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THE STATUS OF BIOSPHERE RESERVES: A PRELIMINARY ASSESSMENT

by

William Gregg, Ph.D.
U.S. National Park Service
and
John Wargo, Ph.D.
Assistant Professor of Natural Resource Policy
School of Forestry and Environmental Studies
Yale University

A. INTRODUCTION

The Action Plan for Biosphere Reserves, approved by the International Coordinating Council in December 1984, established nine objectives for the biosphere reserve program, and recommended 35 actions for implementation by UNESCO, cooperating international agencies, and MAB National Committees. The first objective relates to enhancing the role of the international network in global ecosystem conservation. In accordance with Action 6 under this objective, UNESCO established an advisory panel to refine criteria for selecting and managing biosphere reserves and to review the status of the effectiveness of the network in carrying out its conservation, logistic, and development roles.

At its first meeting in September 1985, the Scientific Advisory Panel on Biosphere Reserves underscored the importance of obtaining information to provide the basis for assessing the status of the network with respect to the objectives in the Action Plan, and to identify opportunities for achieving these objectives. The Panel established an ad hoc working group consisting of Messrs. M. Batisse, W. Gregg, and J. McNeely, to design a questionnaire to obtain this information. In reviewing the recommendations from the Panel's meeting, the MAB Bureau noted the utility of the survey and urged its implementation as soon as possible. In March 1986, members of the ad hoc working group met with interested participants in the All European Conference on Biosphere Reserves in Ceske Budjovice, Czechoslovakia, and the UNESCO MAB Secretariat to review the questionnaire and recommend useful revisions. The Secretariat subsequently transmitted the revised questionnaire to National MAB Committees in May 1986.

In March 1987, a preliminary summary was prepared for the Secretariat by W. Gregg based on the responses received from 122 of the 261 biosphere reserves, representing 36 of the 69 countries participating in the network at that time. In reviewing the summary, the Bureau urged the Secretariat to try to obtain questionnaires for the remaining biosphere reserves in order to facilitate a full analysis. Subsequent communications by the Secretariat with National MAB Committees and UNESCO Regional Commissions elicited additional responses. By the next Bureau meeting in January 1988, 188 of the 266 biosphere reserves, representing 48 of the 70 countries then participating in the network, had responded. The Bureau again urged that an attempt be made to obtain the missing replies.

As of 1 August 1988, the Secretariat has received replies from 219, or 81%, of the 269 biosphere reserves representing 56 of the 70 participating countries. Because some of these replies were received too late to be included in this analysis, our sample for the analysis includes 200, or 74%, of the 269 biosphere reserves, representing 54 of the 70 participating countries. As the Secretariat is still receiving replies, we

B. GENERAL INFORMATION

1. Size

The median size of biosphere reserves is 37,430 hectares (the mean size of 271,000 hectares is a less useful indicator because it is influenced considerably by several very large sites, including the 70-million hectare Northeast Greenland National Park Biosphere Reserve). The majority (70%) exceed 10,000 hectares, and more than a third (38%) exceed 100,000 hectares (Figure B.1). However, only a small number of biosphere reserves (7%) are expansive landscapes larger than 1,000,000 hectares. Fully 30% are smaller than 10,000 hectares, and about 7% are smaller than 1,000 hectares. The small size of the latter sites suggests that a considerable fraction of the network may be inadequately buffered from the effects of habitat fragmentation and other human influences in the vicinity.

2. Biome

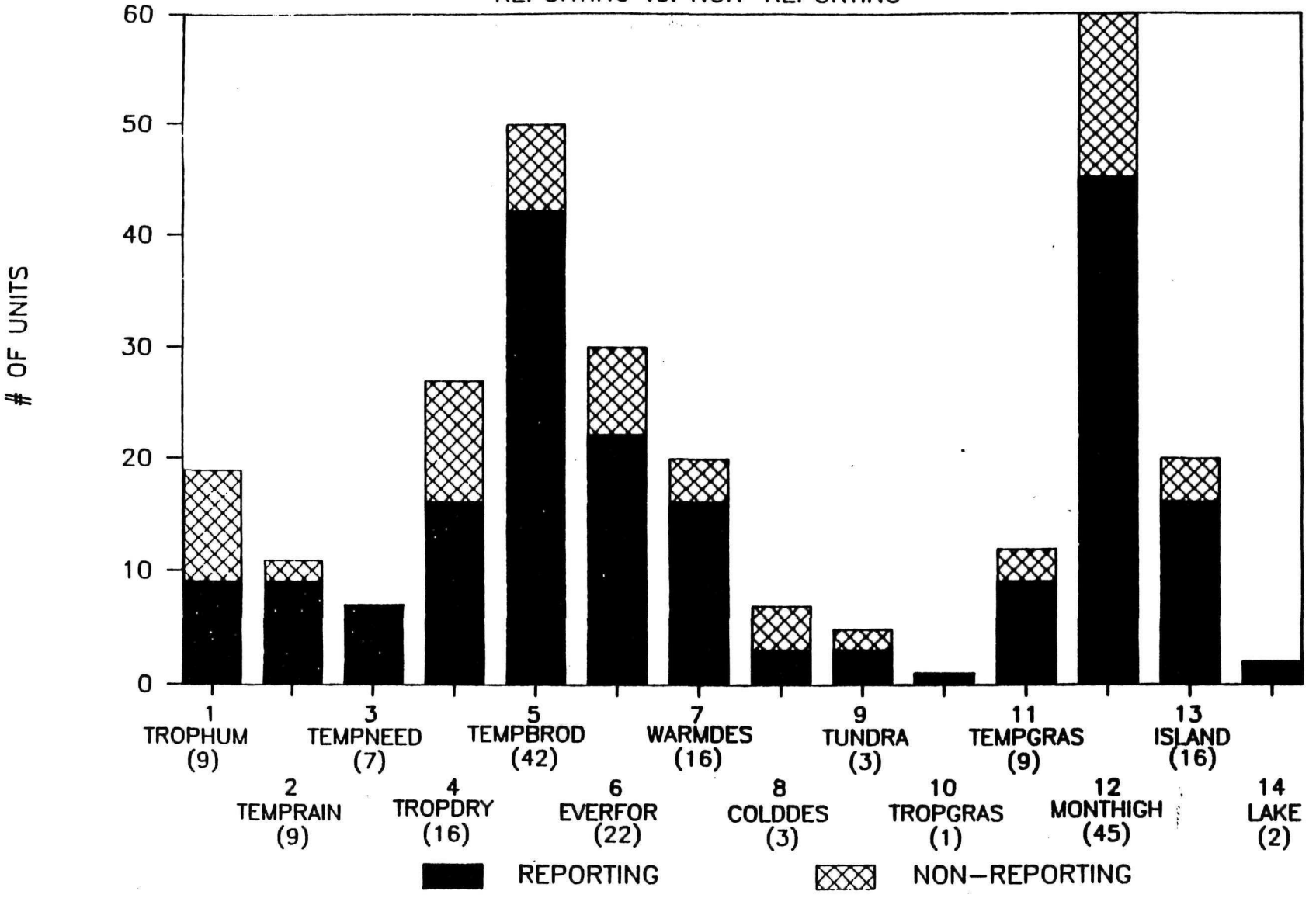
The global distribution of biosphere reserves is markedly uneven (Fig. B.2). Nearly 22% of the sites are categorized as mixed mountain and highland systems with complex zonation, the majority of which are located in central and southern Europe. About 19% of the sites are temperate broadleaf forests or woodlands, most of them in developed countries having long established protected area systems. The network contains lesser, but still substantial, representation of evergreen sclerophyllus forests and woodlands (11%), tropical dry or deciduous forests and woodlands (10%), warm deserts and semi-deserts (7%), mixed island systems (7%) located in tropical regions, and tropical humid forests (7%). Underrepresented with 3-5% of the sites are temperate grasslands (4%), subtropical and temperate rainforests (4%), temperate needleleaf forests and woodlands (3%) and cold deserts and semi-deserts (3%). Most underrepresented are tundra communities (2%), river and lake systems (<1%) and tropical grasslands and savannas (<1%).

believe that further attempts to obtain a total response should be made. Appendix 1 lists the sites which had not reported as of July 20 and thus were not included in this analysis. The greatest percentage of non-reporting sites is in the cold desert (4 sites, 57% of the sites in the biome), tropical humid forest (10 sites, 52%), and tropical dry forest (7 sites, 41%).

The computer analysis and graphical displays of the results of the questionnaires were developed by Mr. John P. Wargo, Assistant Professor of Natural Resource Policy at the Yale University School of Forestry and Environmental Studies in New Haven, Connecticut, USA, with the assistance of Ms. Jennifer Allen and Ms. Jill P. Humphrey. Mr. William P. Gregg, Secretary of the U.S. MAB Project Directorate on Biosphere Reserves, assisted in the design and interpretation of the analysis. Messrs. Jeremy Harrison and Duncan MacKinder of the Protected Areas Data Unit at IUCN's Conservation Monitoring Centre provided assistance in developing menus for entering information as well as information from the Protected Areas Database. Financial support was furnished through the UNESCO MAB Secretariat and the United States National MAB Committee.

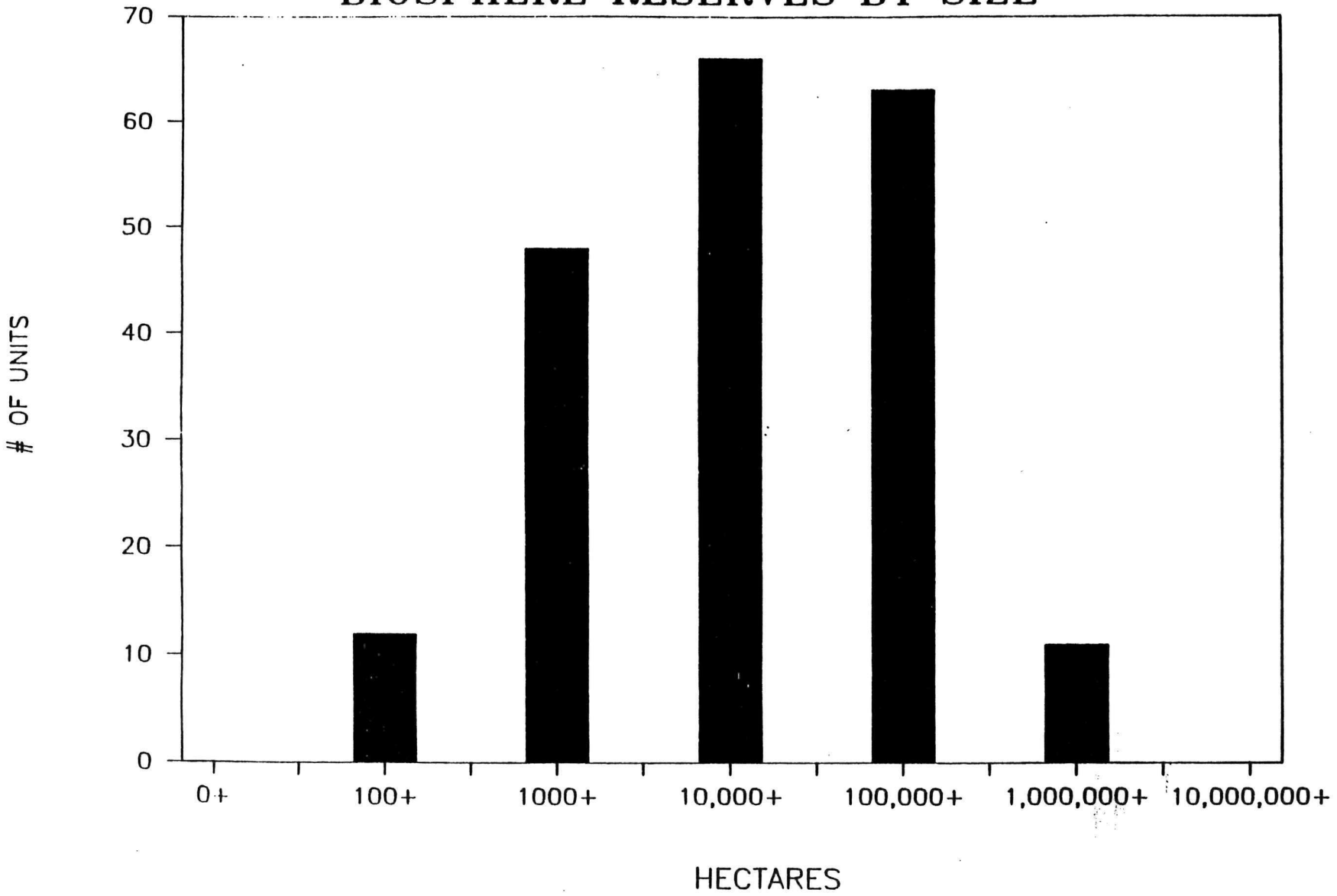
OF RESERVES IN EACH BIOME

REPORTING vs. NON-REPORTING



( ) = # REPORTING

DISTRIBUTION OF REPORTING BIOSPHERE RESERVES BY SIZE



purposes while temperate units are less likely to pursue development/participation, and less likely to view reserve status as providing a legal and administrative basis for resource protection, since one normally already exists. Still, this seems of minor significance in the face of evidence that 75% of the network is pursuing 7 or more purposes, dramatic evidence of a desirable goal structure.

The same data is analyzed by aggregating average raw ranking scores by biome, presented in Figure C.4. Again, the highest total average scores are assigned by tropical units (Biomes 1 and 4; excluding biome 10, tropical grasslands, since in this case only one unit within this biome reported). This distinction is a function of both the high diversity of purposes pursued by tropical units and the high average scores assigned to those purposes. In this case, a low total purpose score could be an indication of a high relative importance assigned to conservation, rather than integrated rural development or participation. Figure A-4 reflects only minor variation in average raw scores for other biomes.

The diversity of conservation purposes pursued by network reserves is reflected in Figure C.5. It is striking that 94% of the reporting reserves pursue the conservation of a representative ecological unit in a natural or minimally disturbed state. There is some variation between tropical units (85%) and temperate units (95%) in the percentage of units pursuing this objective. The next most commonly pursued purpose is the "conservation of national or regional endangered or threatened species": 78% of the network pursues this objective, with insignificant variation between tropical and temperate units.

Figure C.5 also demonstrates the relative importance assigned to species threatened at the national or regional level (network mean positive response=78%) compared with "Red Book" species (network mean=68%). The three purposes pursued the least include the conservation of harmonious landscapes resulting from traditional patterns of land use (network mean=30%); conservation of relatives of economic species (network mean=21%) and the conservation of indigenous production systems (network mean=13%).

C. RESERVE PURPOSES

Respondents were asked to rate the relative importance of the nine objectives of biosphere reserves identified in the Action Plan. The results of the responses are presented in Figures C1-C4. Figure C.1 demonstrates the relative importance of conservation over any of the other purposes. The average network rating for the conservation of natural ecosystems is 4.6, with only slight variation between tropical and temperate reserves. The next highest reported purpose is the conservation of genetic resources, with a network rating of 4.1, and greater variation between tropical units (mean=4.6) and temperate units (mean=3.7). The provision of a legal and administrative basis for protection is considerably less important than the conservation purposes (network mean=2.7) and there is over a full point difference between the ranking by tropical units (3.5) and that by temperate units (2.2). This could indicate that the reserve designation has a greater institutional significance in tropical units, or it could simply reflect the fact that in temperate units the administrative structure remains unaffected by designation.

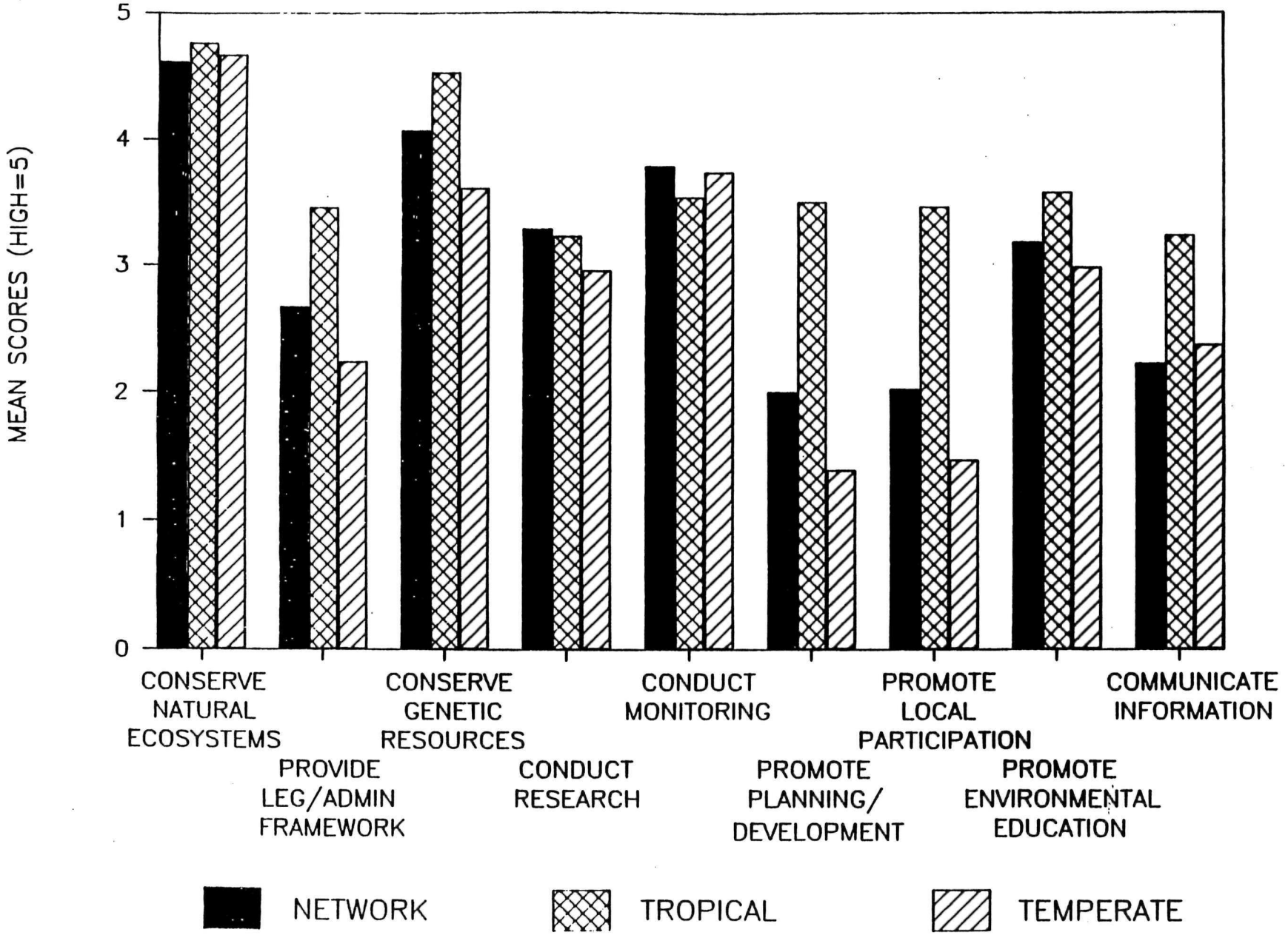
Following conservation, the next most important purposes pursued include research and monitoring, with insignificant differences among tropical and temperate units. The network average for monitoring is 3.8, while it is 3.3 for research. If research and monitoring responses are aggregated, these purposes rank second only to the aggregated conservation purposes (Fig. C.2).

The next most important set of purposes include the distribution of knowledge: environmental education (network mean=3.2) and information communication (network mean=2.3). There is little difference between tropical and temperate units in the ranking of environmental education, while a higher rank is assigned to communication by tropical units (3.2) than temperate units (2.5).

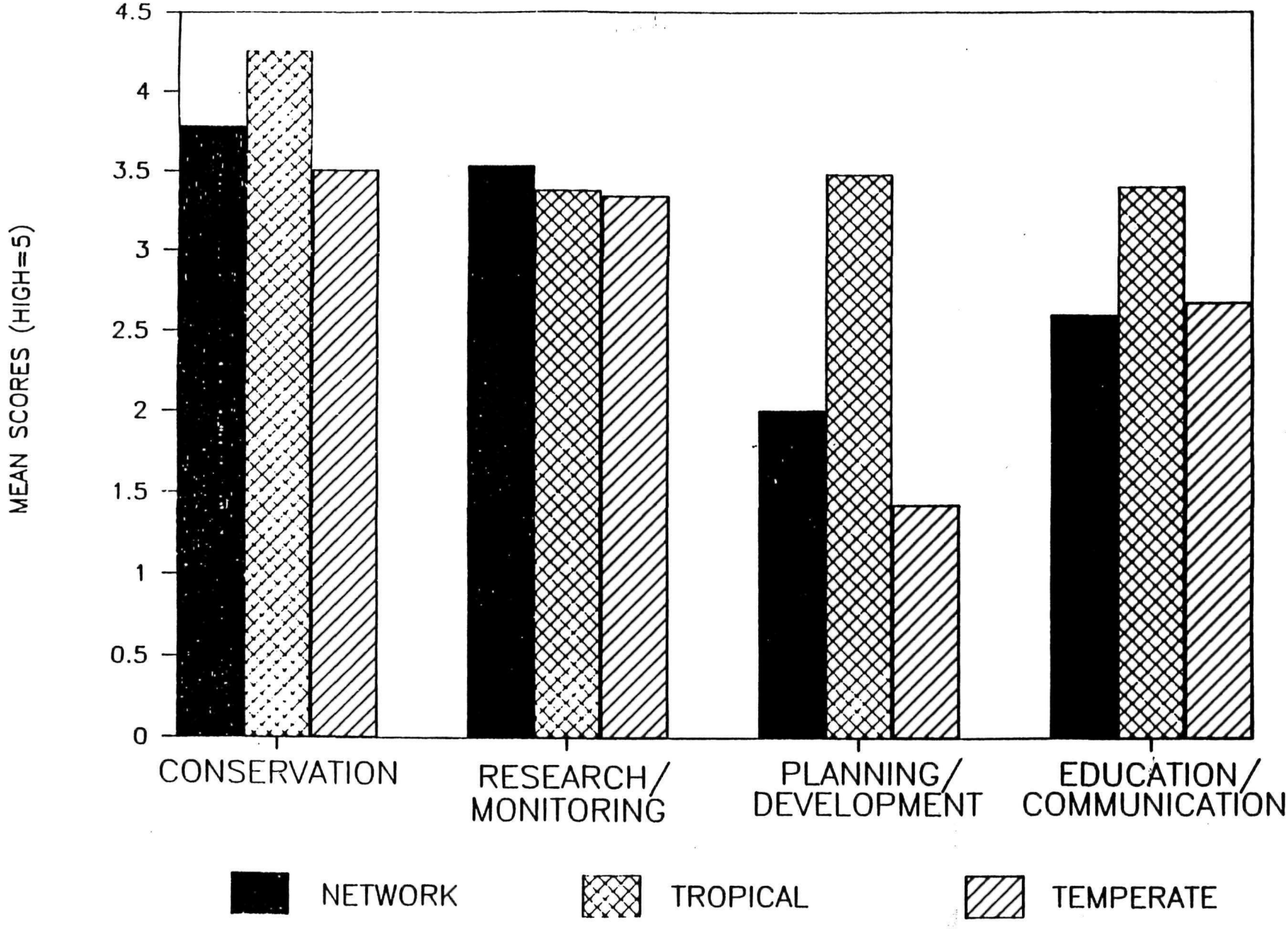
Promotion of regional planning and rural development assumes the lowest ranking (2.0) for the entire network. However, the most significant difference demonstrated among the nine purposes exists between tropical units (mean=3.5) and temperate units (mean=1.5) for this response. A similar response pattern exists for ranks assigned to the promotion of local participation: network mean=2.1; tropical mean=3.4; and temperate mean=1.6.

Since each reserve was asked to rank nine purposes, one indicator of success is the total number of purposes pursued, demonstrated by Figure C.3. The remarkable finding of this analysis is that fully 50% of the reporting network reserves are pursuing all 9 objectives, while 80% of tropical units are pursuing 9 objectives, compared with only 48% of temperate units. This distinction again is explained by the tendency of tropical units to pursue conservation and development/participation

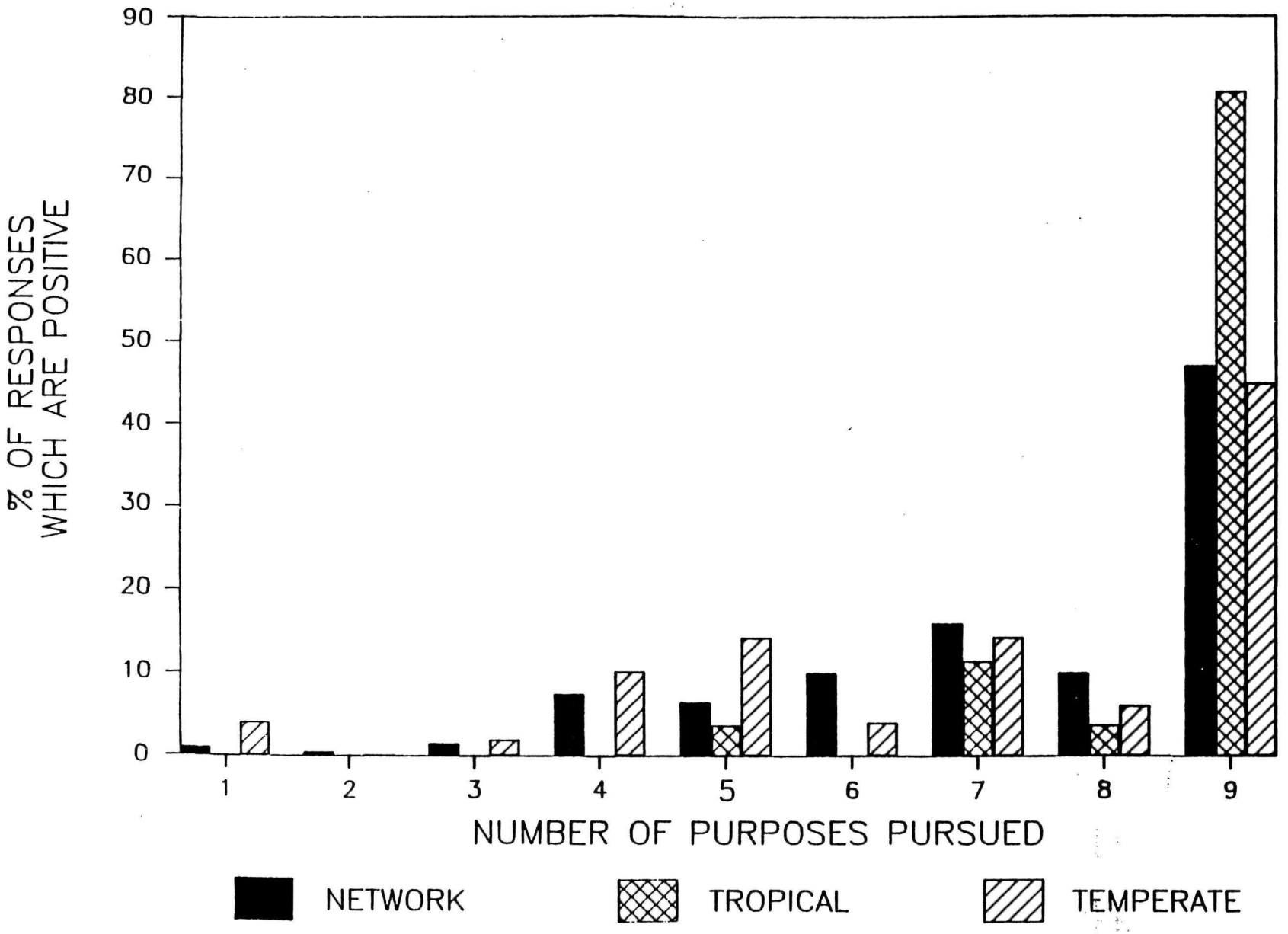
RANKING OF PURPOSES



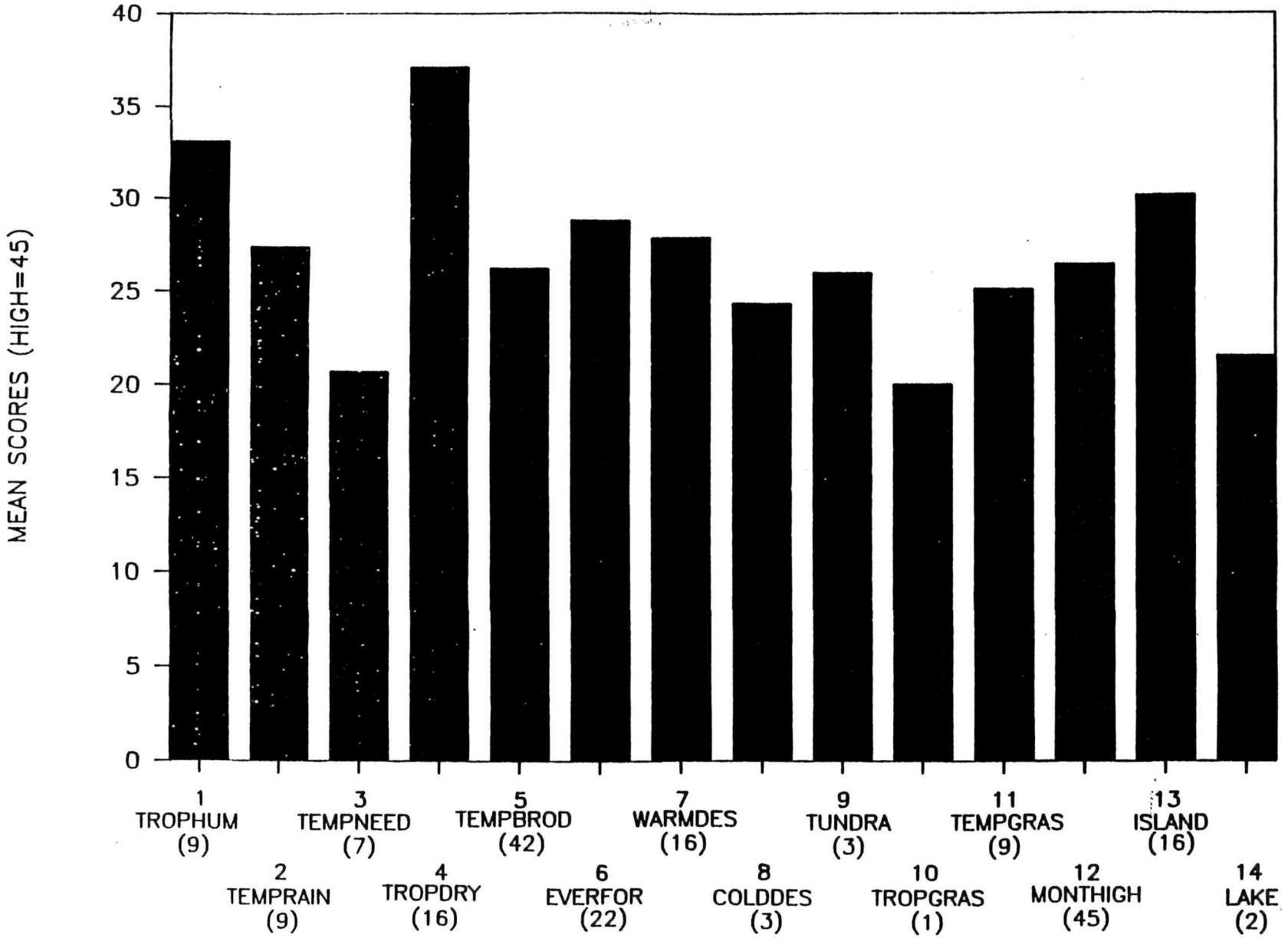
RANKING OF RESERVE PURPOSE CLUSTERS



AVERAGE NUMBER OF PURPOSES PURSUED



AVERAGE TOTAL PURPOSE SCORES BY BIOME



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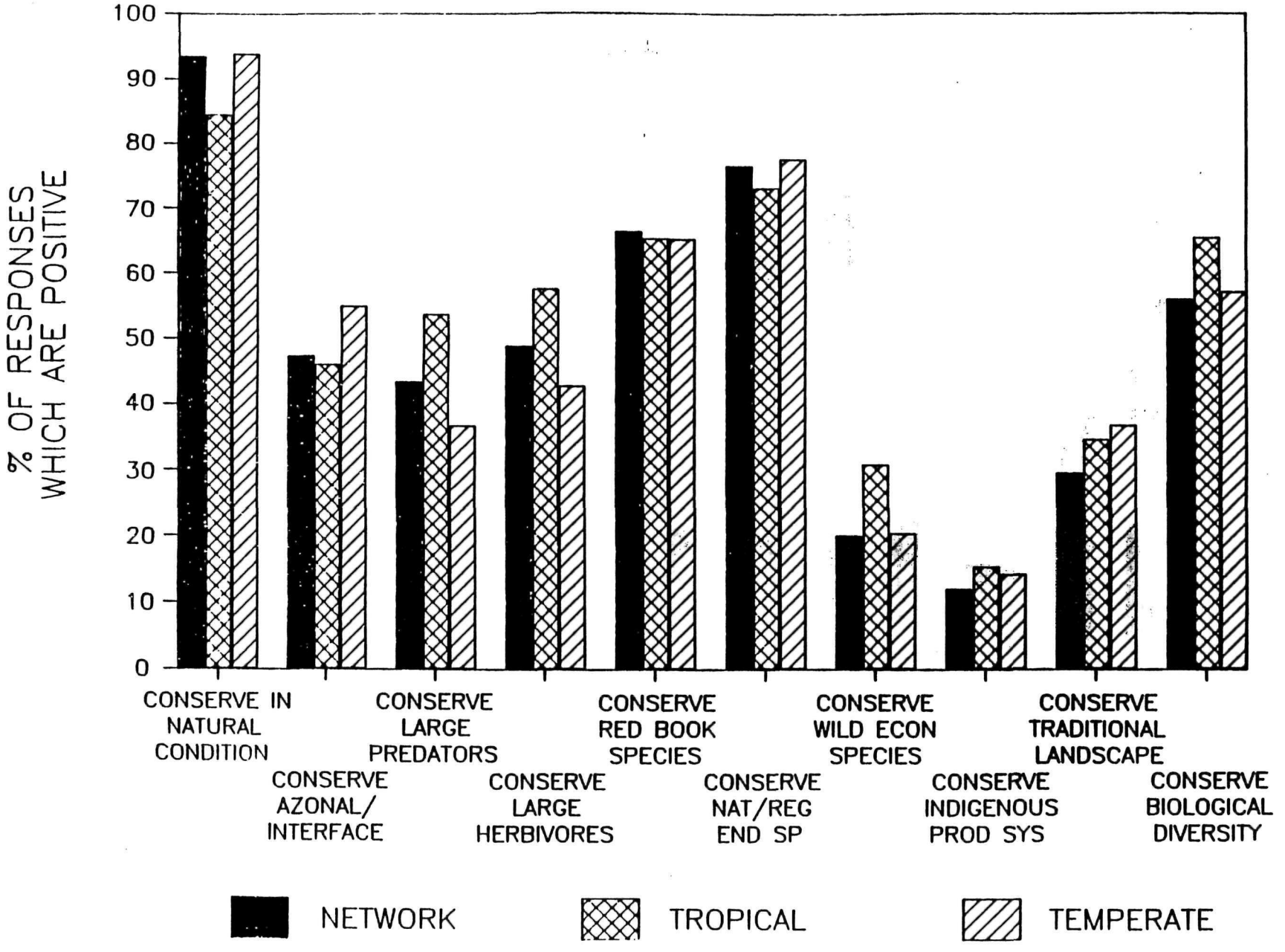
CONSERVATION PURPOSES



D. STATUS OF THE CORE AREAS

Because core areas are indispensable to the conservation and scientific functions of biosphere reserves, their status is a critical consideration in assessing the status of the network. UNESCO guidelines require that each biosphere reserve must contain one or more securely protected, strictly regulated, and minimally disturbed core areas. Slightly more than three-fourths (78%) of the sites presently report this desired condition (Fig. D.1). The remoteness of the core area is reported by about 38% of the sites as a key factor in ensuring protection.

About half of the sites report that the core area(s) contains one or more complete catchment basins, and thus is potentially suitable for ecosystem studies requiring complete watersheds.

In about half the sites (49%), one or more core areas coincide exactly with the boundary of a national park or other previously protected area, while in about 38% the core area(s) covers only part of a previously protected area. Because most protected areas contain developments and areas of human uses which should be excluded from core areas, the large percentage of coincident boundaries may indicate a need for reevaluation of core area boundaries to include only areas which meet established criteria. The fact that 29% of the sites report fishing or shellfishing and 22% report hunting or trapping, which are potentially incompatible with the purpose of core areas, also points toward this need (Fig. D.2).

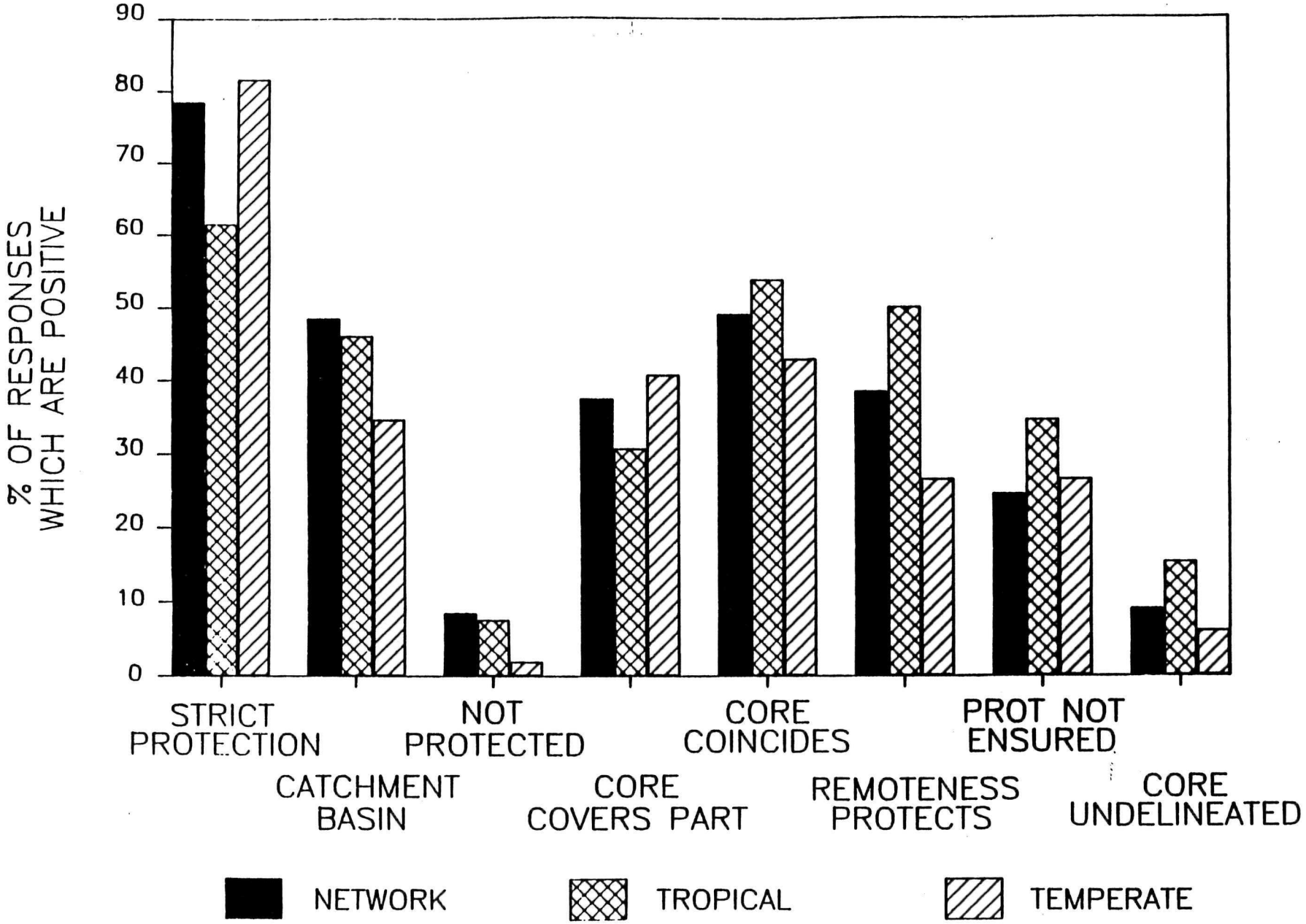
Scientific and educational activities are widely reported in core areas, including, in order of importance, ecological observation (93% of reporting sites), environmental monitoring (80%), environmental education (72%), plant collection (53%), and professional training (43%). Nearly half the core areas (49%) are used for at least some forms of public recreation, which most likely is due to the fact that the majority of the existing core areas are in national parks or equivalent reserves where providing environmentally compatible public recreation is an important objective. Although low intensity recreational activities may be compatible with core area objectives, the data suggest that recreational uses (as well as hunting and fishing, mentioned above) may warrant careful monitoring and evaluation in many core areas.

For the most part, biosphere reserves take advantage of existing legal and administrative protection. However, for 8% of the sites, the core area was not already protected when the biosphere reserve was established, suggesting that the designation may have been instrumental as a basis for improving protection. Sites reporting this condition may be worth further evaluation to determine whether, and how, biosphere reserve designation has influenced protection. About 9% of the sites

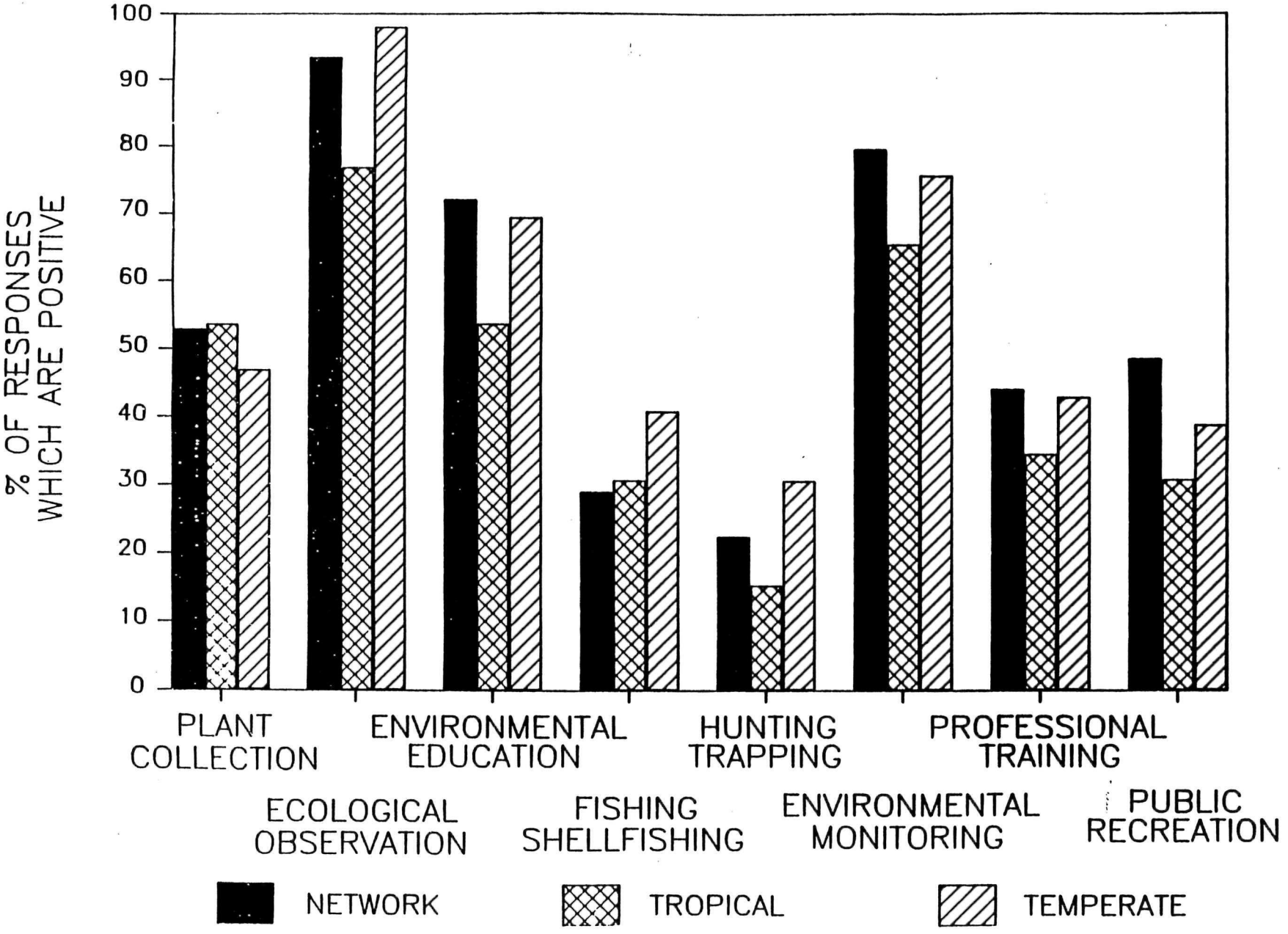
have not yet recognized a core area, and about 8% report that the protection of the core area cannot presently be assured.

Differences between reporting sites in the temperate and tropical biome subgroups are considerable, and appear to reflect differences in the protection and management capabilities of temperate and tropical countries. The temperate biome core areas are somewhat less likely to coincide exactly with a previously protected area, perhaps reflecting more attention to MAB zonation. Strict protection and regulation appears to be better assured in the temperate subgroup (82% vs 62%). Protection of the tropical biome core areas is more likely to be assured largely by remoteness (49% vs 27%). Tropical sites are somewhat more likely to include complete catchments (47% vs 35%), perhaps reflecting the greater percentage of small sites in the temperate subgroup. The tropical subgroup is much more likely not to have recognized the core area (16% vs 7% have not done so). In contrast, designation seems to be much more likely to be associated with de novo protection of core areas than in the temperate subgroup (7% vs 2%).

STATUS OF CORE AREAS



ACTIVITIES OCCURRING IN CORE AREA



E. STATUS OF BUFFER ZONES AND TRANSITION AREAS

Buffer zones and transition areas are important components of the biosphere reserve landscape which provide the geographic context for developing knowledge, skills, and attitudes to sustain harmonious human uses of ecosystems.

Buffer zones normally adjoin or surround core areas. They should be strictly delineated, and, with the core areas, frequently correspond to a national park or other established protected area. Human uses are regulated so as to ensure protection of the core area. Buffer zones are frequently used for experimental research, demonstration, and training to provide the knowledge and skills needed to develop and sustain harmonious uses. Although not required for designation, the inclusion of delineated buffer zones is strongly encouraged.

The questionnaire lists several possible conditions of the buffer zone (Fig. E.1). About 80% of the sites report the presence of a buffer zone. In somewhat less than half the sites (45%), the buffer zone illustrates the optimal condition: it is managed by the same administrator as the core area(s) and is subject to specific restrictions on allowable uses. In about 15% of the sites, the buffer zone is delineated and regulated, but is managed by a different administrator from the core area. In another 15%, the buffer zone is an undelineated area supporting limited human use. Although the questionnaire did not specifically reference regulation in this type of buffer zone, uses of such buffer zones presumably are minimally regulated and the biosphere reserve is largely self-buffering by virtue of the lack of substantial human activity in the vicinity of the core area.

About a tenth of the sites are cluster biosphere reserves, including a mixture of core areas, surrounded by an undelineated buffer zone containing one or more experimental research or management units.

There are considerable differences in the status of buffer zones between the temperate and tropical biome subgroups. The temperate biome sites are twice as likely to have a buffer zone under a different administrator from the core area (27% vs 11%), possibly reflecting the complexity of management systems in temperate zone countries. The sites in this subgroup are also more likely to lack a delineated buffer zone altogether (27% vs 16%), possibly a reflection of a larger proportion of national parks and nature reserves designated in their entirety (and, in many cases, probably inaccurately) as core areas in the temperate biomes. In the tropical biome sites, the buffer zone is more than three times as likely to be undelineated, providing "buffering" as a result of limited human activity. The "cluster concept", originated in the temperate broadleaf forest biome, is reportedly being utilized as a basis for building biosphere reserves in the tropical biomes. In fact, the proportion of cluster biosphere

reserves in the tropical biomes is about twice that of the temperate biomes (15% vs 8%), although the actual number of sites is equal in both subgroups (4).

The transition area, which surrounds the core area(s) and buffer zone(s), completes the biosphere reserve landscape. Usually not delineated, the transition area typically contains a wide range of representative human uses and activities. It is the focus of voluntary cooperation to demonstrate harmonious integration of conservation with culturally, technologically, and institutionally appropriate economic development. Its limits are more biogeographic and cultural than administrative; its boundaries are typically open and vary in space and time depending on the cooperative activities taking place. Figures E.2 and E.3 provide an overview of human uses and activities occurring within the transition area as it presently exists, or, if a transition area is lacking, within a few kilometers of delineated core areas and buffer zones. The number and importance of these uses and activities provide an indication of potential threats to regional biological diversity on the one hand, and, on the other, opportunities for cooperation in developing the basis for sustainable ecosystem uses. Data are reported in terms of average importance ratings, on a five-point scale, for the network as a whole and for the temperate and tropical biome subgroups. Higher ratings indicate greater dominance or significance in the region and more important effects on the value of the biosphere reserve for conservation and research.

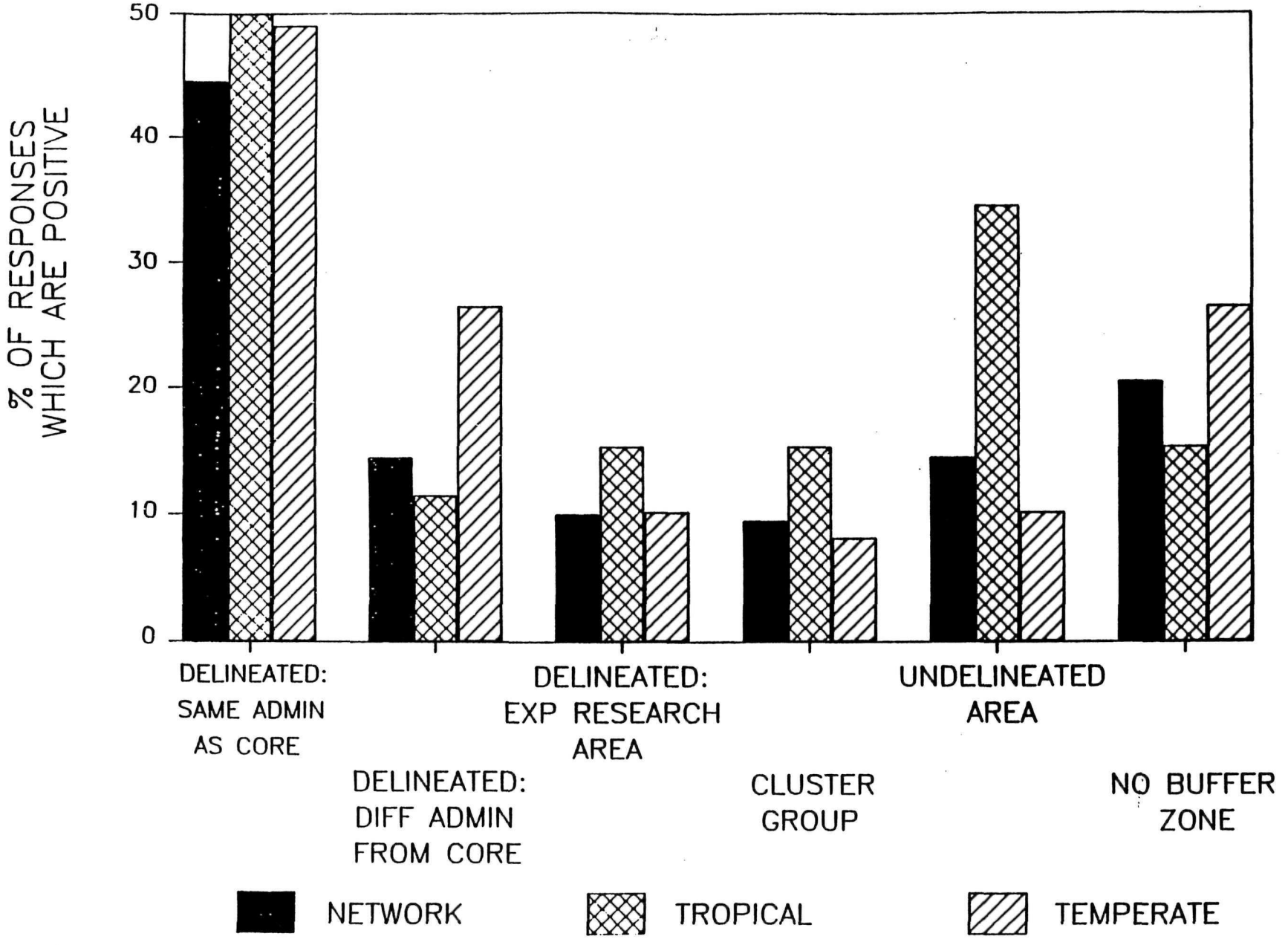
In order of decreasing importance, agricultural uses (reported by 72%), grazing (69%), hunting (65%), recreation (71%), tourism (64%), timber cutting (55%), and agroforestry projects (47%), are the most important uses and activities with an average rating between 2.5 and 1.5. These uses and activities generally also occur in the vicinity of the greatest number of the biosphere reserves (percentages of reserves indicated above in parentheses). The results reflect the strongly rural nature of the network. Less important uses and activities, with a average rating between 1.5 and 0.5, are, in order of average importance scores, fishing (reported by 27% of sites), transportation facilities (50%), water development projects (35%), subsistence activities (39%), poaching (47%), residential development (40%), land conversions (28%), dredging (51%), industrial development (30%), and urban centers (28%). Uses of low average importance (rating <0.5), occurring near relatively few sites, include mining (19%), oil and gas development (13%), shoreline stabilization (13%), and marine products/aquaculture (12%) - the latter two possible only in coastal and marine sites, which are underrepresented in the network. Uses and activities with lower average ratings are invariably of major importance in certain sites.

Differences between the temperate and tropical subgroups are substantial. Average scores for 13 of the 22 listed uses are higher in the temperate subgroup and more than twice as high for

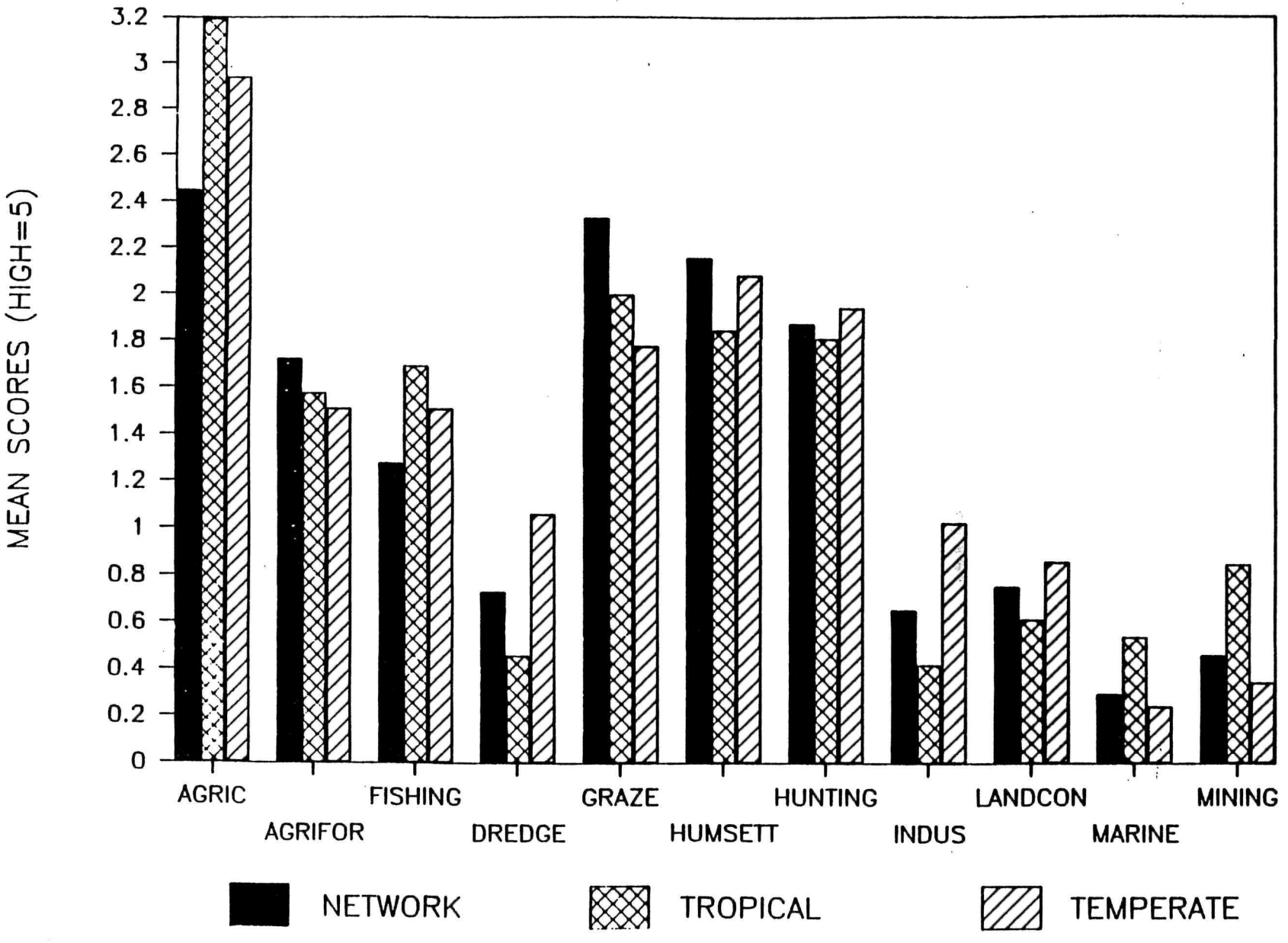
urban uses, i.e. residential development, transportation facilities, urban centers, industrial development, and dredging. Tourism, water development projects and regional land conversions are also somewhat more important in this subgroup. The ratings underscore the importance of cooperative regional planning to integrate these sites into the surrounding urbanizing landscapes, as well as the potentially serious implications for conservation of the current lack of emphasis on the planning and development role (Figs. E.2,3). The tropical subgroup reported ratings nearly four times higher for subsistence activities and twice as high for poaching - each of which occurs in most of the sites. These activities are reported as only moderately important in the network as a whole. The ratings indicate the particular challenges and opportunities for integrating local people into biosphere reserve programs in tropical biomes. The tropical subgroup also reports ratings about twice as high for mining and marine uses, although relatively few sites reported these uses. Only small differences between the subgroups are reported for agriculture and agroforestry, grazing, timber cutting, hunting and fishing, human settlements, oil and gas development, and shoreline stabilization. Most sites report a considerable range of uses and activities in the surrounding area. Of the 22 listed possibilities, 96% of the sites report one or more, 82% of the sites report five or more, 45% report ten or more, 18% report fifteen or more, and 4% report 20 or more, with the maximum at 22. Only nine sites, or nearly 5%, reportedly are not influenced by any of the listed uses and activities. The latter sites may deserve particular consideration in developing baseline ecosystem monitoring programs.

The results indicate great variability, and often complexity, in the types and levels of uses and activities occurring in the larger ecosystems in which the sites are located, and the importance of tailoring scientific and educational programs to particular conditions prevailing at each site.

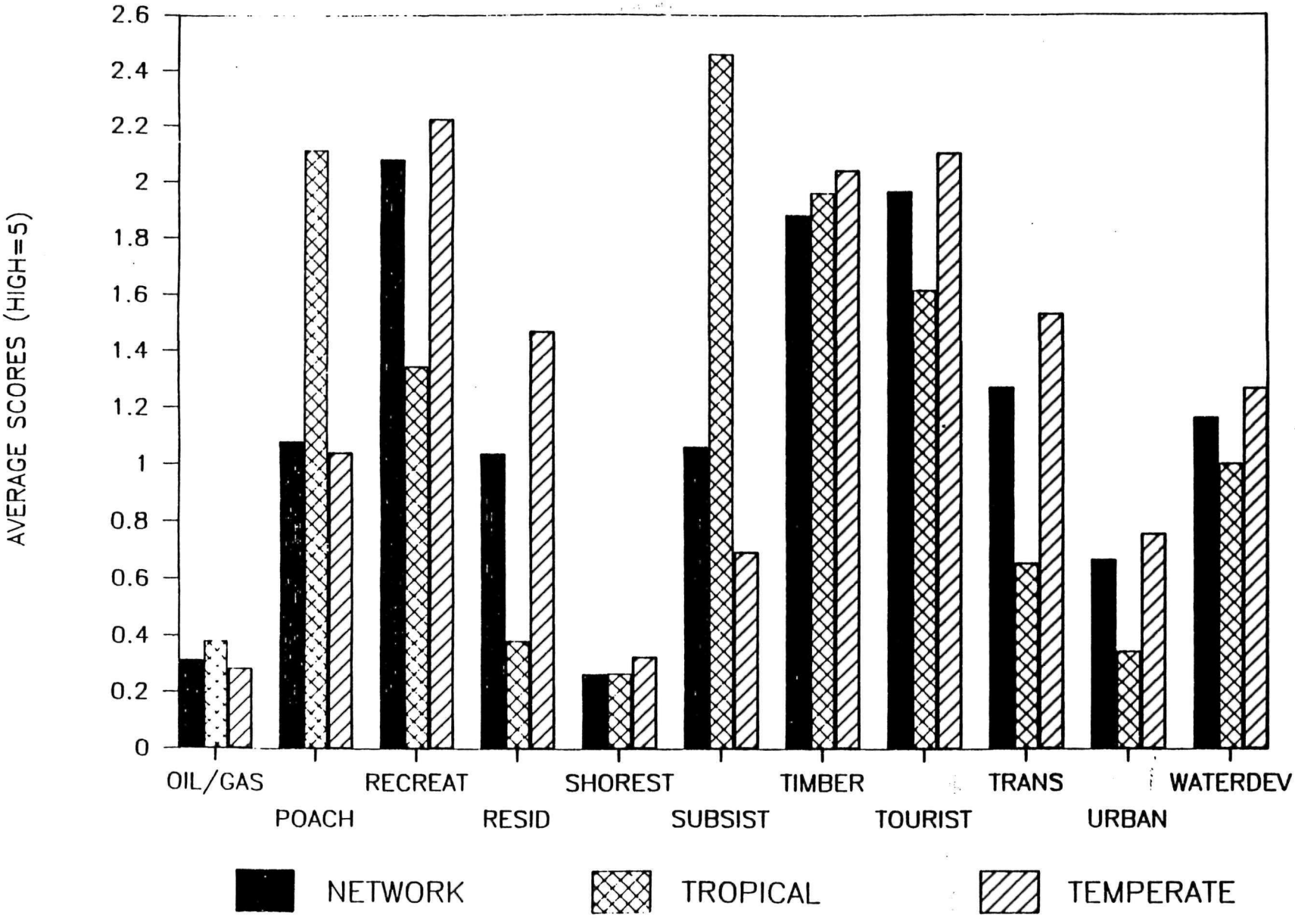
BUFFER ZONE STATUS



ACTIVITIES IN TRANSITION AREAS: PART I



ACTIVITIES IN TRANSITION AREAS: PART II



F. MANAGEMENT AND ADMINISTRATION

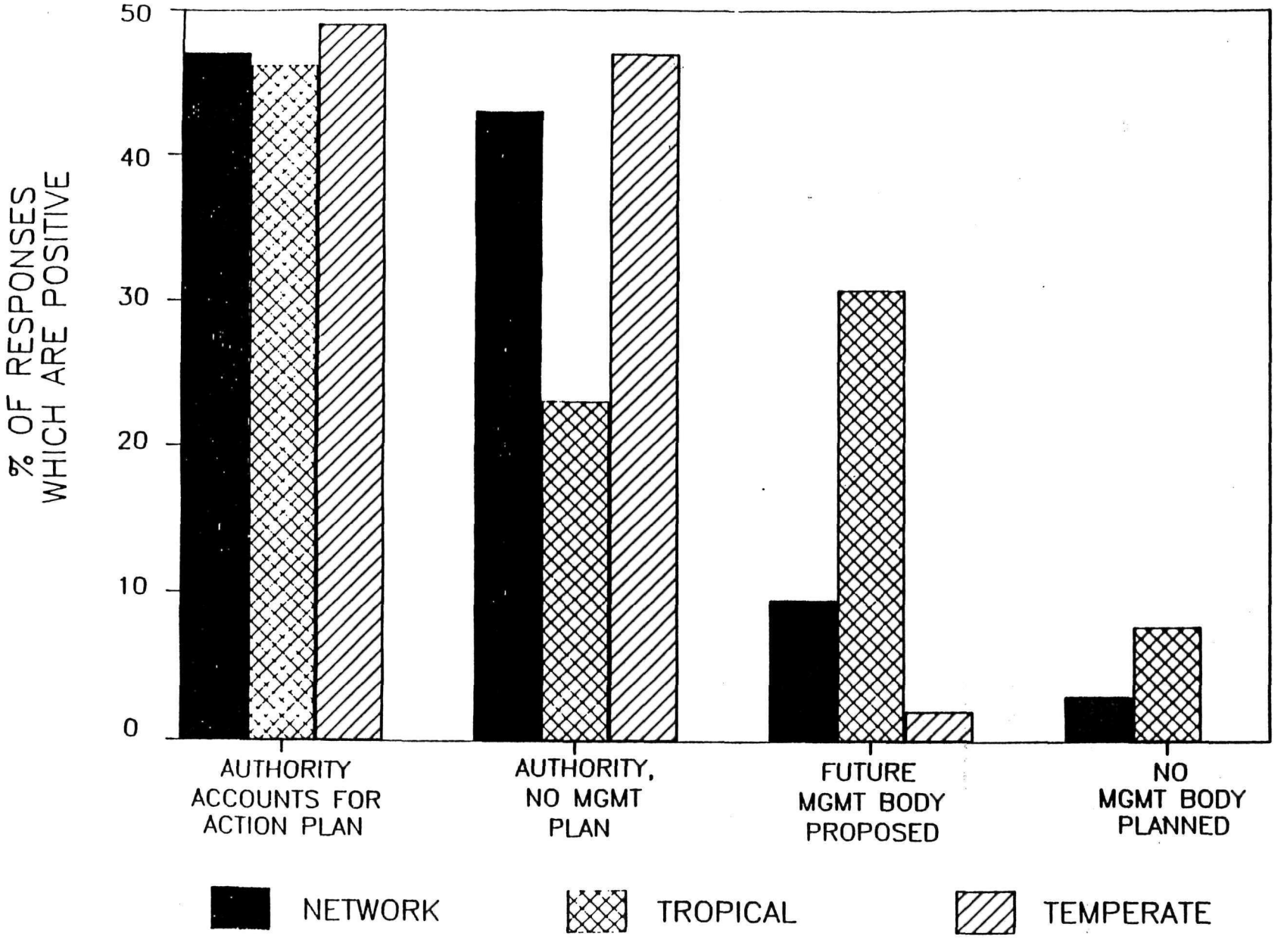
Nearly 47% (94 units) of the reporting reserves indicated that an on-site management authority both exists and is implementing a management plan which considers the Action Plan objectives, while there is no significant distinction between tropical units and temperate units. Approximately 43% of responding units report that while on-site management authority exists, there is no management plan in effect (23% of tropical units report no management plan while 48% of temperate units report no plan). Approximately 9% of the network, 30% of the tropical units and 3% of the temperate units indicated that no on-site management authority exists but will be set up in the near future. Only 4% of the reporting network (6 units) and 8% of tropical units reported that no management body is planned. These data are presented in Figure F.1.

Another possible indicator of the success of reserves is the number of linkages which reserves have to other organizations. 63 of the reporting units have links with 5 or more organizations, while 38 units have no links. Nearly 68% of the network reported having links with the MAB National Committee of the appropriate country, while 62% of tropical units and 77% of temperate units reported this association. The greatest number of linkages exist among network reserves and scientific institutions: 80% of the reporting units responded positively, again with similar dominance of temperate scores over tropical scores. Fewest linkages were reported between reserves and a) other domestic reserves (32%); b) botanical and zoological gardens (21%); and c) foreign reserves (13%), all with no significant differences between tropical and temperate units. These distinctions are represented by Figure F.2.

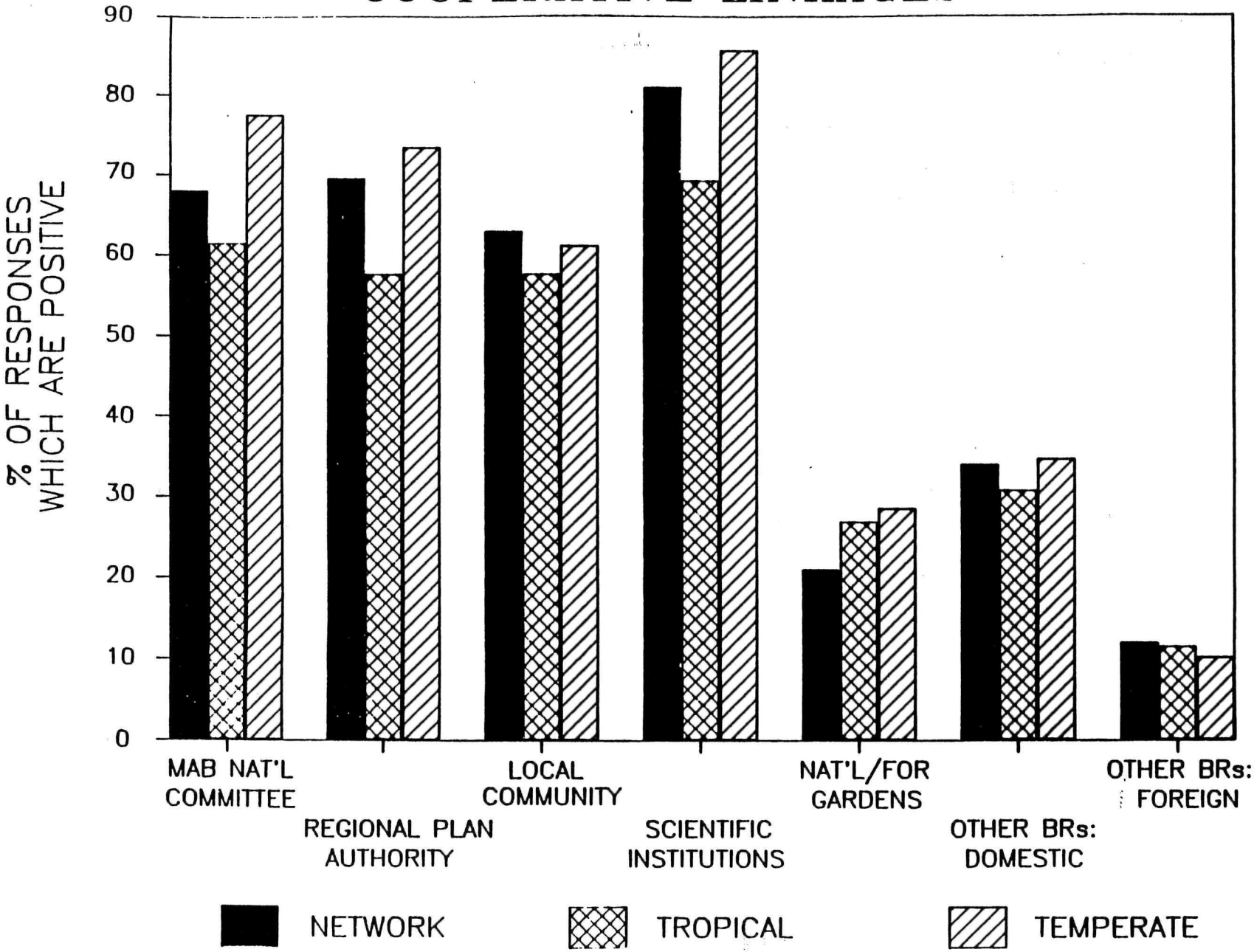
Individual reserves were surveyed to determine what events have taken place to make visitors and the local population aware of the status of the area as a Biosphere Reserve. 30% of the reporting network indicated that a dedication ceremony was held, 61% that entrance signs are in place, 32% that an on-site research station is in place, 46% that a brochure exists, 16% that some future recognition is planned, while 4 units indicated that no recognition activities are planned. 25 units reported at least 4 different types of recognition activities. This analysis is presented in Figure F.3.

Technical and financial support is received from a variety of national sources including a single central authority for the 200 reporting units (with no significant differences reported between tropical and temperate units). 37% of the reporting network receive from a variety of sources including a single authority, while 10% receive support solely from a local administrative authority. 20 units reported receiving no technical or financial support, while 10 reported receiving support from 2 or more sources. This analysis is presented in Figure F.4

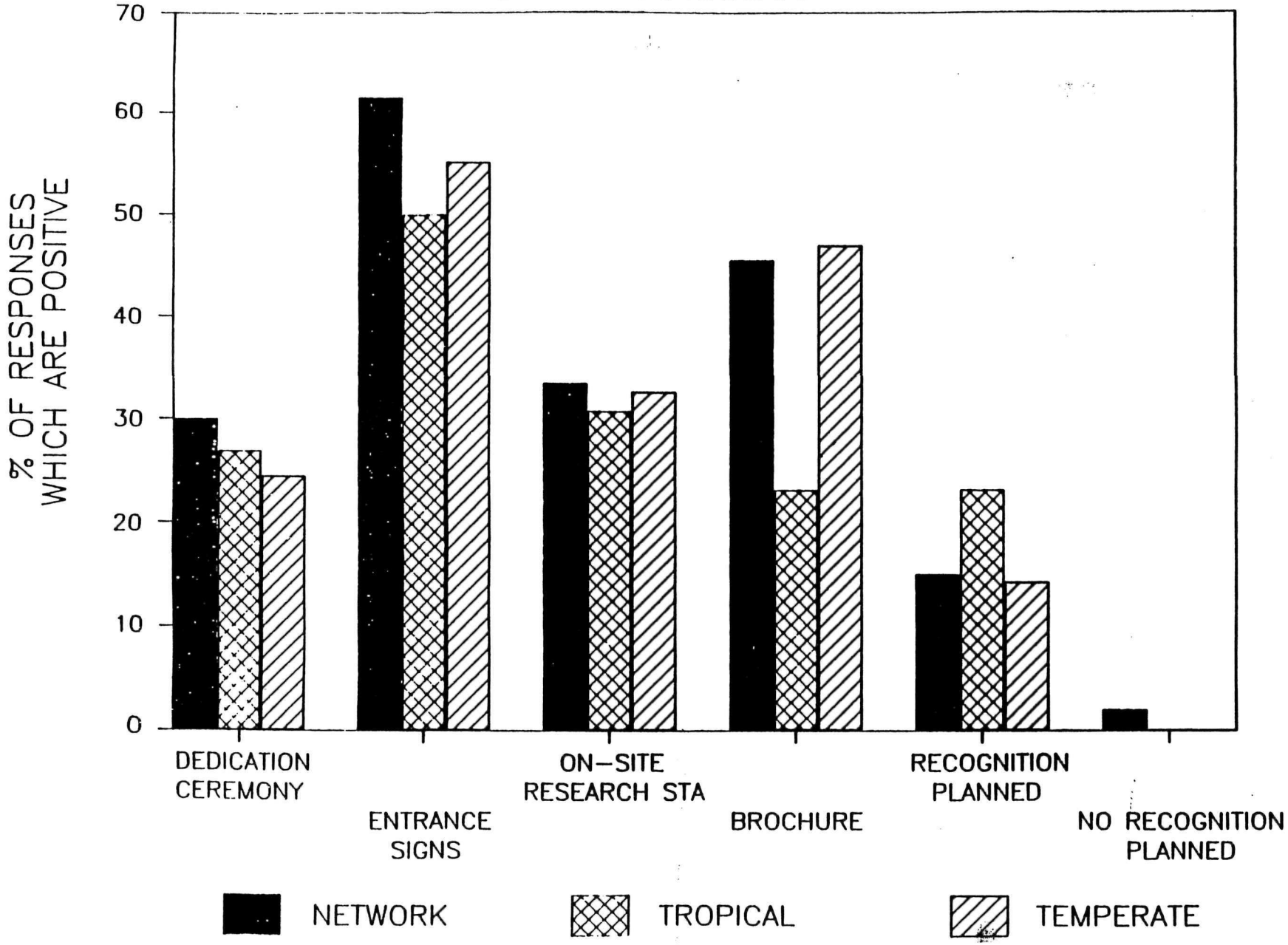
STATUS OF ON-SITE MANAGEMENT



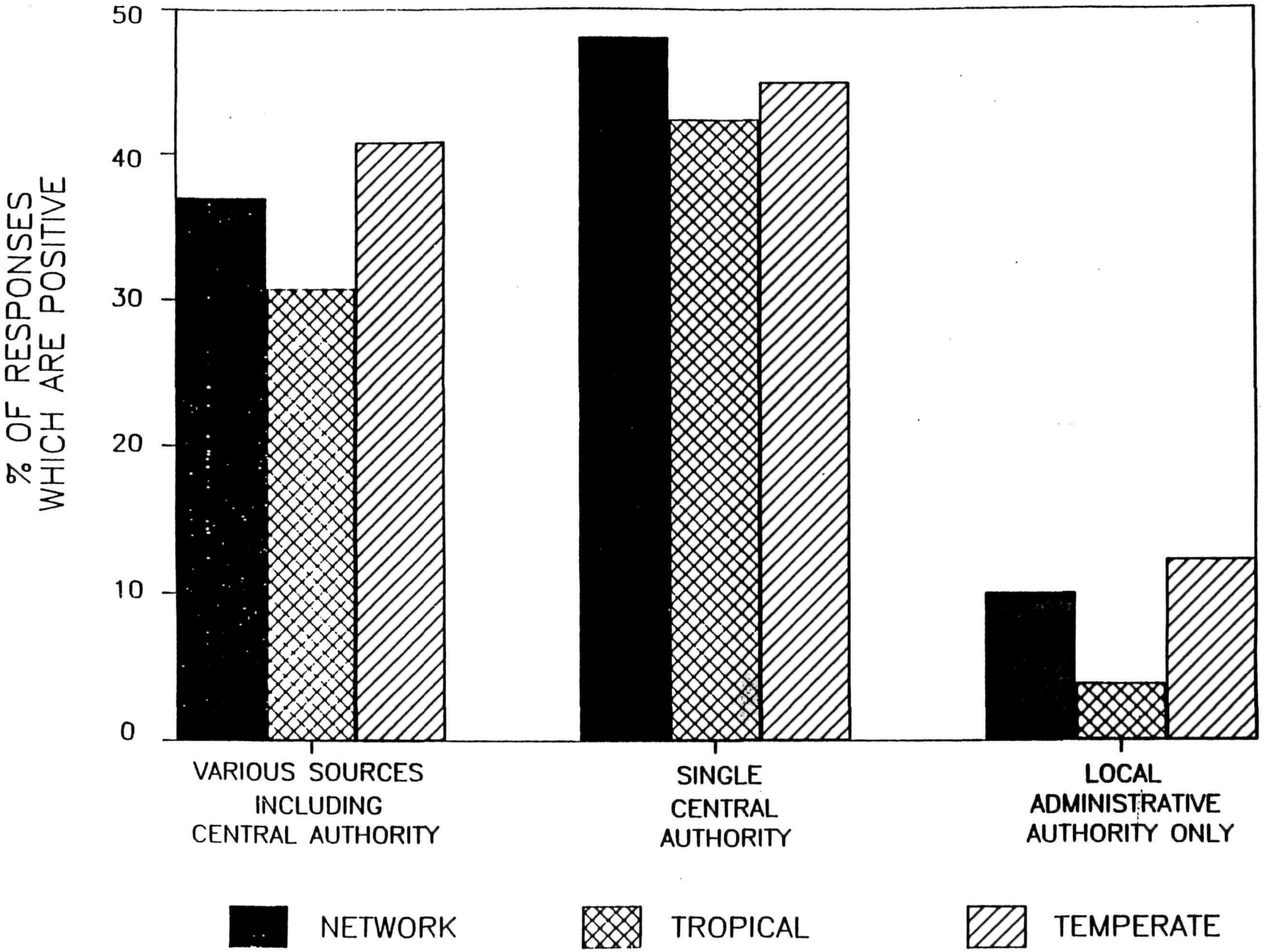
COOPERATIVE LINKAGES



RECOGNITION



TECHNICAL AND FINANCIAL SUPPORT



G. LOCAL POPULATION AND PARTICIPATION

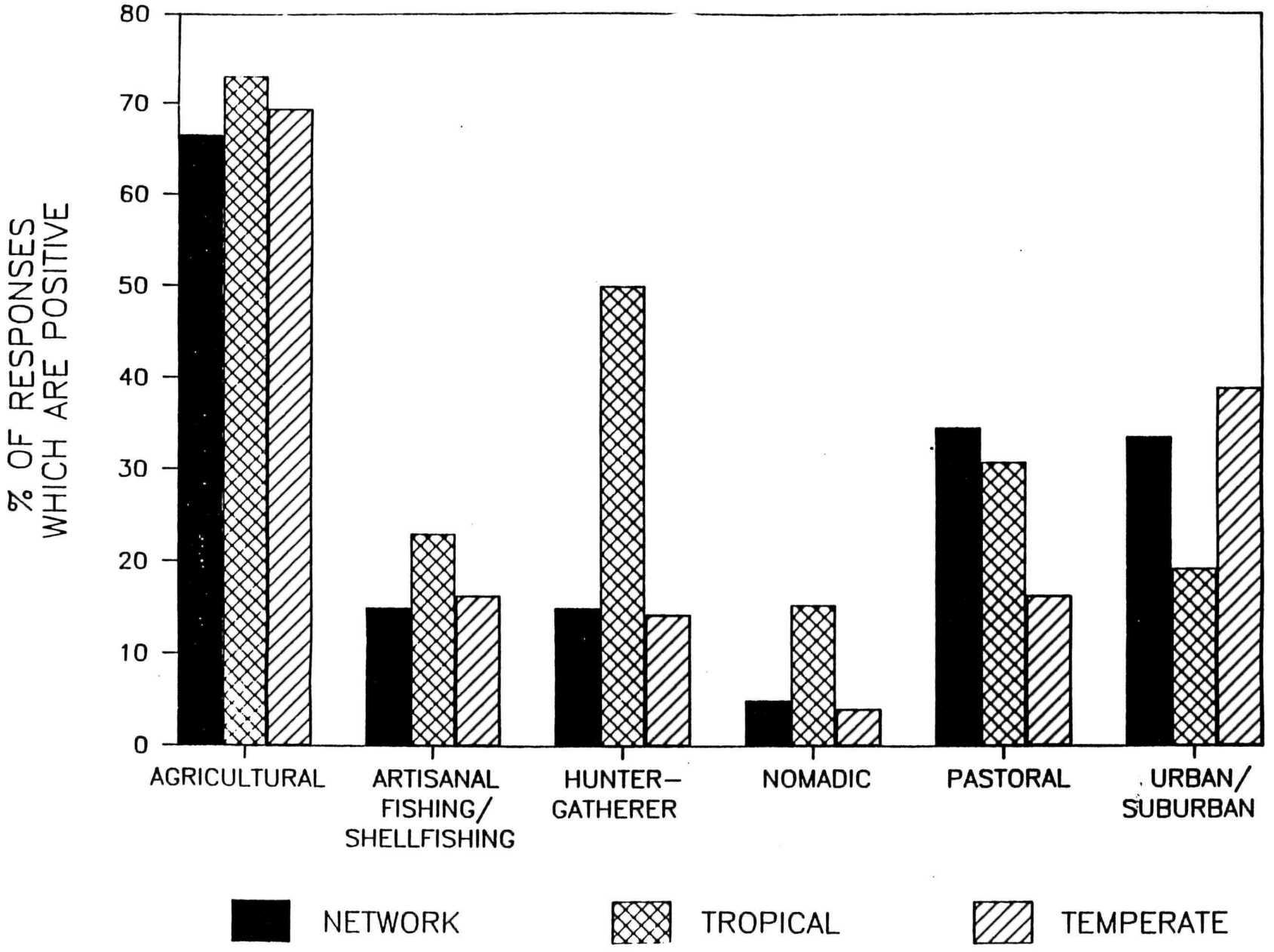
One possible criterion to judge the character of management problems of biosphere reserves is the type and density of population living in and around the reserve. Figure G.1 demonstrates the types of population reported. An agricultural population was reported most often (66% of the network) with little variation among tropical and temperate units. Pastoral cultures were reported to exist in the vicinity of reserves by 33% of reporting units, with a significant variation between tropical units (30%) and temperate units (16%). Urban/suburban populations follow in frequency, reported by 32% of the network, 18% of tropical units and 38% of temperate units. This indicates the potential for intensive development either adjacent to or within reserves located in densely populated areas. These findings may reflect a willingness of temperate cultures to set aside reserves in urbanizing. The three least reported population types include: artisanal (fishing/shellfishing) 15% of the network; hunter-gatherers: 15%, with a significant difference between tropical units (50%) and temperate units (14%); and nomadic cultures reported by 5% of the network, 15% of tropical units and 4% of temperate units. These findings suggest the importance of agriculture to adjacent populations, and therefore the need for reserve managers to integrate environmentally responsible agricultural practices into management plans. They also suggest the potential significance of urban and suburban development as possible threats to conservation and research efforts.

The distribution of permanent population which lives within individual reserve buffer zones varies from 200,000 to 0, and totals 840,000 for the 200 reserves responding to this survey. Three reserves have populations of more than 100,000; 2 have populations between 50,000 and 100,000; 11 between 10,000 and 50,000, 8 between 5,000 and 10,000, 14 between 1,000 and 5,000; 26 between 100 and 1,000, and 44 between 1 and 100. The average population per reserve buffer zone is highest for tropical dry forests (17,400: n=16), followed by evergreen forests (13,875: n=22). It is lowest for islands (675: n=16), lakes (200: n=2), tropical grasslands (1: n=1) and cold deserts (0: n=3). These data are displayed in Figure G.2.

Respondents were asked to identify potential benefits to people living in and around reserves. These results might be thought of as one possible indicator of the level of local support for reserves. A simple scoring system was used to judge relative magnitudes of benefits: for any category, if a benefit was classified as major, it was assigned a score of 2, and if minor, a score of 1. Total scores were then aggregated over benefit types within reserves, biomes, and types of biomes. While 25 reserves reported a benefit score of 25 or greater, 24 reported a unit score of less than 2.

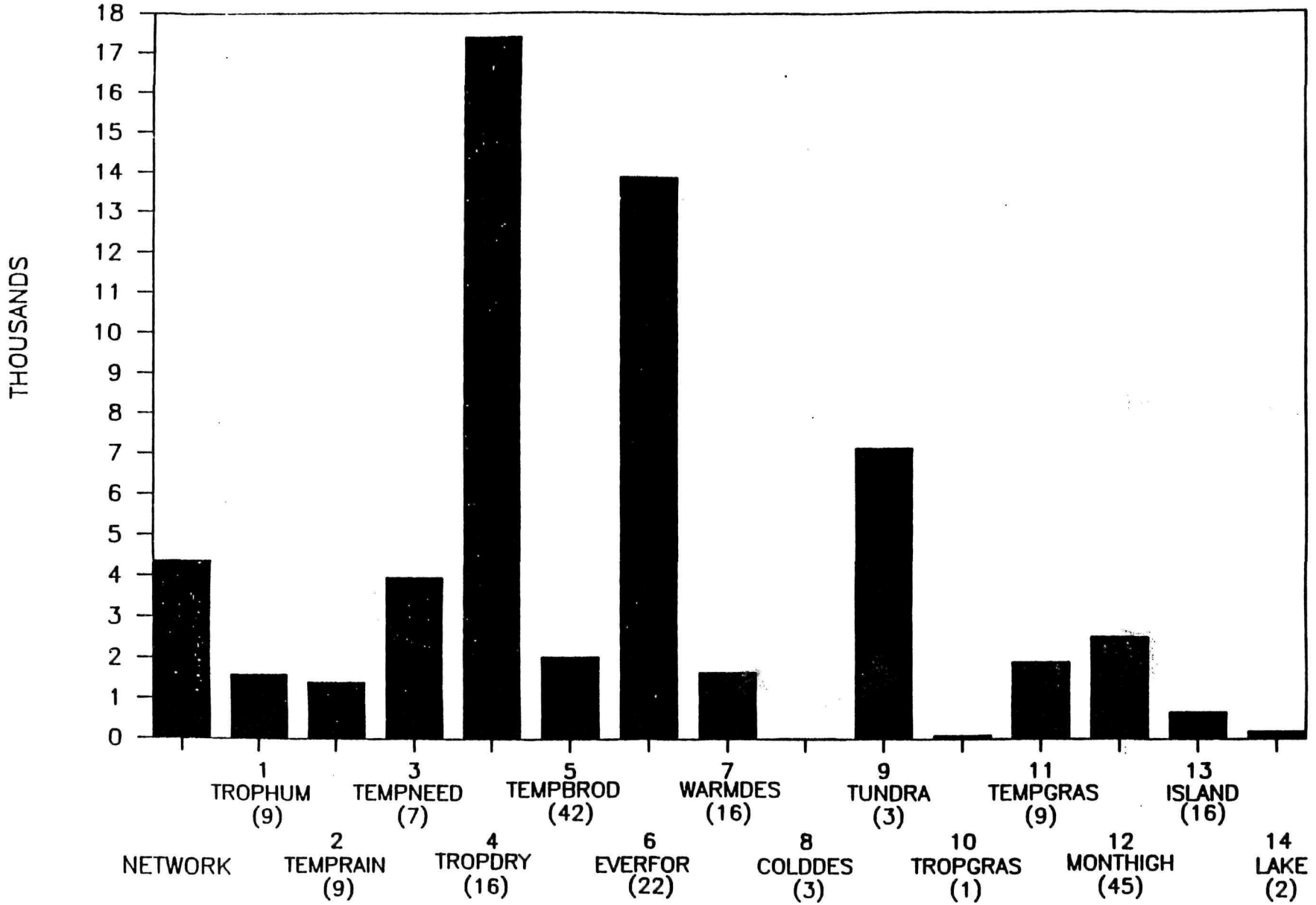
The distribution of reported benefits by type is displayed in Figure G.3. Soil and water conservation is perceived to be of highest relative benefit for the reporting network. This is remarkable as it implies a direct relationship between conservation and economic sustainability. Tourism and recreational opportunities follow closely in relative importance, as do educational and training opportunities and employment opportunities. In all of these cases the perceived benefits are judged to be higher for tropical reserves than for temperate reserves. Lowest benefits are associated with financial incentives, health and community services, and finally rural development assistance. These benefits are again generally believed to be somewhat higher in tropical units than in temperate units, the most notable example being that tropical reserves reported a value 4 times higher than temperate reserves for rural development assistance. It is possible that a strong local dependence on benefits associated with development or resource extraction could result in conflict with conservation objectives. It is notable that benefits associated with the extraction of renewable or non-renewable resources were not surveyed, and that the ranking of benefits was conducted not by the beneficiaries, but by individual reserve managers.

TYPES OF LOCAL POPULATION

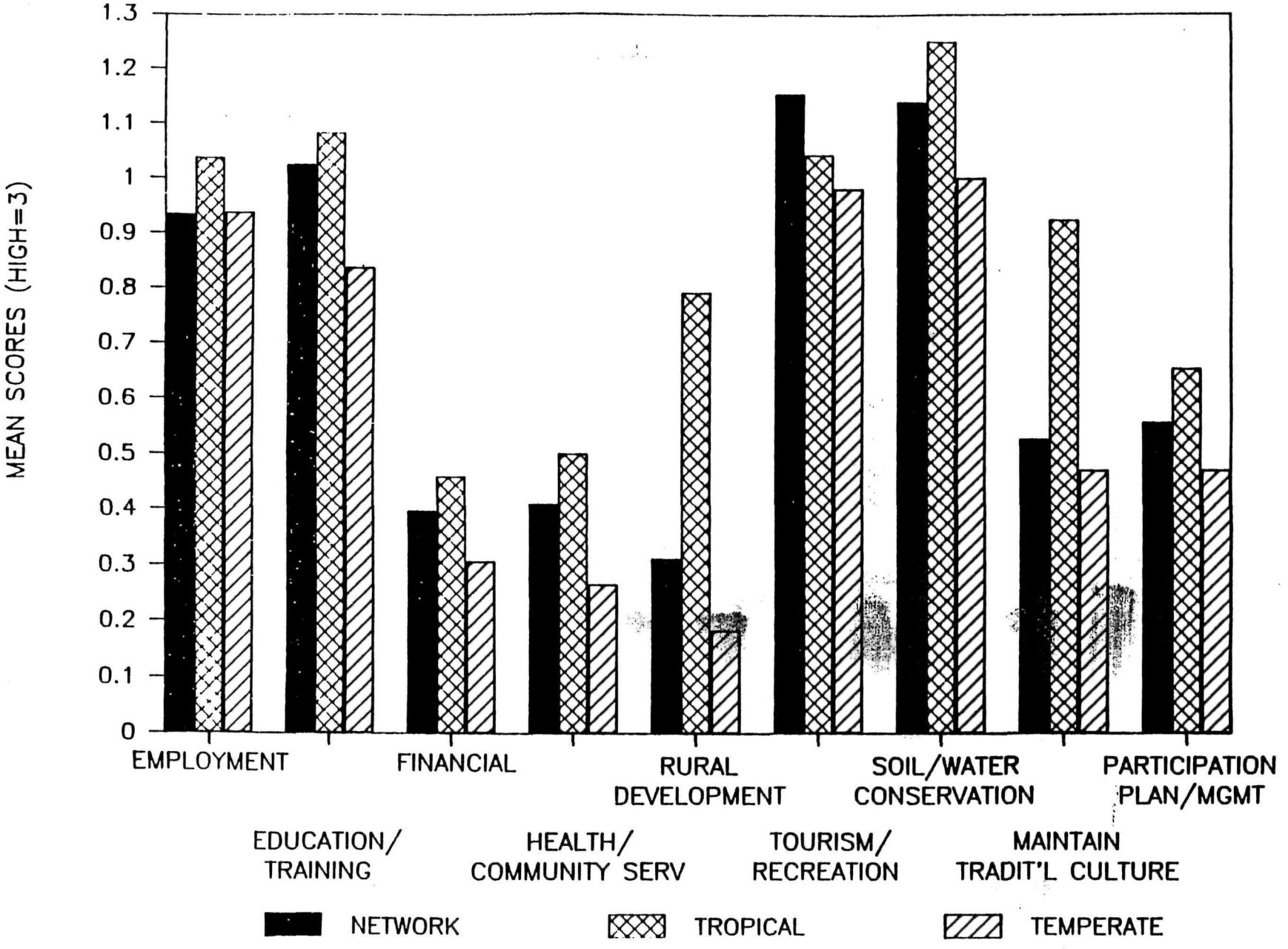


AVERAGE POPULATION WITHIN BUFFER ZONE

BY BIOME



LEVELS OF BENEFITS BY TYPE



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H. RESEARCH

Respondents were asked to characterize the nature of the research program in the biosphere reserve (Fig. H.1). The development of an integrated program of monitoring and research was mentioned as a primary function of biosphere reserves. About 55% of the respondents indicated that such a program of basic and applied research is in place, supporting both site management objectives and sustainable conservation in the region. Programs are more likely to emphasize applied (i.e. research focused on land use and management issues) than basic research. The development of the logistic role of biosphere reserves remains a major networkwide challenge. Only 22% of the sites report participation in comparative monitoring or research with another research site in the same biogeographical province, and only 12% with a site in another province. Although networking was more often reported by temperate biome sites, the differences between the groups were small.

The importance of UNESCO-supported projects is unclear. Although 18% of the sites report UNESCO MAB projects, many of these appear to be supported locally through National MAB Committees based on the descriptions provided. We do not believe that the questionnaire can be used to provide reliable information on participation in UNESCO-sponsored MAB pilot projects and comparative studies.

Although the majority of sites are placing strong emphasis on research, about 28% of the respondents reported that the site is used occasionally for research, but has no permanent monitoring and research program. This condition is more frequently reported for the tropical than the temperate biomes (38% vs 22%). A more comprehensive review of individual responses, and other information available for these sites, should be considered to assess possibilities for strengthening their scientific functions.

Two respondents (from Talamanca-La Amistad BR in Costa Rica and Bamingui-Bangoran BR in the Central African Republic) reported that the site has no research history and no monitoring and research program. However, both sites report a variety of ongoing and planned research activities. We therefore deleted the contradictory negative responses from the analysis.

Respondents were requested to indicate whether activity was existing or proposed for 31 research topics encouraged in biosphere reserves. Because proposed activities are contingent on many uncertainties, our analysis focuses only on ongoing activities as an indication of the status of research in the network. Figure H.2 reports the percentage of positive responses for one or more topics in each of seven categories, as follows:

Aquatic Systems, including the hydrological, limnological and hydrobiological research

Ecosystem Analysis, including comparative ecological research, and work on ecological succession, fire ecology, biogeochemical cycles, sedimentation, resource mapping, and ecosystem modelling

Ecosystem Restoration, including ecosystem restoration and mining reclamation studies

Environmental Pollutants, including acidic deposition, the effects of atmospheric pollutants, water pollutants, and pesticides

Sociocultural Systems, including cultural anthropology, ethnobiology, and traditional land use systems

Species Biology, including biological survey and collection, exotic species, pests and diseases, rare or endangered species, wildlife population dynamics, and genetic resources management

Sustainable Development, including appropriate rural technology, agricultural, forest, and rangeland research, recreation/tourism impacts, soil studies and conservation, and watershed management

Biosphere reserves are carrying out substantial research consistent with their unique scientific mission (Fig. H.2). The programs are strongest in traditional basic research areas of species biology (87% average positive response for one or more included topics) and ecosystem analysis (76%), as well as in applied research to support sustainable economic uses in intensively managed ecosystems (77%). Much less activity is occurring in aquatic systems (39%) and on environmental pollutants (38%), although both are well represented in the temperate biome subgroup (61% and 66% response, respectively), where many biosphere reserves are leading centers for limnological and hydrological research, as well as for integrated studies on the effects of anthropogenic pollutants generated by technological societies. Sociocultural research (and especially studies of traditional land use systems), although strongly encouraged in biosphere reserves, has the lowest representation of the major research categories. Nevertheless, the 28% average positive response for the three included topics (and the 34% response for the tropical biomes) suggests that these lines of research are being integrated into many research programs. A similar average response (33%) is reported for work on restoration of degraded ecosystems - one of the four priority research themes of MAB.

The below table provides a detailed summary of the percentage of sites reporting activity for topics under each research category.

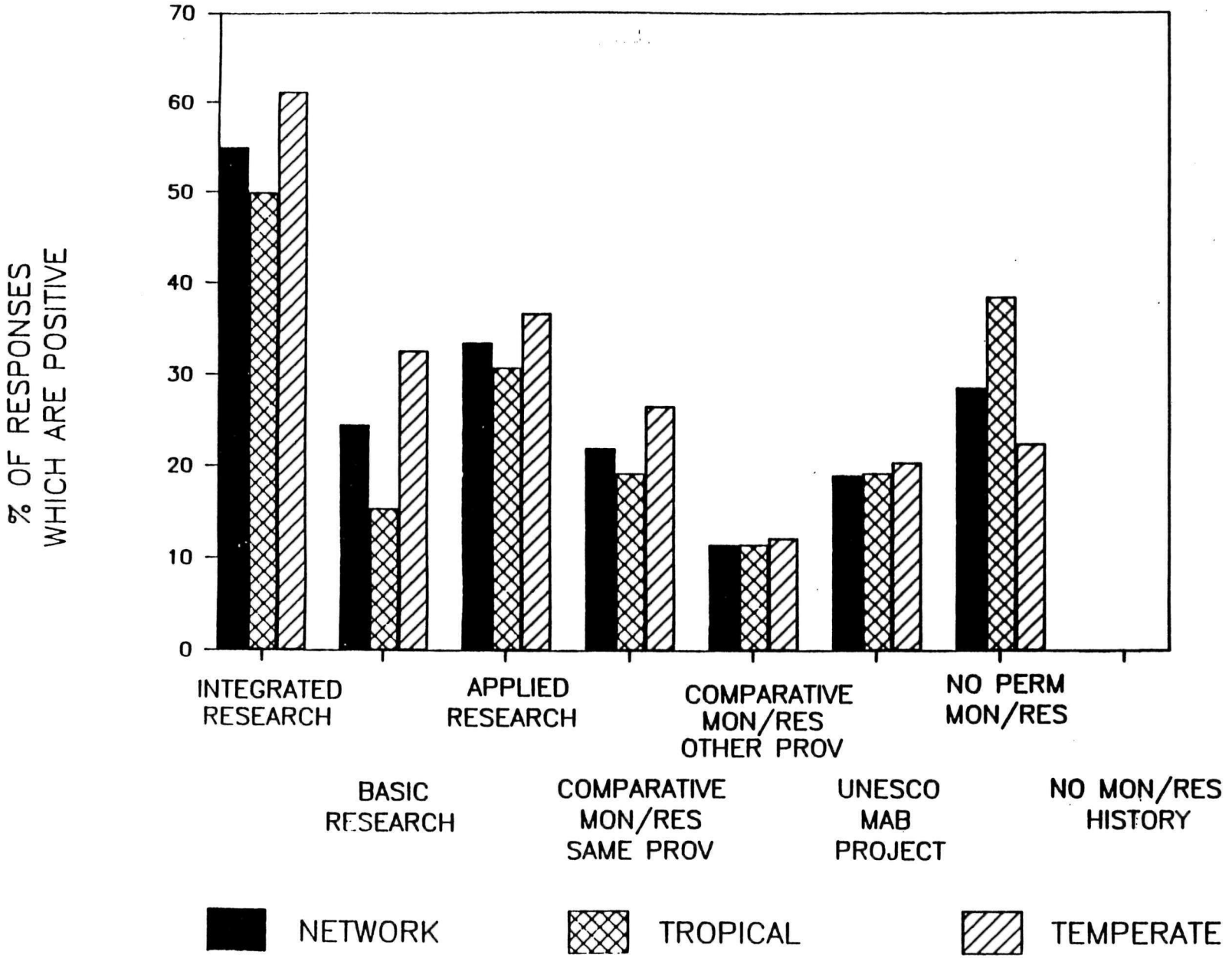
Table H.1 Ongoing Research (% Positive Response)

Category/Topic	Network	Tropical Subgroup	Temperate Subgroup
AQUATIC SYSTEMS			
Hydrological cycle	32	23	45
Limnology and hydrobiology	26	12	43
ECOSYSTEM ANALYSIS			
Biogeochemical cycles	25	15	37
Comparative ecological research	53	46	71
Ecological succession	52	50	63
Ecosystem modelling	25	19	29
Fire ecology	33	27	37
Resource mapping	48	27	61
Sedimentation	17	0	27
ECOSYSTEM RESTORATION			
Ecosystem restoration	32	23	41
Mining reclamation studies	3	4	4
ENVIRONMENTAL POLLUTANTS			
Acidic deposition	21	4	37
Eff. of atmospheric pollutants	20	4	41
Eff. of water pollutants	24	8	47
Eff. of pesticides	11	15	14
SOCIOCULTURAL SYSTEMS			
Cultural anthropology	17	23	14
Ethnobiology	10	27	8
Traditional land use systems	17	31	14
SPECIES BIOLOGY			
Biological survey and collection	76	54	88
Exotic species	19	12	22
Genetic resource management	21	23	20
Pests and diseases	26	15	31
Rare/endangered species	57	31	71
Wildlife population dynamics	55	38	65
SUSTAINABLE DEVELOPMENT			
Appropriate rural technology	9	12	10
Agricultural research	15	15	20
Forest research	44	31	49
Rangeland research	20	15	16
Recreation/tourism impacts	30	19	33
Soil studies and conservation	33	8	37
Watershed management	16	12	18

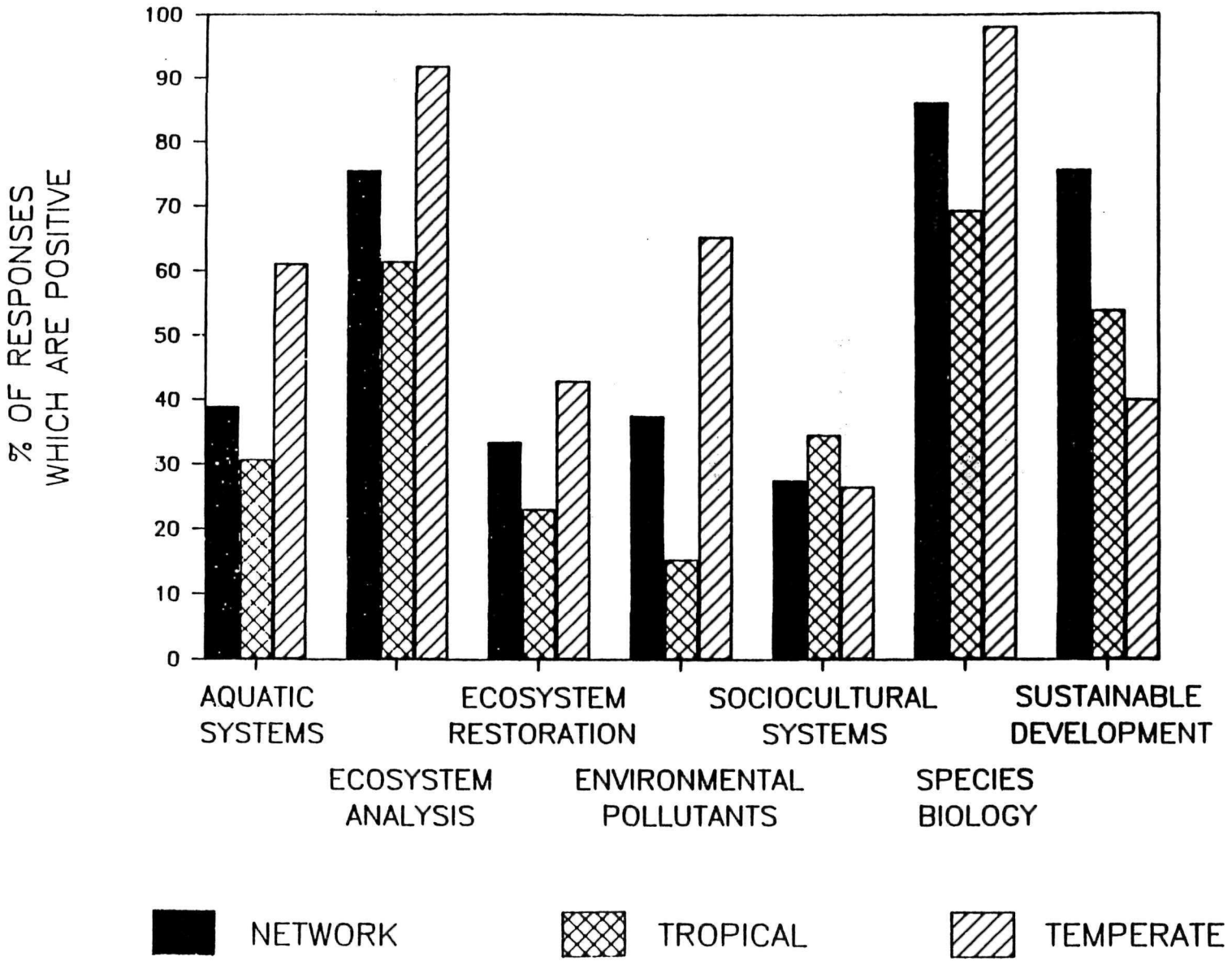
Nearly all biosphere reserves (93%) report at least one ongoing research activity; 73% report five or more activities; 43% report ten or more; 20% report 15 or more, and 5% report activity under 20 or more of the 31 listed topics. Three sites - the California Coast Ranges BR and the Great Smoky Mountains National Park BR in the U.S. and the Kavkazskiy BR in the U.S.S.R., each reporting 22 activities, have the most diverse research programs. Fourteen sites report no ongoing research activity.

Many biosphere reserve research programs are involving substantial numbers of domestic and foreign scientists. Figure H.3 reports scientific activity during the past year as indicated by the average number of domestic and foreign scientists participating in scientific activities in biosphere reserves in each biome. There was at least some international scientific exchange occurring during the past year in eleven of the fourteen biomes. Involvement of domestic scientists ranges from an average of three scientists per site in tropical dry forest sites to 48 scientists in temperate rainforest sites.

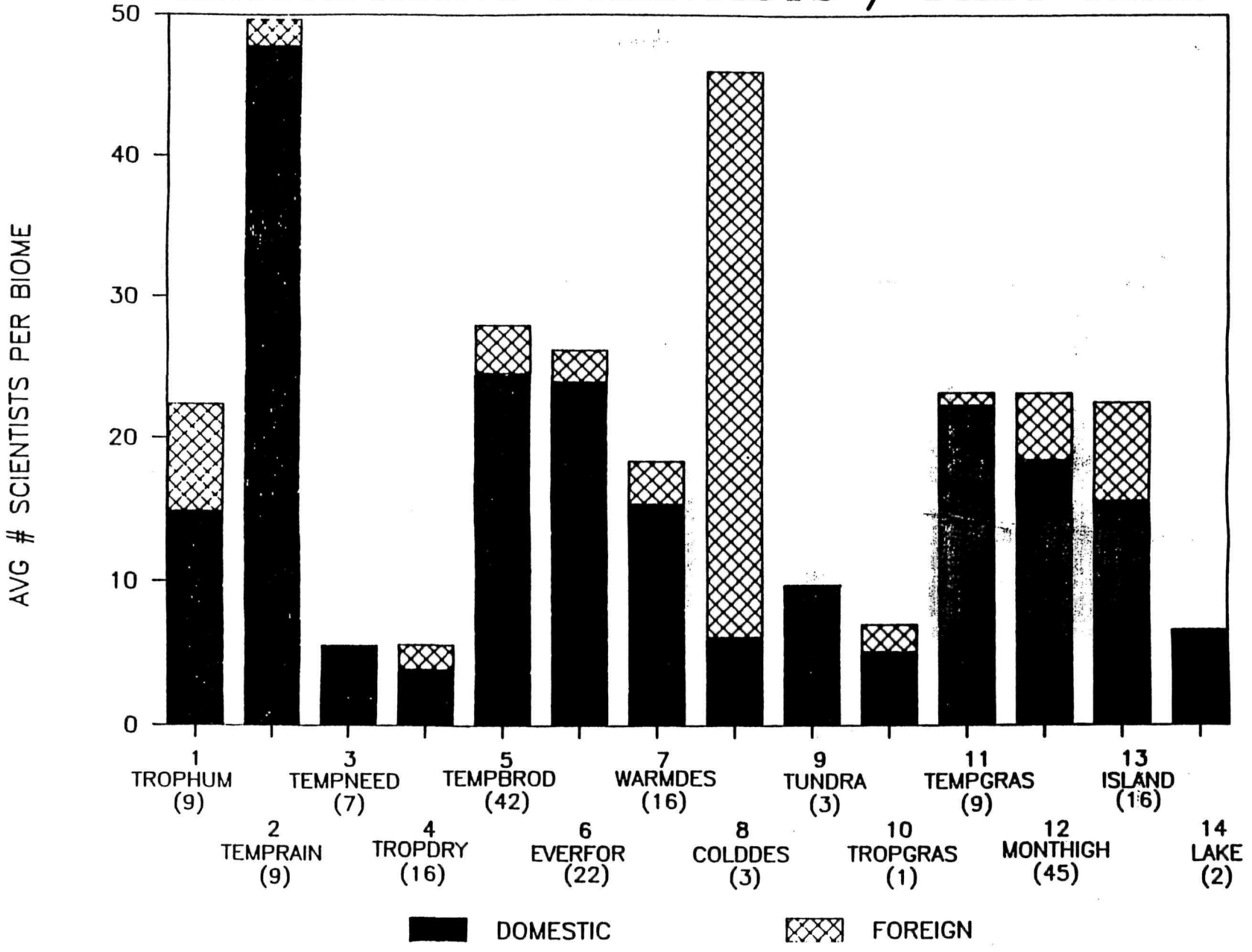
NATURE OF RESEARCH PROGRAM



ONGOING RESEARCH



PARTICIPATING SCIENTISTS / PAST YEAR

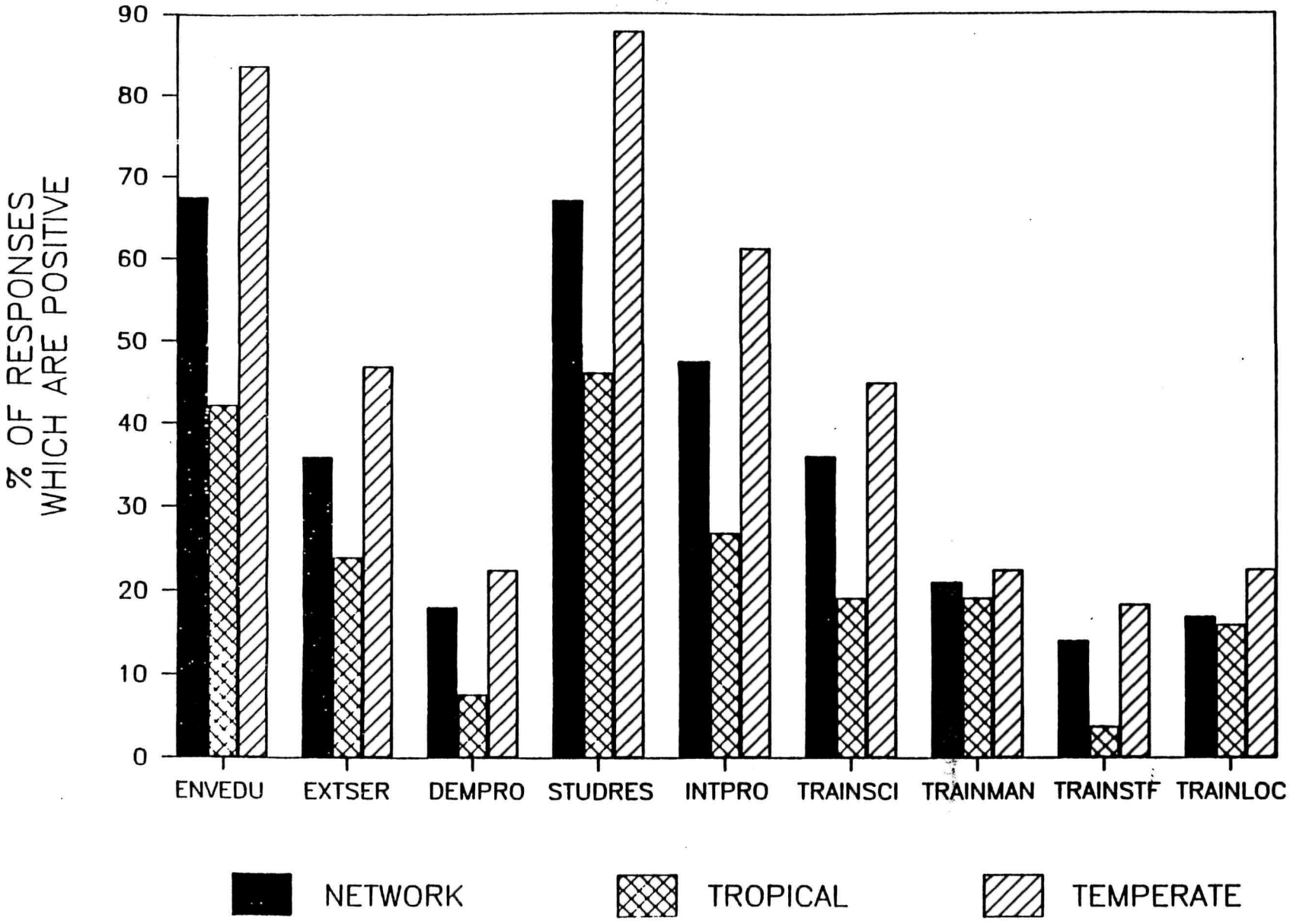


I. EDUCATION AND TRAINING

Education and training, or the distribution of knowledge, is a distinctive purpose of biosphere reserves and is a potentially significant benefit to local populations. Respondents were asked to indicate the types of educational and training projects which were on-going at the time of the survey and these results are displayed in Figure I.1. Environmental education for school children, and graduate and postgraduate student research are the two educational activities reported most often (68% of the reporting units responded positively). In both of these cases, tropical units reported programs less frequently (42% and 45% respectively) than temperate units (84% and 88% respectively). Interpretive programs for tourists were reported next most frequently (48% for the network, 27% for tropical units and 63% for temperate units). Professional training for scientists is the next most reported activity for the network (36% of responses are positive), again with significant disparity between tropical reserves (20% positive) and temperate reserves (47% positive). Training of resource managers and reserve staff ranked relatively lower for the network (21% and 16% respectively).

Three questions explore direct benefits to the local population. Only 35% of the network indicated that extension services are provided for local people, with 23% of tropical units and 46% of temperate units reported positively. Only 18% of the reporting reserves have demonstration projects in land use and management in place, again with significant disparity between tropical reserves (7%) and temperate reserves (22%). Finally, only 17% of the reporting reserves train local people in biosphere reserve concepts and management, with little significant difference between tropical and temperate units. Together these responses indicate an educational emphasis on traditional scientific research, with considerably less emphasis on applied research which might educate local populations in environmentally sound resource management practices.

EDUCATION & TRAINING



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J. ON-SITE STAFF AND FACILITIES

Research and educational programs in biosphere reserves require considerable infrastructure and facilities. Most biosphere reserves report at least some infrastructure to support research. Between half and two-thirds of the sites report lodging for visiting scientists (54%), conference/meeting facilities (50%), road access to research sites (59%), and a climatological monitoring station (60%). Slightly fewer sites report an on-site laboratory (43%), library (47%), storage and curatorial facilities for collections (39%), permanent vegetation monitoring plots (48%), and a hydrological monitoring station (40%). A small percentage of sites provide more specialized facilities, such as an air pollution monitoring station (23%), a small watershed research site (16%), and permanent plots for monitoring lakes or streams (15%) and marine benthic communities (7%).

About 89% of biosphere reserves report one or more of the 14 listed types of infrastructure and facilities; 64% report four or more types; 34% report seven or more; and 9% report ten or more. The greatest number, 12 types, is reported by four sites: the Berezinskiy, Pechoro-Ilychskiy, and Sikhote-Alin Biosphere Reserves in the U.S.S.R., and the Coweeta Hydrologic Station BR in the U.S. Twenty-two sites report no infrastructure to support research and educational activities.

As expected, all types of facilities are much more adequately represented in the temperate biome than the tropical biome subgroup (see below).

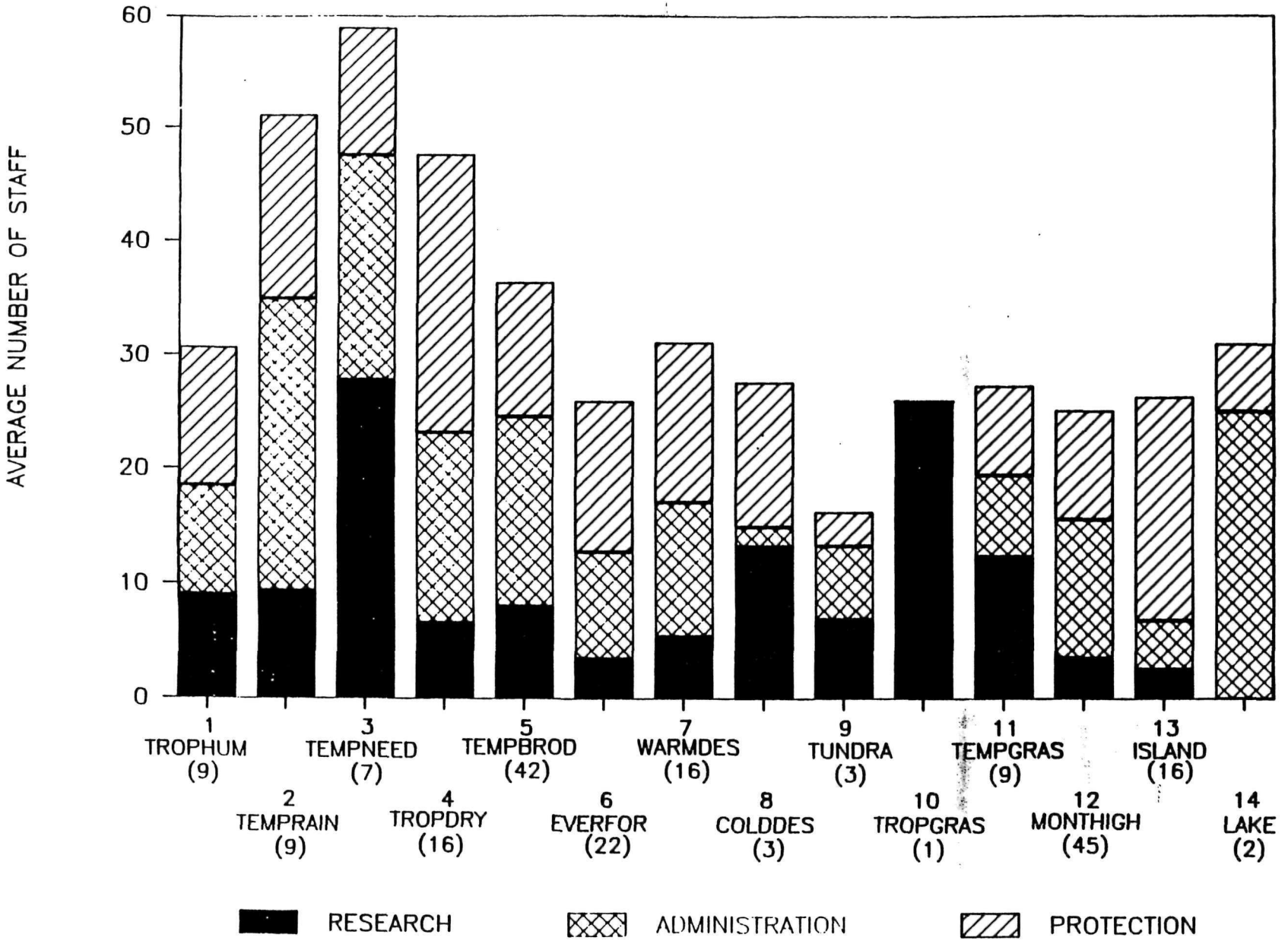
Table J.1 Infrastructure and Facilities

	Temperate Subgroup %	Tropical Subgroup %
Air pollution monitoring station	39	4
Climatological monitoring station	67	39
Conference/meeting facilities	65	39
Hydrological monitoring station	55	27
Laboratory facility	59	31
Library	61	31
Lodging for visiting scientists	61	46
Permanent plots		
Vegetation	53	19
Lake/stream	27	8
Marine benthic	8	4
Road access to research sites	71	46
Small watershed research site	20	12
Storage and curatorial facilities	55	27

The "average" biosphere reserve has a total staff of 37, of whom about 21% are concerned with research, 39% with administration, and 40% with protection of the site. The average staffing levels vary considerably for different biomes (Fig. J.1), and among individual sites. With the exception of the tropical dry forest sites, the largest staffs are reported for sites in temperate biomes. The presence of a sizable on-site research staff appears to be a distinguishing characteristic of the network.

AVERAGE NUMBER OF ON-SITE STAFF

ARRAYED BY BIOME



K. BASIC RESOURCE INFORMATION

The respondents were requested to check types of basic resource information available for the biosphere reserve from a list of 24 types. For some of the types, respondents were also asked to indicate the approximate number of years over which the information was collected as an indication of comprehensiveness. Because responses on the period or record were often not provided or incomplete, we did not consider them in the present analysis.

In preparing the summary, we grouped the 24 types of basic resource information into seven categories, as follows:

Aquatic systems, including information on freshwater and marine ecosystems, as well as surface and groundwater hydrology

Bibliographical information, including the history of scientific study and bibliographies

Biological inventory, including inventories of mammals, other vertebrates, invertebrates, vascular plants, and nonvascular plants, as well as vegetation data

Climatological information, including only this category

Environmental pollutants, including acidic deposition, air quality, and water quality data

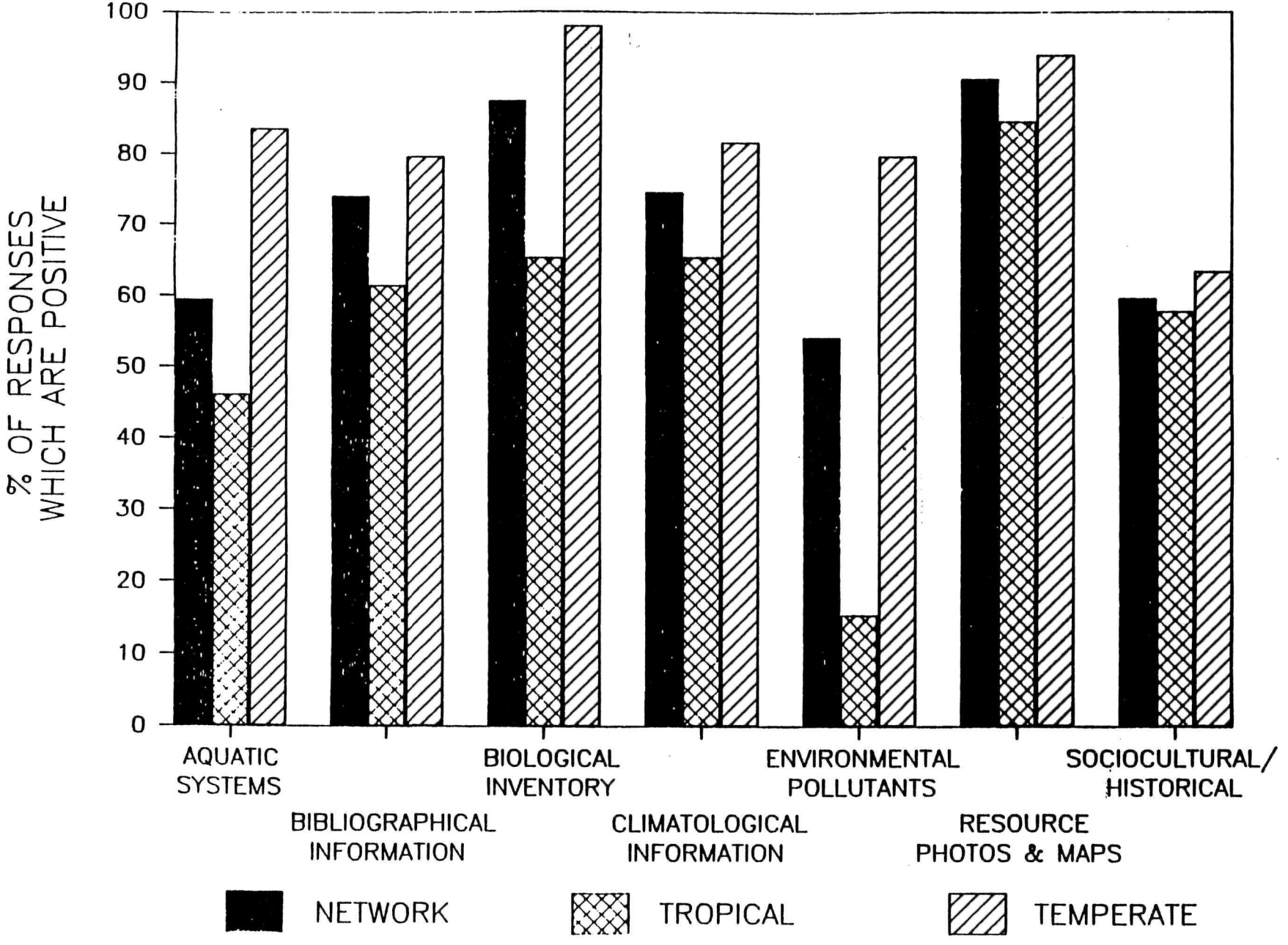
Resource photos and maps, including aerial photographs, and maps of geology, land use, soils, topography, and vegetation

Sociocultural information, including ethnobiological information and land use history

Figure K.1 shows the percentage of positive responses for one or more types of information in each category for the network as a whole and for the temperate and tropical biome subgroups. Biosphere reserves report considerable availability of basic resource information, although most sites have significant gaps within each category. The average network response is about 90% for information under resource photos and maps as well as biological inventory, about 75% for bibliographical and climatological information, about 60% for aquatic systems and sociocultural information, and about 55% for environmental pollutants. There are significant differences between the biome subgroups which presumably reflect differences in research issues as well as infrastructure and institutional capabilities. The temperate subgroup reported more positive responses for every category, although differences are small for resource photos and maps, and sociocultural information which appears to receive proportionately greater emphasis in tropical biomes. The disparity increases progressively for climatological (81% vs 65%) and bibliographical (79% vs 61%) information, biological inventory (98% vs 65%), and aquatic systems (83% vs 46%). The

greatest differences are reported for environmental pollutants (79% vs 15%), which provide a major focus of monitoring programs in temperate biomes, especially the temperate broadleaf forests in which air pollution and acidic deposition are particularly important influences. The results underscore the appropriateness of MAB's efforts to strengthen biological inventory capabilities and programs in tropical biomes (Smithsonian/MAB program) and to facilitate collaboration on environmental monitoring in the temperate biomes, as well as the need to strengthen the availability of information on the sociocultural context of biosphere reserves throughout the network.

BASIC RESOURCE INFORMATION



L. RESERVE RANKING SYSTEM

The design of a computerized system to store and analyze reserve survey response data made possible the development of a method for evaluating the relative effectiveness of each reserve in achieving the objectives described in the Action Plan. While any evaluation by definition is value-based, if the scoring system is explicit and dynamic, it provides a reasonable basis for comparison among reserves, biomes, countries etc. The rather obvious limitation of the current system is grounded in the fact that each reserve was evaluated by a single manager. The knowledge, values and biases of each manager makes comparison difficult at best. The analysis which follows recognizes these limitations and is presented to demonstrate the types of analyses which will be possible in the future given adjustments in data collection methods.

Each reserve has been evaluated based upon responses in 20 categories. Individual responses have often aggregated within a single category to yield a numerical indicator. A judgment was then made by the authors regarding that level of each indicator reflecting a favorable, neutral and unfavorable characteristic. If the indicator is judged favorable, the reserve is assigned a +1 for that variable; if neutral it is assigned a 0; and if unfavorable, it is assigned a -1. Each of the variables are described briefly below along with the numbers of reserves classified as favorable or unfavorable.

Size: The size of a reserve might be thought of as a measure of protection of a specific biome type. 73 sites were classified as favorable since their size exceeds 100,000 acres, while 60 have been classified as unfavorable as their size is less than 10,000 acres. This is obviously a gross ranking system which could easily be refined by assigning weights to various size categories.

Average Purpose Scores: Purpose scores ranged from 0-5 for each of 9 discrete purposes. 11 units with average purpose scores above 4.5 were ranked as favorable, while 12 units with scores below 1.5 were ranked as unfavorable. A perfect average score of 5 would indicate that a reserve is pursuing all 9 purposes vigorously.

Conservation Purposes: Respondents could choose to check 11 conservation purposes of their reserves. If 9 or more were checked yes, the unit was ranked favorable in this system. If fewer than 2 were checked, the unit was ranked unfavorable. 10 reserves were classified as favorable while 74 were classified as unfavorable.

Core Protection: 132 units reported that core areas are strictly protected by management regulations and therefore received a favorable rating. 49 units reported that protection of the core area cannot presently be assured and therefore received an unfavorable rating.

Core Delineation: For this characteristic, no positive score was offered if a core was delineated, however, 17 units received an unfavorable rating since their cores are undelineated.

Catchments: 97 units received a favorable rating since they included complete watersheds, while 103 units received an unfavorable rating for including only partial catchments.

Buffer Zone: 88 reserves were given a favorable rating for having delineated buffer zones with specific regulations administered by the same administrative unit which governs use of the core area. 41 units were given an unfavorable rating for failing to designate a buffer zone.

Transition Zone Activities: Respondents were asked to describe the activities that occur within the transition zones of their reserves. 22 possible activities were specified, and a favorable rating was offered to 47 reserves if 5 or fewer activities were cited, while an unfavorable rating was assigned to 78 units of more than 10 activities were reported.

Management Authority: 94 units received a favorable response since they reported that an on-site management authority exists and is implementing a management plan which takes account of the objectives of the Action Plan. 6 reserves received an unfavorable rating since they reported that no management authority is planned.

Cooperative Linkages: Each reserve was asked to describe the cooperative linkages which exist between the unit and other organizations; 7 links are possible. 63 units described 5 or more linkages and were therefore ranked as favorable, while 38 units were classified as unfavorable for having fewer than two linkages.

Benefits: Respondents judged the level of 9 distinctive benefits to those living in or around the reserve. Major benefits were assigned a value of 2 and minor benefits assigned a value of 1. The total benefit value was thereby quantified for each reserve. 25 units were classified as favorable due to benefit totals greater than 10 while 24 units reported benefit totals less than 2 and were therefore classified as unfavorable.

Research: 109 units were rated as favorable due to their report that an integrated program of basic and applied research is underway. 3 reserves reported no research or monitoring history and therefore received an unfavorable response. It is interesting to note that 57 units reported no permanent research or monitoring facilities.

Facilities: Each unit could report as many as 12 distinctive research facilities. 24 units reported 9 or more facilities and therefore received a favorable response while 53 reported fewer than 2 facilities and therefore received an unfavorable response.

Research Activities: Of 31 possible types of research activities, 38 units received a favorable rating for reporting more than 14 types of research; while 70 received an unfavorable rating for reporting 5 or fewer activities.

Lodging: 107 units received a favorable rating for having some lodging available for research scientists and 93 were rated as unfavorable since no lodging is available.

Staff: 82 units reported having administrative, research and protection staff on-site and were therefore assigned a favorable rating. 19 units reported having no staff on-site and therefore were assigned an unfavorable rating. It is important to recognize that 49 units, 25% of the reporting sample, have no protection staff.

Resource Information: The availability of 24 different types of resource information was surveyed. 25 reserves reported 20 or more types available and therefore were assigned a favorable rating while 32 reserves reported 5 or fewer types available and were therefore classified as unfavorable.

Education and Training: 9 types of education and training programs were surveyed. 9 reserves reported 7 or more types and were assigned a rating of favorable, while 24 reserves reported no programs and were classified as unfavorable.

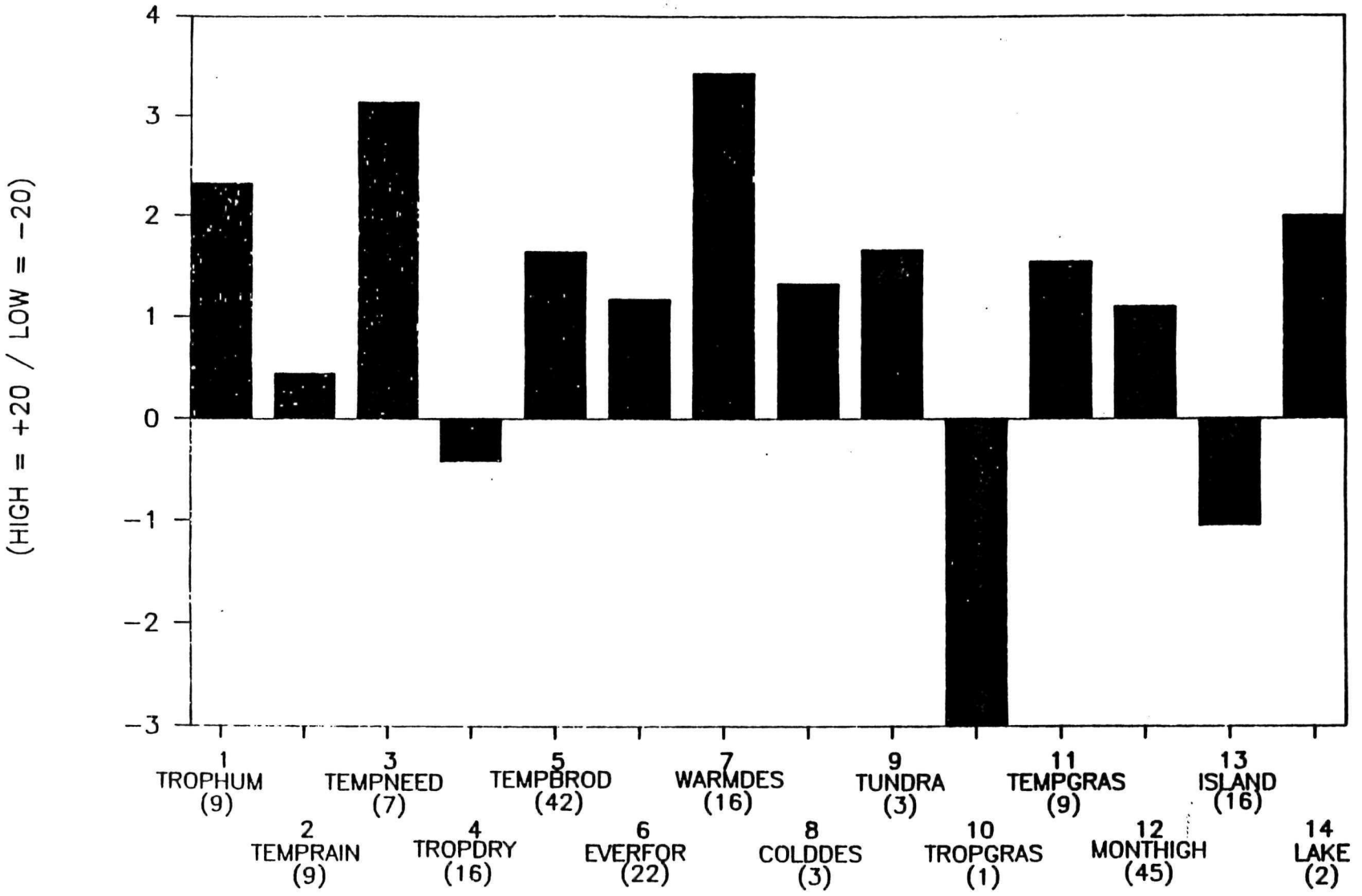
Technical and Financial Support: 10 reserves reported 2 or more sources of technical and financial support and were rated as favorable. 20 reserves reported no sources of technical and financial support and were rated as unfavorable. It should be emphasized that the responses to this question are particularly difficult to interpret due to the ambiguity of the survey question.

Recognition: 25 reserves reported 4 recognition activities and were ranked as favorable, while 4 reserves were rated as unfavorable since no activities were reported to be planned.

Preliminary Ranking Results: Scores for each reserve were totaled from the 20 variables described above and then sorted from most favorable to least favorable. Average scores for each

biome are illustrated in Figure L-1. Biomes with the highest average scores include warm deserts (3.4) and temperate needleleaf forests (3.1). Tropical humid forest follow with an average score of 2.3. Biomes ranking the lowest include: tropical dry forests (-.44); islands (-1.0); and tropical grasslands (-3.0: n=1). The average score for the network as a whole is 1.2, for tropical units it is .42 and for temperate units it is 1.85. Detailed rankings for each reporting reserve follow in Appendix 2.

AVERAGE SCORE BY BIOME



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M. ASSESSMENT OF INDIVIDUAL UNITS: Potential Models

In its August 1986 meeting in La Paz, Bolivia, the Scientific Advisory Panel for Biosphere Reserves noted that "model" biosphere reserves illustrating fully successful implementation of the multiple purposes of biosphere reserves do not yet exist. Nevertheless, the panel made a preliminary effort to identify sites which appeared to afford outstanding opportunities for building models of biosphere reserve concepts in practice. Based on collective knowledge and experience, the Panel identified 16 biosphere reserves as particularly suitable for developing model programs.

Tabulated below are the aggregated scores, average rankings, and number of reserves with a tying score, of these sites based on the preliminary evaluative factors we selected.

Table M.1 Scoring of "Model" Biosphere Reserves

	Score	Rank	# of Ties
Berezinsky BR, U.S.S.R.	+11	1	0
Cevennes BR, France	+6	23	13
Changbai BR, Peoples Republic of China	+9	8	6
Donana BR, Spain	+8	11	2
Galapagos BR, Ecuador	+7	12	12
Kiskunsag BR, Hungary	+7	12	12
Manu BR, Peru	+4	50	15
Mapimi BR, Mexico	0	123	15
Mt. Kulal BR, Kenya	+10	2	2
Rio Platano BR, Honduras	+7	12	12
Sinharaja BR, Sri Lanka	NON-REPORTING		
Southern Appalachian BR Cluster, U.S.A.			
Coweeta Hydrologic Laboratory	+6	23	13
Great Smoky Mountains National Park	0	123	15
Areas combined	+10	2	
Talamanca-La Amistad, Costa Rica	+4	50	15
Trebon BR, Czechoslovakia	+1	99	24
Volcans BR, Rwanda	+6	23	13
Virgin Islands BR, U.S.A.	-0	123	15
Waterton Lakes BR, Canada	+5	36	14

Although several of the sites received high rankings, agreement is limited. The panel identified sites on the basis of strong commitment to MAB goals and exceptional progress and potential in carrying out particular biosphere reserve objectives. Our procedure seeks consistent evaluation with respect to indicators of exemplary or inadequate performance relative to the full range of objectives. In this procedure, accomplished and long-established programs relevant to biosphere-reserve roles tend to be rated highly. New dynamic programs,

with much momentum but fewer components and types of accomplishments, fare less well. The Mapimi Biosphere Reserve in Mexico is a good example. The site was legally established de novo a decade ago as a biosphere reserve, and is widely recognized as a model for integrating conservation and development and involving local people in biosphere reserve programs. However, the site ranked 123rd in our listing, largely because its programs are rapidly evolving, and it lacks the infrastructure and history of scientific and management activity typical of the many long-established protected areas in the network. The equivalently ranked Virgin Islands BR in the U.S. began its biosphere reserve program five years ago. The biosphere reserve presently consists solely of a U.S. national park, which is actively pursuing biosphere reserve objectives. However, the site faces major challenges in developing its role in regional planning and in encouraging local participation.

Our analysis demonstrates the value of linking functionally complementary sites under different administrators to form a single biosphere reserve. The Southern Appalachian Biosphere Reserve cluster presently consists of the Great Smoky Mountains National Park BR and the Coweeta Hydrologic Station BR. Under our evaluation scheme, the sites rank 123rd and 23rd out of 200, respectively (although the former tied for first place in the diversity of its research activities). Combined, they tie for second place - a rating consistent with the Panel's empirical evaluation and with U.S. MAB's designation of the Southern Appalachians as a pilot regional demonstration area.

This analysis is provided as an illustration only. The automated database allows for testing of various combinations of evaluative factors, which can be used in concert with the empirical judgments by those most familiar with the biosphere reserve program to provide oversight and recommendations for strengthening the functions of individual sites.

N. METHODS

This analysis is based upon responses to a survey designed by Messrs. M. Batisse, W. Gregg and J. McNeely to provide a foundation for assessing the status of the Biosphere Reserve Network (see the Introduction section above). The survey was distributed in May 1986 and as of August 8, 1988, 219 reserves have responded. The results presented in this paper are, however, based on only 200 reporting reserves, representing 54 of the 70 participating countries, since the remaining 19 responses were received after our analyses were conducted.

Survey response data was entered into microcomputer-based dBASE III Plus files by hand. In all cases, reported statistics are means, unadjusted by standard deviations due to the small sample sizes for several of the biomes. A later statistical analysis using non-parametric techniques would be possible to test the statistical significance of differences between response categories, units, biomes or other groupings.

Separate files were created for each section of the survey, since dBASE III allows one to open numerous files at one time to perform comparisons among units and responses. In those cases where respondents ranked several factors numerically, the raw scores were entered in one file, while a separate file was created indicating simply a positive or negative response for each question. This second type of file was often necessary to perform counts of average positive responses by question type, the foundation for numerous charts presented within the text.

A different method was designed to perform the ranking assessment of individual units. A new summary ranking file was created containing the 20 variables described in Section L above. Individual section response files were then opened along with the ranking file, and positive (+1), neutral (0) and negative (-1) indicators were placed in the ranking file for reserves which met the specific criteria specified in Section L for each variable. A summary ranking field was then created which simply sums the indicators for each reserve, providing a possible range between +20 and -20. This system is easily adjusted by any desired weighting scheme; however, for this draft, we have avoided attaching a relative importance to any response category (e.g. the management status of the core area vs. the number of recognition activities held).

In all cases, dBASE files were converted into LOTUS 123 (version 2) files for further sorting, variable aggregation and graphing. LOTUS is particularly well suited for these activities. Graphs were then "polished" using FREELANCE Plus and printed on a Hewlett Packard 7475A plotter.

As with any rigorous scientific research, a few words should be said in self criticism concerning methods. The purpose of this effort has been to ascertain the status of the Biosphere

Reserve network with respect to the management objectives set forth in the Action Plan. The method chosen was a single survey administered by mail to each reserve. The responses therefore represent the opinions of single administrators at a single point in time. Previous survey research of U.S. National Seashores conducted by Wargo (1984) demonstrated that responses often will vary considerably within a single management unit.

This analysis makes comparisons among units and biome types, yet it must be remembered that there are as many evaluators as there are reserves. Each respondent interpreted survey questions and provided responses which might be influenced by individual biases, rather than reflecting a consensus among an individual reserve's managers. In some cases specific question design is flawed, including several components, one of which might be true while the other false. Double or triple barrelled questions such as this confuse the respondent and make the responses difficult to interpret.

These criticisms do not detract from the significance of the overview provided by the survey, however they should cause all concerned to carefully consider alternative methods of developing the most accurate reflection of reserve effectiveness. Alternatives might include the creation of assessment teams which move from reserve to reserve conducting on-site interviews with numerous managers. Separate teams might be established to assess separate biomes. This approach would remove the problems of inconsistent evaluation among units and only a single evaluator for each unit. This is obviously a more costly research method, yet one that seems crucial to the long term vitality of the network.

APPENDIX 1

NON-REPORTING BIOSPHERE RESERVES

COUNTRY	RESERVE NAME	SIZE	BIOME
ARGENTINA	Reserva de la Biosfera San Gu	981460	12
AUSTRALIA	The Unnamed Conservation Park	2132600	7
AUSTRIA	Gossenkollesee	100	12
AUSTRIA	Gurgler Kamm	1500	12
AUSTRIA	Lobau Reserve	1000	12
BOLIVIA	Estacion Biologica Beni	135000	12
BOLIVIA	Parque Nacional Pilon-Lajas	100000	1
BURKINA FASO	Mare aux Hippopotames CF	16300	4
CAMEROON	Parc national de Waza	170000	4
CAMEROON	Parc national de la Benoue	180000	4
CAMEROON	Reserve forestiere et de faune	500000	1
CHILE	Parque Nacional Laguna San Raf	1742448	2
CHILE	Parque Nacional Torres del Pai	184414	12
CHILE	Reserva de la Biosfera 'Arauca	81000	5
CHILE	Reserva de la Biosfera La Camp	17095	6
COLOMBIA	Cinturon Andino Cluster Biosph	855000	12
CONGO	Reserve de la biosphere de Dim	62500	1
COSTA RICA	Cordillera Volcanica Central	144363	4
COTE D'IVOIRE	Parc national de Tai	330000	1
COTE D'IVOIRE	Parc national de la Comoe	1150000	4
CUBA	Baconao Biosphere Reserve	84600	13
CUBA	Cuchillas del Toa Biosphere Re	127500	13
CUBA	Guanahacabibes Peninsular	101500	13
DENMARK	Northeast Greenland National P	70000000	9
FRANCE	Atoll de Taiaro	2000	13
GERMAN DEM REP	Middle Elbe Biosphere Reserve	17500	5
GERMAN DEM REP	Vessertal Biosphere Reserve	7460	5
GHANA	Bia National Park	7770	1
GUINEA	Reserve de la biosphere des Mo	17130	1
GUINEA	Reserve de la biosphere du Mas	116170	1
IRAN	Arasbaran Protected Area	52000	12
IRAN	Arjan Protected Area	65750	12
IRAN	Geno Protected Area	49000	8
IRAN	Golestan National Park	125895	12
IRAN	Hara Protected Area	85686	8
IRAN	Kavir National Park	700000	8
IRAN	Lake Oromeeh National Park	462600	12
IRAN	Miankaleh Protected Area	68800	12
IRAN	Touran Protected Area	1000000	8
IRELAND	North Bull Island	500	5
ITALY	Circeo National Park	3260	6
ITALY	Collemeluccio-Montedimezzo	478	12
ITALY	Foret Domaniale du Circeo	3260	6
ITALY	Miramare Marine Park	60	6
KENYA	Kiunga Marine National Reserve	60000	7
KENYA	Malindi-Watamu Biosphere Reser	19600	7
KENYA	Mount Kenya Biosphere Reserve	71759	12
KOREA	Mount Sorak Biosphere Reserve	37430	5

MEXICO	Reserva de la Biosfera Sierra	139577	4
NIGERIA	Omo Strict Natural Reserve	460	1
NORWAY	Northeast Svalbard Nature Rese	1555000	9
PAKISTAN	Lal Suhanra National Park	31441	7
PANAMA	Parque Nacional Fronterizo Dar	597000	1
PORTUGAL	Paul do Boquilobo Biosphere Re	395	6
ROMANIA	Pietrosul Mare Nature Reserve	5865	5
ROMANIA	Retezat National Park	20000	5
SPAIN	Reserva de la Biosfera del Urd	22500	6
SRI LANKA	Hurulu Forest Reserve	512	4
SRI LANKA	Sinharaja Forest Reserve	8864	1
SUDAN	Radom National Park	1250970	4
TANZANIA	Serengeti NP & Ngorongoro CA	2305100	4
THAILAND	Huai Tak Teak Reserve	4700	4
TUNISIA	Parc national de Djebel Bou-He	16488	11
TUNISIA	Parc national de Djebel Chambi	6723	11
TUNISIA	Parc national de l'Ichkeul	10770	6
TUNISIA	Parc national des Iles Zembra	4030	6
UGANDA	Queen Elizabeth (Rwenzori) Nat	220000	4
UNITED KINGDOM	North Norfolk Coast Biosphere	5497	5
USA	Cascade Head Expt. Forest & Sc	7051	2
URUGUAY	Banados del Este	200000	11
YUGOSLAVIA	Reserve Ecologique du Bassin d	200000	12

APPENDIX 2

RANKING OF INDIVIDUAL BIOSPHERE RESERVES

RESERVE NAME	COUNTRY	BIOME	SCORE
BEREZINSKY BIOSPHERE RESERVE	USSR	5	11
BAYERISCHER WALD NATIONAL PARK	FED REP GER	12	10
MT. KULAL	KENYA	7	10
KOSCIUSKO NATIONAL PARK	AUSTRALIA	6	9
ULURU (AYER'S ROCK - MOUNT OLGA)	AUSTRALIA	7	9
RESERVE DE LA BIOSPHERE DE LA PENDJAKI	BENIN	4	9
CHANGBAISHAN BIOSPHERE RESERVE	CHINA	5	9
SIAN KA'AN	MEXICO	1	9
BAIKAL STATE BIOSPHERE RESERVE	USSR	3	9
WOLONG BIOSPHERE RESERVE	CHINA	12	8
DONANA	SPAIN	6	8
WILSONS PROMONTORY NATIONAL PARK	AUSTRALIA	6	7
MONT-SAINT-HILAIRE	CANADA	5	7
WUYISHAN BIOSPHERE RESERVE	CHINA	2	7
XILINGGUOLEI BIOSPHERE RESERVE	CHINA	11	7
GALAPAGOS	ECUADOR	13	7
RESERVE NATIONAL DE CAMARGUE	FRANCE	6	7
RIO PLATANO	HONDURAS	4	7
KISKUNSAG BIOSPHERE RESERVE	HUNGARY	5	7
BIG BEND NATIONAL PARK	USA	7	7
ORGAN PIPE CACTUS	USA	7	7
SIKHOTE-ALIN BIOSPHERE RESERVE	USSR	5	7
CAUCASUS STATE BIOSPHERE RESERVE	USSR	12	7
SREBARNA	BULGARIA	5	6
PARC NATIONAL STENETO	BULGARIA	12	6
BOATINE	BULGARIA	12	6
KRIVOTLASKO PROTECTED LANDSCAPE AREA	CZECHOSLO	12	6
CEVENNES	FRANCE	5	6
PARC NATIONAL DES VOLCANS	RWANDA	12	6
PARC NATIONAL DU NIOKOLO-KOBA	SENEGAL	4	6
YELLOWSTONE NATIONAL PARK	USA	12	6
MOJAVE AND COLORADO DESERTS	USA	7	6
COWEETA HYDROLOGIC LABORATORY	USA	5	6
OKSKY STATE BIOSPHERE RESERVE	USSR	5	6
TSENTRAL'NOLESNOY ZAPOVEDNIK	USSR	5	6
RESERVA ECOLOGICA DE NACUNAN	ARGENTINA	7	5
TSARITCHINA	BULGARIA	12	5
WATERTON LAKES BIOSPHERE RESERVE	CANADA	12	5
LAUCA (MISS PAGE 4)	CHILE	12	5
DINGHUSHAN BIOSPHERE RESERVE	CHINA	1	5
SLOVAK KARST BIOSPHERE RESERVE	CZECHOSLO	5	5
HORTOBAGY NATIONAL PARK	HUNGARY	5	5
MONTSENY	SPAIN	6	5
DINDER NATIONAL PARK	SUDAN	7	5
LUQUILLO EXPERIMENTAL FOREST	USA	13	5
HUBBARD BROOK EXPERIMENTAL FOREST	USA	5	5
ISLE ROYALE NATIONAL PARK	USA	14	5

CHATKAL BIOSPHERE RESERVE	USSR	12
ASTRAKHAN STATE BIOSPHERE RESERVE	USSR	8
RESERVA NATURAL DE VIDA SILVESTRE	ALGERIA	7
MAQUARIE ISLAND NATURE RESERVE	AUSTRALIA	9
PARANGALITZA	BULGARIA	12
TALAMANCA - LA AMISTAD	COSTA RIC	4
CIBODAS NATURE RESERVE	INDONESIA	13
EL CIELO	MEXICO	7
RESERVA DE LA BIOSFERA DEL MANU	PERU	1
MARISMAS DEL RIO ODIEL	SPAIN	6
SAN DIMAS EXPERIMENTAL FOREST	USA	6
CAROLINIAN-SOUTH ATLANTIC BIOSPHERE RESE	USA	5
DENALI NATIONAL PARK AND PRESERVE	USA	3
H.J. ANDREWS	USA	12
NIWOT RIDGE	USA	12
GREAT SMOKY MOUNTAINS NATIONAL PARK	USA	5
BARGUZINSKY BIOSPHERE STATE RESERVE	USSR	3
RESERVE FLORISTIQUE DE YANGAMBI	ZAIRE	1
YATHONG	AUSTRALIA	11
DOUPKI DJINDJIRITZA	BULGARIA	12
IPASSA - MAKOKOU	GABON	1
RESERVA INTEGRAL DE LA MONTE AZULES	MEXICO	1
LA MICHILIA	MEXICO	12
WADDEN SEA	NETHERLAN	5
BIALOWIEZA NATIONAL PARK	POLAND	5
LAKE MANYARA NATIONAL PARK	TANZANIA	4
CENTRAL GULF COASTAL PLAIN	USA	5
EVERGLADES NATIONAL PARK	USA	4
GLACIER NATIONAL PARK, MONTANA	USA	12
PECHORO-ILYCHSKIY ZAPOVEDNIK	USSR	3
SAYANO-SHUSHENSKY STATE BIOSPHERE RESERV	USSR	12
ASKANIYA-NOVA (UKRAINIAN STATE STEPPE B.	USSR	11
CHERNOMORSKIY STATE BIOSPHERE ZAPOVEDNIK	USSR	11
BEINN EIGHE NNR	U.K. (SCO	12
FOREST RESERVE OF LUKI	ZAIRE	1
CROAJINGOLONG	AUSTRALIA	6
HATTAH-KULKYNE NP & MURRAY-KULKYNE PARK	AUSTRALIA	6
BAMINGUI-BANGORAN CONSERVATION AREA	CENTRAL A	4
FANJINGSHAN MOUNTAIN RESERVE	CHINA	2
SIERRA DEL ROSARIO	CUBA	13
PALAVA BIOSPHERE RESERVE	CZECHOSLO	5
SIERRA DE GRAZALEMA	SPAIN	6
LAKETORNE	SWEDEN	5
THREE SISTERS WILDERNESS	USA	12
CALIFORNIA CHANNEL ISLANDS	USA	6
SEQUOIA AND KINGS CANYON	USA	12
GLACIER BAY - ADMIRALTY ISLAND BIOSPHERE	USA	2
ALEUTIAN ISLANDS	USA	9
SOKHONDINSKY BIOSPHERE RESERVE	USSR	11
REPETEK STATE BIOSPHERE RESERVE	USSR	8
VORONEZ BIOSPHERE STATE RESERVE	USSR	5
ST. KILDA NNR	U.K. (SCO	12
PARQUE COSTERO DEL SUR	ARGENTINA	7
NEUSIEDLER SEE-OSTERREICHISCHLER TEIL	AUSTRIA	5

DJENDEMA	BULGARIA	12	1
RIDING MOUNTAIN BIOSPHERE RESERVE	CANADA	3	1
SIERRA NEVADA DE SANTA MARTA	COLUMBIA	4	1
TREBON BIOSPHERE RESERVE	CZECHOSLO	5	1
OMAYED	EGYPT	7	1
LAKE FERTO BIOSPHERE RESERVE	HUNGARY	5	1
GUNUNG LEUSER	INDONESIA	13	1
SHIGA HIGHLAND	JAPAN	5	1
BABIA GORA NATIONAL PARK	POLAND	5	1
DELTA DU SALOUM	SENEGAL	4	1
ORDESA Y VINAMALA	SPAIN	6	1
MANCHA HUMEDA	SPAIN	6	1
CALIFORNIA COAST RANGES	USA	2	1
HAWAII ISLANDS BIOSPHERE RESERVE	USA	13	1
JORNADA EXPERIMENTAL RANGE	USA	7	1
U. OF MICHIGAN BIOLOGICAL STATION	USA	11	1
OLYMPIC NATIONAL PARK	USA	2	1
ROCKY MOUNTAIN NATIONAL PARK	USA	12	1
TSENTRALNOSIBIRSKIY BIOSPHERE RESERVE	USSR	3	1
KRONOTSKY BIOSPHERE STATE RESERVE	USSR	5	1
ALECHIN CENTRAL CHERNOZEM STATE RESERVE	USSR	5	1
RHUM	U.K. (SCO	12	1
DANGGALI CONSERVATION PARK	AUSTRALIA	7	C
FITZGERALD RIVER NATIONAL PARK	AUSTRALIA	6	C
ULLA ULLA BIOLOGICAL RESERVE	BOLIVIA	12	C
BISTRICHKO BRANICHTE	BULGARIA	12	C
KOUPENA	BULGARIA	12	C
ARCHIPELAGO DE JUAN FERNANDEZ	CHILE	13	C
PILIS BIOSPHERE RESERVE	HUNGARY	5	C
AGGTELEKI BIOSPHERE RESERVE	HUNGARY	5	C
KOMODO NATIONAL PARK	INDONESIA	13	C
LORE LINDU NATIONAL PARK	INDONESIA	13	C
MAPIMI	MEXICO	7	C
VIRGIN ISLANDS	USA	13	C
LAPLANDSKY BIOSPHERE STATE RESERVE	USSR	3	C
DYFI	U.K. (SCO	5	C
SOUTHWEST NATIONAL PARK	AUSTRALIA	2	-
MANTARITZA	BULGARIA	12	-
LONG POINT	CANADA	14	-
TANJUNG PATING NATIONAL PARK	INDONESIA	13	-
MOUNT HAKUSAN	JAPAN	2	-
PARC NATIONAL DE LA BOUCLE DU BAOULE	MALI	4	-
SLOWINSKI NATIONAL PARK	POLAND	5	-
ROSCA-LETEA	ROMANIA	11	-
SIERRAS DE CAZORLA Y SEGURA	SPAIN	6	-
PARC NATIONAL SUISSE	SWITZERLA	12	-
VIRGINIA COAST RESERVE	USA	5	-
CENTRAL PLAIN EXPERIMENTAL RANGE	USA	11	-
CORAM	USA	12	-
SAN JOAQUIN EXPERIMENTAL RANGE	USA	6	-
BIG THICKET NATIONAL PRESERVE	USA	5	-
CONGAREE SWAMP UNIT, S.ATL. COASTAL	USA	5	-
NOATAK BIOSPHERE RESERVE	USA	9	-
PARC NATIONAL DU TASSILE	ALGERIA	7	-

MARITCHINI EZERA	BULGARIA	12	-2
ALIBOTOUCH	BULGARIA	12	-2
PARC NATIONAL D'ODZALA	CONGO	1	-2
OLYMPOS NATIONAL PARK	GREECE	6	-2
THE VELEBIT MOUNTAIN	YUGOSLAVI	6	-2
PRINCE REGENT RIVER NATURE RESERVE	AUSTRALIA	4	-3
TCHERVENATA STENA	BULGARIA	12	-3
TCHOUPRENE	BULGARIA	12	-3
DOUPKATA	BULGARIA	12	-3
EL TUPARRO NATIONAL PARK	COLUMBIA	10	-3
SAMARIA NATIONAL PARK	GREECE	6	-3
SIBERUT NATURE RESERVE	INDONESIA	13	-3
MOUNT ODAIGAHARA AND MOUNT OMINE	JAPAN	2	-3
RESERVA DEL NORESTE	PERU	4	-3
BEAVER CREEK	USA	7	-3
DESERT EXPERIMENTAL RANGE	USA	8	-3
FRASER EXPERIMENTAL FOREST	USA	12	-3
KONZA PRAIRIE RESEARCH NATURAL AREA	USA	11	-3
OUZOUNBOUDJAK	BULGARIA	12	-4
PARQUE NACIONAL BOSQUE FRAY JORGE	CHILE	6	-4
KILLARNEY NATIONAL PARK	IRELAND	5	-4
YAKUSHIMA ISLAND	JAPAN	2	-4
PARQUE NACIONAL HUASCARAN	PERU	12	-4
LUKNAJO LAKE RESERVE	POLAND	5	-4
KEG-MA WATERSHED RESEARCH STATION	THAILAND	4	-4
CAIRNSMORE OF FLEET NNR	U.K.	5	-4
TAYNISH NATIONAL NATURE RESERVE	U.K. (SCO	12	-4
SIERRA NEVADA	SPAIN	6	-5
LOCH DRUIDIBEG	U.K. (SCO	12	-5
GUANICA	USA (PUER	13	-6
CLAISH MOSS NNR	U.K. (SCO	12	-6
MOOR-HOUSE	U.K. (SCO	5	-6
KAMTCHIA	BULGARIA	12	-7
SAKAERA ENVIRONMENTAL RESEARCH STATION	THAILAND	4	-7
BRAUNTON	U.K.	5	-7
BASSE-LOBAYE FOREST	CENTRAL A	1	-8
PUERTO GALERA BIOSPHERE RESERVE	PHILIPPIN	13	-8
SILVER FLOW NNR AND MERRICK KELLS SSSI	U.K. (SCO	5	-8
EL CANAL Y LOS TILES	SPAIN	13	-9
FORET DU FRANGO (MISSING PAGES)	FRANCE (C	6	-10
MACCHABEE/ BEL OMBRE NATURE RESERVES	MAURITIUS	13	-10
CAERLAVEROCK NATIONAL NATURE RESERVE	U.K.	5	-10
STANISLAUS-TUOLUMNE EXPERIMENTAL FOREST	USA	12	-12
VALLEE DE LA LUFIRA	ZAIRE	4	-12
FORET CLASSEE DE SAMBA DIA	SENEGAL	4	-13

BIOSPHERE RESERVE SURVEY

The Scientific Advisory Panel for Biosphere Reserves which has been established in 1985 in accordance with a recommendation of the Action Plan for Biosphere Reserves has drawn up the following questionnaire in order to obtain up-to-date information on the status of each Biosphere Reserve for incorporation into the MAB information system. The answers will help identify programme priorities and opportunities for improving the effectiveness of the Biosphere Reserve network.

The questionnaire should also provide a useful tool for MAB National Committees and for Biosphere Reserve managers to make a self appraisal of their own reserve(s) and to stimulate them to improve their status and functioning.

Kindly fill in the present questionnaire as soon as possible so that it be returned to the MAB Secretariat, c/o Unesco, Place de Fontenoy, 75700 Paris, France, preferably by the 31 July 1986.

BIOSPHERE RESERVE SURVEY

Country:

Name of Biosphere Reserve:

A. PURPOSE OF THE BIOSPHERE RESERVE

The Action Plan idenfities nine objectives relating to the multiple purposes of Biosphere Reserves. Please CHECK on the following list each of the purposes that applies to your Biosphere Reserve. Then, on the scale provided, CIRCLE A NUMBER that indicates how important that purpose is in the Biosphere Reserve. Circling number five (5) means that it is a primary purpose and that a major portion of available financial resources and/or staff is being used to achieve it. Circling number one (1) means that the purpose is a minor one and that a negligible portion of available resources is being used to achieve it.

The biosphere reserve is intended to: (Check the purposes that apply)	How important is this purpose? (Please circle)				
( ) Conserve natural or minimally disturbed representative ecosystems	5	4	3	2	1
( ) Provide legal and administrative basis for resource protection and management	5	4	3	2	1
( ) Conserve genetic resources in situ	5	4	3	2	1
( ) Conduct experimental problem-oriented research	5	4	3	2	1
( ) Conduct long-term environmental monitoring	5	4	3	2	1
( ) Promote regional planning and integrated rural development	5	4	3	2	1
( ) Promote local participation in planning and management	5	4	3	2	1
( ) Promote environmental education and training	5	4	3	2	1
( ) Communicate information about biosphere reserves, and develop a centre for generating and sharing knowledge on conservation and management	5	4	3	2	1

3. STATUS OF THE CORE AREA(S)

Under the Action Plan each Biosphere Reserve includes one or several core areas, covering one or more examples of natural or minimally disturbed ecosystems, of centres of endemism or of features of exceptional scientific interest. The core area is normally a strictly protected area.

The following statements describe possible situations of the core area(s) in this particular Biosphere Reserve. Please CHECK the statements which apply.

( ) The core area(s) has strict protection and management regulations which are duly implemented

( ) The core area contains one or more complete catchment basins

( ) The core area(s) WAS NOT already protected when the Biosphere Reserve was established

( ) The core area(s) covers part of a larger previously protected area (eg: national park)

( ) The core area(s) coincides exactly with a previously protected area (eg: national park, nature reserve)

( ) The protection of the core area(s) is largely ensured by its remoteness

( ) The effective protection of the core area(s) cannot presently be fully ensured

( ) The core area(s) has not yet been recognized

2. If the core area(s) covers all or part of a previously protected conservation area (eg. national park, nature reserve, etc...) please give the official name of this protected conservation area:

_____

3. While the core area is meant to be strictly protected, certain activities might be occuring or allowed. If this is the case please CHECK from the following list those activities that apply to the core area of your Biosphere Reserve:

( ) Collection of plant materials

( ) Ecological observations and surveys

( ) Environmental education

( ) Fishing or shellfishing

( ) Hunting or trapping

C. STATUS OF THE BUFFER AND TRANSITION ZONES

The core area(s) of a Biosphere Reserve is surrounded by a series of areas serving several functions and all acting as a protective buffer. In these areas a range of human activities may take place. They may include areas suitable for experimental manipulative research aimed at defining and demonstrating methods of sustainable resource development; examples of harmonious landscape resulting from traditional land use; examples of modified or degraded ecosystems suitable for restoration; etc...

1. The first area around the core area(s) is the buffer zone. It is usually delineated (eg. national park, national forest, etc...). The following statements describe possible buffer zone situations. Please CHECK the statement which best describes the buffer zone of your Biosphere Reserve.

( ) A legally delineated buffer zone subject to specific restrictions on allowable uses and under the same administration as the core area(s)

( ) A legally delineated buffer zone subject to specific regulations under a different administration from the core area(s)

( ) A legally delineated experimental research area subject to specific regulations

( ) A mixture of an undelineated area around the core area(s) and one or more delineated experimental research or management areas (cluster biosphere reserve)

( ) An undelineated area with limited human activities

( ) The buffer zone is presently lacking (ie: core area only)

( ) Other (Please describe)_____

2. A transition zone normally surrounds the delineated buffer zone. In this usually undelineated zone, which constitutes the area of influence of the Biosphere Reserve, a number of uses and activities may be occuring or allowed. Please CHECK from the following list those activities that apply to the transition zone of your Biosphere Reserve, or which occur outside the Biosphere Reserve but within a few kilometers from the delineated core, buffer and research areas. Then CIRCLE a number that indicates how important the use or activity is in the region. Circling number five (5) means that the use or activity is dominant or very significant, and has an important effect on the value of the biosphere reserve for conservation and research. Circling number (1) means that the use or activity is minor and has no effect on the value of the biosphere reserve for conservation and research.

( ) Long-term environmental monitoring

( ) Professional training

( ) Public recreation

Economic uses of non-renewable resources. Please specify:

( ) _____

( ) _____

Economic uses of renewable resources. Please specify:

( ) _____

( ) _____

Subsistence activities by indigenous people. Please specify:

( ) _____

( ) _____

Other activities. Please describe:

( ) _____

( ) _____

( ) Please list any of the above activities you regard as a significant adverse influence on the core area?_____

_____

_____

_____

1. MANAGEMENT AND ADMINISTRATION

Because of its multiple functions, the Biosphere Reserve should normally have specific arrangements for management and administration.

Below are listed some statements concerning the on-site management of your Biosphere Reserve. Please CHECK those statements which apply.

( ) an on-site management authority exists and is implementing a management plan which takes specific account of the objectives of the Action Plan for Biosphere Reserves

( ) an on-site management authority exists but has not yet drawn up a management plan for the Biosphere Reserve

( ) an on-site management body will be set up in the near future

( ) no local management body is planned

2. The on-site management authority normally has links with other bodies in order to fully develop the Biosphere Reserve functions. Please check the links which apply to your Biosphere Reserve:

( ) the MAB National Committee of your country

( ) the administrative authorities responsible for the planning and development of the region

( ) the local community and the representatives of the population living in or around the Biosphere Reserve

( ) scientific institutions involved in basic or applied natural resources research or monitoring

( ) national or foreign botanical and zoological gardens

( ) the management authorities of other Biosphere Reserves in your country

( ) the management authorities of Biosphere Reserves in other countries

3. It is important that visitors and local population be made aware of the status of the area as a Biosphere Reserve. Please CHECK the actions which have been taken for such recognition:

( ) Dedication ceremony
( ) Entrance signs or plaque
( ) Establishment of an on-site research station
( ) Brochure or audio-visual material
Other (please specify)
( ) _____
( ) No recognition yet, but recognition is planned
( ) No recognition planned

These uses and activities occur in the transition zone or within a few km from the delineated areas: (Check those that apply)	How important is this use or activity? (Please rank)				
( ) agricultural activities	5	4	3	2	1
( ) agroforestry projects	5	4	3	2	1
( ) fishing or shellfishing	5	4	3	2	1
( ) dredging/filling	5	4	3	2	1
( ) grazing	5	4	3	2	1
( ) human settlements	5	4	3	2	1
( ) hunting	5	4	3	2	1
( ) industrial development	5	4	3	2	1
( ) land conversions	5	4	3	2	1
( ) marine products/aquaculture	5	4	3	2	1
( ) mining of coal or minerals	5	4	3	2	1
( ) oil and gas development	5	4	3	2	1
( ) poaching	5	4	3	2	1
( ) recreational activities	5	4	3	2	1
( ) residential development	5	4	3	2	1
( ) shoreline stabilization	5	4	3	2	1
( ) subsistence activities	5	4	3	2	1
( ) timber production	5	4	3	2	1
( ) tourist development	5	4	3	2	1
( ) transportation facilities	5	4	3	2	1
( ) urban centres	5	4	3	2	1
( ) water developments projects	5	4	3	2	1
other (please specify)					
( ) _____	5	4	3	2	1
( ) _____	5	4	3	2	1
( ) _____	5	4	3	2	1

If you checked agricultural activities, please list the crops currently in cultivation.

_____

_____

If you checked grazing, please list the types of domestic livestock or native wildlife currently being managed.

_____

_____

Please use the space below to provide additional information on any of the above:

_____

_____

_____

E. LOCAL POPULATION AND PARTICIPATION

1. The local population living in and around the biosphere reserve can best be described as (CHECK those that apply):

( ) Agricultural
( ) Artisanal fishing/shellfishing
( ) Hunter-gatherer
( ) Nomadic
( ) Pastoral
( ) Urban or suburban
Other (please specify):
( ) _____

2. If indigenous populations live within or near the biosphere reserve, please provide a brief description of these populations below:

_____

3. Approximately how many people live permanently within the buffer zone? _____

4. The Biosphere Reserves should normally provide benefits to people living in and around it.

The below list identifies various potential benefits. Please place a CHECK in the space to the left of each category of benefits that applies in your biosphere reserve. Then, place a CHECK in the appropriate column to the right to record whether the benefits associated with the biosphere reserve are major or minor. A major benefit is one having substantial economic return or associated with significant improvement in the well being of most of the local population. A minor benefit is associated with limited economic return or improvement in well being for a small portion of the population.

		Major Benefit	Minor Benefit
( )	employment opportunities	( )	( )
( )	educational and training opportunities	( )	( )
( )	financial incentives and benefits	( )	( )
( )	health and community services	( )	( )
( )	rural development assistance	( )	( )
( )	tourism and recreational opportunities	( )	( )
( )	soil and water conservation	( )	( )
( )	maintenance of traditional cultures and practices	( )	( )
( )	participation in the planning and management of the Biosphere Reserve	( )	( )
( )	Other. Please specify _____	( )	( )

( ) There are virtually no benefits for local people

.. Biosphere Reserves require technical and financial support for their proper management and for addressing interrelated environmental, land use and socioeconomic development problems. Please CHECK the statements in the below list which apply to your Biosphere Reserve.

( ) Activities are receiving support from a variety of national sources including a central administrative authority

( ) Activities are receiving support from a single central administrative authority

( ) Activities are supported solely by the local administrative authority

( ) Activities are receiving special assistance from the local population. Please specify: _____

( ) Activities are receiving support from international sources. Please list the international sources (Unesco, UNEP, FAO, IUCN, WWF, etc...) and the projects they support: _____

_____

_____

7. CONSERVATION

Biosphere reserves may serve a wide range of conservation purposes.

Please CHECK all the below purposes that apply particularly to your biosphere reserve.

( ) Conserving a representative ecological area in natural or minimally disturbed state

( ) Conserving azonal ecosystems and interface areas (wetlands, coastal areas, etc...)

( ) Conserving large predators

( ) Conserving large, wide-ranging herbivores

( ) Conserving endangered or threatened "Red Book" animal or plant species*

( ) Conserving endangered or threatened species or sub-species identified at the national or regional level

( ) Conserving wild relatives of economic species*

( ) Conserving traditional agricultural cultivars or animal domesticates within indigenous production systems*

( ) Conserving an harmonious landscape resulting from traditional patterns of land use

( ) Conserving biological diversity in managed ecosystems

( ) Reestablishing indigenous species in areas where they have been eradicated or have otherwise disappeared

Other. Please specify:

( ) _____

( ) _____

* If readily available, PLEASE PROVIDE A LIST OF THESE SPECIES

5. RESEARCH AND MONITORING

The development of an integrated programme of monitoring and research is a primary function of Biosphere Reserves. CHECK all statements below that apply to your Biosphere Reserve.

( ) The biosphere reserve has an integrated programme of basic and applied research which supports site management objectives and sustainable conservation in the region.

( ) The biosphere reserve has a basic research programme not oriented to land use and management issues.

( ) The biosphere reserve has an applied research programme oriented to land use and management issues.

( ) The biosphere reserve participates in comparative monitoring or research with another biosphere reserve or research site in the same biogeographical province*

( ) The biosphere reserve participates in comparative monitoring or research with a biosphere reserve or research site in another biogeographical province*

( ) The biosphere reserve is the site of a Unesco MAB Project*

( ) The biosphere reserve is used occasionally for research, but has no permanent monitoring and research programme

( ) The biosphere reserve has no research history, and no monitoring and research programme

Approximately how many national scientists have participated in research at the site during the past year? _____

Approximately how many foreign scientists have participated in research at the site during the past year? _____

* Please indicate the research topic and, where applicable, the name of the cooperating site.

_____

_____

_____

_____

2. Research activities may relate to the various functions of the Biosphere Reserve, including in particular the sustainable development of ecosystem resources. Research priorities and status vary from case to case.

Please record the status of each of the below research topics by placing a CHECK in the appropriate column or columns to indicate whether the research is ongoing, planned as part of your Biosphere Reserve's research programme during the next five years.

	Ongoing Activity	Planned Activity
acidic deposition	( )	( )
agricultural research	( )	( )
appropriate rural technology	( )	( )
biological survey and collection	( )	( )
biogeochemical cycles	( )	( )
comparative ecological research	( )	( )
cultural anthropology	( )	( )
ecological succession	( )	( )
ecosystem modelling	( )	( )
ecosystem restoration	( )	( )
effects of atmospheric pollutants	( )	( )
effects of water pollutants	( )	( )
effects of pesticides	( )	( )
ethnobiology	( )	( )
exotic species	( )	( )
fire history and effects	( )	( )
forest research	( )	( )
genetic resources management	( )	( )
hydrological cycle	( )	( )
limnology and hydrobiology	( )	( )
mining reclamation studies	( )	( )
pests and diseases	( )	( )

rangeland management	( )	( )
rare/endangered species	( )	( )
recreation/tourism impacts	( )	( )
resource mapping	( )	( )
sedimentation	( )	( )
soil studies and conservation	( )	( )
traditional land use systems	( )	( )
watershed management	( )	( )
wildlife population dynamics	( )	( )
Other please specify		
_____	( )	( )
_____	( )	( )

I. ON-SITE STAFF AND FACILITIES

In the below listing, CHECK entries which apply within your biosphere reserve.

( ) Air pollution monitoring station

( ) Climatological monitoring station

( ) Conference/meeting facilities

( ) Hydrological monitoring station

( ) Laboratory facility

( ) Library

( ) Lodging for visiting scientists. How many? _____

( ) Microcomputers. Make/model_____

Other computers. Make/model_____

( ) Permanent monitoring plots. How many? Vegetation_____
Lake/stream _____ Marine benthic communities_____
Other (please specify)_____

( ) Road access to research sites

( ) Small watershed integrated research sites. How many? _____

( ) Storage and curatorial facilities for biological and environmental collections

( ) On-site permanent research staff. How many? _____
University-trained staff _____ Technicians _____

( ) On-site administration staff (all staff except for research staff). How many? University-trained staff _____ Other _____

( ) On-site protection staff (wardens, etc...). How many? _____

I. EDUCATION AND TRAINING

Please record the status of each of the below activities by placing a CHECK under the appropriate column or columns to indicate whether the activity is ongoing, planned within the next five years, or both. If no activity, CHECK the last column.

	Ongoing Activity	Planned Activity	No Activity
Environmental education for school children and students	( )	( )	( )
Extension services for local people	( )	( )	( )
Demonstration projects in land use and management	( )	( )	( )
Graduate and postgraduate research projects for students	( )	( )	( )
Interpretive programmes for tourists	( )	( )	( )
Professional training and workshops for scientists	( )	( )	( )
Professional training and workshops for resource managers and land use planners	( )	( )	( )
Training for staff in biosphere reserve management	( )	( )	( )
Training for local people in biosphere reserve concepts and management	( )	( )	( )
Other. Please specify.			
_____	( )	( )	
_____	( )	( )	

J. BASIC RESOURCE INFORMATION

In the below listing, CHECK the types of information which are available for the Biosphere Reserve. After some of the items in the list, space is provided for you to estimate, if possible, the approximate period of record for the type of information.

( ) aerial photographs (_____ years)

( ) acidic deposition data (_____ years)

( ) air quality data (_____ years)

( ) aquatic ecosystems, freshwater (_____ years)

( ) aquatic ecosystems, marine (_____ years)

( ) bibliography

( ) climatological data (_____ years)

( ) ethnobiological information

( ) geological map

( ) history of scientific study

( ) hydrological data, surface (_____ years)

( ) hydrological data, groundwater (_____ years)

( ) inventory of mammals (_____ years)

( ) inventory of other vertebrates (_____ years)

( ) inventory of invertebrates (_____ years)

( ) inventory of vascular plants (_____ years)

( ) inventory of nonvascular plants (_____ years)

( ) land use history (_____ years)

( ) land use map

( ) soils map and description

( ) topographic map

( ) vegetation map

( ) vegetation data (_____ years)

( ) water quality data (_____ years)

( ) other baseline information and data. Please specify:_____

_____

_____

_____

RESPONDENT

Name of respondent: _____

Position: _____

Address: _____

_____

_____

Telephone: _____

Highest academic degree: _____

Professional background: _____

_____

Number of years associated with the Biosphere Reserve: _____

MAILING ADDRESS FOR ADDITIONAL INFORMATION ON THE BIOSPHERE RESERVE
(if different from the respondent)

Name: _____

Position: _____

Address: _____

_____

Telephone: _____

Thank you for your time and effort spent completing this questionnaire. Please return the questionnaire as soon as possible so that it reaches the MAB Secretariat preferably by 31 July 1986.

The results of our analysis should give a clear view of the present state of the international network of Biosphere Reserves and could provide you with ideas and suggestions from what is going on in various parts of the world.

If you would like a copy of the results of our analysis, please check the box below.

( )

N16 (474)

MAR 18 1987

Dr. Bernd von Droste
Director, Division of Ecological Sciences
UNESCO
1, rue Miollis
75015 Paris,
FRANCE

Dear Dr. von Droste:

Per the Secretariat's recent request, I am pleased to provide a partial summary of responses to the MAB biosphere reserve questionnaire, which was distributed by the UNESCO Secretariat to National MAB Committees in May 1986. The attached brief report summarizes selected information from the 122 biosphere reserves in 36 countries responding as of 1 March 1987. The summary demonstrates use of the survey results in developing a preliminary overview of the network's conservation, logistical, and development functions.

We have entered information from the questionnaires into a spreadsheet on an IBM Personal Computer utilizing Symphony software. Incorporation into the MAB Information System should be possible by transferring this information to the dBase III software used by the IUCN's Protected Area Data Unit.

We look forward to working with the Secretariat in strengthening the MAB Information System, and, in particular, in structuring applications of the questionnaire to meet the specific needs of the many potential constituencies of biosphere reserves.

Sincerely,

William P. Gregg, Jr.
Cochairman, U.S. MAB Project Directorate
on Biosphere Reserves

Enclosures

bcc: 474-Gregg
474-Leffel
R. Soles, U.S. MAB Secretariat
U.S. MAB-8 Directorate
MAB:WPG/wpg:3-16-87
CPT24:Survey

STATUS OF THE INTERNATIONAL NETWORK OF BIOSPHERE RESERVES

Preliminary Summary of Selected Survey Results

In May 1986, the UNESCO MAB Secretariat initiated a survey of the International Network of Biosphere Reserves. The purpose was to improve the availability of information on biosphere reserves, facilitate identification of opportunities for developing biosphere reserve functions, and enable a more thorough evaluation of the network with respect to the roles and objectives identified in the Action Plan for Biosphere Reserves.

As of 1 March 1987, 36 countries had returned questionnaires for 122 of the 261 biosphere reserves in the survey. In this report, we provide a very preliminary summary of responses on 44 of the more than 250 items of information on the questionnaire (Attachment 1). We selected items particularly indicative of the status of the network with respect to the conservation, logistical, and development roles of biosphere reserves in general, and the nine objectives of the Action Plan, in particular. We have tabulated responses for each country and its biosphere reserves, arranged alphabetically by acronyms. The acronyms are listed in Attachment 2. Attachment 3 contains the data summary. The columns record responses and provide statistics for each biosphere reserve. At the end of each row are statistics for each item of information for all reporting biosphere reserves.

The results are summarized below. A more comprehensive summary and statistical analysis of the full questionnaire will be prepared later this year.

CONSERVATION ROLE

Conservation of representative ecosystems and genetic resources are presently reported as the most important objectives of the network; only 32 of the 122 respondents consider either objective to be of less than major importance (i.e., rating 3 or lower). Only eight fail to identify at least one of these objectives to be of major importance. As MAB has traditionally emphasized conservation criteria in selection, the results are not surprising.

Providing the legal and administrative basis for protection and management is seen as less important than conservation. The lower rankings for this objective may be partially due to the fact that most biosphere reserves rely on the legal authorities applicable to existing protected areas, and do not independently provide protection. However, about 20% of the biosphere reserves have no on-site protection staff; 18% have no on-site administrative staff; and five report no on-site staff at all. The summary raises questions as to whether conservation and scientific values, particularly in core areas, are being adequately safeguarded in a significant number of biosphere reserves.

About two-thirds of the biosphere reserves report conserving endangered or threatened "Red Book" species, suggesting that this purpose is relatively well recognized in the network. Much less emphasis is being placed on species of potential importance in economic development, including the wild relatives of economic species (16%) or traditional agricultural cultivars and domesticates (9%). On-going initiatives to enhance the role of biosphere reserves in economic development can be expected to strengthen these conservation purposes.

LOGISTICAL ROLE

For purposes of this summary, the logistical role is considered to encompass objectives relating to the generation and sharing of information through monitoring, research, educational, and training activities.

Respondents universally consider scientific functions to be relevant, and usually important. Fully 98% report long-term monitoring as an objective; the average rating approximates those reported for conservation objectives. Only thirty-seven sites (30%) regard the objective to be of less than major importance. Experimental problem-oriented research, reported by 91%, is only somewhat less important, with 55 respondents regarding the objective to be of less than major importance. In view of restrictions on experimental research in many of the national parks and other strictly protected areas comprising most of the existing network, the strength of this objective suggests considerable opportunity exists for developing comparative research functions.

We summarized responses for twelve of the most important types of resource information needed to support the logistical role of biosphere reserves. We found that reasonably comprehensive information is available for slightly less than half, with 54 sites (44%) reporting available information on ten or more types. Seventeen sites (14%) indicate very little available information, as evidenced by a report of four or fewer types. Looking at individual types of information, the gaps are considerable. A surprising 30% have no bibliography. Basic resource maps are lacking in many--a vegetation map in 19%, topographic map in 24%, geological map in 29%, soils map in 34%, and land use map in 54%. A concerted effort to focus satellite technology and limited technical assistance on biosphere reserves could readily address many of these needs concurrently. Similarly, there are many gaps in the important area of biological inventory. About a third of the sites report at least some work on all five types of organisms listed on the questionnaire. Although more than three-fourths report work on vertebrates and/or vascular plants, the figure drops to 58% for invertebrates and 45% for nonvascular plants. MAB's biological diversity program, launched last year in cooperation with the Smithsonian Institution, should help fulfill requirements for biological survey and related training in some of these biosphere reserves.

Research programs tend to be strongest in traditional areas of basic research, such as biological survey and wildlife population studies; and moderately strong in applied research relating to forest and recreational uses, perhaps reflecting the importance of forest reserves and national parks in the existing network. Much less frequently reported are agricultural research and research on traditional land use systems--areas which, until recently, have commanded relatively modest attention in the selection and functional development of biosphere reserves. Both are essential to the development role of biosphere reserves.

Notwithstanding the considerable infrastructure required, research on atmospheric pollution and biogeochemical cycling is relatively well represented. The relatively strong showing of these complex areas of investigation is likely due to the disproportionately greater response to date from North America and Western Europe, where many of the leading sites for such work are included in the network.

Most biosphere reserves report at least some infrastructure to support research. Between half and two-thirds of the sites have lodging for visiting scientists (69%), permanent monitoring plots (67%), road access to research sites (61%), and/or a library (53%); somewhat less than half have a field laboratory (43%). Twenty-four (20%) report all of these facilities, 77 (63%) report three or more, and only nine (7%) report none.

Environmental education and training, which are closely related to scientific functions, is reported as an objective by 92% of the reserves, and of major importance in half.

Weakest is the networking function. Slightly less than three-fourths of the biosphere reserves report that the sharing of information about conservation, management, and biosphere reserves is an objective; and those that do generally consider the objective to be of minor importance (only 31 of the 122 ranked it as major with a rating of 4 or 5). Because this objective is the least likely to be pursued apart from the biosphere reserve program, it may be the most indicative of acceptance of biosphere reserve concepts by site administrators, and a measure of the challenges facing MAB in building functional biosphere reserves.

DEVELOPMENT ROLE

Objectives relating to the development role rank considerably lower than others, and expanding the role of biosphere reserves in sustainable economic development appears to represent the greatest challenge facing the network today. The survey suggests that opportunities are available, but need to be identified and aggressively pursued. About three-fourths of the sites are concerned to some degree with promoting regional planning and integrated development, and a similar number reports existing linkages between the biosphere reserve and local planning and development authorities. However, only 28 (23%) consider this a major objective. Local participation, an essential factor in sustainable development, shows the same pattern--about three-fourths reporting with about two-thirds indicating existing cooperation between the biosphere reserve and the human population living within or near the biosphere reserve. However, only 22 (18%) report local participation as a major objective. Finally, only sixteen sites (13%) report both regional planning and local participation as major objectives. Many of these are in countries which have placed particular emphasis on these functions (e.g., Canada, Costa Rica, Czechoslovakia, and Mexico).

Encouraging is the fact that a third of the biosphere reserves conserve harmonious landscapes, and only slightly fewer are conducting research on traditional land use systems. This suggests that important opportunities already exist for using the network to demonstrate successful integration of conservation and development.

EXAMPLES OF MULTIPLE ROLES IN PRACTICE

The survey can help identify areas which exemplify the multiple roles of biosphere reserves in practice. Using the tabulated responses, we identified all areas having the following characteristics, which collectively indicate an integrated approach to implementing these multiple roles:

- all nine objectives reported with a rating of 2 or higher
- eight or more types of basic information (ex 12)
- four or more types of ongoing or planned research (ex 8)
- three or more types of research facilities (ex 5)
- on-site protection staff
- links with regional development authorities and local population

The following biosphere reserves reported these characteristics:

*Bulgaria: Doupki-Djindjiritza
Bulgaria: Steneto
Canada: Waterton Lakes
*Columbia: Sierra Nevada de Santa Marta
Cuba: Sierra del Rosario
**Czechoslovakia: Krivolatsko
**Czechoslovakia: Palava
**Czechoslovakia: Slovensky Kras
**Czechoslovakia: Trebon
**France: Cevennes
Germany, Fed. Rep.: Bayerischer Wald
**Spain: Grazalema
**Spain: Marismas del Odiel
**Spain: Sierras de Cazorla y Segura
*USA: Carolinian-South Atlantic
USA: Central Gulf Coastal Plain
USA: Glacier
*USA: Hawaii Islands
*USA: Mojave and Colorado Deserts
*USA: Noatak
USA: Olympic
USA: Rocky Mountain
USA: Virgin Islands

The list includes a disproportionate number of harmonious landscapes (**) and multiple-site biosphere reserves (*), and suggests that such areas may afford particular opportunities to demonstrate biosphere reserve concepts.

ANALYSIS WITH AND WITHOUT U.S. RESERVES

Because of the large number of U.S. sites (42) in the total response, we were concerned that these areas would bias the conclusions of the summary. We therefore prepared separate summaries for U.S. and other responses. On the basis of the results, we can conclude that the pattern in the average ratings for the nine objectives is similar in both groups. Conservation objectives are rated somewhat lower and experimental research higher in the U.S. sample, which probably reflects the large number of experimental research sites separately designated as biosphere reserves in the U.S. The ratings for objectives relating to protection and education are nearly identical. Regional planning and local participation objectives ranked somewhat lower in the U.S. sample, reflecting the limited emphasis to date on enhancing the development role. Correlated is the finding that the U.S. reserves are much less likely to have links with regional planning and development authorities.

Not surprisingly, more types of basic resource information are reported for the U.S. sample, with differences ranging from 30% more U.S. reserves reporting topographic maps to virtually no differences between samples for animal inventories. Research follows a similar pattern, ranging from a difference of 34% for effects of pollutants and 26% for biogeochemical cycling to virtually none for agricultural research (where the percentage of non-U.S. reserves reporting activity is 3% greater). Differences are greatest in the area of facilities, ranging from 42% for field laboratories to only 8% for lodging for visiting scientists. U.S. sites are more likely to have research staff, about as likely

to have administrative staff, and much less likely to have protection staff--the latter apparently due to the lack of protection staff on experimental research sites.

On the basis of these preliminary results, it appears that the inclusion of U.S. sites affects primarily the logistical role in portions of the analysis relating to scientific objectives, facilities, and activities where the U.S. network is strong; and, to a lesser extent, portions relating to development objectives, where the U.S. network is relatively weak. Differences in the conservation role are probably due largely to the much greater proportion of experimental research sites in the U.S. which lack a large core area.

Surveys Received for Analysis - March 1987

COUNTRY	BIOSPHERE RESERVE	BIOME
Algeria (ALGE)		
	TASS = Parc National du Tassili	*
Argentina (ARGE)		
	LABL = Reserva de Vida Silvestre "Laguna Blanca"	WARMDES
Australia (AUSL)		
	DANG = Danggali Conservation Park	WARMDES
	FIRI = Fitzgerald River National Park	EVSCLER
	KOSC = Kosciusko National Park	EVSCLER
	MAIS = Macquarie Island Nature Reserve	TUNDRA
	SOUT = Southwest National Park	TERAIN
	YATH = Yathong Nature Reserve	TEGRASS
Austria (AUST)		
	NEOS = Neusiedler See-Osterreichischer Teil	TEBROAD
Bolivia (BOLI)		
	ULUL = Reserva Biologica de Ulla Ulla	MXDMTN
Bulgaria (BULG)		
	ALIB = Reserve Alibotouch	MXDMTN
	BIBR = Reserve Bistrichko Branichte	MXDMTN
	BOAT = Reserve Boatine	MXDMTN
	DJEN = Reserve Djendema	MXDMTN
	DOUP = Reserve Doupkata	MXDMTN
	DODJ = Reserve Doupki-Djindjiritza	MXDMTN
	KAMT = Reserve Kamtchia	MXDMTN
	KOUP = Reserve Koupena	MXDMTN
	MANT = Reserve Mantaritza	MXDMTN
	MARI = Reserve Maritchini ezera	MXDMTN
	OUZO = Reserve Ouzounboudjak	MXDMTN
	PARA = Reserve Parangalitza	MXDMTN
	SREB = Reserve Srebarna	TEBROAD
	STEN = Parc national Steneto	MXDMTN
	TCHE = Reserve Tchervenata stena	MXDMTN
	TCHO = Reserve Tchouprene	MXDMTN
	TSAR = Reserve Tsaritchina	MXDMTN
Canada (CANA)		
	LOPO = Long Point Biosphere Reserve	LAKE
	MONT = Mont St. Hilaire	TEBROAD
	RIMO = Riding Mountain Biosphere Reserve	TENEED
	WALA = Waterton Lakes National Park	MXDMTN
Chile (CHIL)		
	FRJO = Parque Nacional Fray Jorge	EVSCLER
	JUFE = Parque Nacional Juan Fernandez	MXDISL
	LAUC = Parque Nacional Lauca	MXDMTN
Columbia (COLU)		
	NEVA = Los Nevados National Park	*
	SISA = Sierra Nevada de Santa Marta (incl. Tayrona NP)	TRDRY
	TUPA = El Tuparro Nature Reserve	TRGRASS

COUNTRY	BIOSPHERE RESERVE	BIOME
Congo (CONG)		
	ODZA = Parc national d'Odzala	TRHUMID
Costa Rica (CORI)		
	AMIS = Reserva de la Biosfera de la Amistad	TRDRY
Cuba (CUBA)		
	SIRO = Sierra del Rosario	MXDISL
Czechoslovakia (CZEC)		
	KRIV = Krivoklatsko Protected Landscape Area	TEBROAD
	PALA = Palava Protected Landscape Area	TEBROAD
	SLKR = Slovensky Kras Protected Landscape Area	TEBROAD
	TRBA = Trebon Basin Protected Landscape Area	TEBROAD
Ecuador (ECUA)		
	ARCO = Archipielago de Colon (Galapagos)	MXDISL
Egypt (EGYP)		
	OMAY = Omayed Experimental Research Area	WARMDES
France (FRAN)		
	CAMA = Reserve nationale de Camargue BR	EVSCLER
	CEVE = Reserve de la biosphere du PN des Cevennes	TEBROAD
Gabon (GABO)		
	IPMA = Reserve naturelle integrale d'Ipassa-Makokou	TRHUMID
Germany, Federal Republic of (GERM)		
	BAWA = Bayerischer Wald National Park	MXDMTN
Honduras (HOND)		
	RIPL = Rio Platano Biosphere	TRDRY
Indonesia (INDO)		
	GULE = Gunung Leuser Proposed National Park	MXDISL
Ireland (IREL)		
	KILL = Killarney National Park	TEBROAD
Japan (JAPA)		
	MOHA = Mount Hakusan	TERAIN
	MOMO = Mount Odaigahara & Mount Omine	TERAIN
	SHHI = Shiga Highland	TEBROAD
	YAIS = Yakushima Island	TERAIN
Mali (MALI)		
	BOBA = Parc national de la Boucle du Baoule (etc)	TRDRY
Mexico (MEXI)		
	MAPI = Reserva de Mapimi	WARMDES
	MICH = Reserva de la Michilia	MXDMTN
Netherlands (NETH)		
	WASE = Wadden Sea	*

COUNTRY	BIOSPHERE RESERVE	BIOME
Peru (PERU)		
	HUAS = Reserva de Huascaran	MXDMTN
Romania (ROMA)		
	ROLE = Rosca-Letea Reserve	TEGRASS
Rwanda (RWAN)		
	VOLC = Parc national des Volcans	MXDMTN
Senegal (SENE)		
	NIKO = Parc national du Niokolo-Koba	TRDRY
SPAIN (SPAI)		
	CATI = Reserva de la Biosfera del Canal y los Tiles	MXDISL
	DONA = Reserva de la Biosfera de Donana	EVSCLER
	GRAZ = Reserva de Grazalema	EVSCLER
	MAHU = Reserva de la Biosfera de la Mancha Humeda	EVSCLER
	MAOD = Reserva de la Biosfera de las Marismas del Odiel	EVSCLER
	MONT = Parque Natural del Montseny	EVSCLER
	ORVI = Reserva de Ordesa-Vinamala	EVSCLER
	SIER = Las Sierras de Cazorla y Segura BR	EVSCLER
	SINE = Reserva de la Biosfera "Sierra Nevada"	EVSCLER
Sudan (SUDA)		
	DIND = Dinder National Park	WARMDES
Switzerland (SWIT)		
	SUIS = Parc national Suisse	MXDMTN
Tanzania, United Republic of (TANZ)		
	LAMA = Lake Manyara National Park	TRDRY
United States of America (USA)		
	ALIS = Aleutian Islands National Wildlife Refuge	TUNDRA
	BECR = Beaver Creek Experimental Watershed	WARMDES
	BIBE = Big Bend National Park	WARMDES
	BITH = Big Thicket National Preserve	TEBROAD
	CACO = California Coast Ranges Biosphere Reserve	TERAIN
	CASO = Carolinian-South Atlantic Biosphere Reserve	TEBROAD
	CEGU = Central Gulf Coastal Plain Biosphere Reserve	TEBROAD
	CEPL = Central Plains Experimental Range	TEGRASS
	CHIS = Channel Islands Biosphere Reserve	EVSCLER
	CORA = Coram Experimental Forest (incl. Coram NA)	MXDMTN
	COWE = Coweeta Hydrologic Laboratory	TEBROAD
	DENA = Denali National Park and Biosphere Reserve	TENEED
	DESE = Desert Experimental Range	COLDDES
	EVER = Everglades National Park (incl. Ft. Jefferson NM)	TRDRY
	FRAS = Fraser Experimental Forest	MXDMTN
	GLAC = Glacier National Park	MXDMTN
	GLAD = Glacier Bay-Admiralty Island Biosphere Reserve	TERAIN
	GRSM = Great Smoky Mountains National Park	TEBROAD
	GUAN = Guanica Commonwealth Forest Reserve	MXDISL
	HAIS = Hawaii Islands Biosphere Reserve	MXDISL
	HJAN = H.J. Andrews Experimental Forest	MXDMTN
	HUBR = Hubbard Brook Experimental Forest	TEBROAD
	ISRO = Isle Royale National Park	LAKE
	JORN = Jornada Experimental Range	WARMDES

COUNTRY	BIOSPHERE RESERVE	BIOME
United States of America (con'd)		
KOPR	= Konza Prairie Research Natural Area	TEGRASS
LUQU	= Luquillo Experimental Forest (Caribbean NF)	MXDISL
MOCO	= Mojave and Colorado Deserts Biosphere Reserve	WARMDES
NIRI	= Niwot Ridge Biosphere Reserve	MXDMTN
NOAT	= Noatak Biosphere Reserve	TUNDRA
OLYM	= Olympic National Park	TERAIN
ORPI	= Organ Pipe Cactus National Monument	WARMDES
ROMO	= Rocky Mountain National Park	MXDMTN
SADI	= San Dimas Experimental Forest	EVSCLER
SAJO	= San Joaquin Experimental Range	EVSCLER
SEKI	= Sequoia-Kings Canyon National Parks	MXDMTN
SOAT	= South Atlantic Coastal Plain Biosphere Reserve	TEBROAD
STTU	= Stanislaus-Tuolumne Experimental Forest	MXDMTN
THSI	= Three Sisters Wilderness	MXDMTN
UNMI	= University of Michigan Biological Station	TEGRASS
VICO	= Virginia Coast Reserve	TEBROAD
VIIS	= Virgin Islands National Park and Biosphere Reserve	MXDISL
YELL	= Yellowstone National Park	MXDMTN
Yugoslavia (YUGO)		
VEMO	= The Velebit Mountain	EVSCLER
Zaire (ZAIR)		
FLYA	= Reserve Floristique de Yangambi	TRHUMID
LUKI	= Forest Reserve of Luki	TRHUMID

* = data not included in MAB Information System Compilation 4, October 1986.

BIOME CODES

TRHUMID = tropical humid forests

TERAIN = subtropical and temperate rain forests or woodlands

TENEED = temperate needle leaf forests or woodlands

TRDRY = tropical dry or deciduous forests (incl. monsoon forests) or woodlands

TEBROAD = temperate broad-leaf forests or woodlands and subpolar deciduous thickets

EVSCLER = evergreen sclerophyllous forests, scrubs, or woodlands

WARMDES = warm deserts and semideserts

COLDDES = cold winter (continental) deserts and semideserts

TUNDRA = tundra communities and barren arctic desert

TRGRASS = tropical grasslands and savannas

TEGRASS = temperate grasslands

MXDMTN = mixed mountain and highland systems with complex zonation

MXDISL = mixed island systems

LAKE = lake systems

COUNTRY / NAME OF BIOSPHERE RESERVE	ALGE TASS	ARGE LABL	AUSL DANG	AUSL FIRI	AUSL KOSC	AUSL MAIS	AUSL SOUT	AUSL YATH	AUST NEOS	BOLI ULUL	BULG ALTB	BULG BIBR	BULG BOAT	BULG DJEN	BULG DOUP	BULG DODJ	BULG KANT	BULG KOUP	BULG MANT	BULG MORI	BULG OUZO	BULG PARA	BULG STEN	BULG SREB	BULG TCHE	BULG TCHO	BULG TSAR	CANA LOPO	CANA MONT	CANA RIMO	CANA WALA
PURPOSE OF THE BIOSPHERE RESERVE 5=highest 1=lowest blank=N/A																															
Conserve natural or minimally disturbed representative ecosystems	3	5	5	5	5	5	5	5	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	3	4	5	5		5	5	5
Provide legal & admin. basis for resource protection & management		5	5	1	5	5	5	4		5													5						3		4
Conserve genetic resources in situ		5	5	5	5	5	5	4	3		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5
Conduct experimental problem-oriented research	2	3		4	2	3	3	4	1	4	1	5	5	5	5	5	5	5		5	5	5	5	5	3	5	5	2	5	3	4
Conduct long-term environmental monitoring	5	3	4	4	5	5	3	5	3		5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	2	4	3	3
Promote regional planning and integrated rural development	1	5		5				2	1	4		3		5		4	2	2	1	3		2	4	4			3	4			5
Promote local participation in planning and management		3		5	2		3	2	3	2			2	2		2	1	2					3	3			1	4		5	5
Promote environmental education and training		2	3	5	3		4	2	1			3	3	4		3	4	4		2		3	2	4	2		2	1	5	2	4
Communicate information about Biosphere Reserves...		2	3	5				3	5							3							2					1	3	5	4
Percentage of responses:	44%	100%	67%	100%	78%	56%	78%	100%	89%	56%	44%	67%	67%	78%	44%	89%	78%	78%	44%	67%	44%	67%	100%	78%	56%	44%	78%	78%	78%	78%	100%
Average rank:	1.22	3.66	2.77	4.33	3	2.55	3.11	3.44	2.22	2	1.77	2.88	2.77	3.44	2.22	3.55	3	3.11	1.77	2.77	2.22	2.77	4	3.22	2	2.22	2.88	2	3.33	3.11	4.33
LINKS W/ OTHER MANAGEMENT AUTHORITY Y=statement applies blank=N/A																															
The administrative authorities responsible for planning & development	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y
Local community & representatives of population living in or near B.R.		Y		Y	Y		Y		Y			Y		Y				Y	Y			Y	Y	Y		Y	Y	Y	Y	Y	Y
CONSERVATION Y=statement applies blank=N/A																															
Conserving endangered or threatened "Red Book" animal or plant species	Y			Y	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	
Conserving wild relatives of economic species																															Y
Conserving traditional agricultural cultivars or animal domesticates														Y																	
Conserving a harmonious landscape resulting from patterns of land use	Y																Y							Y							Y
RESEARCH ACTIVITIES O=ongoing P=planned blank=no activity																															
Agricultural research				O																											O
Biological survey & collection	O			O	O	O	O	O	O	O	O	O	O	O	P	O	O	P	P	O	O	O	O		O	O	O	O	O	P	O
Biogeochemical cycles					O						P	P				P						P	P	O					O		
Effects of atmospheric pollutants						O						P				P						P	O						O		
Forest research		P									O	O	O	O	O	O	O	O	O	O	O	O	O	P	O	O	O	P	O		
Recreation/tourism impacts	O			P	O		O		O			P		P		O				P							P		O		O
Traditional land use systems		O																													
Wildlife population dynamics		O		P	O	O		O	O	P				P		P				P				O		P	P	O		O	O
Tally of responses:	2	3	0	4	4	3	2	2	3	2	3	5	2	4	2	6	2	2	2	4	2	4	4	3	2	3	4	3	5	2	4
Percentage of responses:	25%	38%	0%	50%	50%	38%	25%	25%	38%	25%	38%	63%	25%	50%	25%	75%	25%	25%	25%	50%	25%	50%	50%	38%	25%	38%	50%	38%	63%	25%	50%
FACILITIES AND ON-SITE STAFF Y=statement applies blank=N/A																															
Laboratory facility						Y			Y															Y					Y		
Library					Y	Y		Y	Y							Y								Y					Y		Y
Lodging for visiting scientists		Y	Y	Y	Y	Y		Y	Y	Y			Y	Y		Y		Y	Y			Y	Y	Y			Y	Y	Y		Y
Permanent monitoring locations			Y	Y	Y	Y		Y	Y			Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y		Y	Y	Y	Y			Y
Road access to research site	Y		Y	Y		Y	Y	Y	Y	Y																	Y		Y	Y	
On-site permanent research staff	Y				Y	Y			Y	Y			Y			Y				Y		Y	Y	Y							
On-site administration staff	Y		Y		Y	Y			Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y
On-site protection staff	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
BASIC RESOURCE INFORMATION Y=statement applies blank=N/A																															
Bibliography	Y	Y		Y	Y	Y	Y		Y	Y	Y		Y			Y							Y	Y	Y		Y	Y	Y		Y
Climatogical data	Y	Y		Y	Y	Y	Y		Y	Y		Y	Y	Y		Y				Y		Y	Y	Y			Y		Y	Y	Y
Geological map	Y			Y	Y	Y	Y		Y		Y	Y		Y		Y						Y	Y	Y					Y	Y	Y
Inventory of mammals	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y		Y	Y	Y			Y	Y	Y	Y	Y
Inventory of other vertebrates		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Y
Inventory of invertebrates		Y	Y			Y		Y	Y		Y	Y		Y			Y			Y		Y	Y				Y	Y	Y		Y
Inventory of vascular plants	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y
Inventory of nonvascular plants			Y		Y	Y			Y																				Y		Y
Land use map								Y	Y	Y																			Y		Y
Soils map and description					Y			Y	Y		Y		Y			Y	Y		Y	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y
Topographic map	Y			Y	Y	Y	Y	Y	Y																			Y	Y	Y	Y
Vegetation map				Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y
Tally of responses:	6	5	6	8	10	9	8	8	12	7	7	6	7	7	4	7	6	4	4	7	3	8	9	6	5	2	8	8	12	7	12
Percentage of responses:	50%	42%	50%	67%	83%	75%	67%	67%	100%	58%	58%	50%	58%	58%	33%	58%	50%	33%	33%	58%	25%	67%	75%	50%	42%	17%	67%	67%	100%	58%	100%

COUNTRY	CHIL	CHIL	CHIL	COLU	COLU	COLU	CONG	CORI	CUBA	CZEC	CZEC	CZEC	CZEC	ECUA	EGYP	FRAN	FRAN	GABO	GERM	HOND	INDO	IREL	JAPA	JAPA	JAPA	JAPA	MALI	MEXI	MEXI	NETH	PERU
NAME OF BIOSPHERE RESERVE	FRJO	JUFE	LAUC	NEVA	SISA	TUPA	ODZA	AMIS	SIRO	KRIV	PALA	SLKR	TRBA	ARCO	OMAY	CAMA	CEVE	IPMA	BAWA	RIPL	GULE	KILL	MOHA	MOMO	SHHI	YAIS	BOBA	MAPI	MICH	WASE	HUAS
PURPOSE OF THE BIOSPHERE RESERVE 5=highest 1=lowest blank=N/A																															
Conserve natural or minimally disturbed representative ecosystems	5	4	5	5	5	4	5	5	5	5	5	5	5	5	5	5	2	5	4	5	5	5	5	5	5	5	5	5	5	5	3
Provide legal & admin. basis for resource protection & management	3	4	3	5	4	2	3	5	2	5	5	4	5	5	5	5	3	4	1		5	1					3	3	5	5	3
Conserve genetic resources in situ	5	5	5	5	3	4	5	5	4	4	5	5	3	5	3	2	3	5	3	4	5	3	3	4	3	4	5	4	5	5	3
Conduct experimental problem-oriented research	2	3	4	5	3	2	1	3	5	3	3	5	4	4	5	4	3	5	2	3	5	3					1	5		3	3
Conduct long-term environmental monitoring	5	1	3	4	2	1	2	3	5	3	5	5	3	5	3	5	4	5	4	2	4	1	4	3	2	3	4	2	4	3	
Promote regional planning and integrated rural development			1	3	5	1	4	4	3	5	3	4	3	3		1	5	4	4		5						3	4	4		3
Promote local participation in planning and management			1	5	5	2	2	4	3	5	3	4	3			1	5	4	4	5	3		2				3	5	4		3
Promote environmental education and training	4	2	3	5	5	2	3	4	4	5	4	4	3	5	5	4	5	4	4	5	5	4	4	5	5	2	2	1	3	3	3
Communicate information about Biosphere Reserves...	3	3	3	4	4	2	3	3	4	5	5	4	4	1	1	2	5	5	3	4	5						1				3
Percentage of responses:	78%	78%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	89%	78%	100%	100%	100%	100%	78%	100%	67%	56%	44%	44%	44%	100%	89%	78%	67%	89%
Average rank:	3	2.44	3.11	4.55	4	2.22	3.11	4	3.88	4.44	4.22	4.44	3.66	3.66	3	3.22	3.88	4.55	3.22	3.11	4.66	1.88	2	1.88	1.66	1.55	3	3.22	3.33	2.66	2.66
LINKS W/ OTHER MANAGEMENT AUTHORITY Y=statement applies blank=N/A																															
The administrative authorities responsible for planning & development	Y	Y		Y			Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y
Local community & representatives of population living in or near B.R.		Y		Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y			Y		Y	Y	Y	Y	Y
CONSERVATION Y=statement applies blank=N/A																															
Conserving endangered or threatened "Red Book" animal or plant species	Y	Y	Y	Y			Y	Y		Y	Y	Y	Y	Y			Y	Y	Y	Y	Y		Y				Y	Y	Y	Y	Y
Conserving wild relatives of economic species		Y	Y											Y				Y			Y			Y			Y				Y
Conserving traditional agricultural cultivars or animal domesticates			Y		Y			Y													Y										Y
Conserving a harmonious landscape resulting from patterns of land use			Y	Y				Y		Y	Y	Y	Y		Y		Y				Y	Y		Y							
RESEARCH ACTIVITIES O=ongoing P=planned blank=no activity																															
Agricultural research					P			P	P	P	O		O	O	P	O	O												O		
Biological survey & collection		O	O	P	P	P	P	O	O	O	O	O	O	O	O		O		O	O	O	O	O	O				P	O	O	O
Biogeochemical cycles			P		P				O	O			O	O	O		O	P	O											O	
Effects of atmospheric pollutants										O	P			P			O		O											P	
Forest research	O			P	P		P	P	O	O		O		O			O	O	O		O				P	O			P		
Recreation/tourism aspects			P	P	O		P	P	P	P	O	O		O		O	P		O		O			O						O	
Traditional land use systems			P		O		P	O			P	O					P	O		O									P		
Wildlife population dynamics		P	O	P	P	P	P	P	O	O		O	O	O		O	O		O			P	O			O	O	O	O	O	
Tally of responses:	1	2	5	4	7	2	5	6	6	7	5	5	4	7	3	3	8	3	6	2	3	2	2	2	1	2	1	2	5	5	1
Percentage of responses:	13%	25%	63%	50%	88%	25%	63%	75%	75%	88%	63%	63%	50%	88%	38%	38%	100%	38%	75%	25%	38%	25%	25%	25%	13%	25%	13%	25%	63%	63%	13%
FACILITIES AND ON-SITE STAFF Y=statement applies blank=N/A																															
Laboratory facility									Y				Y	Y	Y			Y	Y			Y	Y				Y	Y	Y	Y	
Library		Y	Y	Y						Y	Y	Y	Y	Y	Y	Y		Y	Y		Y		Y				Y			Y	
Lodging for visiting scientists		Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y				Y		Y	Y	Y	Y	
Permanent monitoring locations	Y		Y	Y				Y	Y	Y		Y	Y	Y		Y	Y		Y			Y	Y	Y	Y			Y		Y	
Road access to research site	Y		Y	Y					Y	Y	Y	Y	Y	Y	Y		Y	Y	Y		Y	Y	Y	Y	Y			Y	Y	Y	Y
On-site permanent research staff				Y	Y	Y	Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y				Y	Y	
On-site administration staff	Y	Y	Y	Y			Y	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
On-site protection staff	Y	Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y		Y			Y			Y	Y
BASIC RESOURCE INFORMATION Y=statement applies blank=N/A																															
Bibliography	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y				Y	Y	Y	Y		Y	Y	Y	Y
Climatological data	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y
Geological map	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y			Y	Y	Y	Y	Y		Y		Y	Y
Inventory of mammals	Y	Y	Y	Y	Y				Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Inventory of other vertebrates	Y	Y	Y	Y	Y				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y		Y	Y	Y	Y
Inventory of invertebrates	Y		Y	Y					Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y			Y	Y	Y	
Inventory of vascular plants	Y	Y	Y	Y					Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y		Y	Y	Y	
Inventory of nonvascular plants	Y	Y	Y	Y					Y			Y	Y	Y				Y	Y				Y	Y	Y					Y	
Land use map		Y	Y	Y	Y			Y	Y		Y		Y	Y	Y		Y		Y	Y	Y		Y	Y	Y	Y		Y	Y		Y
Soils map and description	Y	Y	Y	Y	Y			Y	Y			Y	Y	Y	Y	Y	Y		Y		Y		Y	Y	Y	Y		Y		Y	Y
Topographic map	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y
Vegetation map	Y	Y	Y	Y	Y			Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y		Y	Y	Y	
Tally of responses:	11	11	12	12	9	2	3	7	12	8	9	11	12	12	10	9	11	6	12	5	8	4	12	12	12	10	1	10	9	11	8
Percentage of responses:	92%	92%	100%	100%	75%	17%	25%	58%	100%	67%	75%	92%	100%	100%	83%	75%	92%	50%	100%	42%	67%	33%	100%	100%	100%	83%	8%	83%	75%	92%	67%

COUNTRY	ROMA	RWAN	SENE	SPAI	SPAI	SPAI	SPAI	SPAI	SPAI	SPAI	SPAI	SPAI	SUDA	SWIT	TANZ	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA
NAME OF BIOSPHERE RESERVE	ROLE	VOLC	NIKO	CATI	DONA	GAAZ	MAHU	MADD	MONT	ORVI	SIER	SINE	DIND	SUIS	LAMA	ALIS	BECR	BIBE	BITH	*CACO	*CASO	CEGU	CEPL	*CHIS	CORA	COME	DENA	DESE	EVER	FRAS
PURPOSE OF THE BIOSPHERE RESERVE 5=highest 1=lowest blank=N/A																														
Conserve natural or minimally disturbed representative ecosystems	5	5	5	5	5	5	5	4	4	5	4	4	5	5	5	5	1	5	5	4	5	5	2	5	2	4	5	4	5	
Provide legal & admin. basis for resource protection & management		5	5	5	4	5	4	4	5	4	5	5	5	5	5	3	3	3	5	4	4	2		3		4	5		5	
Conserve genetic resources in situ	5	5	5	5	5	4	4	5	3	4	5	5	3	5	4	4		4	4	4	3	3	1	5	2		4	3	5	
Conduct experimental problem-oriented research	5	5		4	3	3	3	4	2	1	4	4	3		3	4		2	5	4	3	5	5	4	5	5	4	3	2	5
Conduct long-term environmental monitoring	5	5	5	4	4	4	4	3	1	4	4	4	5	5	3	4	1	3	4	4	4	5	4	5	1	5	4	3	5	5
Promote regional planning and integrated rural development		4		3	3	4	4	3	5	3	3	3	3	1	2	1	1	1	1	1	2	3		1		3	2		1	1
Promote local participation in planning and management		3		2	3	4	4	2	4	3	3	3	4	3	1	2	2	1	1	2	3	2		1	2	1	3		1	
Promote environmental education and training	2	5	5	4	5	5	5	5	5	5	4	4	5	5	3	3		2	3	4	4	5	1	5	3	3	3	3	4	
Communicate information about Biosphere Reserves...		5	1	4	4	4	4	5	3	2	5	5	2	5		3		3	2	2	3	4	2	3	1	4	2	2	2	
Percentage of responses:	56%	100%	67%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	89%	89%	100%	56%	100%	100%	100%	100%	100%	67%	100%	78%	89%	100%	67%	100%	33%
Average rank:	2.44	4.66	2.88	4	4	4.22	4.11	3.88	3.55	3.44	4.11	4.11	3.88	3.77	2.88	3.22	0.88	2.66	3.33	3.107	3.384	3.77	1.66	3.388	1.77	3.22	3.55	2	3.33	1.22
LINKS W/ OTHER MANAGEMENT AUTHORITY Y=statement applies blank=N/A																														
The administrative authorities responsible for planning & development	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y			Y	Y	Y	Y		Y	Y	Y	Y			Y
Local community & representatives of population living in or near B.R.	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y			Y	Y		Y	Y	Y	Y	Y	Y	Y						Y
CONSERVATION Y=statement applies blank=N/A																														
Conserving endangered or threatened "Red Book" animal or plant species	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y		Y	Y		Y		Y	Y	Y		Y					Y	
Conserving wild relatives of economic species			Y								Y	Y									Y	Y		Y						
Conserving traditional agricultural cultivars or animal domesticates									Y		Y	Y																		
Conserving a harmonious landscape resulting from patterns of land use	Y					Y	Y	Y	Y	Y	Y	Y			Y	Y				Y	Y	Y	Y	Y					Y	Y
RESEARCH ACTIVITIES O=ongoing P=planned blank=no activity																														
Agricultural research											P	P			P						O								P	
Biological survey & collection			O	P	O	O		O	O	O			O		O	O		O	O	O	O	O	O	O		O	O	O	O	
Biogeochemical cycles	O				O				O				O		P						O	O	O			O	O		O	
Effects of atmospheric pollutants								O	O		P	P		P	P	O			O				O	O		O			O	P
Forest research	O		O	P					P					O	O					O	O			O	O	O			P	O
Recreation/tourism impacts		P	P		O	O		O	O	O	P	P	P	P	O			P	O	O	O	P		O			O		O	O
Traditional land use systems						O		O	O	O	P	P	O														O		P	O
Wildlife population dynamics	O	O	O	P	O	O			O	O	P	P	O	O	O	O		O	P	O	O	O	O	O		O	O	P	O	O
Tally of responses:	3	2	4	3	4	4	0	4	7	4	5	5	5	4	7	3	0	3	4	4	6	4	4	5	1	5	5	2	8	5
Percentage of responses:	38%	25%	50%	38%	50%	50%	0%	50%	88%	50%	63%	63%	63%	50%	88%	38%	0%	38%	50%	50%	75%	50%	50%	63%	13%	63%	63%	25%	100%	63%
FACILITIES AND ON-SITE STAFF Y=statement applies blank=N/A																														
Laboratory facility					Y		Y		Y	Y				Y	Y			Y		Y	Y	Y	Y	Y		Y	Y			Y
Library		Y			Y		Y		Y	Y				Y	Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	
Lodging for visiting scientists		Y	Y		Y				Y		Y		Y	Y	Y			Y		Y	Y		Y		Y	Y	Y	Y		Y
Permanent monitoring locations						Y	Y	Y	Y		Y		Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y
Road access to research site			Y		Y	Y	Y	Y	Y	Y	Y		Y		Y			Y	Y	Y	Y		Y		Y	Y	Y	Y		Y
On-site permanent research staff					Y	Y	Y	Y	Y	Y			Y		Y			Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	Y
On-site administration staff		Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	Y
On-site protection staff	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	Y	Y		Y			Y		Y	
BASIC RESOURCE INFORMATION Y=statement applies blank=N/A																														
Bibliography				Y		Y		Y	Y		Y	Y		Y				Y	Y	Y	Y	Y	Y	Y		Y	Y	Y		
Climatogical data	Y	Y	Y	Y		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Geological map	Y					Y		Y	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Y	Y			Y
Inventory of mammals	Y	Y	Y			Y		Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y
Inventory of other vertebrates	Y		Y			Y		Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y
Inventory of invertebrates	Y					Y		Y	Y		Y	Y		Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
Inventory of vascular plants	Y	Y				Y		Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Inventory of nonvascular plants	Y					Y		Y	Y		Y	Y	Y	Y	Y			Y	Y	Y	Y			Y		Y				
Land use map	Y					Y		Y			Y	Y				Y				Y	Y	Y	Y	Y		Y	Y			
Soils map and description	Y					Y		Y	Y		Y	Y			Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y
Topographic map	Y	Y	Y	Y		Y		Y	Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Vegetation map	Y			Y		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y
Tally of responses:	11	4	4	4	0	12	0	12	11	0	12	12	7	9	10	7	5	11	11	12	12	11	11	12	8	11	10	6	7	7
Percentage of responses:	92%	33%	33%	33%	0%	100%	0%	100%	92%	0%	100%	100%	58%	75%						100%	100%	92%	92%	100%	67%	92%	83%	50%	58%	58%

COUNTRY	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	USA	YUGO	ZAIR	ZAIR
NAME OF BIOSPHERE RESERVE	GLAC	*GLAD	GRSM	GUAN	*HAIS	HJAN	HUBR	ISRO	JORN	KOPR	LUQU	*MOCO	NIRI	*NOAT	OLYM	ORPI	ROMO	SADI	SAJO	SEKI	*SOAT	STTU	THSI	UNMI	VICO	VIIS	YELL	VEMO	FLYA	LUKI
PURPOSE OF THE BIOSPHERE RESERVE 5=highest 1=lowest blank=N/A																														
Conserve natural or minimally disturbed representative ecosystems	5	4	5	5	5	4	5	5	5	5	4	5	5	5	5	5	5	3	4	5	5	2		4	5	4	5	4	5	5
Provide legal & admin. basis for resource protection & management	5	1	3	1	5	1	1	4		1	1	4	1	3	5	5	5	4	1	5	5		4	3	4	5	1	3	4	1
Conserve genetic resources in situ	4	4	4	5	5	5	4	4	3	4	3	5	4	5	4	5	5	1	2	5	5		5	2	5	3	5	5	4	5
Conduct experimental problem-oriented research	3	3	4	3	3	5	5		5	5	5	2	5	2	4	5	4	5	5	4	2	5	1	4	3	4	5	4	5	4
Conduct long-term environmental monitoring	3	5	4	5	4	5	5	5	5	5	3	3	5	4	3	5	4	5	4	5	3	4	4	4	4	5	5	4		5
Promote regional planning and integrated rural development	4	1	1	1	2	3	1				2	2		3	2	4	3	1	2	1	3		1	1	4	3	3		5	1
Promote local participation in planning and management	3	1		1	3	2	1	1			2	2	2	4	2	3	4	2	2	2	3		3	2	3	4	3		1	1
Promote environmental education and training	2	1	3	5	5	4	4	3	2	2	3	4	5	2	5	5	4	4	4	5	4	2	3	3	2	4	4	3	3	1
Communicate information about Biosphere Reserves...	2	3	3	2	4	4	5	3	3		5	2	2	2	3	5	3	3	1	3	3		2	2	1	3	2	3	4	1
Percentage of responses:	100%	100%	89%	100%	100%	100%	100%	78%	67%	67%	100%	100%	89%	100%	100%	100%	100%	100%	100%	100%	100%	44%	89%	100%	100%	100%	100%	78%	89%	100%
Average rank:	3.44	2.555	3	3.11	3.833	3.66	3.44	2.77	2.55	2.44	3.11	3.222	3.22	3.111	3.66	4.66	4.11	3.11	2.77	3.88	3.666	1.44	2.55	2.77	3.44	3.88	3.66	2.88	3.44	2.66
LINKS W/ OTHER MANAGEMENT AUTHORITY Y=statement applies blank=N/A																														
The administrative authorities responsible for planning & development	Y	Y			Y	Y		Y				Y		Y	Y	Y	Y	Y		Y			Y			Y	Y		Y	Y
Local community & representatives of population living in or near B.R.	Y		Y		Y			Y				Y	Y	Y	Y	Y	Y				Y		Y	Y		Y	Y	Y	Y	Y
CONSERVATION Y=statement applies blank=N/A																														
Conserving endangered or threatened "Red Book" animal or plant species	Y	Y	Y	Y	Y						Y	Y		Y		Y	Y			Y	Y				Y	Y	Y	Y		
Conserving wild relatives of economic species						Y					Y					Y												Y		
Conserving traditional agricultural cultivars or animal domesticates																Y												Y		
Conserving a harmonious landscape resulting from patterns of land use	Y		Y		Y				Y	Y									Y		Y							Y		Y
RESEARCH ACTIVITIES O=ongoing P=planned blank=no activity																														
Agricultural research	P								0	P						P			0		0				P			P	0	0
Biological survey & collection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	P	0	0		0
Biogeochemical cycles	P	P	0		0	0	0	0		0	0	0	0				0	0		0	0			0		0	0				P
Effects of atmospheric pollutants	0		0		0	P	0	P				0	0	0	0	P	0	0		0	0					P	P			
Forest research	0	0	0		0	0	0	0		0	0		0		0			0	0	0	0	0		0			0	0	0	0
Recreation/tourism impacts	0		0	0				0	P		P	0	0	0		P	0			0	0			0	0	0	P	P		P
Traditional land use systems	P				0	0	0		0	P				0		0			0		0					0		P	0	P
Wildlife population dynamics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	P	0	0	0	0	0				0	0	0	P	0	P
Tally of responses:	8	4	6	3	6	6	6	6	5	6	5	5	6	5	4	6	5	5	5	6	8	1	1	4	4	6	6	6	4	7
Percentage of responses:	100%	50%	75%	38%	75%	75%	75%	75%	63%	75%	63%	63%	75%	63%	50%	75%	63%	63%	63%	75%	100%	13%	13%	50%	50%	75%	75%	75%	50%	88%
FACILITIES AND ON-SITE STAFF Y=statement applies blank=N/A																														
Laboratory facility	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y				Y	Y	Y	Y		Y	
Library	Y	Y	Y		Y	Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y		Y	Y		Y	Y
Lodging for visiting scientists	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y
Permanent monitoring locations		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y		Y	Y		Y	Y		Y	Y	Y		
Road access to research site	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y			Y	Y	Y	Y		Y	Y		Y		Y	Y	Y		Y
On-site permanent research staff	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y		Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y
On-site administration staff	Y	Y	Y	Y	Y	Y		Y			Y	Y	Y	Y	Y	Y	Y		Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
On-site protection staff	Y	Y	Y		Y	Y		Y			Y	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y			Y	Y	Y	Y	Y
BASIC RESOURCE INFORMATION Y=statement applies blank=N/A																														
Bibliography	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	Y	Y	Y	Y
Climatogical data	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y
Geological map	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	
Inventory of mammals	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y		Y					Y	Y	Y	Y	Y
Inventory of other vertebrates	Y	Y	Y		Y	Y	Y		Y	Y		Y	Y	Y		Y	Y	Y	Y		Y				Y	Y	Y	Y	Y	
Inventory of invertebrates	Y	Y	Y		Y	Y	Y			Y		Y	Y			Y			Y		Y					Y	Y	Y	Y	
Inventory of vascular plants	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	
Inventory of nonvascular plants	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y				Y	Y	Y	Y	Y			Y			Y		Y	
Land use map	Y	Y	Y		Y	Y		Y		Y	Y		Y	Y			Y		Y		Y	Y				Y		Y		Y
Soils map and description			Y		Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y			Y		Y		Y	Y	Y
Topographic map	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Vegetation map	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y		Y	Y	Y		Y		Y	Y	Y	Y	Y
Tally of responses:	11	8	12	5	12	12	11	9	10	11	8	11	12	9	6	9	11	10	11	8	12	5	3	8	4	11	10	11	11	7
Percentage of responses:	92%	67%	100%	42%	100%	100%	92%	75%	83%	92%	67%	92%	100%	75%	50%	75%	92%	83%	92%	67%	100%	42%	25%	67%	33%	92%	83%	92%	92%	58%

	Total			International Only			U.S. Only		
Total number of responses:	122			80			42		
PURPOSE OF THE BIOSPHERE RESERVE 5=highest 1=lowest blank=N/A	Tally	Percent	Average	Tally	Percent	Average	Tally	Percent	Average
Conserve natural or minimally disturbed representative ecosystems	119	98%	4.50	79	99%	4.66	40	95%	4.19
Provide legal & admin. basis for resource protection & management	90	74%	2.77	54	68%	2.74	36	86%	2.83
Conserve genetic resources in situ	116	95%	4.08	78	98%	4.36	38	90%	3.53
Conduct experimental problem-oriented research	111	91%	3.42	71	89%	3.25	40	95%	3.73
Conduct long-term environmental monitoring	119	98%	3.88	77	96%	3.78	42	100%	4.09
Promote regional planning and integrated rural development	89	73%	2.01	55	69%	2.24	34	81%	1.57
Promote local participation in planning and management	90	74%	1.98	55	69%	2.09	35	83%	1.77
Promote environmental education and training	112	[illegible]	3.23	72	90%	3.24	40	95%	3.21
Communicate information about Biosphere Reserves...	98	[illegible]	2.24	50	63%	2.13	38	90%	2.45
Percentage of responses: Average Percent:	85%			82%			91%		
Average ranks: Average Rank:	3.12	Stan. Dev.:	0.82	3.16	Stan. Dev.:	0.83	3.04	Stan. Dev.:	0.78
LINKS W/ OTHER MANAGEMENT AUTHORITY Y=statement applies blank=N/A	Tally	Percent		Tally	Percent		Tally	Percent	
The administrative authorities responsible for planning & development	96	[illegible]		66	83%		25	60%	
Local community & representatives of population living in or near B.R.	79	[illegible]		55	69%		24	57%	
CONSERVATION Y=statement applies blank=N/A	Tally	Percent		Tally	Percent		Tally	Percent	
Conserving endangered or threatened "Red Book" animal or plant species	84	68%		59	74%		22	52%	
Conserving wild relatives of economic species	19	16%		13	16%		6	14%	
Conserving traditional agricultural cultivars or animal domesticates	11	9%		10	13%		1	2%	
Conserving a harmonious landscape resulting from patterns of land use	42	34%		27	34%		15	36%	
RESEARCH ACTIVITIES O=ongoing P=planned blank=no activity	Tally	Percent		Tally	Percent		Tally	Percent	
Agricultural research	28	23%		19	24%		9	21%	
Biological survey & collection	102	84%		64	80%		38	90%	
Biogeochemical cycles	49	40%		25	31%		24	57%	
Effects of atmospheric pollutants	42	34%		18	23%		24	57%	
Forest research	70	57%		45	56%		25	60%	
Recreation/tourism impacts	68	56%		42	53%		26	62%	
Traditional land use systems	35	29%		21	26%		14	33%	
Wildlife population dynamics	91	75%		54	68%		37	88%	
Tally of responses: Average Tally:	3.98			3.60			4.69		
Percentage of responses: Average Percent:	50%			45%			59%		
FACILITIES AND ON-SITE STAFF Y=statement applies blank=N/A	Tally	Percent		Tally	Percent		Tally	Percent	
Laboratory facility	53	43%		23	29%		30	71%	
Library	65	53%		33	41%		32	76%	
Lodging for visiting scientists	84	69%		53	66%		31	74%	
Permanent monitoring locations	82	67%		49	61%		33	79%	
Road access to research site	75	61%		45	56%		30	71%	
On-site permanent research staff	76	62%		43	54%		33	79%	
On-site administration staff	100	82%		65	81%		35	83%	
On-site protection staff	97	80%		69	86%		28	67%	
BASIC RESOURCE INFORMATION Y=statement applies blank=N/A	Tally	Percent		Tally	Percent		Tally	Percent	
Bibliography	86	70%		52	65%		34	81%	
Climatogical data	100	82%		61	76%		39	93%	
Geological map	87	71%		52	65%		35	83%	
Inventory of mammals	99	81%		66	83%		33	79%	
Inventory of other vertebrates	97	80%		65	81%		32	76%	
Inventory of invertebrates	71	58%		47	59%		24	57%	
Inventory of vascular plants	102	84%		63	79%		39	93%	
Inventory of nonvascular plants	55	45%		30	38%		25	60%	
Land use map	56	46%		33	41%		23	55%	
Soils map and description	81	66%		50	63%		31	74%	
Topographic map	93	76%		53	66%		40	95%	
Vegetation map	99	81%		64	80%		35	83%	
Tally of responses: Average Tally:	8.41			7.95			9.29		
Percentage of responses: Average Percent:	70%			66%			77%		

UNESCO QUESTIONNAIRE ON BIOSPHERE RESERVES:

Preliminary Analysis of U. S. Responses

Bruce Leighty

Yale School of Forestry and
Environmental Studies

August 12, 1986

UNESCO QUESTIONNAIRE ON BIOSPHERE RESERVES:

Preliminary Analysis of U. S. Responses

Summary

The nine objectives of the Action Plan are reflected in the management of U. S. biosphere reserves, but not equally. Emphasis is greatest on long-term environmental monitoring and the conservation of representative ecosystems, while there is comparatively less emphasis on promoting either regional planning and integrated rural development, or local participation in planning and management.

Core areas are fairly well protected, a result of using existing protected areas as cores. Rarely have core areas been established in areas that were not previously protected.

Some confusion is evident over the meaning and use of the terms "buffer" and "transition" areas. Nevertheless, a large number of activities are occurring within these zones.

Virtually all of the biosphere reserves in the U. S. have on-site management authority and over half of them are implementing a management plan that includes objectives similar to those of the Action Plan for Biosphere Reserves. Few U. S. biosphere reserves have linkages outside the U. S.

Two-thirds of the biosphere reserves report people living within the boundary of the reserve and most biosphere reserves report benefits accruing to local populations.

A wide range of conservation objectives are being met, with a heavy emphasis on the conservation of representative ecological areas, but only half of the reserves protect large predators or wide-ranging herbivores. There is a limited emphasis on cultural and economic aspects of species conservation, such as conserving traditional agricultural cultivars or wild relatives of economic species.

All biosphere reserves in the U. S. network have a history of research or a monitoring and research program. The research emphasis tends to be more applied than basic. Less than half of the biosphere reserves participate in comparative monitoring or research with other biosphere reserves or research sites.

While a large number of education and training activities are occurring at U. S. biosphere reserves, most are not specifically related to the biosphere reserve concept. Relatively few biosphere reserves report specific training in biosphere reserve concepts or their applications, either to the public or to their staffs.

Most biosphere reserve sites in the U. S. are well supported with on-site staff and facilities. In addition, U. S. biosphere reserves usually have well developed and numerous sources of information.

Introduction

This analysis is based on responses from 39 of the 43 U. S. Biosphere Reserves. Thirty-one individual biosphere reserves and eight biosphere reserve clusters are represented. For cluster biosphere reserves, composite scores were awarded based on the questionnaires returned by the individual sub-units making up the cluster. Where applicable, numeric responses were averaged for an overall score. However, for questions asking if an activity takes place or if some condition exists, an affirmative response by any sub-unit of the reserve was considered an affirmative answer for the entire reserve. It was felt that adopting this convention was the best way to portray accurately and completely the overall condition of a cluster biosphere reserve. However, occasionally this convention leads to contradictory responses within a given category.

While caution should be exercised in reading the figures cited in this report too literally, the numbers do provide a good indication of what activities are the most and least prevalent, or important. For that reason, the analysis below concentrates on making such comparisons.

Section By Section Analysis

Part A

Purpose of the Biosphere Reserve

The nine objectives identified in the Action Plan as relating to the multiple purposes of a Biosphere Reserve are being reflected in the management of U. S. Biosphere Reserves. The average biosphere reserve manager checked eight of the nine purposes as relevant to their management. No purpose is being met by less than 80% of the sites responding, although the importance surrounding the achievement of these purposes did vary.

All of the sites without exception reported that long-term environmental monitoring is being conducted and most ranked the importance of that monitoring as very high, with an average score of 4.15 out of a possible 5.0, second only in importance to conserving natural or minimally disturbed representative ecosystems (average score 4.46). After monitoring and ecosystem conservation, conducting experimental problem-oriented research was next highest in the number of sites marking it as relevant (37) and the importance value it was given (3.97), followed by conserving *in situ* genetic resources (35 sites, average score 3.97).

The least frequently checked objectives and the lowest ranked in importance were promoting regional planning and integrated rural development

(32 sites, average score 1.94) and promoting local participation in planning and management (33 sites, average score 2.21).

Part B

Status of the Core Areas: Possible Situations

The bulk of the core areas within the U. S. network (90%) have strict protection. In most cases, the protection of these core areas has existed since the inception of the biosphere reserve. In fact, over half of the core areas coincide exactly with previously existing protected areas. Very few of the reserves -- only two -- report having core areas that were not already protected when the reserve was established. Eight sites, or approximately one-fifth of the biosphere reserves in the U. S., report that core areas or parts of core areas have not been delineated yet.

A large number of U. S. biosphere reserves, approximately two-thirds, have core areas that contain entire catchment basins.

Status of the Core Areas: Activities Occurring Within Them

Core areas support a number of varied activities, with the average biosphere reserve reporting the occurrence of seven such activities. The most prevalent activities are related to either public recreation or to research and education, specifically: ecological observations and surveys which are occurring in all of the U. S. biosphere reserves, long-term environmental

monitoring (occurring at 37 sites), environmental education (36 sites), or the collection of plant materials (31 sites). Many respondents added that collection occurs only under strict permit.

As expected for core areas, activities that are least prevalent involve economic uses of renewable (16 sites) or non-renewable (6 sites) resources, and subsistence activities by indigenous people (8 sites). If those activities do occur, the most commonly mentioned economic uses involving non-renewable resources were oil and gas exploration or development, and mineral exploration or mining. Commonly cited economic uses of renewable resources included fishing, grazing, timber harvesting, and tourism (including concessions). Subsistence activities most often involved hunting, fishing, trapping, or the collection of natural resources.

Eight biosphere reserves reported activities that were a significant adverse influence on the core area, including fishing (2 sites), oil and gas development, mining (2 sites), low-flying military aircraft, heavy visitor use and disturbance, increased use of off-road vehicles, ranching, and kelp harvesting. Only one reserve reported multiple threats to its core area from ranching, fishing, and kelp harvesting. The other seven reported only single threats.

Part C

It was evident from comments made on the questionnaire that there was some confusion among respondents as to the exact meaning of the terms "buffer"

and "transition" areas. This confusion makes conclusions in this section more tentative.

Status of the Buffer Zone

The most frequent response within this section reported the absence of a buffer zone, although over half of the reserves report having a buffer. For those reserves with buffer zones, there are almost equal numbers of sites with legally delineated areas that are under the same administration as the core area (10) as there are sites with legally delineated buffers subject to regulations under a different administration from the core area (11). There are also a number of reserves (8) with a mixture of delineated and undelineated areas (cluster biosphere reserves).

Status of the Transition Area

The average biosphere reserve reports thirteen to fourteen activities occurring within its transition area, highlighting the large number of different uses and activities that are occurring within these areas. Hunting, recreational activities, human settlements, tourist development, and poaching were most often cited among the activities listed.

For those sites checking agricultural activities (28), the most common crops grown were grains (wheat, rice, soybean, and corn), vegetables (tomatoes, peppers, beans, squash, potatoes, and cucumbers), hay, and fruit orchards (citrus, apples, and tropical fruits).

For those sites checking grazing activities (30), the most common domestic livestock raised included both dairy and beef cattle, horses, sheep, goats, and pigs. Commonly cited native wildlife included elk, deer, antelope, and bighorn sheep.

Part D

Management and Administration: On-Site Management

Virtually all of the biosphere reserves in the U. S. have on-site management authority and over half of them are implementing management plans which reflect the objectives of the Action Plan for Biosphere Reserves. Only a handful of sites, specifically three, plan no local management body.

Management and Administration: Linkages

The average biosphere reserve reports three to four linkages with other bodies, most often with scientific institutions, the MAB national community, and local or regional administrative authorities. However, relatively few sites, only three, have links with biosphere reserves in other countries.

Management and Administration: Recognition

Most U. S. biosphere reserves have taken two or three actions to make visitors and the local population aware of the status of the area as a biosphere reserve. The use of entrance signs or plaques is the most

frequently taken action (29 sites). Approximately half of the biosphere reserves (19) have held dedication ceremonies. Some reserves commented on the use of commemorative patches on uniforms, news releases, and the use of visitor programs as a means of communicating the status of a site as a biosphere reserve.

Management and Administration: Technical and Financial Support

The majority of the biosphere reserves in the U. S. network, approximately two-thirds, derive support from a variety of national sources, including a central administrative authority. Only a few (7) receive special assistance from the local population. However, that support comes in a variety of forms, including grants and cooperative support from local agencies and institutions, state government, local natural history associations, sportsmen's and conservation groups, and contributions from individuals and user groups. Only three reserves receive support from international sources.

Part E

Local Population and Participation: Description

In general, the local population surrounding the U. S. biosphere reserve network can be described as either agricultural or urban/suburban. There are no biosphere reserves with nomadic populations living locally, only one with hunter/gatherers, three with pastoral populations, and four with artisanal fishing populations. Many of the reserves characterized surrounding local

populations as rural or noted that they were comprised of forest industry personnel or retirement and second home owners.

Local Population and Participation: Indigenous Populations

This section was difficult to interpret because of the variable responses evoked by the term "indigenous." While many reserves responded with descriptions of Native American groups or long-term residents of the area, many reserves simply described the local population that lived in the area, regardless of their length of tenure there.

Local Population and Participation: People Living Within the Boundary

Two-thirds of the biosphere reserves reported people living within the boundary of the reserves. The number of people ranged from as high as 500,000 to as low as six.

Local Population and Participation: Benefits to People

It would appear that biosphere reserves in the U. S. do benefit local people, as only three reserves reported no benefits to the local population. Predominant benefits include education and training (37), employment (36 sites), tourism and recreation (35), and soil and water conservation (31). Least commonly cited benefits were rural development assistance (9 sites) and health and community services (12 sites).

Part F

Conservation

The average biosphere reserve serves five to six conservation purposes. All of the reserves without exception cited the conservation of representative ecological areas as one of those purposes. Other commonly cited purposes included conserving biological diversity in managed ecosystems (30 sites) and conserving national or regional threatened or endangered species (25 sites). Indicative of the protection afforded to higher trophic levels, only half of the reserves cited conservation of large predators or wide-ranging herbivores as a purpose that applied to their site.

There is clearly less emphasis among U. S. biosphere reserves on cultural or economic aspects of conservation. Only one reserve cited the conservation of an animal domesticate (the peccary) as an objective of the reserve, while five reserves mentioned the conservation of wild relatives of economic species (only one site specified a species, the pomegranate).

Part G

Research and Monitoring: Program Status

No biosphere reserve in the U. S. network reported the absence of a research history or a monitoring and research program. The majority of the reserves, over 80%, have integrated programs of basic and applied research.

The research emphasis appears to be more applied, with more than twice as many reserves reporting applied research programs (25) oriented to land use and management issues over basic research programs (9). Less than half of the biosphere reserves (17) participate in comparative monitoring or research with other biosphere reserves or research sites in the same biogeographical province. Only a few sites reported occasional research use without a permanent monitoring and research program.

During the past year, over four-fifths of the reserves reported the participation of national scientists in research at their reserve, with numbers ranging from four to 125 scientists. A little less than a third of the reserves reported international scientists working at their sites, with numbers ranging from one to thirteen scientists.

Research and Monitoring: Research Priorities

The average biosphere reserve in the U. S. network reported sixteen to seventeen ongoing or planned research activities. The most frequently mentioned were biological surveys and collection (35 sites), comparative ecological research (34), wildlife population dynamics (34), ecological succession (33), ecosystem modelling (32), fire history and effects (31), acidic deposition (27), and resource mapping (27). The least prevalent were appropriate rural technology (5 sites), ethnobiology (6), pesticide effects (8), mining reclamation studies (8), and agricultural research (9).

Part H

Education and Training

The average biosphere reserve in the U. S. network reported five to six activities related to education and training either occurring or planned at their site. The most frequently mentioned were graduate and post-graduate research (38 sites), environmental education for children and students (34), and interpretive programs for tourists (32). The least frequently mentioned were extension services for local people (14 sites), and training for local people (8) as well as staff (14) in the biosphere reserve concept.

Part I

On-Site Staff and Facilities

As a whole, biosphere reserves in the U. S. appear to be well supported with on-site staff and facilities. The average biosphere reserve reported ten to eleven entries under this section.

The most prevalent facilities were climatological monitoring stations (34 sites), microcomputers (31), libraries (30), and lodging for visiting scientists (29). The least prevalent were watershed research sites (20) and air pollution monitoring stations (24). However, even for the least prevalent facilities, over half of the biosphere reserves reported the presence of these items.

Thirty reserves reported on-site permanent research staff, with staff numbers ranging from one to forty people. Thirty-two reserves reported on-site administrative staff, with staff numbers ranging from one to 125 people, and twenty-seven reserves reported on-site protection staff, with numbers ranging from two to 100 people.

Part J

Basic Resource Information

The average biosphere reserve cited the availability of sixteen to seventeen types of information. The most frequently mentioned were topographic maps (38 sites), aerial photographs (37), climatological data (36), vascular plant inventories (36), and vegetation data (34).

In addition to vascular plant inventories, many reserves also have inventory data on mammals (32), other vertebrates (30), nonvascular plants (24), and even invertebrates (22).

The least frequently held types of information were aquatic ecosystem data (9 sites), ethnobiological information (11), hydrological data for groundwater (16), land use maps (19), and deposition data (19). Less than half of the reserves had information of this type.

Part K

Respondents

The educational background of respondents was divided almost equally between bachelors, masters, and doctoral degrees. Nineteen respondents received bachelors degrees -- three bachelor of arts and sixteen bachelor of sciences. Eighteen respondents received masters degrees -- five master of arts and thirteen master of sciences. Sixteen respondents received doctoral degrees. As indicated by the relative number of arts versus sciences degrees, the educational training of the typical respondent was biased towards science.

By combining similar professional backgrounds into broader categories, the following breakdown emerges:

Professional Background	Number of Respondents
Park or refuge management (including rangers and naturalists)	13
Plant or community ecology	8
Forestry	7
Wildlife biology or management	6
Research biology	5
Marine biology or fisheries research	3
Range science	3
Watershed management	2
Other (resource management, professor, public administration, anthropology)	4

The average respondent has been associated with the biosphere reserve for over eight years.

August 4, 1986

BIOSPHERE RESERVE SURVEY ANALYSIS Total # of B.R.'s responding: 39

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PART A.1 PURPOSE OF THE BIOSPHERE RESERVE 5=higest 1=lowest blank=N/A	Tally	Percent	Average
Conserve natural or minimally disturbed representative ecosystems	37	95%	4.46
Provide legal & admin. basis for resource protection & management	34	87%	3.44
Conserve genetic resources in situ	35	90%	3.97
Conduct experimental problem-oriented research	37	95%	3.97
Conduct long-term environmental monitoring	39	100%	4.15
Promote regional planning and integrated rural development	32	82%	1.94
Promote local participation in planning and management	33	85%	2.21
Promote environmental education and training	37	95%	3.41
Communicate information about Biosphere Reserves...	35	90%	2.71

Tally of responses: Average Tally: 8.18 Stan.Dev.: 1.52

Percentage of responses: Average Percent: 91%

Average rank: Average Rank: 3.38 Stan.Dev.: 0.55

PART B.1 STATUS OF CORE AREA Y = statement applies blank = N/A	Tally	Percent
The core area has strict protection & management regulations...	35	90%
The core area contains one or more complete catchment basins	25	64%
The core area was not protected when the B.R. was established	2	5%
The core area covers part of a larger previously protected area	10	26%
The core area coincides exactly with a previously protected area	23	59%
The protection of the core area is largely insured by its remoteness	9	23%
The effective protection of the core area cannot presently be ensured	9	23%
The core area has not yet been delineated	8	21%

B.3 CORE AREA ACTIVITIES Y = statement applies blank = N/A	Tally	Percent
Collection of plant materials	31	79%
Ecological observation & surveys	39	100%
Environmental education	36	92%
Fishing or shellfishing	26	67%
Hunting or trapping	21	54%
Long-term ecological monitoring	37	95%
Professional training	27	69%
Public recreation	30	77%
Economic uses-nonrenewable resources	6	15%
Economic uses-renewable resources	16	41%
Subsistance-indigenous people	8	21%
Other activities	4	10%

Tally of responses: Average Tally: 7.21

Percentage of responses: Average Percent: 60%

C.1 STATUS OF BUFFER ZONE Y = statement applies blank = N/A	Tally	Percent
An area subject to restrictions under same administration as core area	10	26%
An area subject to regulations under different administration as core	11	28%
Delineated experimental research area subject to specific regulations	3	8%
Mixture of undelineated area around core & research-management areas	8	21%
An undelineated area with limited human activities	4	10%
A buffer zone is presently lacking	16	41%
Other	6	15%

C.2 USES & ACTIVITIES IN TRANSITION AREA 5=highest 1=lowest blank=N/A	Tally	Percent
agricultural activities	28	72%
agroforestry projects	22	56%
dredging/filling	11	28%
fishing or shellfishing	28	72%
grazing	30	77%
human settlements	34	87%
hunting	36	92%
industrial development	24	62%
land conversions	25	64%
marine products/aquaculture	9	23%
mining of coal or minerals	15	38%
oil and gas development	12	31%
poaching	31	79%
recreational activities	36	92%
residential development	29	74%
shoreline stabalization	7	18%
subsistance activities	23	59%
timber production	26	67%
tourist development	32	82%
transportation facilities	28	72%
urban centers	18	46%
water development projects	23	59%
other-1	7	18%
other-2	2	5%

Tally of responses:		Average Tally:	13.74
Percentage of responses:		Average Percent:	60%
Average rank:		Average Rank:	2.72

D.1 ON-SITE MANAGEMENT AUTHORITY Y = statement applies blank = N/A	Tally	Percent
On-site management authority exists & is implementing management plan	23	59%
On-site authority exists but has not yet drawn up a management plan	16	41%
On-site management body will be set up in the near future	1	3%
No local management body is planned	3	8%
Tally of responses: Average Tally:	1.10	
Percentage of responses: Average Percent:	28%	

D.2 LINKS W/ OTHER MANAGEMENT AUTHORITY Y=statement applies blank=N/A	Tally	Percent
The MAB National Committee of your country	27	69%
The administrative authorities responsible for planning & development	24	62%
Local community & representatives of population living in or near B.R.	22	56%
Scientific institutions involved in natural resources research	34	87%
National or foreign botanical & zoological gardens	5	13%
Management authorities of other Biosphere Reserves in your country	16	41%
Management authorities of other Biosphere Reserves in other countries	3	8%
Tally of responses: Average Tally:	3.36	
Percentage of responses: Average Percent:	48%	

D.3 ACTIONS TAKEN FOR B.R. RECOGNITION Y=statement applies blank=N/A	Tally	Percent
Dedication ceremony	19	49%
Entrance sings or plaque	29	74%
Establishment of an on-site research station	19	49%
Brochure or audio-visual material	20	51%
Other	7	18%
Tally of responses: Average Tally:	2.41	
Percentage of responses: Average Percent:	48%	

No recognition yet, but recognition is planned	Tally: 4	Percent:	10%
No recognition and none planned	Tally: 2	Percent:	5%

D.4 TECHNICAL AND FINANCIAL SUPPORT Y=statement applies blank=N/A	Tally	Percent
Activities are receiving support from a variety of national sources	26	67%
Activities are receiving support from single administrative authority	11	28%
Activities are supported solely by the local administrative authority	7	18%
Acitvities are receiving special assistance from local the population	7	18%
Activities are receiving support from international sources	3	8%
Tally of responses: Average Tally:	1.38	
Percentage of responses: Average Percent:	28%	

E.1 LOCAL POPULATION	Y = statement applies blank = N/A	Tally	Percent
	Agricultural	21	54%
	Artisanal fishing/shellfishing	4	10%
	Hunter-gatherer	1	3%
	Nomadic	0	0%
	Pastoral	3	8%
	Urban or suburban	19	49%
	Other	18	46%

How many people live permanently within the Biosphere Reserve: Tally, non-0: 26 Percent: 67% Average :2433.54 Minimum: 6 Maximum: 50000 Stan.Dev: 9625.56

E.4 BENEFITS TO LOCAL POPULATION	2=major 1=minor blank=N/A	Tally	Percent
	Employment opportunities	36	92%
	Educatonal and training oportunities	37	95%
	Finincial incentives and benefits	19	49%
	Health and community services	12	31%
	Rural development assistance	9	23%
	Tourism and recreational opportunities	35	90%
	Soil and water conservation	31	79%
	Maintanance of traditional cultures and practices	18	46%
	Participation in the planning and management of the Biosphere Reserve	28	72%
	Other	5	13%

Tally of responses: Average Tally: 5.90
Percentage of responses: Average Percent: 59%

There are virtually no benefits for local people Tally-no benefits: 3 Percent: 8%

F.1 CONSERVATION	Y = statement applies blank = N/A	Tally	Percent
	Conserving a representative ecological area in natural state	39	100%
	Conserving azonal ecosystems and interface areas	22	56%
	Conserving large preditors	19	49%
	Conserving large, wide-ranging herbivores	22	56%
	Conserving endangered or threatened "Red Book" animal or plant species	20	51%
	Conserving endangered/threatened species identified at national level	25	64%
	Conserving wild relatives of economic species	5	13%
	Conserving traditional agricultural cultivars or animal domesticates	1	3%
	Conserving an harmonious landscape resulting from patterns of land use	13	33%
	Conserving biological diversity in managed ecosystems	30	77%
	Reestablishing indigenous species in areas where they have disappeared	17	44%
	Other	6	15%

Tally of responses: Average Tally: 5.62
Percentage of responses: Average Percent: 47%

6.1 RESEARCH AND MONITORING Y = statement applies Blank = N/A	Tally	Percent
The B.R. has an integrated program of basic and applied research...	32	82%
The B.R. has a basic research program ...	9	23%
The B.R. has an applied research program ...	25	64%
Participates in comparitive research with site(s) in the same province	17	44%
Participates in comparitive research with site(s) in another province	8	21%
The Biosphere Reserve is the site of a UNESCO MAB project	6	15%
The B.R. is used occasionally for research but no permanent program	5	13%
The B.R. has no research history, & no monitoring or research program	0	0%

Tally of responses: Average Tally: 2.62
Percentage of responses: Average Percent: 33%

How many national scientists have participated in reasearch at site	Tally, non-0:	33	Percent:	85%	Average :	30.18	Minimum:	4	Maximum:	125	Stan.Dev:	30.09
How many foreign scientists have participated in reasearch at the site	Tally, non-0:	12	Percent:	31%	Average :	5.67	Minimum:	1	Maximum:	13	Stan.Dev:	3.82

PART 6.2 RESEARCH ACITVITIES O=ongoing P=planned blank=no activity	Tally	Percent
Acidic deposition	27	69%
Agricultural research	9	23%
Appropriate rural technology	5	13%
Biological survey & collection	35	90%
Biogeochemical cycles	21	54%
Comparative ecological research	34	87%
Cultural anthropology	13	33%
Ecological succession	33	85%
Ecosystem modelling	32	82%
Ecosystem restoration	24	62%
Effects of atmospheric pollutants	23	59%
Effects of water pollutants	21	54%
Effects of pesticides	8	21%
Ethnobiology	6	15%
Exotic species	20	51%
Fire history & effects	31	79%
Forest research	24	62%
Genetic resources management	12	31%
Hydrological cycle	20	51%
Limnology & hydrobiology	20	51%
Mining reclamation studies	8	21%
Pests & diseases	19	49%
Rangeland management	11	28%
Rare/endangered species	24	62%
Recreation/tourism impacts	24	62%
Resource mapping	27	69%
Sedimentation	18	46%
Soil studies & conservation	22	56%
Traditional land use systems	13	33%
Watershed management	17	44%
Wildlife population dynamics	34	87%
Other	8	21%

Tally of responses: Average Tally: 16.49
Percentage of responses: Average Percent: 52%

H.1 EDUCATION AND TRAINING O=ongoing P=planned blank=no activity	Tally	Percent
Environmental education for school children and students	34	87%
Extension services for local people	14	36%
Demonstration projects in land use and management	19	49%
Graduate and postgraduate research projects for students	38	97%
Interpretive programs for tourists	32	82%
Professional training and workshops for scientists	28	72%
Professional training/workshops - resource managers/land use planners	26	67%
Training for staff in biosphere reserve management	14	36%
Training for local people in Biosphere Reserve concepts and management	8	21%
Other	3	8%

Tally of responses: Average Tally: 5.54
Percentage of responses: Average Percent: 55%

I.1 ON-SITE STAFF AND FACILITIES Y=statement applies blank=N/A	Tally	Percent
Air pollution monitoring station	24	62%
Climatological monitoring station	34	87%
Conference/meeting facilities	27	69%
Hydrological monitoring station	27	69%
Laboratory facility	27	69%
Library	30	77%
Lodging for visiting scientists	29	74%
Microcomputers	31	79%
Permanent monitoring locations	29	74%
Road access to research site	27	69%
Small watershed integrated research site	20	51%
Storage/curatorial facilities for biological/environmental collections	27	69%
On-site permanent research staff	30	77%
On-site administration staff	32	82%
On-site protection staff	27	69%

Tally of responses: Average Tally: 10.79
Percentage of responses: Average Percent: 72%

How many on-site permanent research staff:	Tally, non-0:	29	Percent:	74%	Average :	6.72	Minimum:	1	Maximum:	40	Stan.Dev:	9.
How many on-site administration staff:	Tally, non-0:	30	Percent:	77%	Average :	30.20	Minimum:	1	Maximum:	125	Stan.Dev:	34.
How many on-site protection staff:	Tally, non-0:	25	Percent:	64%	Average :	17.32	Minimum:	2	Maximum:	100	Stan.Dev:	21.

J.1 BASIC RESOURCE INFORMATION Y = statement applies blank = N/A	Tally	Percent
Aerial photographs	37	95%
Acidic deposition data	19	49%
Air quality data	22	56%
Aquatic ecosystems, freshwater	24	62%
Aquatic ecosystems, marine	9	23%
Bibliography	30	77%
Climatogical data	36	92%
Ethnobiological information	11	28%
Geological map	33	85%
History of scientific study	30	77%
Hydrological data, surface	28	72%
Hydrological data, groundwater	16	41%
Inventory of mammals	32	82%
Inventory of other vertebrates	30	77%
Inventory of invertebrates	22	56%
Inventory of vascular plants	36	92%
Inventory of nonvascular plants	24	62%
Land use history	30	77%
Land use map	19	49%
Soils map and description	28	72%
Topographic map	38	97%
Vegetation map	31	79%
Vegetation data	34	87%
Water quality data	25	64%
Other	15	38%

Tally of responses: Average Tally: 16.90

Percentage of responses: Average Percent: 68%

K.1 RESPONDENT

Number of years associated with the Biosphere Reserve (in years) Average # Years: 8.460

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