even if every step of the foregoing program is successfully implemented it will not be a substitute for adequate land planning which, if performed appropriately, could avoid all the problems of degradation.

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IUBS PRE-ASSEMBLY WORKSHOP

Perth 10-13 October 1988

Biological Diversity : Causes and Maintenance

TIMETABLE

Monday 10 October

0900-1200	Welcome and introductions, definition of Workshop objectives and adoption of timetable, preliminary discussion of topic focussing on achievements to date
1200-1300	Lunch
1300-1700	Open discussion session - presentation of background material and discussion of application of knowledge
1930	Dinner

Tuesday 11 October to Wednesday 12 October

Field trip to species-rich shrublands north of Perth with stops at Yanchep and Moore River National Parks, the proposed Mt Lesueur Nature Reserve and the Eneabba mineral sands mining operation (rehabilitation). Overnight stay at Jurien.

Thursday 13 October

0900-1700

Workshop discussion session
Report of the IUBS Working Group on Species Diversity (Decade of the Tropics)
Proposals for ongoing work
US National Committee Proposal
French Delegation Proposal
Prospects for collaborative studies, study site criteria, future meetings
Report to IUBS General Assembly

BIOLOGICAL DIVERSITY : CAUSES AND MAINTENANCE

OPEN DISCUSSION SESSION, MONDAY 10 OCTOBER

CONCLUSIONS

1. Conservation of biological diversity is an objective fundamental to the persistence of human kind. In simple terms, diversity is necessary in order to maintain the potential for change in biological systems at all temporal and spatial scales.

2. At the level of the biosphere, conservation of organisms in species-poor communities is as important as conservation of organisms in species-rich communities.

   The potential for studies of species-poor systems to elucidate principles that are applicable to species-rich systems should not be overlooked.

3. Four key areas of inquiry were identified:

   i) In order to understand better the functioning of biological communities it is desirable to develop comprehensive inventories of them. Systems that are presently intact should have priority for inventory work since they reveal fully how natural systems function. Inventories should be as complete as is practicable.

   ii) Studies of taxonomy, genetics and population biology will underpin all more detailed ecological research and management. The question is which organisms or group of organisms should be the focus of these intensive studies? An important criterion in making this selection is the practical value of the knowledge. Where it is

clear that there are some conservation benefits to be derived from detailed knowledge then these studies are justifiable.

iii) One means of linking studies of different organisms, and different communities at very different sites, is to develop classifications based on functional attributes. For example it is possible to classify plant species in terms of their roles in the Nitrogen cycling process or in relation to their response to various disturbance factors. If such classifications are developed and widely applied, it will be worth investigating whether there are consistent patterns of organisms on the various functional groups.

iv) What is the role of disturbance/disturbers in the maintenance of community and ecosystem processes and particularly in the regeneration cycle? What is the role of episodic events generally?

4. A second set of questions was raised; these relate to the application of knowledge about biological diversity to conservation and management of communities and ecosystems.

i) The acquisition of secure conservation reserves (national parks, nature reserves etc) must have high priority. Are there clear guidelines for reserve selection? The general view was that clear guidelines exist (e.g. select areas of high diversity of landscape features and they will invariably include high biological diversity) but that political and socio-economic factors/arguments are often more useful.

ii) Human impacts are becoming increasingly pervasive. What array of procedures can we bring to bear to minimise adverse human impacts inside designated

conservation areas? These should include providing alternative food and fuel resources on land outside the reserves. What new management practices should be applied to other types of land to ensure that uses are sustainable? In some cases it is desirable to develop programs to encourage private landholders to conserve plant and animal communities on their properties and to rehabilitate degraded areas.

iii) How do we maintain the biotic communities in order to retain the component species? Two propositions were put forward. Firstly the emphasis of any ecological studies should be on the response of organisms to disturbances. Secondly, there is an important role for application of experimental management and monitoring procedures in management of natural areas.

6. The final comment of the discussion group was that restoration is at best a second option for the conservation of biological diversity. Restoration is no substitute for proper land use planning and management which adequately provides for conservation of biological resources.