

ISLAND RESOURCES FOUNDATION

FINAL REPORT

ISLAND RESOURCE MANAGEMENT THE VIRGIN ISLANDS EXPERIENCE

A Planning Study for A Workshop
On Environmental Assessment, Resource Allocation,
Carrying Capacity, Growth Management,
and Enhancing Information Transfer
For Decision-Making in Smaller Islands

Prepared For

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ISLAND RESOURCE MANAGEMENT
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FINAL REPORT

I. INTRODUCTION.

- A. At a 1979 conference on "Environmental Management and Economic Growth in the Smaller Caribbean Islands," held at the Wildey headquarters of the Caribbean Development Bank, Barbados under the primary sponsorship of the U.S. Man and the Biosphere Program and with U.S./AID, UNESCO, UNEP/ECLA, Caribbean Development Bank and United Nations co-sponsorship, the availability of practical, appropriate, and up-to-date "guidelines for island resource management" surfaced repeatedly. It was acknowledged that some island areas are more advanced than others in this arcane art and that all smaller islands are ill-served by standard, continentally derived and too often inappropriate resource management approaches, planning models, and resource assessment/allocation/development and conservation strategies.
- B. The U.S. MAB 7 Directorate, under the direction of Mr. William Beller and with the support of the U.S. National Commission for UNESCO, subsequently approved a project, developed by the Island Resources Foundation, to address this problem by means of a case study of the U.S. Virgin Islands, selected principally because the territory possessed a superior data base (to document successes and failures) and had extensive experience with various environmental policies, legislative approaches, research programs, conservation efforts and had begun to evaluate growth management and ecosystem carrying capacity questions with a view to optimizing island development.
- C. It was assumed that by such a case study, using a "workshop and research" format, one could establish a base for comparing the U.S. Virgin Islands experience with that of other island areas and that the exercise would contribute to the articulation of improved general principles and guidelines for integrated island resource management and development planning.

This report, with its appendices, constitutes the design phase of the project and provides detailed operational plans, recommendations, and alternative scenarios for its implementation, along with an annotated inventory of available source materials and background study papers required to optimize the proposed "Virgin Islands resource management workshop".

II. STATEMENT OF THE PROBLEM.

A. Islands - The Size and Isolation Factor.

Aldo Leopold once reflected, "One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is invisible to laymen." Unfortunately, in the special case of the world's oceanic and coastal islands, much of the damage being inflicted is invisible to almost everybody -- laymen, politicians, scientists, planners alike. As in the case of the old saying, "out of sight, out of mind," insular remoteness obscures from all but a very few persons the burgeoning insidious impact of contemporary continental pressures on small insular systems and their associated, fragile terrestrial and coastal environments.

But, as insular smallness confronts continental bigness in its various manifestations, what are the prospects for islands and island peoples? The pessimist well may say there is no hope, for island cultures, environments, and ecosystems will be overwhelmed and fundamentally changed if not destroyed. But for those who can say of an island, "This is my home, my native land," the values of smallness, isolation, national self-sufficiency, and the insular condition have a special meaning and promise. If islanders are uneasy, it is understandable. And if the process of change is to be managed and sustainable island eco-development is to become a reality, then the skills and expertise and accrued learning of both islanders and continental scholars and specialists need to be applied in the search for island development, resource management and survival strategies.

However, in the normal scheme of world politics, islands -- especially small islands -- lack sufficient area, population and geopolitical leverage to count for very much. This is true even though they are numerous, ubiquitous, conceptually exciting and loom large in myth, folk tales, literature, art and in the history of man's explorations and exploitation of the world's oceanic reaches, as well as in his search for adventure, the pursuit of empires, and occasionally in his escape from the imagined or real pressures of continental civilization through human revitalization strategies called travel, tourism, and recreation.

To a large degree, islands have been traditionally perceived by continental peoples as frivolous appendages, satellite areas or frontier outposts. Whether colonial, territorial, or even politically independent, small islands are viewed by continental powers as marginally valuable -- as difficult, contumacious, cantankerous geographical hybrids. Islands of all types -- coastal, oceanic or grouped as an archipelago (extending from one or linking two continental areas) -- have historically

been treated cavalierly, even callously, and have frequently been managed with disregard for the niceties of prevalent democratic theory, political morality and social ethics. Even academicians have often perceived islands as neat, private laboratories for research, secure in their splendid isolation, or as exotic, microcosmic test sites for both ecological studies and assorted theories and hypotheses about man-environment relationships.

B. Islands As A Special Development Case.

It is not widely acknowledged that oceanic island areas, ecosystems, territories or countries constitute a special case as a resource management problem, requiring customized research, planning, and development strategies. For centuries they were largely seen as simply exotic locations (by tourists and scientists), as exploitable possessions (by former colonial powers), as intriguing settings (by novelists, tourists, movie makers, and artists), and as inconsequential geographical entities (by development planners and agencies). They were seldom taken seriously by planners as being significantly "different".

It is, in fact, only within the past decade or so that most of the world's populated islands have begun to emerge as subjects of specialized, systematic resource analysis and of planning and management strategies rather than adaptations of traditional, continentally focused models (Fosberg, 1965).

The reasons for this relatively recent shift in perspective regarding the role of smaller islands in the larger scheme of global development are reasonably obvious.

1. Although all of the world's islands taken together have a combined land area of about 3 million square miles (not including Greenland with 840,000 square miles), they constitute only about five percent of the earth's total land area. However, thirty-seven or approximately a quarter of the world's independent states (with membership in the United Nations and other international forums) are wholly insular. Four-fifths of this number (see Table 1) are developing countries, with twelve in the Caribbean and nine in the South Pacific.
2. There are sixty-two islands with areas greater than 4,000 square miles, and one hundred and twenty-six islands with areal dimensions larger than 1,000 square miles. However, some very important islands are much, much smaller, and many of these

smaller, formerly colonial island territories and associated states have over the past decade or so opted for independence or are moving in this direction and, thus, represent new factors on the international scene.

3. Jet air travel and containerized cargo movement, tourism, satellite communication links, television, multi-national corporations, and geopolitical considerations have each contributed to a gradual change in perspectives on islands and island development, by islands, continentals, and bilateral and international development agencies.

TABLE 1.
INDEPENDENT ISLAND COUNTRIES

1. Antigua	14. Iceland	26. Philippines
2. Bahamas	15. Ireland	27. Singapore
3. Bahrain	16. Jamaica	28. Solomon Islands
4. Barbados	17. Japan	29. Sri Lanka
5. China, Republic of	18. Kiribati	30. St. Lucia
6. Cuba	19. Madagascar	31. St. Vincent
7. Cyprus	20. Maldives	32. Tonga
8. Dominica	21. Malta	33. Trinidad and Tobago
9. Dominican Republic	22. Mauritius	34. Tuvalu
10. Fiji	23. Nauru	35. United Kingdom
11. Grenada	24. New Zealand	36. Vanuatu
12. Haiti	25. Papua New Guinea	37. Western Samoa
13. Indonesia		

But isolated smallness has its price, and island microcosms simultaneously have and present unique opportunities and imperatives for addressing the resources management question, since many smaller islands are entirely coastal and have little or no "interior" (Towle, 1978).

International concern regarding developing island countries, as a kind of special case of the whole development process, first surfaced in a serious way in the late 1960's when a number of academic scholars and one or two international institutions began a search for a theory and a prescription for certain types of "special circumstances" within the international organizational framework to improve technical assistance programs to various kinds of "special problem" areas. For example, international organizations began to separate out least developed or land-locked countries as needing special attention, and strategic distinctions began to appear regarding least developed, less developed and more developed countries. The concept of Third World countries came into vogue as a classification, and eventually some attention was paid to islands as a special case.

As early as 1966, scientists working with the International Biological Programme, IUCN, and the Pacific Science Congress articulated a concern for the conservation of certain Pacific islands through a series of conferences, symposia and resolutions which launched the "islands for science" program. Subsequent IUCN initiatives at a Symposium on Conservation of Nature -- Reefs and Lagoons", held in Noumea, New Caledonia (August 1971), stressed the need for specialized ecological guidelines in island development project planning, and noted the vulnerability of island ecosystems to disturbances arising out of human activities. The specific environmental impacts of tourist development on the resources of coastal zones of certain Pacific islands were also given attention.

Shortly thereafter, one of the priority study projects listed by UNESCO's International Coordinating Council for the "Man and the Biosphere Programme" was designated "ecology and rational use of island ecosystems" and resulted in the famous MAB "Green Book #11 on Islands", published by UNESCO in 1973. The Islands Resources Foundation, an independent, non-profit entity, based in St. Thomas, U.S. Virgin Islands, was established in 1972. About the same time a special "Group of Experts" was assembled by the Secretary-General of UNCTAD (UN Conference on Trade and Development) to "identify and study the particular problems of developing island countries and to make recommendations thereon". This was the first full scale attempt to examine the economic problems of developing island countries within an international forum. Islands surveyed ranged in size from a large archipelago like Indonesia, with about 100 million inhabitants, to very small islands with only a few thousand inhabitants. An attempt was made to classify the island countries and territories according to various significant characteristics, and a further attempt

was made to identify certain key problems and the implications for development policy.

The report from the group of experts was published by UNCTAD in 1974, entitled "Developing Island Countries", and was followed shortly by a UNDP sponsored study of coastal development problems in the Caribbean (Towle and McEachern, 1974), and two IUCN initiatives: 1) a book on "Ecological Guidelines for Island Development" (McEachern and Towle, 1974) and 2) an environmental management case study of the British Virgin Islands (Howell and Towle, 1976), all developed by the Island Resources Foundation.

Since 1974, the available specialized literature on island resource development and management has expanded rapidly, embracing hurricane risks and storm flooding (Bowden, 1974; Nichols, 1979), coastal zone management planning (Towle, Grigg and Rainey, 1976; McElroy, 1978), case studies of islands and island groups (Towle, Howell, and Rainey, 1976; Brookfield, 1980), mangrove systems (Nichols and Towle, 1977; Teytaud, 1981), carrying capacity (South Pacific Regional Environment Programme, 1980), environmental planning and management (McEachern and Towle, 1974b; Simberloff, 1974; Virgin Islands Government, 1980), energy (Bonnet and Towle, 1981), national and marine park system development (ECNAMP, 1980 and 1981; Posner and Cuthbertson, 1981; Robinson, 1973; Towle, 1975), coastal erosion (Deane, Thom, and Edmunds, 1973), tourism impact and planning (Coulianos, 1980; Jackson, 1981; Potter and Tyson, 1980), solid waste management (Towle, 1982), and marine resource development (Towle, 1979; Goodwin and Taylor, 1981).

Simultaneously, out of the South Pacific area came a whole series of parallel studies addressing island ecosystems (Dahl, 1980; Mueller-Dombois, 1973; Simberloff, 1974; Man and the Biosphere Program, 1977) and environmental planning (South Pacific Commission, 1981; Baines, 1981); while a body of theoretical systems oriented island studies (diCastri and Glaser, 1979; Institute of Social and Economic Research, 1980; Dommen, 1980) also began to take shape.

Of particular note is a UNESCO/MAB/UNFPA sponsored carrying capacity case study of the Lau sub-island group in Fiji. The multidisciplinary team was headed by Dr. Harold Brookfield, formerly of McGill University, and included such eminent scholars as R.D. Bedford, T.P. Bayliss-Smith, Bernard Salvat, Anne Whyte, J.B. Hardaker, R.F. McLean and other island specialists. The seven volumes of reports from this project, dealing with population-environment relations, resources, and development and which were published between 1977 and 1980 (the last as MAB Technical Notes #13), constitute a major point of departure for the proposed Caribbean/Virgin Islands resource management workshop and this project planning report (Brookfield, 1980).

C. Island Ecosystems: A Special Resource Management Problem.

Developing island countries, especially the smaller systems, are particularly dependent upon their surrounding marine environments and coastal zone. Populations, ports, mangrove lagoons, major cities, a fisheries industry critical to the local food supply, the tourism industry, some agriculture, all watershed drainage and most industrial, commercial, and processing activity are clustered in this generally narrow but highly complex, circumferential area where the island meets the sea.

The greater the pace of island development, the greater the stress placed upon this interface of interacting terrestrial and marine ecosystems and the more there is a need to devise workable and appropriate management strategies and practices for the resource base to achieve sustainable development goals. But this is not easy to accomplish because most proven temperate zone approaches, procedures and models are inappropriate for tropical and sub-tropical seas where the majority of developing islands are situated.

There is general agreement among scientists that tropical seas and especially their shallow coastal areas are much richer in species diversity than the colder oceanic regions of the globe. In fact, a rather large number of genera, families and groups of a higher order are found only on the edges of the warm oceans and constitute the primary elements in tropical and sub-tropical coastal eco-systems. Three of these vital tropical systems are coral reefs, mangrove swamps and sea grass beds, all typical to island coastal zones, but, nevertheless, probably the most valuable productive ecosystems within the marine environment surrounding tropical islands. All three are important as "land builders and stabilizers" and as "wave energy absorbers" protecting shorelines from storm induced erosion. The mangroves additionally constitute a valuable resource as habitat for many traditionally, nutritionally and commercially important food species. All three are susceptible to impacts generated on-shore.

Tropical marine and coastal eco-systems pose an especially difficult environmental management problem. Their chemical and physical characteristics, their community structure and their biological functions differ or behave differently from their better known temperate zone counterparts at comparable depths. As one might expect, the dispersal, breakdown, uptake and impact of water pollutants (and this includes sediment discharges) also differ qualitatively in the tropics, and both an appreciation of this and an understanding of how they differ are essential for proper marine resource planning, structural design, environmental monitoring, and impact mitigation strategies in tropical waters. Island systems tend to have lower tolerances to various kinds of abnormal stress resulting from excessive and recurring concentrations of waste discharges in any particular location.

Fortunately, as noted above, the past two decades have seen a significant growth of scientific research and information regarding tropical marine pollution, its causes and effects on various coastal biotic communities and species and on appropriate effective pollution control strategies and practices. While our knowledge is less than complete and some further research on specific pollutants and their breakdown rates and impacts on specific island eco-systems is still needed, we already have a good working base of scientific information that is accessible.

The primary task at hand is not, therefore, fundamentally a basic research problem so much as it is a science application problem focusing on those few island systems with a fair data base and where experimental resource management programs have addressed a long standing, complex sequence of development activity within a geographical, spatial, institutional and interdisciplinary framework that offers instructional replication possibilities for other developing islands confronting similar problems.

As island-based ecological, development, and environmental data accumulate, the need and opportunity for data assemblage, verification, analysis, synthesis and interpretation also grow. It is appropriate to attempt to see what has and has not been learned and to assume that the world can learn something from both past mistakes and successes regarding island microcosms. If politics is the art of the possible, resource management is the art of the practical. It is eminently practical to study selected island areas within this context.

III. THE VIRGIN ISLANDS RESOURCE MANAGEMENT CASE STUDY PROJECT - ASSUMPTIONS.

- A. UNESCO's MAB Project 7, Ecology and Rational Use of Island Ecosystems, provides the institutional and conceptual framework for sharing information and experiences and for cooperating on a worldwide basis in the search for more effective means to manage human use of small island ecosystems. Through the MAB network, knowledge regarding the management of diverse island ecosystems can be pooled and general principles and guidelines derived, evaluated, and disseminated rapidly.
- B. Within the Caribbean region, the U.S. Virgin Islands provide a useful case for studying an extreme case of man-environment relationships on small islands. Each of the three major islands, St. Croix, St. Thomas, and St. John, is quite different and thus a variety of planning and management techniques have been attempted within a unitary governmental structure. Attempts at planning and managing the use of island resources in the U.S. Virgin Islands have met with mixed results (see Appendix C to this report). Nonetheless, these experiences provide some insight into the understanding of island ecosystems (science), of the development of tools to apply that understanding to development (technology), and of the ways in which island resource management can be organized (institutions). Because of the rapid growth of the Virgin Islands' economy and population within the last few decades, considerable practical experience has been gained in facing the questions of carrying capacity, stress on natural and social systems, thresholds of overload and system instability, and with educational, permitting, licencing, research, planning techniques needed to deal with these factors.
- C. A systematic review of the U.S. Virgin Islands resource management experience would provide the basis for the U.S. MAB 7B Directorate to contribute to the overall MAB 7 search for general principles and guidelines as well as providing the informational base for cooperation with other MAB 7 Directorates around the world. The product would be directly relevant to other Caribbean islands and, depending on separate ongoing initiatives regarding island taxonomies, relevant to specific categories of islands generally outside the region.

- D. Consultation with appropriate regional agencies and institutions (UWI, CDB, CEER, CARICOM, PAHO, OAS, CCA), international bodies (UN, UNITAR, UNEP, IUCN, UNCTAD), with academically based island scholars and with local island government planners and resource managers would be required. To accomplish this, the Island Resources Foundation would, on the basis of its prior work with twenty-six different island countries and territories and with all of the above mentioned regional and international agencies and institutions, take the lead in assessing both the dimensions of the problem and eliciting from appropriate sources a "state of the art" data base.
- E. A resource management oriented Virgin Islands workshop, blending academicians, local political leadership and technical practitioners, and which analyzed the Virgin Islands experience in a "retrospective forecasting" context, with broad participation by resource users, could produce more "transferable" guidelines than a strictly technical, engineering, or scholarly approach.
- F. Before mounting a Virgin Islands workshop, it would be useful to assemble a small group of island "experts" to explore the state of the art regarding island modelling strategies and similar analytical tools and experiences (developed as Appendix A).
- G. An assessment of the Virgin Islands data base would be made in advance of any workshop (developed as Appendix C).
- H. A methodology would be selected or defined that would enhance the "transferability" and utility of any workshop findings or conclusions to other island areas (developed as Appendix B).

IV. METHODOLOGICAL CONSIDERATIONS.

A. Historical Antecedents.

With the exception of the work of Fosberg (1965), McEachern and Towle (1974) and Brookfield (1980), there has been little effort made and even fewer useful products addressing the problem of comprehensive island resource management. As noted above, some sectoral studies do exist. But, in the absence of any workable typology (or systematic classification) of islands which would facilitate our understanding of comparability and enhance the likelihood of transferability of any model practice, procedure, process or methodology, we confront the fact that experimentation is in order. However, the entire exercise is risky, albeit both timely and defensible -- even if only because any such endeavor expands and improves the local resource management infrastructure system of any study island or islands through the normal collative, analytical, and synthetic activities regarding available historical data.

However, the present effort to apply an appropriate, retrospective forecasting modelling mechanism to the U.S. Virgin Islands resource management experience has the advantage of following, and therefore learning from, the Brookfield MAB 7 Fiji project and its complex modelling approach (see Appendix A, Exhibit A-2).

B. Initial Approaches.

A preliminary attempt to identify a preferred methodological approach to the Virgin Islands' resource management experience, as a potentially instructive exercise for other islands, was undertaken in a workshop format in late 1980. A dozen island resource specialists, including Drs. Brookfield and Whyte from the UNESCO/MAB/Fiji Project, representing diverse disciplines and different island areas, were assembled in St. Thomas with the express purpose of eliciting suggestions and guidelines, based on prior experience, for prospective use in the Virgin Islands project. The exercise was less than satisfactory, as the reader can readily determine from the detailed summary of the workshop proceedings, attached to this report as Appendix A.

One thing was very clear. The integration of the diverse disciplinary based perspectives of a dozen island specialists required more than a two day workshop. If there was any consensus, it focuses on the educational value of the participatory process to the host or study island and the participants rather than the transferability of findings to other comparable island areas or islands with comparable resource management problems. Nevertheless, a proposed workshop outline was defined (see Appendix A, Exhibit A-3 and A-4) which could be used if the original project objectives are slightly modified.

C. The Methodological Dilemma.

The questions generated by the preliminary two-day methodology workshop were complex:

- (1) Should we opt for a generalized approach with less host island specificity or a more rigorous modelling approach with a high level of local specificity?
- (2) Should we seek maximum citizen/resource user/decision-maker, non-academic participation or press for a greater emphasis on professional expertise, analysis and comparative studies based on available data?
- (3) Should we experiment, using the Virgin Islands data base available, with a combination of public participation (to get at the perceptual difference), ecosystems modelling (to learn what stress overload thresholds exist) and simulation modelling (for decision-making)?
- (4) Should we try to combine a quantitative and qualitative systems approach (with or without models, mini-computers, and maxi-input from local participants and/or other islanders)?

One thing was very clear -- a low tech, long term, participatory strategy would be more realistic, more appropriate to the target island system, more likely to produce solid results but on a more limited basis or scope with less immediate transferability, less rigorously documented findings and at lower costs. With a high tech modelling approach, we would have less relevance to the target island system, more defensible transferability of findings, and more defensible documentation with more prospect of advancing the state of the art but at a probably higher initial cost.

Subsequent re-analysis of the problem and extensive investigations regarding available, adaptable, and appropriate systems modelling approaches brought forward for evaluation the hybrid AEAM (Adaptive Environmental Assessment and Management) approach as developed by C. Holling. The substance of this second phase methodology review and modification of project strategy to provide an alternative approach is dealt with in detail in Appendix B.

V. CONCLUSIONS.

- A. The AEAM approach, as outlined in Appendix B, is preferred as it offers the best long term "transferable guidelines" product. The estimated workshop cost, however, is \$75,000 to \$100,000, including the background papers and publication of the results. The time frame would be 18 to 24 months.
- B. The participatory process approach as outlined in Appendix A is eminently feasible, although it would result in a less transferable project. It would cost approximately \$25,000 to \$40,000, and the time frame would be 12 to 18 months.
- C. The optimum strategy would be to develop two simultaneous comparative projects, one in the U.S. Virgin Islands using the AEAM methods (because the data base is adequate to the task) and one in the adjacent British Virgin Islands (or in Antigua, St. Lucia, St. Vincent, or Dominica) using a participatory process akin to the approach outlined in Appendix A.

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ISLAND RESOURCE MANAGEMENT
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Final Report

APPENDIX A
Preliminary Project Planning and
Research Methodology Workshop Report*
(November 8-9, 1980)

INTRODUCTION.

Twelve island resource development planning specialists (some scholars, some practitioners), drawn from four countries and three island territories, and representing eight academic disciplines, were assembled in late 1980 for a state-of-the-art two day workshop on island systems research, resource management, and carrying capacity analysis. It was assumed that the MAB 7 strategy regarding the possible use of the U.S. Virgin Islands as an instructive case study in island resource management would be enhanced by such an undertaking. It was also assumed, however, that prior and ongoing island-focussed resource management research efforts in other locations could and should be examined as prospective model approaches or methodologies for adaption to the Virgin Islands context. Given the high costs of some previous investigations and systematic studies, there was a need to evaluate the utility, relevance and cost effectiveness of antecedent initiatives of a parallel or similar nature in order to devise an optimum lower cost approach.

Opening Session, November 8, 1980

1. Dr. Edward L. Towle, president of the host institution, Island Resources Foundation, opened the workshop with a welcome to the participants (see Exhibit A-1) and touched briefly on the overall purpose of the UNESCO/MAB program and the objective of MAB 7 (Ecology and the Rationale Use of Island Ecosystems). He then spoke more specifically to the task at hand: (1) to elicit counsel from researchers working on similar studies in other island areas regarding proven concepts and analytical tools and procedures to be used for public sector decision-making concerning small island resources; and (2) to help in structuring a cost effective approach for an application of the U.S. Virgin Islands experience; and (3) to link the Virgin Islands project as far as possible with earlier UNESCO sponsored work on the Fiji island group and other ongoing studies in the Caribbean, in order to contribute to UNESCO's overall attempt to understand better

* This report was originally prepared in draft by Dr. Jerome McElroy and has been edited and amended by Dr. Edward Towle.

how island environments are impacted by development and how these impacts can be better managed/controlled for long-run viability or eco-development. Towle stressed the unique features that the U.S. Virgin Islands offer as a case study (see also Table 1):

- (a) a tri-island system (St. Thomas, St. John and St. Croix), involving other small satellite islands but with a unitary government, a major tourism industry, a major oil refinery (800,000 bpd), a national park, a multi-ethnic social structure, and a formerly significant but declining agricultural sector;
- (b) recurring demographic pressures of both immigration and emigration as a significant link or nodal point between the Caribbean region and North America, resulting in a high proportion of non-native residents (some permanent, some in-transit over the short and long term);
- (c) a higher level of development and relative affluence vis à vis the other neighboring Caribbean island systems, with its customary demonstration effect;
- (d) a variety of linkages with the continental United States, Puerto Rico, Denmark and Europe, and Africa, regarding territorial status, economic dependence, cultural roots, raw material supply, trade, etc. (i.e., an open system);
- (e) a variety of experiences applying or adapting U.S. government environmental management and development planning strategies to a smaller insular system (e.g., U.S. EPA, U.S. Fish and Wildlife Service, U.S. Coastal Zone Management Program, U.S. Geological Survey, U.S. Department of Housing and Urban Development).

2. Towle indicated briefly that the open format of the workshop was calculated to encourage a free exchange of ideas and the input of insights derived from Puerto Rico, Barbados, Fiji, Bermuda and elsewhere which could be applied in the case of the U.S. Virgin Islands. The focus was decidedly on an efficient, cost-effective resource management strategy. He briefly mentioned the workshop was partitioned into three segments. In the first, the aim was to concentrate on available and appropriate analytical tools, models, or designs for analyzing the environmental/population interaction within the multi-island management system. In the second, the

TABLE 1
U.S. Virgin Islands Primary Data

ISLAND	SIZE	POPULATION (approx.)	POPULATION DENSITY	PRIMARY ACTIVITY	UNIQUE FEATURES
St. Thomas	28 sq. mi.	48K	1714/sq. mile	tourism trade and commerce	Seat of government, excellent harbor, hilly, traditional commercial entrepôt
St. Croix	88 sq. mi.	49K	556/sq. mile	industry tourism agriculture	Formerly dominated by cane culture, now site of oil and alumina processing industry, artificial harbors
St. John	20 sq. mi.	2.5K	125/sq. mile	tourism residential	Rural, three-fifth a national park, mountainous, no harbors
Satellite Islands and Cays (57)	c. 4.8 sq. mi.	c. .47K	100/ sq. mile	residential tourism recreation wildlife preserves	Principally uninhabited except for Water and Hassel Islands

the aim was to discuss policy relevance of previous research, i.e., strategies for better influencing decision-makers. In the third, the focus was to assemble a draft research program for the Virgin Islands based project yet to come.

3. Finally, Towle introduced the participants, enumerating their particular research specialties, experience, and institutional affiliation (see appended list of participants, Exhibit A-1).

4. Dr. Harold Brookfield, who was project director for the UN sponsored, UNFPA funded, multi-island carrying capacity study of Fiji and the ongoing, follow-on project for the Eastern Caribbean islands (based in Barbados), began by summarizing his experience. He stressed:

- (a) similar structure (openness) and dependent nature of the so-called isolated Fiji's and the less isolated U.S. Virgin Islands;
- (b) special features of the Caribbean, including
 - (i) a much better data base, (ii) his team's eventual decision to use "stress points" in

place of carrying capacity, (iii) financial constraints and the strategic importance of establishing priorities from the start, and (iv) the more comprehensive macro program they had initially envisioned for the Caribbean as well as the more limited catchment management (single-drive variable) approach subsequently developed in the face of financial constraints.

There was some brief discussion of the Brookfield-Fiji team's analytical model (later distributed and appended herein as Exhibit A-2), and the question of computer expense for testing was posed. Blowers indicated MAB might be able to assist. Dr. Juan Bonnet of the Puerto Rico Center for Energy and Environment Research (CEER) concurred that MAB funding was limited but that in the Virgin Islands case he was hopeful that a good methodology would emerge from the workshop which other agencies interested in the Caribbean might well wish to assist in funding.

5. Next, Allen Putney of the Eastern Caribbean Natural Area Management Program, based in St. Croix, cited his efforts to solve practical resource management problems with effective, low-cost methods involving local managers seeking to maximize local benefits from environmental uses. The insights gathered from this field work were the following:

- (a) The best approach is to move slowly across a broad front encompassing all major systems -- legislative, planning, local training and education, development, and research. This is a slow, but measured approach, one which can effectively move toward effective resource management. We must look at the entire problem and be involved in all aspects.
- (b) The program must, however, focus on the simple and not get lost in abstract, academic research that cannot be effectively disseminated. In addition, much published research results is out of date, not in touch with ongoing activities, or irrelevant to islands.
- (c) The Virgin Islands represent a very apt candidate. Other West Indians frequently say, "We don't want to be another Virgin Islands." Yet much money has gone into those islands and the question now is to determine what can be learned from their experience. What mechanisms of

management have been attempted, which have succeeded (failed), and why? The three major Virgin Islands are so rich in diversity. How have these differences affected efficient decision-making? The Virgin Islands project represents a unique opportunity for MAB.

6. The other researchers of the Barbados-based UNESCO/MAB project team (Dr. Whyte and Dr. Marshall) were asked to contribute. Whyte focussed on differential environmental perceptions of the large-scale decision-makers (public sector) and of the small-scale, "man-in-the-street" users. She also argued that it was preferable to define carrying capacity operationally as a set of stress points or perceived problems with specific resources. Next, she indicated the differences in stress points as perceived by public officials and by the resident population as revealed in her Caribbean survey research. As illustrative, decision-makers prioritized key stress factors as water, hurricane hazards, and crowding, while the people perceived stress primarily in terms of energy costs, unemployment and educational access. She stressed the importance of the integrative approach in general and, in particular, matching the perceived stresses with the individual household (community and/or island) response to the stress, i.e., their coping strategies. As a corollary, she felt often the discrepancy between the decision-makers' list and the citizens' experience might be due to the satisfactory equilibrium achieved in the so-called stress situation through successful coping mechanisms, for example, the case of crowding and how it is differentially perceived.

Marshall indicated that although there is an abundance of research in the West Indies, there is very little understanding of island systems coming out of it. She indicated that her hopes for their project had been dashed by the lack of funds and that there was no strong consensus among the researchers concerning how to allocate optimally the limited resources remaining in the project. She also raised the question of native Virgin Islander participation in the workshop, especially in view of the fact that native-born Virgin Islanders had become -- in the space of one generation -- a demographic minority. In response, McElroy indicated that the invited Virgin Islands representative, Dr. Orville Kean, presently Dean at the College of the Virgin Islands and formerly Director of Policy Planning and Research for the Virgin Islands government, was unable to attend due to a last minute scheduling conflict, which was to be regretted.

Some discussion ensued on two points: (1) the meaning of carrying capacity and (2) the need to focus on constructing a conceptual model. In the former case, Blowers enunciated the more traditional "finite or static" approach wherein the island as a natural system is modified by man to the point where definite limits appear in the form of negative feedback loops, impacting the population, quality of life, migration patterns, etc. Putney countered with a "dynamic" view that carrying capacity is elastic, i.e., responsive to man's adaptation to potential thresholds and overloads through new technology, and other imported inputs which stretch carrying capacity. This disagreement was not resolved and re-appeared later in subsequent sessions.

Dr. Fuat Andic of Puerto Rico sought to focus the workshop more specifically on the formulation of a systems model (framework) which could simply and consistently deal with economic/environmental interactions in a systematic way. Indeed, in his view, this was the purpose of the workshop as a response to dissatisfaction expressed at an earlier MAB meeting in Puerto Rico, when the discussion rambled over disparate issues in a haphazard manner. He posed the task at hand thusly: given the desire for further development in the Caribbean, what are the constraints, conditions, impacts expected on the environment. Therefore, to develop guidelines for long-term viability, what is needed is a simple, three-step input:

- (a) Establish a model specifying the various input measures or variables depending on the information output determined necessary.
- (b) Inventory the Virgin Islands data base to determine whether it can be operationalized and if new data is required, establish procedures to generate them.
- (c) Perform the application, perhaps simple at first, with the possibility of enhancement later on as it is applied elsewhere or as new data become available, and so on.

Whyte was less enthusiastic about models because of the large amount of externalities occurring which would not be captured. She felt any operational model of the entire system was usually not policy-relevant because institutionally decision-making responsibility was narrowed to individual agencies. For these decision-makers the relevant approach was more micro sectoral analysis. Blowers felt there might not be need to construct a very expensive systems approach with the assump-

tion that two or three driving variables are all that are effectively needed to demonstrate the system and have impact on critical features such as water, beaches and open space, or issues like employment, income, etc.

7. Next, Dr. Wolfgang Sterrer of Bermuda summarized his experience in developing a soon to be published book, Bermuda's Delicate Balance. After an initial introduction covering features of Bermuda's size, population, and economy, he described the unique process which took place as a result of very limited funding and the widespread popular support the project generated. In its simplest form, the schema was as follows:

- (a) Initially several scientists and interested citizens posed a series of questions relating to man/environment issues in Bermuda. These were a small group of people with research skills plus considerable knowledge of the island, but most of all desirous of sustaining their island as a viable and attractive human habitat over the long term. The focus of these questions was directed toward people, the resources available to them, and their interaction within a utilitarian context, i.e., how to make the system work better.
- (b) Major resource sectors were inventoried, coupled with the kinds of human activity-use impacting them.
- (c) As areas of concern surfaced -- traffic, pollution, noise, wastes -- certain people were identified with expertise and/or responsibility in a certain area (who also had environmental interest and the time available) to put down in writing their conceptualization of the specific problem, its causes, and potential remedies.
- (d) After these voluntary papers were submitted, first drafts were reviewed and revised and then re-drafted by the original authors as well as other individuals. In this process, the "working document" became a mechanism for involving 200-300 Bermudians, raising community awareness and sensitivity, and thereby assisting decision-makers.
- (e) Sterrer projected that the book will be read avidly not only because of Bermuda's high literacy rate but also because the many authors and re-

viewers have a built-in obvious interest in the shape of the final product. In addition, the local Department of Education has expressed an interest in using the book as a secondary text.

The hope is that with this initial stage of the project complete -- basically, gathering the data and identifying the problems -- the community can move forward to a new plateau, i.e., more detailed, particular analyses of more specific problems with attendant management options.

Saturday Afternoon, November 8, 1980

1. Dr. Linda Basch of UNITAR (United Nations Institute for Training and Research) was invited to summarize her Caribbean island research involvement. She indicated the UN's primary interest in migration and her two specific responsibilities:

- (a) To gather together a comprehensive bank of material on migration in the region (intra-regional) with a view toward establishing a regional collection of data so the information and experience could be more widely shared;
- (b) To carry out a particular research project of Trinidad, the southern growth pole of the area.

Presently, she was also examining the feasibility of looking at the U.S. Virgin Islands variant as the growth pole in the north. In general, UNITAR's special interest was on the migration decision at the household level, kin networks in both countries of origin and destination, and their interaction over time using longitudinal data.

2. At this point a free-flowing discussion ensued in which several participants requested, on the one hand, a re-statement of the purpose of the workshop and, on the other, a re-focus on the questions to be posed (and answered). These were variously interpreted. In response, McElroy/Towle attempted to redefine the purpose, i.e., developing a model that would be policy-relevant, which could subsequently be operationalized in the Virgin Islands context, and which could make a contribution to the MAB program. In addition, the relatively good data base in the Virgin Islands made the testing easier. Thus, it was necessary to take up the operational frame of reference question and construct an analytical tool which could be applied to resource management issues in other Caribbean islands.

Several other questions surfaced:

- (a) Putney: What are the informational outputs we want?
- (b) Sterrer: What constraints of data and time and funding are we dealing with in the U.S. Virgin Islands?
- (c) Brookfield: How general should the model be? If it is too general, it may be useless for transferability.

Some partial responses included:

- (a) Andic: We are asking simply for policy-conducive research to measure the impact of economic/demographic change on the environment, specified in terms of land use, water, power, housing, jobs, etc.
- (b) Blowers: We are talking about working up a regional demonstration project.
- (c) Putney: We should take our cue from Bermuda. What we want is to start up an information flow, a process. It begins when people start asking resource-competition type questions and gradually this involves resource users -- public/private -- expressing their concerns in some community forum. The output of the project is the very flow of information and this very process of discussion.
- (d) Whyte: There is a different kind of learning experience involved in the different types of approaches taken in the research management question. Beginning with the construction of a macro systems model may be less fruitful than starting off with the management and juridicial system as the initial control, then taxonomically detailing the decision option possibilities, and finally spelling out the impacts each option would have on the environment, on labor, on business, etc.

3. At this point, the discussion became more structured with a focus on detailing the essential components of a research/management program. This represented the first systematic attempt to fashion an overall program strategy to get at the Virgin Islands experience. This agenda of basic ingredients included the following:

- (a) List of resources: identification of problems/topics

- (b) Development of priorities from among these, ranking levels of concern
- (c) Consideration of various demands on the resources (including variabilities, seasonal, secular)
- (d) Consideration of the aspirations of the population and projections with growth implications
- (e) History of ecological change including the pattern and process of resource decision making underlying resource allocation/use
- (f) Retrospective forecasting: construction of future scenarios, especially alternatives to simple extrapolation from past and present use patterns, foreclosures, and resource development systems
- (g) Participatory research: step/phase/process
- (h) Evaluation of limits of transferability of the program to other contexts.

During the discussion focussing on the formulation of the above list, several other points were raised and discussed. Putney re-emphasized the importance of the process idea and suggested that the project design should describe as many users of resources as possible as well as define their perceptions of this usage. Blowers indicated that perhaps the educational aspects of the process design might be as important as the output of solutions proposed. Finally, before the break a second interchange took place concerning the most appropriate definition of carrying capacity. It was reiterated that carrying capacity was sensitive (variable) to imported inputs, that island limits were not exclusively biological but economic/social/technological (given cost constraints) as well, and that the "stress points" approach was preferable.

4. The next two hours focused on how to improve the consumption of the research product, especially the policy recommendations. McElroy opened with his experience in the Frederiksted community development project on St. Croix (to arrest long-term economic deterioration) which involved a high degree of community mobilization and local participatory decision-making. However, he posed the difference between that undertaking in which the problem or need was relatively obvious and unambiguous -- no jobs -- and the perceptions

relatively universal with the present project concerning competitive uses (conflicts) and too much activity (as opposed to not enough jobs, income opportunities, etc.).

Brookfield made several telling recommendations drawn from his South Pacific project experience in Fiji. These included:

- (a) Avoid internecine inter-agency conflicts in government.
- (b) Present findings to decision-makers before you draft the results to include their suggestions.
- (c) Incorporate as much public participation as possible.
- (d) Remember that MAB's objective is to provide guidelines for decision-makers, not the decisions themselves.
- (e) Realize that often our research efforts/programs come in bits and pieces because the program implementation is often less robust from the ideal articulated in the original fleshed-out design proposal. As a result, among other things, our fragmented efforts can have untoward effects.

Other suggestions were, on the one hand, to make certain the Virgin Islands project was perceived as a Virgin Islands project for Virgin Islands beneficiaries and, on the other, to be sensitive to the positive role that out-groups can make if they can judiciously assist in facilitating the infrastructure which a decision-maker already has in place.

Towle ended the discussion with a brief summary of the Virgin Islands situation. He pointed out that the Virgin Islands, because of the intensity of growth pressures, has made considerable progress in terms of putting together the elements of a comprehensive (although not always) consistent resource management strategy. Over the past twenty years the Virgin Islands environment has adapted to a variety of alien inputs; but the islands, nevertheless, represented an ongoing process of management experimentation within an as yet only partially defined legislative framework, often lacking roots in clearly defined policies.

Sunday, November 9, 1980

1. Towle reconvened the workshop, and McElroy indicated the modifications which had occurred thus far in formulating the Virgin Islands strategy as a result of the workshop. He illustrated these changes by contrasting the original plan with what was evolving from these sessions. Originally four components were planned:

- (a) Developing the model or framework, supposedly the task of the workshop;
- (b) Meeting with local technicians and decision-makers to secure the data for operationalizing the model;
- (c) Commissioning papers judged necessary, ie., analyses of existing data or developing new data;
- (d) Disseminating the findings/policy recommendations in a town meeting type forum (for) to the community.

However, several new critical elements surfaced the prior day which had to be incorporated. These included differential environmental perceptions and definition of the output of the project as an educational process inherent in widespread community participation. The focus of this revised project design included four components (later expanded to six, see Exhibit A-3) constructed in sequence precisely to capture differential perceptions and encourage popular participation. These steps included:

- (a) From a review of the literature, verbally formulating a readily communicable concept of environment change as a consequence of economic development.
- (b) (i) Testing the model in a simple graphic way using assembled data on demographic/economic change and environmental (land use, water quality) behavior.
(ii) Presenting the verbal model and Virgin Islands test to data users/suppliers, especially in government, to secure their suggestions on the educational value of this research for the purpose of community "environmental consciousness raising". Possible types of modifications might involve:

- * new kinds of analyses using more graphic variables;
- * development of new data.

- (c) A community survey of the public's perception of stress points and their suggestions for resolution.
- (d) Evaluation of the survey data: where there are substantial overlap (unanimity), recommending policy action if the group so desired. Where there was divergence, recommending mechanisms to reduce conflicts if so desired. Essentially, the "action agenda" was open-ended and to be determined by the community's response to the survey findings.

2. At this point, suggestions were invited from the floor.

- (a) The overlap/divergence strategy was favored because in the former case you had the essential ingredients of managerial success, i.e., a critical problem clearly identified with some consensus on the direction of change needed.
- (b) The project must program local participation early on.
- (c) A household survey may not be the most appropriate instrument. Perhaps a better approach would be to sample various representative interest groups. It was also suggested that media focus on a given issue could be a good barometer of community awareness of a given issue. Likewise, the radio talk shows involving telephone callers are indicative.
- (d) It was suggested that a primary role of the scientist should not be restricted to conceptualizing the man/environment interaction only, but that he/she also could assist in linking up the population's perceptions of surface manifestations with actual environmental practices, pressures, and problems.
- (e) Both McElroy/Towle indicated some of the specific variables appropriate for testing. In addition to the standard economic variables and ethnic/migration movements, these included water quality, forest cover, beach erosion, beach access, sea grass beds, coral reefs, vessel moorings, rainfall run-off, etc.

3. There followed several substantive suggestions that were incorporated into the design. These included the following:

- (a) The public participation component ("survey") should also include some aspects of how people cope with various stresses. If such questions are not explicitly elicited, then it might be necessary either to commission a micro study on such mechanisms or during the public participation process make certain some field checking is done to check perceptions, coping mechanisms, etc.
- (b) More focus was suggested for transferability. Specifically, it was recommended that:
 - (i) MAB research experience would be part of the beginning of the process in terms of the literature search and in the very formulation of the design;
 - (ii) One output of significance would be the experience of multi-ethnic decision-making.
 - (iii) The project would represent primarily an attempt to tap into an ongoing planning process already in place (Virgin Islands) and help in integrating the implementation of a holistic management strategy from the disparate programs, processes, and legislative initiatives that presently exist.
 - (iv) It was also agreed that any success stories be included in published documents emanating from the project since some cases may be amenable to replication elsewhere.
 - (v) Finally, Towle indicated that perhaps the two most transferable aspects of the project would be:
 - * a low-budget approach to more effective management decisions, and,
 - * improvement in information transfer rather than scientific data generation. In this regard, prior Virgin Islands resource management failures might be due more to poor dissemination rather than to a weak information or data base.

- (c) Whyte constructed a flow chart of the tasks involved which included the time phasing in both man and calendar months. This was generally accepted (see Exhibit A-4).

4. Andic suggested that the general outline was relatively clear to all participants. It was noted that perhaps the actual detailed project design should retain fairly discreet parts which would facilitate the funding participation of several agencies in the likely event that MAB monies which could be devoted to the project would be insufficient to carry the entire project to term.

5. Towle thanked participants for their encouragement and participation and adjourned the workshop.

LIST OF INVITEES TO MAB-7
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8-9 November 1980
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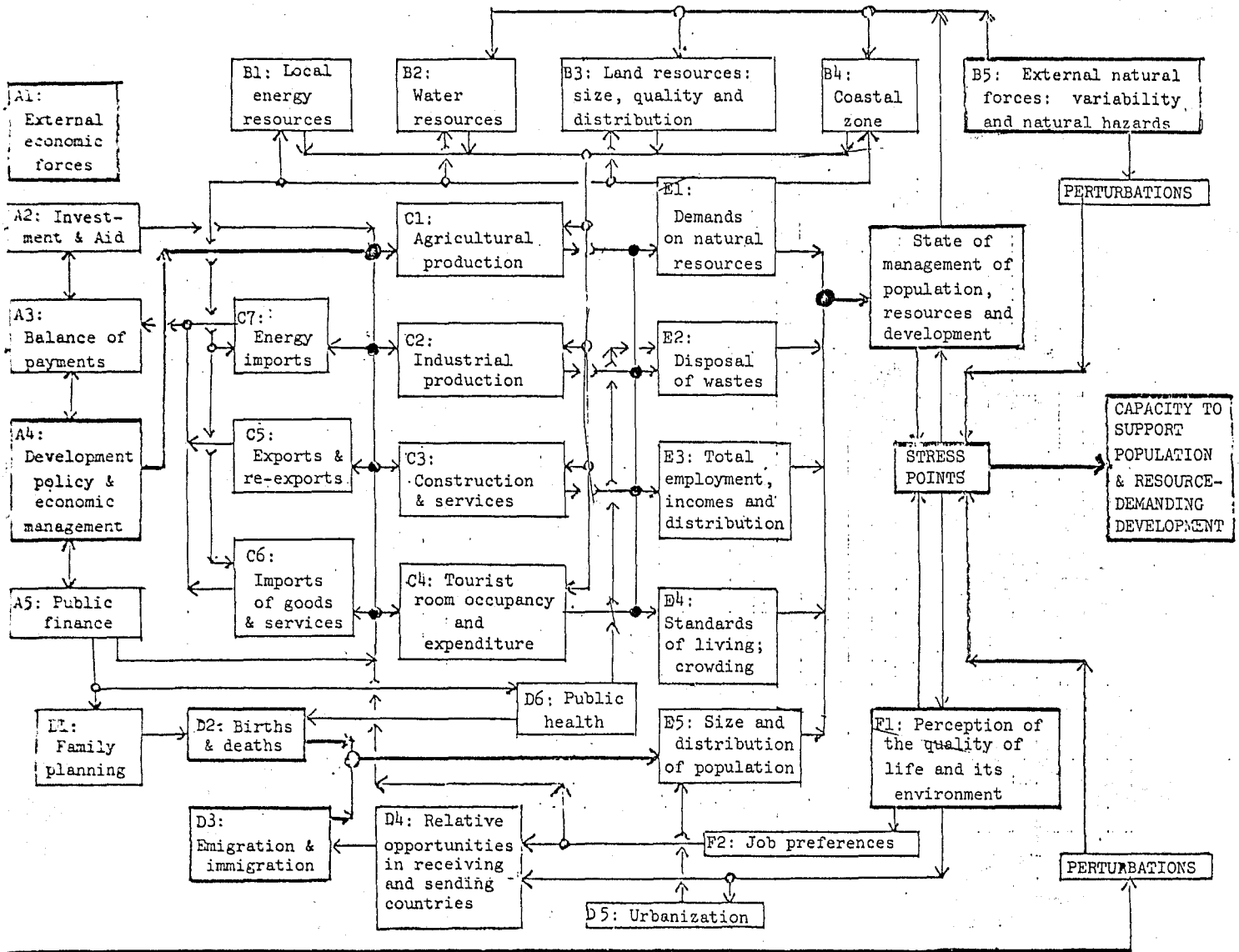
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EXHIBIT A-2



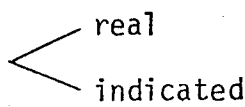
DAY ONE

Plan
(original program design)

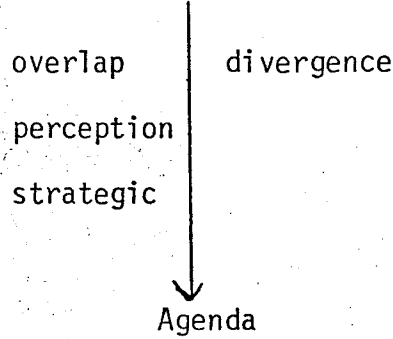
1. Framework
(establish)
2. Data Assembly
(V.I. sources)
3. Papers
(commissioned)
Indicators
Demographic
Economic
Environmental
4. Findings

DAY TWO

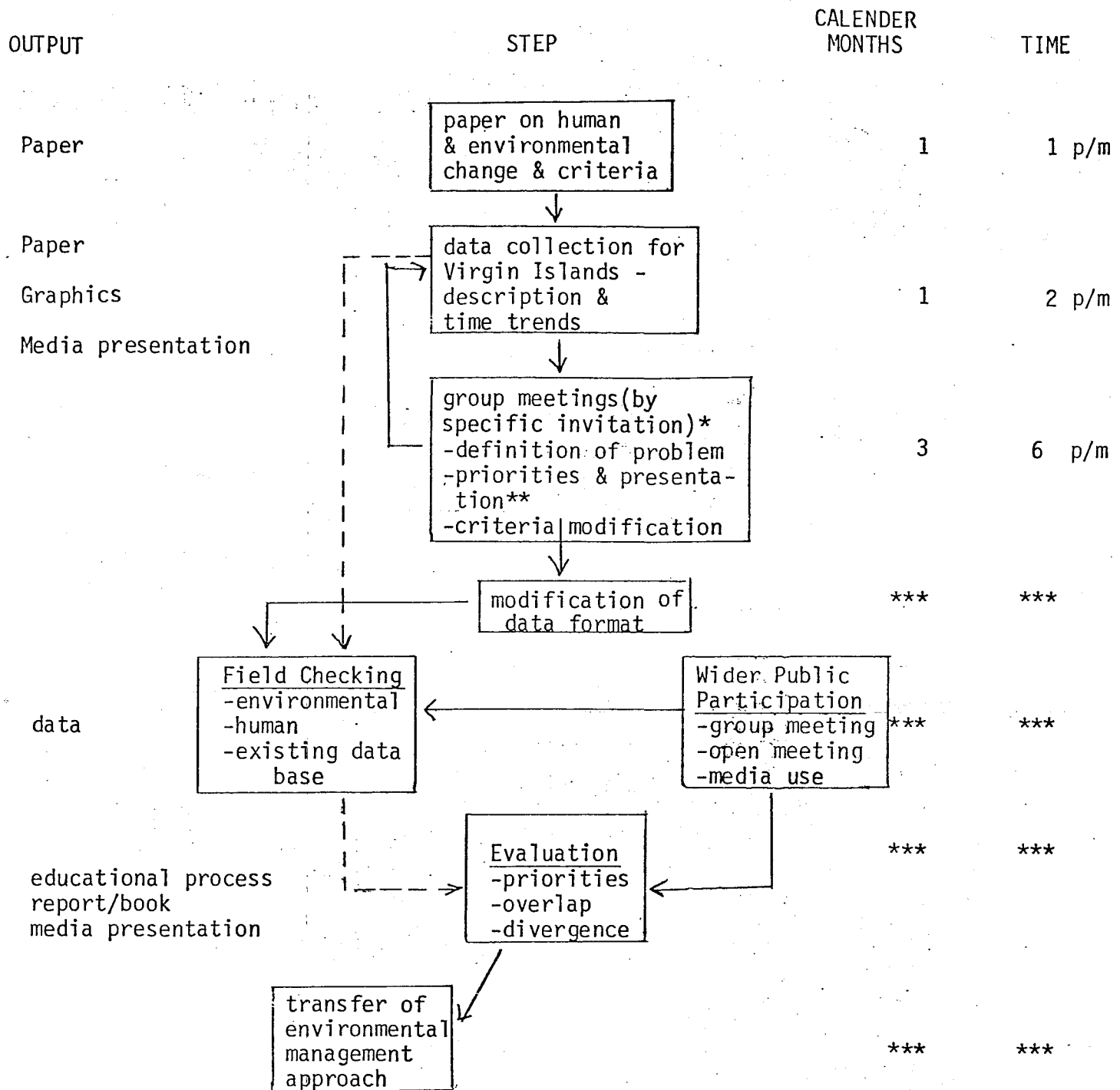
Revised Plan
(revised program design)

1. Concept Changes
(V.I. data)
2. Data 
 - real
 - indicated
3. Survey /Participatory Research

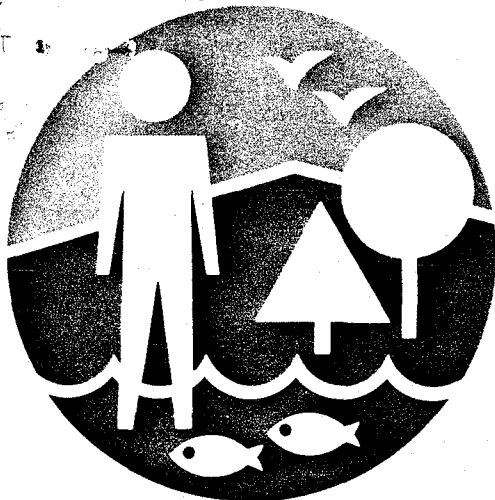
stress points?
follow-up?
4. Evaluation /Assessment


 - overlap
 - perception
 - strategic

Agenda



*Success stories
 **Delphi strategy
 ***Not yet determined



MAB

FINAL VERSION
Jan. 18, 1983

U.S. MAN AND THE BIOSPHERE PROGRAM

IO/UCS/MAB
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Rapporteur's Report

on the Planning Session for a

WORKSHOP AND CONFERENCE ON OPPORTUNITIES AND CONSTRAINTS
FOR DEVELOPMENT IN SMALL OCEANIC ISLANDS

Held at the U.S. Department of State
Washington, D.C.
October 25, 26, 27, 1982

Under the Sponsorship of the
U.S. Man and the Biosphere Program
Brooke C. Holmes, Acting Executive Director

Planning Session Chaired by: William S. Beller, Chairman
U.S. MAB Directorate on
Caribbean Islands

Rapporteur's Report Prepared by: Dr. Edward Towle, President
Island Resources Foundation
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A COMMITTEE OF THE UNITED STATES NATIONAL COMMISSION FOR UNESCO

Commission Established by Act of Congress July 30, 1946

PLANNING SESSION FOR A
WORKSHOP ON ENVIRONMENTAL MANAGEMENT AND
ECONOMIC GROWTH IN THE SMALLER OCEANIC ISLANDS

I. BACKGROUND.

Early in 1982, the Chairman of the U.S. MAB 7 (Caribbean Islands) Directorate, Mr. William Beller, suggested the idea of a workshop to "determine a methodology for analyzing the development of oceanic islands." He explored the concept with various island specialists in the United States, Europe, and the Caribbean area and with appropriate U.S. and international organizations, agencies and non-government institutions with programs or responsibilities regarding island systems.

Positive endorsements of the concept resulted in a recommendation to the U.S. MAB program to hold a planning meeting of key persons to design a preliminary approach for a future workshop that might, in turn, lead to a major international conference of islanders, island specialists, and technical assistance persons dealing with islands.

U.S. MAB approved the idea and agreed to sponsor the preliminary planning meeting, which was held in Washington, D.C. on October 25, 26, and 27, 1982.

The stated intent of the meeting was to "utilize the participants as a sounding board, and to solicit their recommendations and criticisms for developing a detailed program of action and a convincing proposal to be submitted to suggested agencies for sponsorship and funding." The prospective participants were asked in advance by Mr. Beller to address the following key tasks:

- * Determine a set of goals and expected final products of the meetings.
- * Adopt a strategy to achieve the goals. In this light, the participants might accept, modify, or revamp the suggested concepts for the workshop and conference, or consider alternate schemes.

- * Fill out the conceptual framework for the adopted scheme.
- * Determine participants and scheduling, timetable, and location for the scheme decided upon.
- * Identify potential sponsors and funding sources.
- * Identify follow-up work, and set up appropriate sub-committees, or responsibilities.

A significant precedent existed for the concept in the unique U.S. MAB 7 designed "Conference on Environmental Management and Economic Growth in the Smaller Caribbean Islands," held in Barbados in September 1979. This island focussed conference, which laid some of the groundwork for UNEP's Caribbean Environment Programme, was sponsored by the United States Agency for International Development, the Caribbean Development Bank, the U.N. Department for International Economic and Social Affairs, UNESCO, UNEP/ECLA, and U.S. MAB.

This island conference formulated an experimental strategy for analyzing the development of oceanic islands within a single region -- the Caribbean. However, because the meeting was only one week long, and the approach new, the participants did not delve deeply into the issues raised, nor into methods for dealing with them. Mr. Beller suggested using these issues for the projected worldwide smaller islands initiative, perhaps devoting part of the planning sessions to developing a methodology for considering the issues suggested in Barbados but which were left unresolved. For example:

- The island development process and options. What are the choices the smaller islands have for economic growth?
 - i) Review of existing strategies
 - ii) Assessment of alternative strategies.
- Growth limiting factors and carrying capacity. How do the natural and human

resources of a small island constrain its economic growth?

- Accountability: how do different development strategies affect or how are they affected by:
 - i) natural resources and environmental considerations -- land use, coastal and soil erosion, pollution (including oil spills), disposal of solid wastes;
 - ii) social and cultural considerations -- population pressure, rapid changes in technology, values, attitudes and societal structure?
- In view of the carrying capacities of smaller islands and factors of accountability, what are the alternative strategies or possibilities for development?
- How to devise sound development in smaller islands:
 - i) Opportunities for technical cooperation among islands --
 - * in joint development programs
 - * in joint monitoring and research programs
 - * in sharing information and networking;
 - ii) Opportunities for international assistance and cooperation, specifically, technical, financial, training/education.

II. FIRST DAY: OCTOBER 25, 1982.

9:00 A.M. Opening Session/Orientation.

The meeting was opened by Mr. Brooke Holmes, acting executive director of the U.S. MAB Program, who welcomed the participants and noted that, as convened, the meeting represented a rather unique opportunity to approach an important man-environment management problem for island areas, utilizing integrated strategies.

Mr. Holmes indicated that U.S. MAB was pleased to be the initiating sponsor and host for this important first step in a potentially important new approach to improving management strategies for islands and their resources. He suggested that the nature of the concept and its long-term funding requirements would necessitate multiple or shared sponsorship arrangements for the later stages since the scope of the project, even in its preliminary phases, extended beyond the support capability of U.S. MAB.

Mr. Holmes then turned the meeting over to the chairman, Mr. William Beller, who introduced the participants (see Appendix A) and presented an extended introductory opening statement summarizing the kinds of resource development/management problems which island areas confront. He pointed to the need for a more systematic, more rigorous, more extensive, more coordinated, more interdisciplinary assault on questions relating to oceanic island survival (whether these be cultural, ecological or economic issues) and for such strategies to be designed to reduce island dependency factors, to establish carrying capacity indices, to improve planning guidelines and to provide opportunities for learning more about island resource management methodologies.

Mr. Beller then opened the meeting to comments and suggestions from the other participants.

Synthesis of Comments and Exhcanges.

Dr. Philippos Loukissas, of Pennsylvania State University, suggested that small oceanic islands, due to their size and isolation, offer an exceptional opportunity for study under relatively controlled conditions. The findings from such research on man-environment/resource use and carrying capacity is-

sues can hopefully be useful for continental areas as well.

Mr. Kent Hughes, of NOAA, observed that there is a need to seek cost reduction approaches to data collection/indexing, storage and retrieval activities vis à vis islands and their surrounding oceanic environments. He suggested a larger emphasis on advance determination of optimum levels of precision, on estimating user demand and requirements, and on data synthesis and interpretation, as opposed to data collection and storage.

Mr. Lawrence Hill (U.S. Forest Service) noted that some island data needed for planning and resource management is quantifiable whereas other data is not so readily dealt with in a "statistical fashion." Certain benefits accrue to society from environmental management and economic development and growth which do not have tangible (market) values. Mr. Hill asked how such values can be taken into account (what is their weight) in a methodology for analyzing island development strategies? He also noted a need to validate existing data (which is more voluminous than accessible). Such data may be useful, if validated, and could reduce the costly requirement to collect new data.

For example, reams of data exist about island resources and environmental conditions (physical, biological, social and economic). While resource and social experts are aware of its existence, it serves no useful purpose until the politicians and other decision-makers know how to use it and understand what it means. The question is how can we get this information into their hands and in what form to make it useful to them. Mr. Hill noted that identification of physical and biological problems in the environment of islands is relatively easy to do. What is not well understood or easy to cope with are the underlying social origins of these problems, e.g., physical problems may not be due to development alone.

Mr. Hughes (NOAA) observed, as a data manager professional, that while machine data processing, storage and retrieval systems regarding some island areas and their surrounding oceanic environments exist, there are recurring problems with determining what is useful, what is needed, what is timely, and what a "utilitarian vs. an academic" format ought to look like to really work.

Advance planning is essential to make any data system work in a cost effective way and to provide intended benefits. An ancillary question is, for whom, i.e., who needs it, who will pay, and is it important for other than academic reasons.

Break.

Mr. Beller re-opened the meeting with a series of observations:

- (1) We need to determine the outputs of the projected workshop and even of this planning session.
- (2) The actions taken by this group could be very significant for the future of many island areas in the world.
- (3) We should define the target island areas, i.e., by type, size, etc.

Dr. Edward Towle (Island Resources Foundation) presented a brief overview of prior and current island research, resource assessment, taxonomic and planning studies. He drew particular attention to the UNESCO/MAB sponsored carrying capacity project carried out in the Fiji Islands by Dr. Harold Brookfield in the mid-1970's and to a recent U.S. MAB sponsored, Island Resources Foundation administered project to examine the resource management experience of the U.S. Virgin Islands.

Some discussion of comparability questions ensued with Dr. Loukissas observing that the significant differences between Mediterranean islands and the Caribbean suggest there might be difficulty in establishing transferrable "principles" and even in making comparisons. However, a beginning was needed.

Mr. John Noble, of the Conservation Foundation, noted, however, that all developing islands shared a common desire to reduce their dependency on externalities and, generally speaking, islands sought to develop a greater degree of self-reliance. This desire should be recognized by international technical assistance and aid agencies. Perhaps the proposed workshop could address how best to do this, i.e., what works and what does not.

There was some discussion regarding the kinds of "dependency" and the nearly universal endorsement of "dependency reduction" and "enhanced self-sufficiency" as a possible goal for the proposed island workshop.

Dr. Towle raised the question of who were the intended clients. Island scholars? Professionals and technicians in agencies assisting or serving islands? Island governments themselves? Planners? Decision-makers? Or some combination of these? He suggested the additional need to define more precisely the anticipated products of the workshop and those of any antecedent study projects.

Some discussion ensued pointing up the desirability of "improving island growth" and of development "benchmarks," of encouraging more analysis of what works (and what does not), of stressing the need for an exchange process among "island resource management practitioners" and of developing an island "constituency" through a participatory process which would involve islanders/clients in both the planning and research/study activities as well as the workshop itself.

Afternoon Session.

Mr. Salvino Busuttill of UNESCO's Division of Human Settlement and Socio-Cultural Environment, was invited by the chairman to present his observations and responded by saying that UNESCO was immensely interested in the concept, and co-sponsorship of the proposed workshop was a distinct possibility. His office has been recently involved in a series of specialized island studies (some involving Dr. Loukissas of Pennsylvania State University) and was interested in expanding the framework of its investigations to include the Caribbean and the South Pacific island groups.

He indicated an initial preference for a "product" focussing on decision-makers and emphasized the need to make the product of research efforts "digestible" and intelligible for government leaders and planners, i.e., not too abstract or laced with jargon, emphasizing practical guidelines, rules, principles, development strategies and options. He reviewed the details of the Mediterranean Islands project, particularly its combined use of scholarly analysis in book or report form, island specific study papers, econometric models, training exercises and even films, all incorporating a local participatory component.

Mr. Busuttil noted that the econometric model employed in UNESCO's Mediterranean Islands project would be ready for public dissemination about March 1983, and that the local training component had had a high priority, along with an evaluation element, all carried out as a locally endorsed MAB project involving local university personnel who worked with outside specialists on an interdisciplinary basis. He concluded by reiterating the argument for expanded, more systematic and comparative island focussed investigations.

Mr. Beller queried the group regarding the assumed value of bringing islanders and island researchers together, in either a workshop or conference format, questioning whether this was a valid format. Dr. Towle observed, in response, that there were several assumptions which under-lay the basic one suggested by Mr. Beller. For example, it is assumed that:

- (a) Islands are different as ecosystems from continental areas and, as such, require specialized resource assessment and planning approaches.
- (b) Islands have been, are, or could be classified, grouped, analyzed, and compared; an island taxonomy is conceptually possible even if not immediately achievable.
- (c) Islands have special resource development problems due to a generally limited resource base, accessibility, isolation, size, the so-called "brain drain" (or out migrations) and other factors; as such, islands require customized development strategies sensitive to the insular environment and responsive to available human, natural, physical, and institutional options and external risk factors.
- (d) Most islands are generally on the defensive vis à vis outside continental change factors, and some islands have devised more successful resource management and development strategies than others. Some experiences may have instructive value for both negative and positive reasons.

Most of these assumptions are increasingly verifiable in the emerging literature on islands and this, in effect, answers Mr. Beller's query about our collective (and tentative) larger assumptions regarding the need for mechanisms to exchange or transfer these experiences. Even though more analytical, synthetic and comparative research work is needed, the basic concept has validity.

Mr. Busuttil concurred, remarking that having spent two years on assignment in the Bahamas, he was struck by the degree of similarity between the Caribbean and the Mediterranean island experiences, particularly with reference to tourism and the larger, overall problems of development planning. There was a need to compare and to share information from different island areas. It could be a productive exercise to answer the question, "How have they dealt with similar problems?"

Mr. Ivor Jackson (Eastern Caribbean Natural Area Management Program) queried Mr. Busuttil regarding the level and type of "people participation" in the Mediterranean Islands project, particularly with reference to obtaining input on aspirations and values. Mr. Busuttil noted the importance of this process but concluded that, while it is useful, even essential, it is, nonetheless, difficult and a time consuming activity. Dr. Loukissas agreed, and Mr. Jackson observed that in his experience with ECNAMP (Eastern Caribbean Natural Area Management Program), broad public involvement through all phases of the project helped build a constituency, had training value and tended to encourage the search for more practical solutions and approaches.

At this juncture, Mr. Beller, the chairman, suggested a shift in focus back to the matter of target islands, client goals and a workshop methodology. The following points surfaced.

- * Planning in multiple island systems (i.e., islands with satellite islands such as the Bahamas or the Fiji Islands) differs from the coastal islands or isolated oceanic islands.
- * Central planning in multiple island systems tends to result in problems with peripheral areas.
- * We should focus on alleviating dependency relationships which serve as a constraint to development.

- * One goal should be to identify growth limiting factors and how they can be overcome.
- * Some growth limiting factors cannot be overcome, only understood.
- * Cultural considerations are vital.
- * CARICOM and the Caribbean Development Bank should be invited to participate.
- * Focus on providing useful products to island government decision-makers.
- * Senior decision-makers depend on technocrats and bureaucrats -- they should be the target.
- * Focus on improving the administration of islands.
- * To be saleable, workshop concept and final products must have an economic development component.
- * Do not leave out the planners in the individual islands, within regional bodies and in the aid/technical assistance and specialized international agencies.
- * The workshop should be kept small, and our clients should be islands and the governments that manage islands.
- * The workshop should be entitled "Resource Management and Economic Growth of Small Islands"(tentative consensus reached).

Mr. Beller, noting the lateness of the hour, thanked the participants and adjourned the meeting until the following day. All participants and their spouses were invited to dinner at the Beller home.

III. SECOND DAY: OCTOBER 26, 1982.

9:00 A.M.

William S. Beller, chairman of the planning session, presented Salvino Busuttil with a copy of "Puerto Rico and the Sea" and briefly discussed how that program was conceived and conducted. Mr. Busuttil commented on the value of such an approach for the Mediterranean area.

The chairman said that the previous afternoon he had received a cable from Francesco di Castri, which was highly supportive of the work that the present group was engaged in. Dr. di Castri is UNESCO's Director, Division of Ecological Sciences, and also Secretary, International Coordinating Committee for MAB. Although wishing his schedule had permitted him to attend the meeting, Dr. di Castri went on to say, "Nevertheless, hereby wish to assure you of our keen interest in proposed Workshop and possible follow-up worldwide conference and our intention to participate actively in their planning. Glad that Salvino Busuttil as well as Brian Payne can provide input from UNESCO and MAB to 25 October meeting. In addition, we are available for telephone consultation if needed. Wishing all participants fruitful and stimulating planning session. (signed) di Castri, UNESCO"

Ivor Jackson summarized problems and opportunities in the Caribbean area and characterized them in terms of seriousness and of the difficulty in identifying solutions. He suggested a comparison with what is known about resource and environmental problems in the Mediterranean island area:

- * Watershed management
- * Land ownership/tenure issues
- * Coastal erosion problems due to construction of tourist facilities, marinas, etc.
- * "Erosion" of social values due to tourism development
- * Identification of alternative construction materials, sand sources, and extraction processes

- * Pollution issues, including human waste, solid waste disposal, vessel waste in enclosed bays, oil spills, etc.
- * Human problems -- lack of institutional ability to manage change, low skill base level, difficulty of coordination between social/physical planners, etc.

Mr. Jackson, as Dr. Towle had the previous day, asked about "clients." They should include not only governments and government employees, but "donor" countries and their resident technicians and personnel working in island areas. Mr. Jackson further addressed the need to design an answer to the "who benefits" question from the process, in order to balance local versus national versus international benefits (the latter category referring to those who visit, use or rely on but do not reside permanently in island areas).

Comments followed:

- * Successful implementation depends in large measure on public participation

(continued on page 12)

- * There is a need to explore how development (particularly tourism) affects the local island culture and how and to what extent social change takes place, i.e., influence on the expectations of local people and institutions.
- * Population -- demographic shifts -- varies from island to island. The mix is constantly in a state of flux, and the trend is towards a more "integrated" mix.

Dr. Loukissas asked what is the most important single factor influencing tourism development. Ivor Jackson suggested physical factors are most important. Local attitudes regarding tourism development, for example, do not seem to be the most important factor.

Dr. Loukissas suggested that in Greece the most rapid tourism development was on the smaller islands. Larger ones did not have needs or pressures to develop tourism because of the availability of alternative opportunities. It was found that islanders preferred not to develop tourism because of perceived negative social implications associated with such development.

Mr. Busuttil suggested that Vincent Checchi Co. of Washington, D.C. would be a source of information on tourism development in the Caribbean, along with PADCO, Inc., the World Bank and IADB. Mr. Busuttil also suggested looking into the linkages between tourism and other sectors of the economic sector, with a view to identifying economic multipliers.

Other comments included:

- * An increase in tourism tends to increase the volume of imports. Often there is no serious or effective attempt to increase production of local food to support an expanding tourism sector.
- * New studies have been thoroughly undertaken to look into "leakages" in the economy (import/export balance).
- * Mr. Busuttil noted an ongoing Club Med project to set up local groups to produce local goods (especially food) for Club Med consumption.

William Beller summarized the discussion, listing themes and topics discussed and asking whether the group has truly suggested a structure for the workshop/conference.

Dr. Loukissas suggested that the workshop identify projects for needed research and studies which would be followed by a conference where the research findings would be communicated for the purpose of policy development. The workshop could give "marching orders" to the community of island scholars and resource management practitioners for the eventual presentation of formal papers at a subsequent conference.

Mr. Busuttil suggested that UNESCO could possibly provide funds to commission papers in the area of comparative island analysis. Dr. Loukissas suggested using the Gozo-Malta model for possible use in any comparative approach.

Additional suggestions:

- * The workshop should have a technical orientation.
- * The conference should have a policy orientation.
- * UNEP/ECLA should be involved as well as the Caribbean Tourism Research Centre in Barbados.

Break.

Loukissas and Busuttil summarized problems and work done by the MAB programs in the Mediterranean area, following which Mr. Beller opened the floor to questions about the proposed workshop focus, topics, specific participants, and scheduling. From the participants came the following options.

Suggested Topics for the Workshop.

- * Multiple Island Systems: Management Problems
- * Economic Dependency Relationships: Insular vs. Continental
- * Growth Limiting Factors: Opportunities and Constraints for Development
- * Natural Resources
- * Socio-Cultural Resources

* Developmental Linkages:

- tourism
- agriculture
- transportation
- communication
- administration
- population migration.

Suggested Background Study Papers.

- * Systemic/synthetic papers on the role of islands, or the importance of islands, related to special management situations.
- * Factors which make an island different from each other or from a continental area.
- * A taxonomy for island systems.
- * Comparative studies of key island areas with good data bases (e.g., Greece, U.S. Virgin Islands, Fiji) and satellite areas.

Suggested Thematic, Methodological Considerations (preliminary).

- * Modeling
- * Components of inventories (comparability?)
- * Taxonomic framework
- * Data handling systems
- * Carrying capacity and environmental "thresholds" in island ecosystems
- * Institutional factors/arrangements
- * Citizen participation (input or process?)
- * Dependency factors

Strategic Planning Considerations (Option #1-Preliminary).

- (1) What is the problem? (define problems)

Local	}	Establish differences and similarities via background papers
Regional		
Global		

- (2) What are the possible solutions?

Local	}	Develop at a workshop
Regional		
Global		

- (3) Can solutions be tested?
- (4) How to report solutions: Conference
Reports
Film/Tape?

Strategic Planning Considerations (Option #2-Preliminary).

- (1) Identify development issues, opportunities, and management concerns.
 - Establish data information needs.
 - Obtain data information needs.
- (2) Analyze current situations (resource by resource and on an interdisciplinary basis).
- (3) Establish needs (basis?) for required changes.
- (4) Formulate alternatives (options, procedures).
- (5) Analyze/evaluate alternatives:
 - Impacts (negative/positive, immediate)
 - Consequences (negative/positive, long-range).
- (6) Establish criteria for selections of alternatives or options.
- (7) Select options.

Considering the forgoing discussions, Mr. Hill proposed the following workshop outline and theme.

FINAL PROPOSED ISLAND WORKSHOP PLAN/OUTLINE.

THEME/TITLE: Opportunities and Constraints for Development in Small Islands

- A. Background Papers (see above) prepared in advance.
- B. Working Groups, meeting separately to discuss:
 - 1) Natural Resources
 - 2) Socio-Cultural Resources
 - 3) Economics
 - 4) Health
 - 5) Administration and Institutional Management
 - 6) Political Configurations
 - 7) Other.

NB. Prepare synthesis of each working group session prior to (C) below.

- C. Working Group Interactions: examine trade-offs through an interdisciplinary approach.
 - 1) Reports
 - 2) Debate/Discussions
 - 3) Consensus/Recommendations.
- D. Re-group and reconsider working group reports and amend/modify.
- E. Develop final recommendations for follow-up conference on "Opportunities and Constraints for Development in Small Oceanic Islands."
- F. Specific site testing of "models" (post workshop).

SUGGESTED ACTION PLAN/SCHEDULE.

- (1) Island Workshop - 1984 (location to be determined)
- (2) Island Conference - Spring 1985 (location to be determined)
- (3) Steering Committee, chaired by William Beller, to develop full workshop proposal by December 1982 and explore funding options.

IV. THIRD DAY: OCTOBER 27, 1982.

9:00 A.M.

Mr. Beller opened the final planning session by summarizing the previous two days of deliberation, making effective use of the worksheets prepared on the previous day and now displayed on the walls of the conference room.

He then introduced a new participant, Ms. Joan M. Nicholson, Business and Industry Liaison Officer for the United Nations Environment Program. She expressed genuine interest in the problem of islands and made several comments and suggestions focussing, in particular, on the value of developing proper linkages with the UNEP Regional Seas Program, since the well known "Mediterranean Strategy," which has been quite successful, was to be replicated in the Caribbean region.

Additionally, Ms. Nicholson recommended that the planning group include women in the development process, noting a variety of recent initiatives in this area, such as ODC, Worldwide Women in Development, World Women's Banking, Women in Development and parallel activities in U.S. AID, the World Council of Churches, and the Pan American Development Foundation, to name a few. She noted that if changes are needed and suggested, for the island development process, then women are a significant part of the power base and can help to effect required changes.

Mr. Beller responded by noting the planning group's concern for incorporating local cultural factors and the entire human/culture base (which by definition, if not practice, includes women) in environmental, resource use/management, administration and conservation planning.

Ms. Nicholson offered to provide any support she could in conjunction with UNEP/NYLO and with women's groups concerned with island development and environmental issues. She also recommended that UNEP be included in planning efforts and noted that UNEP shares Washington office space with Mr. Peter Perry of UNDP.

Mr. Beller acknowledged Ms. Nicholson's contribution and offer of assistance, observing that the intended strategy for both the proposed workshop and follow-on conference incorporated a strong, open-ended participatory component and that the planning group was open to co-sponsoring arrangements and cooperative initiatives.

Dr. David Black, of OAS, observed that the matter of broad participation in setting priorities for action was very important and reported a recent U.S. AID funded OAS project to strengthen agricultural activities in the OAS "region" where, in the absence of established priorities, an "open" strategy involving the private sector, banks, government personnel, and specialists was designed and implemented with very positive and promising results.

He noted, parenthetically, the possibility of establishing closer liaison between the island workshop project and the OAS Caribbean Science and Technology Cooperation Committee (CSTCC), a suggestion acknowledged by the chairman. Mr. Jackson then inquired about the possibility of including major private sector international banks, such as Barclay's, in the proposed exercise (not necessarily only as a funding source), which the chairman indicated would be explored.

Since it was nearly noon and time to adjourn, Mr. Beller re-introduced Mr. Holmes to make the closing remarks.

Mr. Holmes expressed his pleasure at the progress made by the working group, observing also that the outline of work on the draft plan -- for a two week workshop leading to a major world conference on resource management and development in small islands -- was a major undertaking which showed evidence of a broad rather than a narrow approach.

After thanking all the participants, Mr. Holmes turned the meeting back to Mr. Beller, who expressed his appreciation to all and adjourned the planning session.

APPENDIX A

Planning Session for

WORKSHOP ON ENVIRONMENTAL MANAGEMENT AND ECONOMIC GROWTH IN THE SMALLER OCEANIC ISLANDS

October 25, 26, 27, 1982

Department of State, Washington, D.C.

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APPENDIX B

Mr. William Beller's introductory remarks as Chairman to the U.S. MAB 7 Planning Session for a "Workshop on Environmental Management and Economic Growth in the Smaller Oceanic Islands," October 25, 1982, 9:30 a.m., Room 2722B, U.S. Department of State, Washington, D.C.

Ladies and Gentlemen:

What we are seeking is a way, or a method, for analyzing the problems of the smaller oceanic islands. Then based on this method, or analysis, to suggest ways for these lands to achieve healthful development--for the long term as well as the short.

This is what we sought in Barbados in 1979. This is when we held the "Conference on Environmental Management and Economic Growth in the Smaller Caribbean Islands." There was much excitement about this Conference. Interest and cooperation was so high that the time, measured from the first idea for the Conference to its holding and the distribution of its Transactions, took only nine months. The Conference was sponsored by the Caribbean Development Bank, the UN Department for International Economic and Social Affairs, UNESCO, UNEP/ECLA, and the U.S. Man and the Biosphere Program. The Agency for International Development gave significant financial support.

The results of the Conference warranted the initial excitement and interest. The recommendations made by the representatives of the smaller islands played a seminal role in UNEP's Caribbean Action Plan, now ready for signing by the involved nations. The chief recommendation, that of designing and instituting an Oil Spill Contingency Plan, is also in protocol form awaiting signatures. Interestingly enough, the Oil Spill Contingency protocol has become the carrot to persuade the Caribbean nations to sign the Action Plan.

I have gone into some detail about the Barbados Conference because we can take advantage of its precedence and build upon it. I'll return to this matter in a few moments.

272

Turning away, I'm indeed saying the obvious when I note that all of us here are familiar with some of the smaller oceanic islands in the world. A smaller oceanic island we define as an insular body having an area less than 10,000 square kilometers, and a population less than 500,000 people. In the Caribbean, fifteen islands and island systems fit this definition.

From our familiarity with such islands, I'm sure that many of us have seen the avid quest of many islanders for imported food, foreign industry, tourism, and to emulate and even adopt aspects of foreign cultures. To live up to their enlarging expectations, many of the islanders need and seek increasing amounts of foreign currency. To get it, the islanders have to make and sell something of value; or form political and economic dependencies with mainland nations.

This picture suggests an important question: can the smaller oceanic islands, especially sovereign ones, be economically viable? Must they do it in the scheme of Nauru, an 8-square mile member of the Gilbert Islands? When open-cut mining of phosphates is completed near the close of this century on about four-fifths of Nauru's land, the place will not be habitable and its 3,300 natives will have to move. Ensuring its specialization, an island such as Nauru dedicates the skills of many of its workers to the island's major industry, and gives special privileges to the industry, which often include the use of prime lands and waters.

Is there an equation that under more subtle circumstances than Nauru is experiencing will factor in what an island has

to offer in terms of its natural and human resources? Then tell us whether the island is running down? And additionally, what changes should be made to keep this from happening?

To make a point, maybe I exaggerate. In truth, an island seldom dies this way--by its turning into a rock through the overuse of its resources--where its carrying capacity for life is reduced to zero.

Instead, we see an island dying where there are few jobs for its citizens, where there is hunger, where deforestation and removal of ground cover causes the mountains and agricultural land to erode; and where the sediment flows into the sea to destroy the mangroves, coral reefs, and spawning and fishery grounds.

The citizens lose their hope and grow surly. Tourists don't want to go to the island. There is political unrest and instability. Or worse than that, the people lose so much of their hope that they become uncaring and docile. The intelligentsia leave the island, as well as some of the more ambitious of the workers.

I don't have to go on. You all know this type of island. And it is not only among the smaller ones. But what we can learn about the smaller ones, we can possibly extrapolate to the larger ones, and to mainlands.

Let me divulge some of my own feelings on a matter, which I've seldom stated! At the time of the Barbados conference, I had come to the conclusion that most of the smaller islands, standing unaided, are not economically viable. I wondered why their officials would not admit this fact, and then use it to their

advantage. I believed that the islands would be better off, in most instances, if they formed alliances with mainlands, not necessarily political ones but at least ones involving enlightened protectors and sympathetic trading partners. The seeming inability of many islands to feed themselves had been persuasive.

My belief suddenly changed, about a year ago. Some Israeli agricultural entrepreneurs had come to Puerto Rico. Through intensive agricultural techniques, they began transforming non-productive farm land into highly productive land. Their work shows so much promise that officials in Puerto Rico today conservatively estimate that it will be a short time before Puerto Rico turns from a net importer to become a net exporter of food products. Earlier this month, I'm told, this strategic experiment in Puerto Rico was shown on the television program, "60 Minutes".

I might note as a addendum that U.S. MAB initiated a program about a year ago to bring Israeli agricultural experts to a number of the islands in the Caribbean; and has joined with the OAS, and conceivably with AID, to bring this program about.

Thank you for staying with me to develop a point.

What is important is that agriculture often is a major factor in the viability equation for a small oceanic island. So, for that matter, might be fisheries. How do we identify these factors, and equally important, their relationships to other factors? How do we measure their significance? What can an island anticipate when it goes down one road of development? Acquiring an oil refinery, for example? or monoculture?

How much can tourism offer a given island? And is it enough? What are the losses? How do you analyze the problem?

Can we use the experiences of other islands? Maybe a mix of development alternatives and strategies is best. How do we share data, and expertness? Again, where are the methods of analysis we can use?

In essence, then, we are asking how viable the smaller oceanic islands are? And for how long, and under what circumstances? We have asked what methods we can use to find the answers. On a less terminal scale, how can the smaller islands develop in a healthful way, and how can we suggest ways for instrumentalities to help them?

I hope the outline of the problem is emerging. The solution, of course, we shall pursue in the time that follows.

The AID, UNESCO, and U.S. MAB among others, have already taken some steps toward the solution:

We have spoken of the Barbados Conference.

I believe that Professor Loukissas and Dr. Busuttil can speak about--

- the "Project for Studying the Small Islands in the Mediterranean," a UNESCO Conference held in Tunisia on March 24-28, 1980;
- and about the "International Conference on the Environmental, Social, and Physical Problems of the Small Islands in the Mediterranean," another UNESCO Conference, but held in Salina in October, 1981;
- And about the Summer School on Methods for Interdisciplinary Research on Mediterranean Islands and Coastal Ecosystems, held in Greece in August, 1981;
- and Dr. Edward Towle will be able to speak about the "Management of Island Resources: the U.S. Virgin Islands Experience," a planning conference held under MAB Caribbean Islands Directorate in October, 1980.

So many of us, in at least two and probably three ocean basins, are thinking about the same problems, and their solutions.

We're speaking, then, not only of a methodology, but also about the collection of data, the sharing of experiences. We are talking of deriving an equation, which is the methodology; and of seeking the values of its coefficients, which are the data and experience.

Here are the three steps in the program that we have called you together for, as some of us see the program.

The first step, and the one for which we are now meeting, is to lay detailed plans for a major Workshop. The Workshop product, among other things, would include a methodology for analyzing the problems and ways to achieve the best development of the islands. Thus, the second step would be the Workshop.

One of its outputs, the methodology, the experts in the islands could then use to prepare country papers in a structured way for a world-wide Conference, the third step.

This Conference on Environmental Management and Economic Growth in the Smaller Oceanic Islands, possibly UN-sponsored, would address and recommend solutions to many of the island problems. Unlike the Workshop, the Conference would invite political as well as technical experts, and would consider establishing instrumentalities.

The present meeting will produce a product that will form the basis for the Workshop. The document will be used to interest funding and sponsoring agencies, several of which are helping us in its formulation. The few of us here have the opportunity

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to launch a program as significant to oceanic islands as was the 1972 UN Conference to Developing Lands.

Out of this meeting, we hope we set up committees to follow through what we shall have started. The aggregate of ourselves we might constitute as the organizing committee.

We are hoping to adjourn Wednesday at noon, and telescope what we are doing into two days, leaving Wednesday morning for discussion of policy questions, particularly with AID and OAS, and possibly the UNESCO representative who is here today.

I have jumped a little ahead because I wanted to indicate where I think we are going. However, we can proceed easier if we agree on three points:

First, small oceanic islands are unique, i.e., there are qualitative differences between the way small islands react to pressures and the way larger ones or mainlands do. For example, a smaller island can be seriously harmed by an event such as a hurricane or a polluted water table, which a larger land mass might scarcely feel.

Second, we do not adequately understand the way smaller islands react to external pressures, and therefore these lands are handicapped in learning the ways for them to develop;

And last, islands can be analyzed in a logical way.

These, then are the three assumptions. The Barbados Conference suggested one way to proceed to develop a methodology, given the three assumptions. We might consider using such a methodology for our analysis:

-First, what are the options the smaller islands have for economic growth? The islands can be paved over, for example, or left pristine.

-Second, what are the growth limiting factors for a smaller island. These are related to the island's carrying capacity for life and development. Surely the amount of potable water and of arable land put a quantitative limit on the amount of agricultural crops that can be grown.

-Third, is the matter of accountability. In view of the theoretical options an island has for growth, that is, the qualitative aspect; and in view of the upper extent of this growth, that is, the growth limiting factors, how will different options change the upper limits for an island's growth.

-Fourth, in view of an island's carrying capacity, and factors of accountability, what are the alternative strategies and avenues for development.

-And lastly, what help and instrumentalities could we recommend to assist islanders in achieving the growth they believe is in their best interests.

At this point the meeting becomes yours.

APPENDIX C

PROFILE OF ISLAND FOCUSED RESEARCH EFFORTS AND RESOURCE PLANNING STUDIES

Submitted by Dr. Edward Towle

A. Islands - The Size and Isolation Factor.

Aldo Leopold once reflected, "One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is invisible to laymen." Unfortunately, in the special case of the world's oceanic and coastal islands, much of the damage being inflicted is invisible to almost everybody -- laymen, politicians, scientists, planners alike. As in the case of the old saying, "out of sight, out of mind," insular remoteness obscures from all but a very few persons the burgeoning insidious impact of contemporary continental pressures on small insular systems and their associated, fragile terrestrial and coastal environments.

But, as insular smallness confronts continental bigness in its various manifestations, what are the prospects for islands and island peoples? The pessimist well may say there is no hope, for island cultures, environments, and ecosystems will be overwhelmed and fundamentally changed if not destroyed. But for those who can say of an island, "This is my home, my native land," the values of smallness, isolation, national self-sufficiency, and the insular condition have a special meaning and promise. If islanders are uneasy, it is understandable. And if the process of change is to be managed and sustainable island eco-development is to become a reality, then the skills and expertise and accrued learning of both islanders and continental scholars and specialists need to be applied in the search for island development, resource management and survival strategies.

However, in the normal scheme of world politics, islands -- especially small islands -- lack sufficient area, population and geopolitical leverage to count for very much. This is true even though they are numerous, ubiquitous, conceptually exciting and loom large in myth, folk tales, literature, art and in the history of man's explorations and exploitation of the world's oceanic reaches, as well as in his search for adventure, the pursuit of empires, and occasionally in his escape from the imagined or real pressures of continental civilization through human revitalization strategies called travel, tourism, and recreation.

To a large degree, islands have been traditionally perceived by continental peoples as frivolous appendages, satellite areas or frontier outposts. Whether colonial, territorial, or even politically independent, small islands are viewed by continental powers as marginally valuable -- as difficult, contumacious, cantankerous geographical hybrids. Islands of all types -- coastal, oceanic or grouped as an archipelago (extending from one or linking two continental areas) -- have historically

been treated cavalierly, even callously, and have frequently been managed with disregard for the niceties of prevalent democratic theory, political morality and social ethics. Even academicians have often perceived islands as neat, private laboratories for research, secure in their splendid isolation, or as exotic, microcosmic test sites for both ecological studies and assorted theories and hypotheses about man-environment relationships.

B. Islands As A Special Development Case.

It is not widely acknowledged that oceanic island areas, ecosystems, territories or countries constitute a special case as a resource management problem, requiring customized research, planning, and development strategies. For centuries they were largely seen as simply exotic locations (by tourists and scientists), as exploitable possessions (by former colonial powers), as intriguing settings (by novelists, tourists, movie makers, and artists), and as inconsequential geographical entities (by development planners and agencies). They were seldom taken seriously by planners as being significantly "different".

It is, in fact, only within the past decade or so that most of the world's populated islands have begun to emerge as subjects of specialized, systematic resource analysis and of planning and management strategies rather than adaptations of traditional, continentally focused models (Fosberg, 1965).

The reasons for this relatively recent shift in perspective regarding the role of smaller islands in the larger scheme of global development are reasonably obvious.

1. Although all of the world's islands taken together have a combined land area of about 3 million square miles (not including Greenland with 840,000 square miles), they constitute only about five percent of the earth's total land area. However, thirty-seven or approximately a quarter of the world's independent states (with membership in the United Nations and other international forums) are wholly insular. Four-fifths of this number (see Table 1) are developing countries, with twelve in the Caribbean and nine in the South Pacific.
2. There are sixty-two islands with areas greater than 4,000 square miles, and one hundred and twenty-six islands with areal dimensions larger than 1,000 square miles. However, some very important islands are much, much smaller, and many of these

smaller, formerly colonial island territories and associated states have over the past decade or so opted for independence or are moving in this direction and, thus, represent new factors on the international scene.

3. Jet air travel and containerized cargo movement, tourism, satellite communication links, television, multi-national corporations, and geopolitical considerations have each contributed to a gradual change in perspectives on islands and island development, by islands, continentals, and bilateral and international development agencies.

TABLE 1.
INDEPENDENT ISLAND COUNTRIES

1. Antigua	14. Iceland	26. Philippines
2. Bahamas	15. Ireland	27. Singapore
3. Bahrain	16. Jamaica	28. Solomon Islands
4. Barbados	17. Japan	29. Sri Lanka
5. China, Republic of	18. Kiribati	30. St. Lucia
6. Cuba	19. Madagascar	31. St. Vincent
7. Cyprus	20. Maldives	32. Tonga
8. Dominica	21. Malta	33. Trinidad and Tobago
9. Dominican Republic	22. Mauritius	34. Tuvalu
10. Fiji	23. Nauru	35. United Kingdom
11. Grenada	24. New Zealand	36. Vanuatu
12. Haiti	25. Papua New Guinea	37. Western Samoa
13. Indonesia		

But isolated smallness has its price, and island microcosms simultaneously have and present unique opportunities and imperatives for addressing the resources management question, since many smaller islands are entirely coastal and have little or no "interior" (Towle, 1978).

International concern regarding developing island countries, as a kind of special case of the whole development process, first surfaced in a serious way in the late 1960's when a number of academic scholars and one or two international institutions began a search for a theory and a prescription for certain types of "special circumstances" within the international organizational framework to improve technical assistance programs to various kinds of "special problem" areas. For example, international organizations began to separate out least developed or land-locked countries as needing special attention, and strategic distinctions began to appear regarding least developed, less developed and more developed countries. The concept of Third World countries came into vogue as a classification, and eventually some attention was paid to islands as a special case.

As early as 1966, scientists working with the International Biological Programme, IUCN, and the Pacific Science Congress articulated a concern for the conservation of certain Pacific islands through a series of conferences, symposia and resolutions which launched the "islands for science" program. Subsequent IUCN initiatives at a Symposium on Conservation of Nature -- Reefs and Lagoons", held in Noumea, New Caledonia (August 1971), stressed the need for specialized ecological guidelines in island development project planning, and noted the vulnerability of island ecosystems to disturbances arising out of human activities. The specific environmental impacts of tourist development on the resources of coastal zones of certain Pacific islands were also given attention.

Shortly thereafter, one of the priority study projects listed by UNESCO's International Coordinating Council for the "Man and the Biosphere Programme" was designated "ecology and rational use of island ecosystems" and resulted in the famous MAB "Green Book #11 on Islands", published by UNESCO in 1973. The Islands Resources Foundation, an independent, non-profit entity, based in St. Thomas, U.S. Virgin Islands, was established in 1972. About the same time a special "Group of Experts" was assembled by the Secretary-General of UNCTAD (UN Conference on Trade and Development) to "identify and study the particular problems of developing island countries and to make recommendations thereon". This was the first full scale attempt to examine the economic problems of developing island countries within an international forum. Islands surveyed ranged in size from a large archipelago like Indonesia, with about 100 million inhabitants, to very small islands with only a few thousand inhabitants. An attempt was made to classify the island countries and territories according to various significant characteristics, and a further attempt

was made to identify certain key problems and the implications for development policy.

The report from the group of experts was published by UNCTAD in 1974, entitled "Developing Island Countries", and was followed shortly by a UNDP sponsored study of coastal development problems in the Caribbean (Towle and McEachern, 1974), and two IUCN initiatives: 1) a book on "Ecological Guidelines for Island Development" (McEachern and Towle, 1974) and 2) an environmental management case study of the British Virgin Islands (Howell and Towle, 1976), all developed by the Island Resources Foundation.

Since 1974, the available specialized literature on island resource development and management has expanded rapidly, embracing hurricane risks and storm flooding (Bowden, 1974; Nichols, 1979), coastal zone management planning (Towle, Grigg and Rainey, 1976; McElroy, 1978), case studies of islands and island groups (Towle, Howell, and Rainey, 1976; Brookfield, 1980), mangrove systems (Nichols and Towle, 1977; Teytaud, 1981), carrying capacity (South Pacific Regional Environment Programme, 1980), environmental planning and management (McEachern and Towle, 1974b; Simberloff, 1974; Virgin Islands Government, 1980), energy (Bonnet and Towle, 1981), national and marine park system development (ECNAMP, 1980 and 1981; Posner and Cuthbertson, 1981; Robinson, 1973; Towle, 1975), coastal erosion (Deane, Thom, and Edmunds, 1973), tourism impact and planning (Coulianos, 1980; Jackson, 1981; Potter and Tyson, 1980), solid waste management (Towle, 1982), and marine resource development (Towle, 1979; Goodwin and Taylor, 1981).

Simultaneously, out of the South Pacific area came a whole series of parallel studies addressing island ecosystems (Dahl, 1980; Mueller-Dombois, 1973; Simberloff, 1974; Man and the Biosphere Program, 1977) and environmental planning (South Pacific Commission, 1981; Baines, 1981); while a body of theoretical systems oriented island studies (diCastri and Glaser, 1979; Institute of Social and Economic Research, 1980; Dommen, 1980) also began to take shape.

Of particular note is a UNESCO/MAB/UNFPA sponsored carrying capacity case study of the Lau sub-island group in Fiji. The multidisciplinary team was headed by Dr. Harold Brookfield, formerly of McGill University, and included such eminent scholars as R.D. Bedford, T.P. Bayliss-Smith, Bernard Salvat, Anne Whyte, J.B. Hardaker, R.F. McLean and other island specialists. The seven volumes of reports from this project, dealing with population-environment relations, resources, and development and which were published between 1977 and 1980 (the last as MAB Technical Notes #13), constitute a major point of departure for the proposed Caribbean/Virgin Islands resource management workshop and this project planning report (Brookfield, 1980).

C. Island Ecosystems: A Special Resource Management Problem.

Developing island countries, especially the smaller systems, are particularly dependent upon their surrounding marine environments and coastal zone. Populations, ports, mangrove lagoons, major cities, a fisheries industry critical to the local food supply, the tourism industry, some agriculture, all watershed drainage and most industrial, commercial, and processing activity are clustered in this generally narrow but highly complex, circumferential area where the island meets the sea.

The greater the pace of island development, the greater the stress placed upon this interface of interacting terrestrial and marine ecosystems and the more there is a need to devise workable and appropriate management strategies and practices for the resource base to achieve sustainable development goals. But this is not easy to accomplish because most proven temperate zone approaches, procedures and models are inappropriate for tropical and sub-tropical seas where the majority of developing islands are situated.

There is general agreement among scientists that tropical seas and especially their shallow coastal areas are much richer in species diversity than the colder oceanic regions of the globe. In fact, a rather large number of genera, families and groups of a higher order are found only on the edges of the warm oceans and constitute the primary elements in tropical and sub-tropical coastal eco-systems. Three of these vital tropical systems are coral reefs, mangrove swamps and sea grass beds, all typical to island coastal zones, but, nevertheless, probably the most valuable productive ecosystems within the marine environment surrounding tropical islands. All three are important as "land builders and stabilizers" and as "wave energy absorbers" protecting shorelines from storm induced erosion. The mangroves additionally constitute a valuable resource as habitat for many traditionally, nutritionally and commercially important food species. All three are susceptible to impacts generated on-shore.

Tropical marine and coastal eco-systems pose an especially difficult environmental management problem. Their chemical and physical characteristics, their community structure and their biological functions differ or behave differently from their better known temperate zone counterparts at comparable depths. As one might expect, the dispersal, breakdown, uptake and impact of water pollutants (and this includes sediment discharges) also differ qualitatively in the tropics, and both an appreciation of this and an understanding of how they differ are essential for proper marine resource planning, structural design, environmental monitoring, and impact mitigation strategies in tropical waters. Island systems tend to have lower tolerances to various kinds of abnormal stress resulting from excessive and recurring concentrations of waste discharges in any particular location.

Fortunately, as noted above, the past two decades have seen a significant growth of scientific research and information regarding tropical marine pollution, its causes and effects on various coastal biotic communities and species and on appropriate effective pollution control strategies and practices. While our knowledge is less than complete and some further research on specific pollutants and their breakdown rates and impacts on specific island eco-systems is still needed, we already have a good working base of scientific information that is accessible..

The primary task at hand is not, therefore, fundamentally a basic research problem so much as it is a science application problem focusing on those few island systems with a fair data base and where experimental resource management programs have addressed a long standing, complex sequence of development activity within a geographical, spatial, institutional and interdisciplinary framework that offers instructional replication possibilities for other developing islands confronting similar problems.

As island-based ecological, development, and environmental data accumulate, the need and opportunity for data assemblage, verification, analysis, synthesis and interpretation also grow. It is appropriate to attempt to see what has and has not been learned and to assume that the world can learn something from both past mistakes and successes regarding island microcosms. If politics is the art of the possible, resource management is the art of the practical. It is eminently practical to study selected island areas within this context.

