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PARCS PARKS PARQUES

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Unión Internacional para la Conservación de la Naturaleza y de los Recursos Naturales

PARQUES PARCS PARKS

Union internationale pour la conservation de la nature et de ses ressources



Commission on National Parks and Protected Areas
Commission des parcs nationaux et des aires protégées
Comisión de Parques Nacionales y Areas Protegidas



PARKS PARQUES PARCS

An international journal for managers of national parks, historic sites, and other protected areas
Una revista internacional para directores de parques nacionales, campos arqueológicos y otras
áreas protegidas

Revue internationale pour gestionnaires de parcs nationaux, de lieux historiques et autres
lieux protégés

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Aims and objectives

PARKS is a practical journal for technical and management personnel dealing with natural, historical and cultural values of national parks and other protected areas. It covers all aspects of the planning, use and operation of these areas throughout the world. The aim of PARKS is to promote more effective management of protected areas and to facilitate communication between protected area managers worldwide.

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Editorial

How realistic are national park managers in their assessment of threats to their parks? Are there particular threats common to most parks? These are questions examined in a study of problems perceived by managers of parks in the Neotropical Realm. A summary of the main results was presented at the 27th Working Session of IUCN's Commission on National Parks and Protected Areas held at Bariloche, Argentina, in March 1986, and an analysis of them is included in both the English and Spanish sections of this issue. Many of these threats will, of course, apply to parks in other realms, and readers are encouraged to let us have their views and comments on the very fundamental issues involved.

Those familiar with the East African Savanna will know that schemes for cropping the vast herds of animals in the Serengeti region have been talked about for many years; indeed pilot projects have been tried from time to time, although no significant follow-up ever took place. The underlying concept of these schemes is challenged in a thought-provoking article which relates animal behaviour, cropping techniques and the role and requirements of local people.

Continuing the theme of taking a new look at established ideas and practices, a review of issues from the 20th International Parks Seminar is included which raises a range of important considerations for parks managers.

Responses to the questionnaire distributed with PARKS Volume 11, numbers 2/3 continue to come in and are being processed. It should not be long before all address corrections have been made and suggestions for improvement taken into account within the limitations of our severely restricted budget. In this regard, we were encouraged by the number of replies accepting the idea of a subscription, and also of those agreeing to subscribe on behalf of less fortunate organizations. A policy review of these matters will be included in the questionnaire analysis with particular reference to long-term financial strategy.

Very many replies contained requests for more "parks techniques" articles, and this is a demand we must try to meet. To do so we obviously require the material, and we hope we can rely on our readership to help us in this. We would be very grateful for details of tips and techniques readers have found useful and which we could pass on to others through PARKS.

Most encouraging of all were the many favourable comments contained in the replies. We realize that much more could be done if we had a better financial position, but it is reassuring to know that what has been done is generally welcomed and appreciated.

TONY MENCE (*Editor*)

News

New reserves in Senegal

Two game reserves, Gueumbeul and Popenguine, have been created bringing the total of Senegal's nature reserves to three, along with six national parks. Two other special reserves are in process of being established, Dindello (111 ha) and Kassel (10 ha).

Interpretation Workshop in Chile

The First Protected Wildlands Interpretation Workshop was held 17–26 November 1986, at Puyehue National Park, Chile. Twenty-five professionals and rangers attended the Workshop, organized by the Chilean Forest Service (CONAF) with support from the US National Park Service and WWF-US. Besides 20 Chilean participants, five professionals from Argentina, Uruguay, Paraguay and Ecuador were sponsored by FAO/UNEP Latin American technical network on national parks. Principal instructor was Raymond Olivas, Assistant Chief Naturalist, Big Bend National Park. WWF-US contributed printed materials and two slide projectors which, after being used in the workshop, were assigned to Lake District National Parks for interpretive purposes.

Gabon joins World Heritage Convention

Gabon has adhered to the Convention bringing the total number of State Parties to 92 (the same number as CITES).

Plan for Africa's largest national park

A Workshop on the Management of Salonga National Park took place in Mbandaka, Zaïre, 9–13 February 1987. The meeting was organized by the Institut Zairois pour la Conservation de la Nature, with the support of the World Heritage Fund and IUCN. It was well attended and benefited from the participation of representatives of national administrations (Land Planning, Environment, Tourism, Rural Development, Army), and of international organizations (FAO, IUCN, Unesco, WWF). A set of 16 recommendations covering management and research guidelines for the 3.6 million ha park were adopted by the workshop and will constitute the basis of Salonga's management plan, to be drafted in the near future. A bonus discovery was that the presence of the pygmy chimpanzee in Salong has now been confirmed.

Taman Negara National Park off threatened list

The Malaysian Government has revoked a decision to build a road into the interior of the park. An alternative less disruptive route has been found. Non-governmental conservation groups played a major role in reversing the decision. The park is now no longer on the Register of Threatened Protected Areas of the World.

Centennial commemoration ceremony at Tongariro National Park, New Zealand

The gift of the nucleus of Tongariro National Park by the Ngati Tuwharetoa people in September 1887 will be commemorated at the park 100 years later by an early morning Maori ceremony on 23 September 1987 followed by a ceremonial welcome to the official party in which it is hoped the Governor-General and Prime Minister of New Zealand will participate.

US ratifies Ramsar Convention

At the time of ratification, the US designated four new wetland sites for the List of Wetlands of International Importance.

Recruitment notice

The Saudi Arabian National Commission for Wildlife Conservation and Development is recruiting for eight positions in this new organization. These are: Environmental Planning, Wildlife Research, Data Officer, Education and Training, Plant Ecology, Animal Ecology, Marine Science and Ornithology. Positions are for a period of 3 years. Applicants should submit two copies of their curriculum vitae, and names of three references to: The Secretary General, NCWCD, PO Box 61681, Riyadh 11575, Saudi Arabia.

Byrd Fellowship Programme

The Institute of Polar Studies of the Ohio State University announces the Byrd Fellowship Programme for post-doctoral researchers working on Arctic and Antarctic problems. The purpose of the programme is to provide fellowships at the Ohio State University to

men and women with distinguished academic backgrounds pursuing advanced research on either Arctic or Antarctic problems. The field of study is open. Contact: Byrd Fellowship Committee, Institute of Polar Studies, The Ohio State University, Columbus, Ohio 43210, USA.

New Zealand establishes Whanganui National Park

The new 74,231-ha Whanganui National Park formally came into existence on 6 December 1986, the first national park to be established in New Zealand in the past 22 years. In announcing the new park the Minister for Lands said that Maori claims to traditional fishing rights and to "customary Maori title" to the bed of the river or to other land areas which may not have been correctly or fairly acquired by the Crown, would not be prejudiced. The

Government has also announced its intention to create the Papatara National Park to protect forests on the west coast of the South Island.

Additions to protected area system in Suriname

Four new nature reserves have been established: Peruvia, 31,000 ha of swamp forest with numerous macaws; Upper Coesewijne, 27,000 ha of sandy savanna with giant river otters, manatees and caimans; Copi, 25,000 ha of savanna with pre-Colombian ruins; and Wanekreek, 45,400 ha of savanna. In addition, the existing nature reserve at Raleighvallen/Voltzberg has been extended from 56,000 to 77,000 ha. Two more nature reserve and two forests reserves are to be announced soon. Land under protection in Suriname now amounts to 4.5 per cent of the country's total land area.

Publications

Protected Natural Areas of the World

By V. A. Borisov, L. S. Belousova and A. A. Vinokurov

Published by Agropromizdat, Moscow (1985)

This book provides descriptive information on 3,000 protected natural areas in 170 countries and territories. For each country, the information presented consists of: (1) legislation governing the protected areas; (2) the areas' administering departments or agencies; (3) research and other organizations associated with the areas in some capacity; and (4) a summary of protected area numbers by protected area categories. Where appropriate, similar information is provided on the basis of smaller political units such as provinces, republics, and territories. A location map of each country's listed protected areas accompanies the text.

The information presented on each protected area listed includes: its name; area in hectares; year of establishment, and occasionally the year of transfer from one protected area category to another; its administrative district; its minimum and maximum heights above sea level; a short description of the area's landscape, unique features, and flora and fauna; and whether it has an international designation such as a World Heritage Site, Ramsar Site, or Biosphere Reserve.

The compilation of such a book is clearly a formidable task and the authors are to be commended for presenting so much information in a format which makes the book a handy reference.

It is also well organized in its presentation of the information. However, it does not catalogue all of the world's protected areas as one may be led to think on the basis of its title. It is, in fact, a compilation of information on selected protected areas. In this regard, the criteria used in selecting the areas for inclusion could have been more explicit and specific. The description of relevant legislation among the provinces is also inconsistent. For some provinces legislation governing wildlife management is mentioned, whereas it is not in the case of others. These concerns clearly indicate some of the difficulties to be encountered in compiling information of this nature. Perhaps more than anything else, they underline the need for more information sharing.

P. GRIGORIEW

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This is a shortened version of a much longer review which is available from IUCN's Commission on National Parks and Protected Areas, IUCN, Avenue du Mont-Blanc, 1196 Gland, Switzerland

Managing Protected Areas in the Tropics

Compiled by John and Kathy MacKinnon, Graham Child, and Jim Thorsell
A broad introduction to the multidisciplinary field of protected area management containing sections on the biogeographical basis of selection of sites, basic legal and policy requirements, public use and relations with local

peoples, resource management guidelines and means of assistance. It includes case studies from throughout the tropics and aims to be a basic source book for middle and senior level managers in the world's 1,750 tropical reserves.

This book forms part of a series resulting from the workshops held at the World Congress on National Parks, Bali, 1982.

Published by IUCN. ISBN 2-88032-808-X, 1987, £17.50 (US\$25).

Antarctica: Our Last Great Wilderness

By Geoff Mosley

An eloquent statement on the need for conservation. Available from Australian Conservation Foundation, 672B Glenferrie Road, Hawthorn, Victoria, Australia 3122.

Arctic Heritage Symposium: results published

The Arctic Heritage Symposium was held in Banff, Alberta, Canada, 24-28 August 1985, sponsored by the Association of the Canadian Universities for Northern Studies (ACUNS) in association with IUCN's Commission on Ecology and CNPPA. The Symposium dealt with the ecological, planning and management aspects of Arctic Heritage use and conservation. The Proceedings volume (633 pages) is obtainable cost C\$27.50 from: Association of Canadian Universities for Northern Studies, 130 Albert, Suite 1959, Ottawa, Canada, K1P 5G4.

The state of national parks in the Neotropical Realm

Gary E. Machlis* and Rod P. Neumann†

National parks and protected areas around the world are increasingly threatened by pollution, poaching, development and other pressures. Systematic and current information is critically important for effective use of national and international resources. This article seeks to describe the state of national parks in the Neotropical Realm. The study has two main objectives: to document managers' perceptions of national park conditions in the Neotropical Realm; and to document the socioeconomic activities in, and adjacent to, national parks in the Neotropical Realm. Protected areas in the Realm increased dramatically in the 1970s, and many neotropical problems (such as colonization in the humid tropics) have unique implications for resource management.

Los parques nacionales y áreas protegidas alrededor del mundo encuentran su existencia constantemente amenazada—por contaminación, saqueo de recursos, desarrollo y otras presiones. La información actualizada y sistemática es crítica e importante para un uso efectivo de los recursos nacionales e internacionales. El presente trabajo busca documentar la situación actual de los parques nacionales en la Región Neotropical. Este trabajo tuvo dos objetivos principales: el documentar la percepción que de las condiciones de los parques nacionales en la Región Neotropical, tienen los responsables de los mismos; a la vez trata de documentar las actividades socioeconómicas que se llevan a cabo dentro de y alrededor de los parques nacionales en la Región Neotropical. El enfocar el presente trabajo a la Región Neotropical es particularmente apropiado, considerando que las áreas protegidas en la Región se han incrementado dramáticamente en la década de los 1970s, y presentan problemas muy particulares (tales como colonización de los trópicos húmedos) que tienen implicaciones únicas en el manejo de recursos.

Dans le monde entier, les parcs nationaux et les aires protégées sont de plus en plus menacés par la pollution, le braconnage et le développement économique, entre autres facteurs. Il est capital de disposer d'une information systématique et actualisée si l'on veut parvenir à une utilisation efficace des ressources nationales et internationales. L'article cherche à décrire l'état des parcs nationaux du domaine néotropical. L'étude a deux objectifs principaux: étayer la conception que le domaine néotropical et étudier les activités socio-économiques à l'intérieur des parcs nationaux et dans leurs environs, dans le domaine néotropical. La superficie des aires protégées du domaine néotropical s'est fortement accrue dans les années 70 et bien des problèmes inhérents aux néotropiques (par exemple la colonisation des terres dans les tropiques humides) ont des effets particuliers sur la gestion des ressources.

Literature review

As serious pressures on park resources have increased, so have research and discussion concerning the conditions of park ecosystems. The literature is fragmented, ranging from general treatments in popular articles (Frome, 1981; Wolf, 1982; McCloskey, 1984) to more technical proceedings (Elliott, 1974).

Although a few comparative studies among parks in different countries of the world have been conducted (Goddard 1961; Hart, 1966; Wielgolaski, 1971; Nelson *et al.*, 1978), most inquiries have been limited to general case studies of specific parks (for example, Olwig, 1980; Jefferies, 1982; Mishra; 1982) or discussions of geographically homogeneous parks (Darling and Eichhorn, 1967; Myers, 1972; Sax, 1980; Lusigi, 1981). In addition, much of the research has been qualitative.

Recently, a few systematic studies of threats to parks have been conducted, most of which deal with US parks. At the request of the US Congress, the US National Park Service conducted in 1980 its servicewide study of threats to US parks. Machlis and Tichnell (1985) examined threats to park resources in 60 countries, including 13 in the neotropics. A total of 1,656 threats were reported worldwide; threats to animal life, vegetation and management accounted for most of the reported threats. Stage of

economic development was found to significantly influence the status, location, and cause of threats.

The English literature specific to parks in the Neotropical Realm is largely composed of case studies, many of them qualitative. Most focus on a single park (for example, Hendrix and Moorehead, 1983; Buchanan, 1985), with attention given to areas with special symbolic or ecological significance, such as Galapagos National Park in Ecuador (Black, 1976; de Groot, 1983; Kramer, 1983). Other studies have centred on one threat, such as shifting cultivation (Meganek and Goebel, 1979) or road construction (Defler, 1983; Fearnside and Ferreira, 1984), and examined it in a national or international context.

Researchers have cited a variety of activities as threatening neotropical park resources. In an examination of rain forest preservation in Venezuela, Hamilton (1976) reported poaching, removal of plants, ill-defined park boundaries, and colonization as disrupting protected area management. Certain activities, such as colonization, are reported as common to parks throughout much of the realm (Perry, 1972; Dourojeanni, 1984). Other activities, such as the construction of a NASA shuttle landing strip (Le Monde, 1985), are unique and site-specific. Many of the reported activities appear to have been historically present; for example, Vogt (1946) observed that poaching, grazing and lack of public support were threatening Mexico's parks 40 years ago.

A recent study of the problems facing national parks in the Neotropical Realm was conducted by Wetterberg *et al.* (USDI, 1985). Repeating research conducted 10 years

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previously, the authors documented administrators' opinions on the status and problems of national park systems, and compared 1984 results with earlier data. The most frequently reported problems were lack of trained personnel and lack of public support. The authors state:

"These types of problems, which are increasingly common throughout the world . . . are likely to increase in the coming decade as remaining land-use options are foreclosed (1985, p. 82)."

Although the literature on threats to parks in the neotropics is incomplete, it suggests the importance of identifying realm-wide trends. Further, the literature indicates that socioeconomic activities in and adjacent to national parks are likely to have significant impacts upon park ecosystems.

Theoretical framework

This study takes a human ecological perspective, elaborated in earlier works (see Machlis *et al.*, 1981; Machlis 1984; and Machlis and Tichnell, 1985). We argue that parks can best be examined by treating them as ecological systems. Figure 1 illustrates a conceptual diagram of a park ecosystem. The *biophysical environment* represents the natural resources of the park and the ecological processes necessary to sustain it. The *social environment* of the park comprises several elements—management institutions, cultural norms, rules and regulations, and so forth. The *human populations* include staff, visitors and local communities.

The park ecosystem is in turn imbedded in a wider regional ecosystem, and is critically influenced by the population, organization, technology, and environment that make up that region (see Figure 1).

The components of a park system can be further specified. Several important subsystems emerge, including air, water, soil, vegetation, animal life, cultural resources, management and administration, and visitors. Figure 2 presents a conceptual model of such a park system and suggests key linkages via flows of energy, nutrients, money and information (for a detailed discussion of the model see Wright and Machlis, 1984).

Because complex relations exist among these subsystems, threats associated with one subsystem may not impact all others similarly. For example, organic pollution may cause unacceptable changes in the water subsystem, yet may have little effect on wildlife or visitors. Therefore, data are best collected on the condition of each individual subsystem. Such data provide a more realistic and detailed assessment of a park and can highlight especially vulnerable subsystems. This "systems approach" guided the design, data collection, and analysis of threats to neotropical parks.

The concept of threats

The concept of threats is difficult to define. Machlis and Tichnell state:

"Threats to parks are really stresses perceived to have detrimental impacts upon valued components of park ecosystems. Such a definition is almost entirely social rather than biological. To be a threat, the stress must be perceived by ourselves or with the aid of scientific instruments. Threats can range from merely suspected to fully documented, and the level of acceptable documentation is a subjective criterion (1985, p. 11)."

Management objectives must be considered as a component in any definition of threats to parks. Loss of a highly visible and symbolic animal population (such as

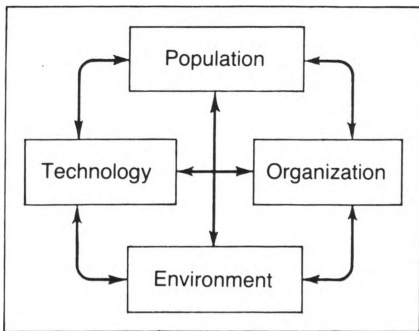
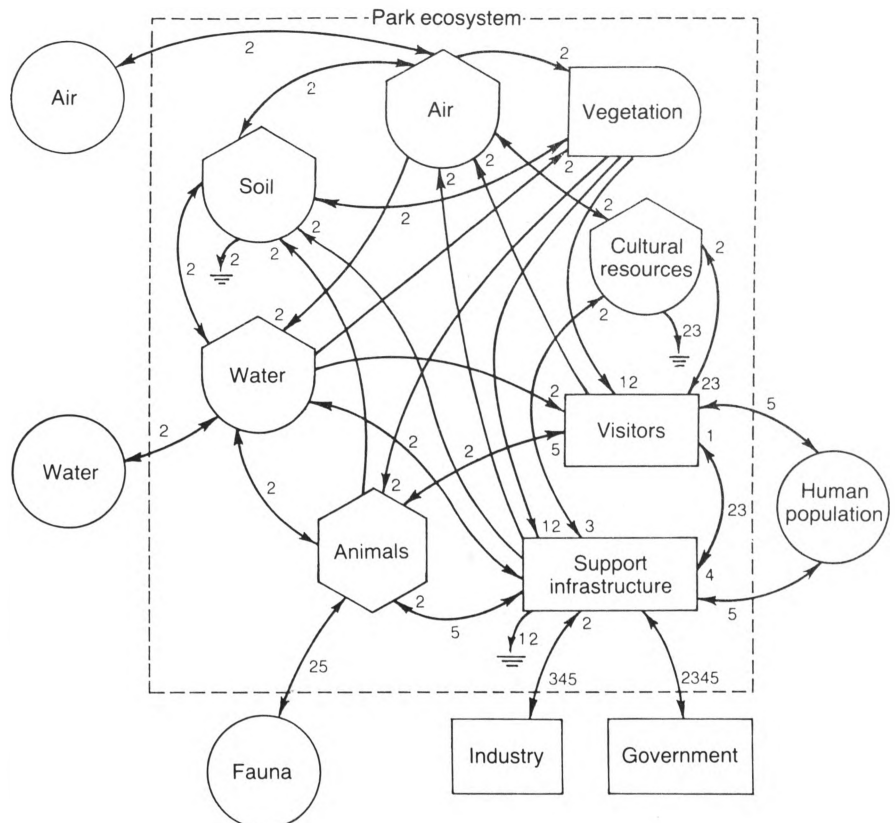


Figure 1 ▲
Key variables of the human ecosystem.

Figure 2 ►
Specified diagram of park ecosystem. The notation is based on H. T. Odum's *System ecology: An introduction*. New York: Wiley and Sons, 1983. The shapes imply storage, production and consumption functions, and the numbered arrows refer to flows of (1) energy, (2) materials, (3) information, (4) money, and (5) individuals. The symbol ≡ represents a sink. Adapted from R. G. Wright and G. E. Machlis. *Models for park management: A prospectus*. Cooperative Park Studies Unit Report CPSU/UI SB85-1, Moscow: University of Idaho, 1984, p. 20.



the panda in China or marine turtles in the Caribbean) might cause less than catastrophic harm to the viability of an entire ecosystem but so jeopardize park objectives that it constitutes a clear and present threat.

An understanding of threats is further made difficult because the term has been used to describe both *activities* (such as poaching) and *environmental conditions* (such as the presence of exotics). It may be useful to clarify threats as unacceptable conditions, caused by human or natural activities. Therefore, as used in this study the term threat denotes: *those conditions of either human or natural origin that cause significant damage to park resources, or are in serious conflict with the objectives of park administration and management.* Examples include erosion, chemical pollution, non-native flora and fauna and too many visitors.

Methods

The results of this study are based on the responses to an international survey of national park managers in the Neotropical Realm, conducted between December 1985 and April 1986. The survey included the biogeographical region designated by Udvardy (1975) as the Neotropical Realm. The realm's boundaries encompass all Central and South America, the Caribbean and parts of Mexico and the USA. To achieve a relatively homogeneous population in regard to management objectives, only areas that met national park criteria as defined by the IUCN General Assembly in 1969 were surveyed. The *IUCN Directory of Neotropical Protected Areas* (IUCN, 1981) was the primary source for park names and addresses. Every national park (IUCN category II) listed for the Neotropical Realm was included in the survey.

A questionnaire was constructed in four sections, two of which were used to gather data for this paper. The first section asked managers about human activities in and adjacent to their park. A list of 24 activities was provided and managers were asked to indicate the presence of these activities, within 10 km of the park.

In the second section, park resources were grouped into seven subsystems, reflecting the theoretical framework: water, air, soil, animal life, vegetation, management and administration, and a miscellaneous "other" category. Each subsystem included a list of potential threats that applied specifically to it. The list of threats were compiled from the literature previously reviewed, and from the earlier study by Machlis and Tichnell (1985).

Drafts of the questionnaire were sent to several professionals with expertise in neotropical ecology for review. The revised questionnaire was written in English and translated into Spanish and Portuguese. A questionnaire was airmailed to each park, along with several reminders. The responses for each completed questionnaire were numerically coded. The data were then keypunched and stored in a computer file for analysis.

Limitations

This study has several limitations. The most significant is that the survey documents managers' perceptions rather than actual conditions. These perceptions may not reflect the actual kind, extent, or seriousness of problems that face a specific park, and may be affected by a respondent's education and values or by the level of monitoring in a park. Yet as a measure of what managers perceive, the survey is reasonably valid. A second limitation is that

the study is cross-sectional, conducted at only one point in time. If the surveys were distributed at another time, and completed by a different set of managers, the results would undoubtedly vary. Such variations may bias the results. For this reason, questions concerning the characteristics of respondents were analysed to provide a profile of the respondents.

A third limitation is that parks without staff personnel were unlikely to return the questionnaire. Hence, the survey may under-represent national parks that do not currently have a management staff. A fourth limitation is that threats to cultural resources such as buildings, archeological sites, and trails are excluded from the study because of time, funding, and expertise restrictions. Cultural resources play an important role in many parks and may influence what threats occur to natural resources. Their exclusion limits the scope of our study and may result in certain threats going unreported.

Results of the survey

Profile of the respondents

Preliminary results show personnel in 122 of the 183 parks included in the census have returned questionnaires, representing 19 countries. The response rate was 69 per cent. Two questionnaires were returned as undeliverable, and communications with neotropical officials indicated that another five areas were never fully established as national parks. Adjusted $N=176$.

Most respondents (75 per cent) were involved in day-to-day park operations. Sixty-six per cent indicated by job title that they were in charge of managing the area. Other respondents included rangers, technicians, and regional or central government officers.

Respondents had moderate levels of experience and relatively high levels of education. Forty-three per cent of the respondents had between one and five years of experience at the park, while another 25 per cent had worked at the park for six years or more. Nearly half (46 per cent) indicated they had six or more total years in park management or related fields. The vast majority (84 per cent) had completed secondary school and 51 per cent reported completing five or more years of university work.

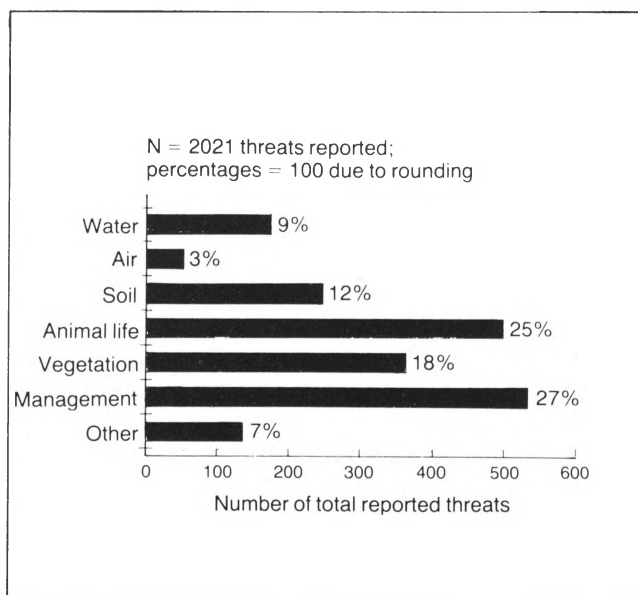


Figure 3 Reported threats by subsystem.

Threats to parks: general results

A total of 2,021 threats were reported. Figure 3 shows the reported threats by subsystem, with the highest proportion in the management (27 per cent) and animal life subsystems (25 per cent). Only 3 per cent of the reported threats were to the air subsystem; the water subsystem also had a low proportion of reported threats.

Table 1 presents reported threats to the water subsystem. The most common was siltation, with 34 per cent of the parks reporting its occurrence. Chemical pollution was also frequently reported. Several other threats, groundwater changes, inadequate rainfall, blocked waterways, temperature changes and salinization, had similar rates. Table 2 shows that reported threats to the air subsystem (chemical pollution, smoke and dust) also had similar rates, with, respectively, 16, 15, and 13 per cent of the parks so reporting.

Table 1 Reported threats to water subsystem

Rank	Threat	Respondents reporting (No.)	(%)
1	Siltation	41	34
2	Chemical pollution	32	26
3	Groundwater changes	20	16
4	Blocked waterway	20	16
5	Water temperature changes	18	15
6	Inadequate rainfall	17	14
7	Salinization/alkalinization	15	12
8	Oxygen depletion	12	10

Table 2 Reported threats to air subsystem

Rank	Threat	Respondents reporting (No.)	(%)
1	Chemical pollution	20	16
2	Smoke	18	15
3	Dust	15	13

Table 3 describes the threats to the soil subsystem. Erosion was reported by most parks (57 per cent) and several other threats to soil were reported by about a third of the parks: inadequate vegetation cover, loss of nutrients and soil compaction. The threats to animal life subsystems are reported in Table 4. Several threats were common to parks in the Neotropical Realm; 58 per cent of the parks reported reduced populations and 43 per cent reported non-native animals (exotics). Further, several of these threats with similar and significant reporting rates are “systemic,” i.e. their impacts are often expressed at the ecosystem level: decreased species diversity (44 per cent of the parks), habitat loss (44 per cent) and species extinction (44 per cent). Overpopulation of a species, blocked migratory routes and disease were reported by less than a quarter of the parks.

Table 3 Reported threats to soil subsystem

Rank	Threat	Respondents reporting (No.)	(%)
1	Erosion	70	57
2	Inadequate vegetation cover	44	36
3	Loss of nutrients	39	32
4	Soil compaction	39	32
5	Chemical pollution	24	20
6	Change in pH	21	17
7	Increased salts	12	10

Table 4 Reported threats to animal life subsystem

Rank	Threat	Respondents reporting (No.)	(%)
1	Reduced population of a species	71	58
2	Decreased species diversity	56	46
3	Fire	54	44
4	Habitat loss	54	44
5	Species extinction	54	44
6	Non-native animals	53	43
7	Inadequate food supply	32	26
8	Chemical pollution	25	20
9	Overpopulation of a species	23	19
10	Inadequate water supply	23	19
11	Blocked migratory routes	22	18
12	Diseases	20	16
13	Flooding	15	12

Table 5 shows the reported threats to the vegetation subsystem. Loss of vegetation cover was the most commonly reported (48 per cent), followed by fire (46 per cent) and exotic plants (40 per cent). More than a quarter of all parks reported systemic threats similar to that described for animal life: decreased species diversity, change in species composition, and species extinction. Table 6 shows the results for the management and administration subsystem. Many of the threats were reported by most parks. For example, lack of trained personnel was reported by 70 per cent of the parks in the Neotropical Realm. The most commonly reported threats were the absence of needed resources such as facilities (59 per cent), public support (56 per cent), interagency coordination (48 per cent), and ownership and control (47 per cent). The least reported threats had to do with visitors, with 21 per cent of the parks reporting too few visitors, and 16 per cent reporting too many visitors.

Table 5 Reported threats to vegetation subsystem

Rank	Threat	Respondents reporting (No.)	(%)
1	Loss of vegetation cover	59	48
2	Fire	56	46
3	Exotic plants	49	40
4	Trampled plants	45	37
5	Decreased species diversity	42	34
6	Change in species composition	34	28
7	Species extinction	31	25
8	Chemical pollution	21	17
9	Inadequate water supply	16	13
10	Flooding	13	11

Table 6 Reported threats to management and administration subsystem

Rank	Threat	Respondents reporting (No.)	(%)
1	Lack of trained personnel	85	70
2	Lack of facilities	72	59
3	Lack of public support	68	56
4	Lack of interagency coordination	58	48
5	Lack of ownership and control	57	47
6	Inadequate weak laws	45	37
7	Inadequate agency organization	40	33
8	Inadequate access	34	28
9	Unsafe conditions	34	28
10	Too few visitors	26	21
11	Too many visitors	19	16

Table 7 lists the results of the “other” category. Thirty-four per cent of the parks reported litter as a threat. Degraded scenic views and degraded geological features were reported by a quarter of the parks. Finally, threats

written in by the respondents vary from generic (“biological contamination”) to the specific (“beavers”). The most commonly written-in threats had to do with lack of economic resources or budget.

A number of threats were repeatedly reported by parks in the Neotropical Realm. Table 8 ranks the 15 most reported threats. Many are to the management subsystem, with lack of trained personnel (70 per cent) and facilities (59 per cent) being the most common. Yet several threats to biological subsystems was also reported by most parks: reduced animal populations, erosion, loss of vegetation cover, and exotic animals. Other threats were common: decreased species diversity, loss of habitat, fire and species extinction. Hence, a “core” of related threats may exist in the Neotropical Realm, composed of reduced ecosystem variability (loss of habitat, populations and species) and lack of management resources. Other threats, such as soil erosion, fire and exotics may contribute to this core of threats.

Activities in and adjacent to neotropical parks

A variety of human activities, from shifting agriculture to urban development, are found in and adjacent to neotropical parks. Table 9 shows the number of respondents reporting each activity listed in the questionnaire. The vast majority (75 per cent) reported livestock grazing in or near the park. Additionally, most reported poaching, plantation agriculture and road construction. Agricultural activities such as shifting agricultural and commercial logging were reported with high frequency relative to industrial activities such as mining and manufacturing. Illegal activities, such as smuggling and unlawful capture of animals, varied in occurrence. Eight parks reported that armed conflict was present.

Conclusion: implications of the data

The data from this survey have several important implications. We present these as opinions, realizing that practical solutions to the problems facing national parks in the Neotropical Realm must come from those familiar with field situations.

First, national parks in the Neotropical Realm face serious threats. Managers commonly reported critical resource problems: soil erosion, exotics, loss of habitat, fire. While the data are based upon perceptions, it is clear that the park ecosystems are undergoing significant and harmful change. Where the cause of a threat continues (such as an increasing colonization, fire and livestock grazing), the likelihood of recovery is minimized.

These challenges would be difficult enough, given the proper human and financial resources. But the most commonly reported threats were to management itself. Without adequate management resources, it seems doubtful that many of the threats identified in this survey can be aggressively and effectively dealt with. The survey provides evidence for concern.

Second, we suggest that international action be oriented towards the identified “core” of threats. As described earlier, the most commonly reported threats were of three kinds: erosion, reduced ecosystem variability, and lack of management resources. International activities addressing these threats will have relevance and value throughout the Neotropical Realm. For example, we suggest that practical management techniques for dealing with soil erosion be developed, disseminated,

Table 7 Other threats reported

Rank	Threat	Respondents reporting	
		(No.)	(%)
1	Litter	41	34
2	Degraded scenic views	34	28
3	Degraded geologic features	31	25
4	Noise pollution	13	11
5	Unwanted odours	8	6

Table 8 Fifteen most reported threats

Subsystem	Threat	Respondents reporting	
		(N)	(%)
Management	Lack of trained personnel	85	70
Management	Lack of facilities	72	59
Animal life	Reduced population of a species	71	58
Soil	Erosion	70	57
Management	Lack of public support	68	56
Vegetation	Loss of vegetation cover	59	48
Management	Lack of interagency coordination	58	48
Management	Lack of ownership and control	57	47
Vegetation	Fire	56	46
Animal life	Decreased species diversity	56	46
Animal life	Fire	54	46
Animal life	Loss of habitat	54	44
Animal life	Species extinction	54	44
Animal life	Non-native animals	53	43
Vegetation	Non-native plants	49	40

N = number of parks reporting

Table 9 Reported human activities

Rank	Activity	Respondents reporting	
		(N)	(%)
1	Livestock grazing	91	75
2	Unlawful killing of animals (subsistence)	84	69
3	Plantation agriculture	71	58
4	Road construction	65	53
5	Tourist resort development	56	46
6	Unlawful capture of animals	51	42
7	Shifting cultivation	46	38
8	Commercial logging	44	36
9	Unplanned colonization	43	35
10	Building construction	42	34
11	Unlawful killing of animals (commercial)	42	34
12	Unlawful plant collection	35	29
13	Urban development	35	29
14	Quarrying	34	28
15	Lawful killing of animals	28	23
16	Mining	21	17
17	Smuggling	17	14
18	Hydroelectric power	15	12
19	Industrial manufacturing	15	12
20	Coca/marijuana harvesting	13	11
21	River impoundment	11	9
22	Armed conflict	8	7
23	Oil and gas drilling	6	5
24	Coal-fired power	3	2

N = number of parks reporting

encouraged and supported throughout the Neotropical Realm. Interdisciplinary and comparative research on species diversity and habitat loss might be encouraged, with the goal of providing managers with monitoring techniques and rehabilitation strategies. And in the face of the threats to management, increased recruiting of park professionals is an urgent need. The approach, not original, is to “think globally, act locally.” The global issues are the core threats; the solutions must be localized in each nation or park.

Third, the activities in and adjacent to national parks in the neotropics suggest diverse management strategies will be a necessity in the 1990s and beyond. Inside the national parks, significant agricultural activity occurs: livestock grazing, plantation agriculture, shifting cultivation, commercial logging, cocoa/marijuana harvesting. Adjacent, the pattern is similar. Importantly, many activities take place both in and adjacent to a park, suggesting some boundaries to be fragile, permeable or currently unenforceable. As these activities will probably continue through the century, so may the associated threats.

Hence, management strategies that deal creatively with human pressures are necessary tools, now and in the future. We suggest that park managers have much to gain by working cooperatively with local populations. The data illustrate that park management in the Neotropical Realm cannot be isolated from surrounding rural development. The fact that 56 per cent of the managers cited lack of public support as a threat makes the need for community relations obvious. Elsewhere we have suggested:

... parks [should] be seen as the multiple-use areas they already are—providing watershed protection, recreation, tourism expenditures, employment, and so forth. Their integration into regional socio-economic systems is, we believe, the crucial element that will sustain them in the long term, regardless of a nation's stage of development. Some measurable benefits must flow from park to region. When a threat to a national park is perceived by the regional population as a threat to its own well-being, such integration will be complete, and the wise husbandry of parks more readily accomplished (Machlis and Tichnell, 1985, p97).

Finally, the response to this survey suggests park managers in the Neotropical Realm are dedicated professionals, and an important part of the world conservation movement. Not only was the response excellent, the care with which the questionnaires were completed suggests real concern about sharing knowledge. Often, respondents wrote long and careful comments describing their problems, failures and successes. If the threats to national parks in the neotropics are to be acknowledged, managed, and in some cases resolved, a most important step may be the encouragement and support of these professionals.

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References

Black, M. J. 1976. Galapagos National Park, problems and solutions, *Parks* 1 (1): 2–4.
 Buchanan, A. 1985. *Costa Rica's wild west*. *Sierra*. July–August: 32–35.
 Budowski, G. and MacFarland, C. 1984. Keynote address: the Neotropical Realm. In *National parks, conservation, and development: the role of protected areas in sustaining society*, J. A. McNeely and K. R. Miller, eds. pp. 552–560
 Darling F. F. and Eichhorn, N. D. 1967. *Man and nature in the national parks—reflections on policy*. Washington DC: Conservation Foundation.

Defler, T. R. 1983. A remote park in Columbia, *Oryx* 17 (1): 15–17.
 deGroot, R. S. 1983. Tourism and conservation in the Galapagos Islands, *Biol. Conserv.* 26 (4): 291–300.
 Dourojeanni, M. J. 1984. Future directions for the Neotropical Realm. *National parks, conservation, and development: the role of protected areas in sustaining society*, J. A. McNeely and K. R. Miller, eds. pp. 621–625.
 Elliot, H., ed. 1974. *Second World Conference on National Parks*. Morges, Switzerland: IUCN.
 Feamside, P. M. and Ferreira, G. L. 1984. Roads to Rondonia: highway construction and the farce of unprotected reserves in Brazil's Amazonian forest, *Environ. Conserv.* 11 (4): 358–360.
 Frome, M. 1981. What is happening to our national parks? *National Parks* 55: 10–15.
 Goddard, M. K. 1961. What the United States can learn. *Comparisons in resource management—six notable programs in other countries and their possible U.S. application*. H. Jarrett, ed. Baltimore: Johns Hopkins University Press.
 Hamilton, L.S. 1976. Tropical rainforest use and the preservation: a study of problems and approaches in Venezuela. *International Series* No. 4. Sierra Club Special Publications.
 Hart, W. J. 1966. A systems approach to park planning, *IUCN, Publ. New Series: Suppl. Paper* No. 4. Morges, Switzerland: IUCN.
 Hendrix, G. Y. and Morehead, J. M. 1983. Everglades National Park: imperiled wetland, *Ambio* 12 (3): 153–57.
 International Union for the Conservation of Nature and Natural Resources. 1981. *IUCN directory of neotropical protected areas*. Dublin: Tycooly International Publishing Limited.
 Jefferies, B. E. 1982. Sagarmatha National Park: the impact of tourism in the Himalayas, *Ambio* 11 (5): 247–281.
 Kramer, P. 1983. The Galapagos: islands under siege, *Ambio* 12 (3): 186–90.
 Le Monde. 1985. La NASA souhaite utiliser Isle de Paques pour sa navette spatiale, *Le Monde* 21 May, Chile.
 Lusigi, W. J. 1981. New approaches to wildlife conservation in Kenya, *Ambio* 109 (2–3): 87–92.
 Machlis, G. E., Field, D. R. and Campbell, F. L. 1981. The human ecology of parks, *Leis. Sci.* 4 (3): 195–212.
 Machlis, G. E. 1984. Protection forestry. In *The human factors affecting forestry/fuelwood projects: an agenda for research and development*. U.S. AID workshop, 11–13 February 1984, Washington DC.
 Machlis, G. E. and Tichnell, D. L. 1985. *The state of the world's parks: an international assessment for resource management, policy and research*. Boulder: Westview Press.
 McCloskey, M. 1984. *World parks*. *Sierra*. 69 (6): 36–42.
 Meganek, R. A. and Goebel, J. M. 1979. Shifting cultivation: problems in parks in Latin America, *Parks* 4 (2): 4–8.
 Mishra, H. R. 1982. Balancing human needs and conservation in Nepal's Royal Chitwan Park, *Ambio* 11 (5): 246–251.
 Myers, N. 1972. National parks in savannah Africa, *Science* 178 (4067): 1255–1263.
 Nelson, J. G., Needham, R. D. and Mann, D. L., eds. 1978. *International experience with national parks and related reserves*. Ontario: Department of Geography, University of Waterloo.
 Olwig, K. F. 1980. National parks, tourism and local development: a West Indian case, *Human Organization* 39 (1): 22–30.
 Perry, R. 1972. Parks and problems in Columbia, *Oryx* 11 (6): 433–440.
 Sax, J. L. 1980. *Mountains without handrails—reflections on the national parks*. Ann Arbor: University of Michigan Press.
 Tichnell, D. L., Machlis, G. E. and Fazio, J. R. 1983. Threats to national parks: a preliminary survey, *Parks* 8 (1): 14–17.
 Tichnell, D. L. and Machlis, G. E. 1984. Threats to national parks: an international survey. *Cooperative Parks Studies Unit Report CPSU/UI S84–1*. Moscow: University of Idaho.
 Udvardy, M. D. F. 1975. A classification of the biogeographical provinces of the world. *IUCN Occasional Paper* No. 18. Morges, Switzerland: IUCN.
 U. S. Department of the Interior. 1985. *Decade of progress for South American national parks 1974–1984*. Washington DC.
 Vogt, W. 1946. Mexico's national parks, *National Parks Magazine* (April–June): 13–16.
 Wielgolaski, F. E. 1971. National parks and other protected areas in North America in relation to those in Norway and Sweden, *Biol. Conserv.* 3 (4): 285–291.
 Wolf, R. 1982. Crisis in the national parks, *Rocky Mountain Magazine* 4 (11): 49–55.
 Wright, R. G. and Machlis, G. E. 1984. Potential indicators for monitoring biosphere reserves. *The biosphere: Problems and solutions*. Amsterdam: Elsevier Science Publishers, pp. 49–63.

Editorial

Que tan realísticos son los administradores de parques nacionales en la evaluación de las amenazas a sus parques? Existen amenazas particulares comunes a la mayoría de los parques? Estas son preguntas examinadas en un estudio de los problemas percibidos por los administradores de parques en la región neotropical. Un resumen de los resultados principales fué presentado en la 27ava Sesión de Trabajo de la Comisión sobre Parques Nacionales y Areas Protegidas de la UICN celebrado en Bariloche, Argentina, en Marzo del año pasado y un análisis de los mismos se incluye en las secciones en Inglés y Español de ésta edición. Por supuesto que muchas de estas amenazas se aplicarán a parques en otras regiones, y a los lectores se les anima a darnos sus puntos de vista y comentarios sobre los muy fundamentales temas relacionados.

Aquellos familiarizados con la Sabana del Africa Oriental sabrán que se ha hablado por muchos años de esquemas para apacentar las vastas manadas de animales en la región del Serengeti; en efecto se han tratado proyectos piloto de tiempo en tiempo, aunque nunca se ha llegado a resultados significativos. El concepto fundamental de estos esquemas es desafiado en un artículo provocador que relata comportamiento animal, técnicas para apacentar y el papel y los requerimientos de la gente local.

Continuando con el tema de tomar un nuevo vistazo a las ideas y prácticas establecidas, se incluye una revisión de los temas del 20avo Seminario Internacional de parques el cuál da lugar a una cadena de consideraciones importantes para administradores de parques.

Respuestas al cuestionario distribuído con PARKS PARQUES PARCS Vol. 11 nos. 2-3 continúan llegando y estan siendo procesadas. No tomará mucho tiempo antes de que todas las correcciones para las direcciones se hagan y sugerencias para mejorías se tomen en cuenta dentro de las limitaciones de nuestro presupuesto severamente reducido. En este respecto estamos animados por el número de respuestas aceptando la idea de una subscripción, y también de aquellos de acuerdo en subscribirse a nombre de organizaciones menos afortunadas. Una revisión del sistema de estos asuntos será incluida en el análisis del cuestionario con referencia particular a la estrategia financiera a largo plazo.

Muchas respuestas contenían peticiones por más artículos de 'técnicas de parques' y obviamente, esta es una demanda que trataremos de satisfacer. Para ésto se requiere que el material necesario nos sea disponible de antemano y esperamos que podamos confiar en nuestros lectores para ayudarnos en ésto. Estaremos muy agradecidos por detalles de consejos y técnicas que los lectores hallan encontrado útiles y que podamos pasar a otros por medio de PARKS PARQUES PARCS.

Lo más animante de todo fueron los muchos comentarios favorables contenidos en las respuestas. Estamos concientes de que mucho más podría hacerse si estuviéramos en una situación financiera mejor, pero es alentador saber que lo que se ha hecho es generalmente bienvenido y apreciado.

TONY MENCE – *Editor*

Noticias

Taller de Interpretación en Chile

El Primer Taller de Interpretación de Tierras Silvestres Protegidas fué celebrado del 17-26 de Noviembre 1986 en el Parque Nacional Puyehue, Chile. Veinticinco profesionales y guardabosques atendieron el congreso, organizado por el Servicio Forestal Chileno (CONAF) con apoyo del Servicio de Parques Nacionales de los EUA y el WWF-US (Fondo Mundial para la Naturaleza-EUA). Además de veinte participantes chilenos, cinco profesionales de Argentina, Uruguay, Paraguay y Ecuador recibieron apoyo de la red técnica Latinoamericana de parques nacionales de la FAO/PNUMA. El instructor principal fué Raymond Olivas, Sub-jefe Naturalista, Parque Nacional Big Bend. WWF-US contribuyó con material impreso y dos proyectores de transparencias los cuales fueron asignados despues del taller para el Parque Nacional Lake District para propósitos interpretativos.

EUA ratifica la Convención Ramsar

Al ratificar la Convención, los EUA designaron cuatro sitios de humedales nuevos para la lista de Humedales de Importancia Internaional.

Gabón se une a la Convención del Patrimonio Mundial

Gabón se ha adherido a la Convención trayendo el número total de Estados Partes a 92 (el mismo que CITES).

Plan para el parque nacional más grande de Africa

Se llevó a cabo un Taller sobre el Manejo del Parque Nacional Salonga en Mbandaka, Zaire del 9 al 13 de Febrero 1987. La reunión fué organizada por el Instituto Zaireño para la Conservación de la Naturaleza, con el apoyo del Fondo para el Patrimonio Mundial y la UICN. Hubo buena participación y se benefició con la participación de representantes de administraciones nacionales (Planeación de Tierras, Medio Ambiente, Turismo, Desarrollo Rural, Armada y organizaciones internacionales (FAO, UICN, Unesco, WWF).

Una serie de 16 recomendaciones cubriendo las pautas para la administración e investigación de las 3.6 millones de hectáreas del parque fueron adoptadas por el taller y constituirán la base del plan de manejo de Salonga, que se preparará en un futuro cercano. Un descubrimiento adicional fué la confirmación de la presencia del chimpancé pigmeo en Salong.

Adiciones al Sistema de Area Protegidas en Suriname

Se han establecido cuatro nuevas reservas: Peruvia: 31 000 ha de bosques de pantano con numerosos araraunas; Coesewijne Alto: 27 000 ha de sabana arenosa con nutrias gigantes de río, manatí y caimanes; Copi: 25 000 ha de sabana con ruinas precolombinas, y Wanekreek: 45 400 ha de sabana. Asimismo, la reserva natural existente en Raleighvallen/Voltzberg se ha extendido de 56 000 a 77 00 ha. Dos reservas naturales más y dos reservas forestales serán anunciadas pronto. Terrenos bajo protección en Suriname ahora llegan al 4.5% del total de terrenos en el país.

Ceremonia del Centenario Conmemorativo en el Parque Nacional Tongariro, Nueva Zelandia, 23 Septiembre 1987

El regalo del núcleo del Parque Nacional Tongariro por la gente Ngati Tuwharetoa en Septiembre 1887 será conmemorado en el parque 100 años después con una ceremonia Maori en la madrugada seguida por una ceremonia de bienvenida al grupo oficial en la cual se espera que participará el Gobernador General y Primer Ministro de Nueva Zelandia.

La situación de los parques nacionales en la Región Neotropical

Gary E. Machlis* y Rod P. Neumann†

Los parques nacionales y áreas protegidas alrededor del mundo encuentran su existencia constantemente amenazada—por contaminación, saqueo de recursos, desarrollo y otras presiones. La información actualizada y sistemática es crítica e importante para un uso efectivo de los recursos nacionales e internacionales. El presente trabajo busca documentar la situación actual de los parques nacionales en la Región Neotropical. Este trabajo tuvo dos objetivos principales: el documentar la percepción que de las condiciones de los parques nacionales en la Región Neotropical, tienen los responsables de los mismos; a la vez trata de documentar las actividades socioeconómicas que se llevan a cabo dentro de y alrededor de los parques nacionales en la Región Neotropical. El enfocar el presente trabajo a la Región Neotropical es particularmente apropiado, considerando que las áreas protegidas en la Región se han incrementado dramáticamente en la década de los 1970s, y presentan problemas muy particulares (tales como colonización de los trópicos húmedos) que tienen implicaciones únicas en el manejo de recursos.

National parks and protected areas around the world are increasingly threatened by pollution, poaching, development and other pressures. Systematic and current information is critically important for effective use of national and international resources. This article seeks to describe the state of national parks in the Neotropical Realm. The study has two main objectives: to document managers' perceptions of national park conditions in the Neotropical Realm; and to document the socioeconomic activities in, and adjacent to, national parks in the Neotropical Realm. Protected areas in the Realm increased dramatically in the 1970s, and many neotropical problems (such as colonization in the humid tropics) have unique implications for resource management.

Dans le monde entier, les parcs nationaux et les aires protégées sont de plus en plus menacés par la pollution, le braconnage et le développement économique, entre autres facteurs. Il est capital de disposer d'une information systématique et actualisée si l'on veut parvenir à une utilisation efficace des ressources nationales et internationales. L'article cherche à décrire l'état des parcs nationaux du domaine néotropical. L'étude a deux objectifs principaux: étayer la conception que le domaine néotropical et étudier les activités socio-économiques à l'intérieur des parcs nationaux et dans leurs environs, dans le domaine néotropical. La superficie des aires protégées du domaine néotropical s'est fortement accrue dans les années 70 et bien des problèmes inhérents aux néotropiques (par exemple la colonisation des terres dans les tropiques humides) ont des effets particuliers sur la gestion des ressources.

Revision de literatura

Conforme se han incrementado las serias presiones sobre los recursos de los parques, también se han incrementado las investigaciones y discusiones sobre las condiciones de los ecosistemas en los parques. La literatura está fragmentada, cubriendo desde tratados muy generales en artículos populares (Frome, 1981; Wolf, 1982; McCloskey, 1984) hasta memorias más técnicas (Elliott, 1974).

Aunque se han realizado algunos estudios comparativos en diferentes partes del mundo (Goddard, 1961; Hart 1966; Wielgolaski, Nelson *et al.* 1978), la mayoría de las investigaciones se han limitado a estudios de caso generales en parques específicos (por ejemplo, Olwig, 1980; Jefferies, 1982; Mishra, 1982) o discusiones de parques geográficamente homogéneos (Darling y Eichhorn, 1967; Myers, 1972; Sax, 1980; Lusigi, 1981). Adicionalmente, mucho de la investigación ha sido cualitativa.

Algunos estudios sistemáticos sobre las amenazas a parques se han llevado a cabo recientemente, la mayoría de los cuales se orienta hacia los parques en EUA. A una petición del Congreso Americano, el Servicio de Parques Nacionales de EUA. realizó su primer estudio a nivel nacional sobre las amenazas a los parques americanos en 1980. Machlis y Tichnell (1985) examinaron las amenazas

hacia los parques y sus recursos en 60 parques, incluyendo 13 de los Neotropicales. Un total de 1,656 amenazas fueron registradas a nivel mundial; amenazas a la vida animal, vegetación y manejo alcanzaron las cifras más altas. Se encontró que el estado de desarrollo económico influyó significativamente el status, localización y causa de las amenazas.

La literatura anglosajona específica de los parques en la Región Neotropical está fundamentalmente compuesta por estudios de caso, muchos de ellos cualitativos. La mayoría se enfoca en un solo parque (por ejemplo, Hendrix y Morehead, 1983; Buchanan, 1985), con atención hacia las áreas con un significado, simbólico especial o ecológico, tales como el parque Nacional Galápagos en Ecuador (Black, 1976; de Groot, 1983; Kramer, 1983). Otros estudios se han centrado en una amenaza específica, como el de la agricultura itinerante (Meganek y Goebel, 1979) o construcción de caminos (Defler, 1983; Fearnside y Ferreira, 1984), examinándolo en un contexto nacional o internacional.

Los investigadores han citado una variedad de actividades que amenazan los recursos de los parques neotropicales. En un examen de la preservación del bosque lluvioso en Venezuela, Hamilton (1976) registra saqueo de recursos, colecta de plantas, en definición de los límites del parque y la colonización como actividades que afectan el manejo de las áreas protegidas. Algunas actividades, tales como la colonización, se reportan comúnmente en los parques de mucho de la región (Perry, 1972; Dourojeanni, 1984). Otras actividades, tales como la construcción de una pista de aterrizaje para

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vehículos espaciales de la NASA (Le Monde, 1985) son únicos y específicos de un sitio. Muchas de las actividades reportadas han estado presentes históricamente; por ejemplo, Vogt (1946) observó que el saqueo de recursos, pastoreo y falta de apoyo público amenazaban los parques Mexicanos hace cuarenta años.

Un estudio reciente sobre los problemas que enfrentan los parques nacionales en la Región Neotropical fué realizado por Wettenberg *et al.* (USDI, 1985). Estos autores repitieron una investigación realizada hace diez años, documentando las opiniones de los administradores y responsables de parques, acerca de los problemas y el status de los sistemas de parque nacionales, comparando los resultados de 1984 con los previos. Los problemas más frecuentemente reportados fueron la falta de personal capacitado y la falta de apoyo público. Los autores indican:

“Estos tipos de problemas, los cuales son comunes y se incrementan por todo el mundo . . . probablemente se incrementaran en la década entrante conforme se limitan las escasas opciones futuras en el uso de la tierra (1985, p.82).”

Aunque la literatura existente acerca de las amenazas hacia los parques en el neotrópico es incompleta, esta sugiere la importancia en identificar las tendencias generales en la región. Además, la literatura indica que las actividades socioeconómicas dentro de y alrededor de los parques nacionales, probablemente tendrán impactos significativos en los ecosistemas de los parques.

Marco teórico conceptual

Este estudio se enfoca desde una perspectiva de ecología humana, elaborandose en base a trabajos previos (vease Machlis *et al.*, 1981; Machlis, 1984; y Machlis y Tichnell, 1985). Proponemos que los parques pueden ser mejor examinados tratandolos como sistemas ecológicos. La

figura 1 ilustra un diagrama conceptual de un ecosistema de parque. El *medio ambiente biofisico* que representa para mantenerlo. El *medio ambiente social* del parque incluye varios elementos—instituciones involucradas en el manejo, normas culturales, personal que ahí labora, los visitantes y las comunidades humanas locales.

El ecosistema del parque se encuentra inmerso a la vez en un ecosistema regional más amplio, y se encuentra críticamente influenciado por la población humana, organización, tecnología, y medio ambiente que constituyen esa región (vease Figura 1).

Los componentes del ecosistema del parque pueden especificarse más finamente. Algunos subsistemas importantes son el aire, agua, suelo, vegetación, animales, recursos culturales, manejo y administración, y visitantes. La Figura 2 representa un modelo conceptual del sistema del parque y sugiere uniones claves a través de flujos de energía, nutrientes dinero e información (para una discusión detallada del modelo vease Wright y Machlis, 1984).

Considerando las complejas relaciones existentes entre estos subsistemas, las amenazas asociadas con un subsistema pueden impactar diferentemente al resto. Por ejemplo, la contaminación orgánica puede causar cambios no aceptables en el subsistema del agua, sin embargo, afectará solo a la vida silvestre o a los visitantes. Por esto, las mejores colecciones de datos serán aquellas, que se colecten para cada uno de los subsistemas. Estos datos proporcionarán una evaluación más realista y detallada del parque, mostrando claramente los subsistemas más vulnerables. Esta “aproximación de sistemas” es la guía para el diseño, la colección de datos, y el análisis de las amenazas en los parques del neotrópico.

El concepto de amenaza

El concepto de amenaza es difícil de definir. Machlis y Tichnell indican:

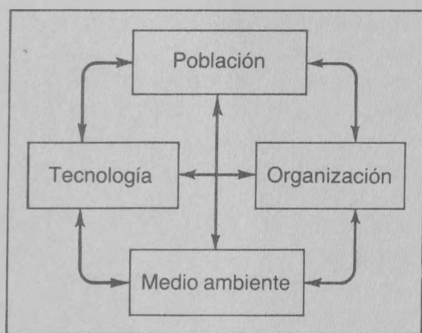
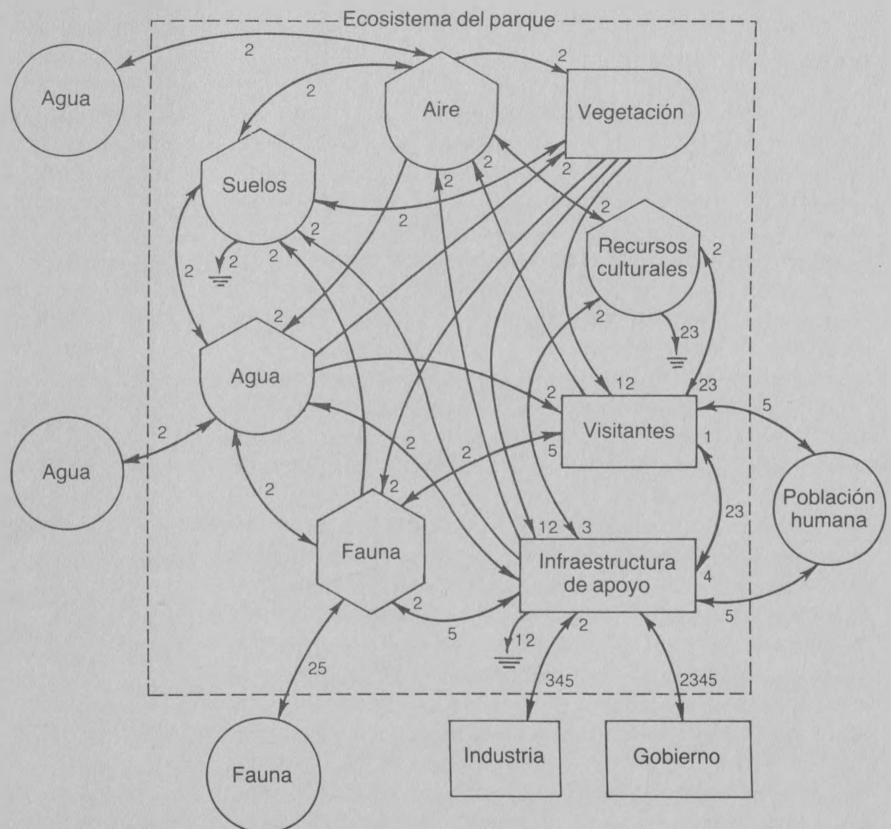


Figura 1 ▲ Variables claves en el ecosistema humano.

Figura 2 ►

Diagrama que especifica el ecosistema del parque. La forma de diagramar se basa en Odum, H. T. *Ecología de sistemas: Una introducción* New York: Wiley and Sons, 1983. Las formas implican funciones de almacenamiento, producción y consumo, y las flechas numeradas indican flujos de (1) energía, (2) materiales, (3) información, (4) dinero, e (5) individuos. El símbolo ≡ representa escape. Adaptado de R. G. Wright y G. E. Machlis, *Modelos para manejo de parques: Un prospecto. Reporte de la Unidad Cooperativa para el estudio de Parques*. CPSU/UI SB85-1, Moscow: University of Idaho, 1984, p.20.



“Las amenazas a parques son realmente percibidas como situaciones de stress que tienen impactos detrimentales sobre los componentes valiosos del ecosistema del parque. Esta definición es casi completamente social y no biológica. Para que se perciba una amenaza, el stress deberá ser observado por nosotros, o con la ayuda de instrumentos científicos. Las amenazas pueden variar en rangos desde meramente sospechadas hasta totalmente documentadas, y los niveles de documentación aceptados provienen de criterios subjetivos (1985, p.11).”

Los objetivos de manejo deberán ser considerados como uno de los componentes en cualquier definición de amenaza hacia los parques. La pérdida de poblaciones animales altamente visibles y simbólicas (tales como los Pandas de China o las tortugas marinas del mar Caribe) pueden causar daños poco catastróficos para la viabilidad de un ecosistema completo pero sí pueden afectar los objetivos de un parque al presentarse como una amenaza actual y claramente definida.

La comprensión del concepto de amenaza se ha oscurecido también porque el término ha sido usado para describir *actividades* por un lado (tales como saqueo de fauna silvestre) y *condiciones ambientales* (tales como la presencia de especies exóticas). Puede ser útil el clarificar las amenazas como condiciones no aceptables, causadas por actividades humanas o naturales. Por lo tanto, el término amenaza usado en este trabajo denotará:

“Aquellas condiciones de origen humano o natural que causan un daño significativo a los recursos del parque, o aquellas que entran en serios conflictos con los objetivos, manejo, o administración del parque.”

Ejemplos típicos incluirían erosión, contaminación química, introducción de especies de flora y fauna no nativas y demasiados visitantes.

Métodos

Los resultados de este estudio se basan en las respuestas proporcionadas por un cuestionario internacional dirigido a los responsables de los parques nacionales en la Región Neotropical, el cual se llevó a cabo de Diciembre de 1985 hasta Abril de 1986. La Región Neotropical se describió en base a la definición hecha biogeográficamente por Udvardy (1975). Sus límites alcanzan toda América Central y del Sur, el Caribe y partes de México y los Estados Unidos Americanos. Con el fin de obtener un muestreo, relativamente homogéneo en relación a los objetivos de manejo, se investigaron solo áreas que cubren los criterios de parques nacionales definidos por la Asamblea General de la UICN en 1969. El Directorio de Áreas Protegidas del Neotrópico de la UICN (1981) fue utilizado como la fuente primaria para obtener los nombres y las direcciones de los parques incluidos en la encuesta. Cada parque nacional (categoría II de la UICN) enlistado en el Directorio para la Región Neotropical fue incluido.

Se elaboró un cuestionario con cuatro secciones, las cuales fueron utilizadas para obtener datos para el presente trabajo. La primera sección incluyó preguntas para los responsables de parques acerca de las actividades dentro de y en los alrededores de los parques. Se proporcionó además una lista de 24 actividades

solicitando información sobre la presencia de estas actividades dentro del área de 10 km del parque.

En la segunda sección los recursos del parque fueron agrupados dentro de siete subsistemas, reflejando el marco teórico del trabajo: agua, aire, suelo, vida animal, vegetación, manejo y administración y una categoría extra rotulada “otra.” Cada subsistema incluyó una lista de amenazas potenciales que se aplicaba específicamente a él. Las listas de amenazas fueron recogidas de la revisión de literatura previamente revisada y de un estudio previo de Machlis y Tichnell (1985).

Versiones previas del cuestionario fueron enviadas para revisión a expertos profesionales con conocimientos en ecología neotropical. Los cuestionarios ya revisados fueron redactados en Inglés y traducidos al Español y Portugués. Cada cuestionario fue enviado por correo aéreo a cada parque. Además de varios recordatorios posteriores. Las respuestas de cada cuestionario completo fueron codificadas numéricamente. Los datos fueron capturados y almacenados en computadora para su análisis.

Limitaciones

Este estudio tiene varias limitaciones. La más importante es que el cuestionario documenta la percepción que los responsables de estas áreas tienen, en lugar de las condiciones actuales. Estas percepciones pueden no reflejar la problemática actual, su magnitud o su seriedad que cada parque enfrenta, pudiendo ser influenciada por el nivel de monitoreo en el parque mismo. Sin embargo con una medida de la percepción de los responsables de estas áreas el cuestionario es razonablemente válido. Una segunda limitación es que este estudio es sincrónico, llevado a cabo en un momento dado. Si el cuestionario se distribuyese en otro momento, a un grupo diferente de responsables, los resultados sin duda variarían. Estas variaciones podrían sesgar los resultados. Por esta razón, se incluyeron y analizaron preguntas que caracterizaran a las personas que llenaron el cuestionario con la finalidad de obtener un perfil de los mismos.

Una tercera limitación es que los parques sin personal no regresaron el cuestionario lleno. Por esto, la investigación puede no representar adecuadamente a este tipo de parques nacionales. Una cuarta limitación es

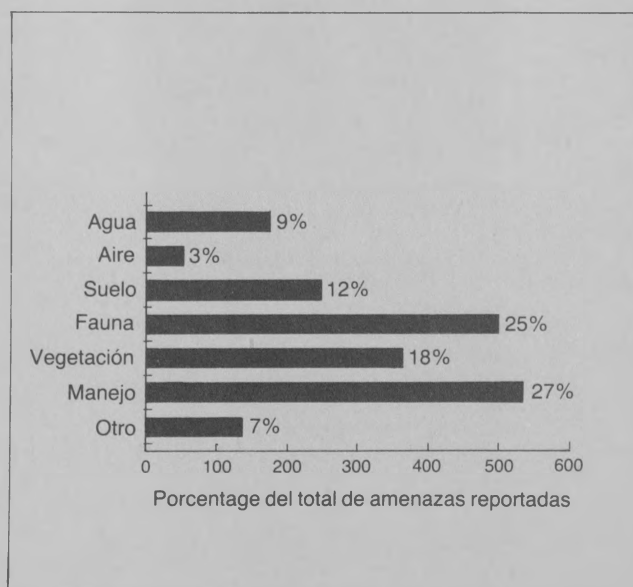


Figura 3 Amenazas reportadas por subsistemas.

que no incluimos amenazas a recursos culturales tales como construcciones, sitios arqueológicos, etc., por restricciones de tiempo, apoyo económico y experiencia. Los recursos culturales juegan un papel importante en muchos parques influyendo las amenazas presentes a los recursos naturales. Su exclusión limita el alcance de nuestro estudio pudiendo no detectar amenazas que se incluyen aquí.

Resultados

Perfil del Personal que Respondió

Los resultados preliminares muestran que el personal de 122 parques de los 183 originalmente muestreados, llenaron y regresaron los cuestionarios, representando 19 países. La tasa de respuesta fue de 69 por ciento.²

La mayoría de los que respondieron (75%) estaban involucrados en las operaciones diarias del parque. Sesenta y seis por ciento indicó, por el título de su cargo, que fueron los responsables por el manejo tal área. Otros que respondieron incluyeron vigilantes, técnicos y responsables de las oficinas regionales o centrales del gobierno.

Los que respondieron tienen un nivel moderado de experiencia, con un nivel relativamente alto de educación. Cuarenta y tres por ciento tenían de uno a cinco años de experiencia en el parque. Casi la mitad (48%) indicó que tenían seis o más años en el área de manejo de parques o campos relacionados. La gran mayoría (84%) había completado la secundaria y 51 por ciento de ellos reportaron haber completado cinco o más años de carrera universitaria.

Amenazas a parques: resultados generales

Un total de 2,021 amenazas fueron reportadas. La Figura 3 muestra las amenazas reportadas por subsistemas, con las proporciones más altas en los subsistemas de manejo (27 por ciento) y fauna (25 por ciento). Solo 3 por ciento de las amenazas reportadas incluyeron el subsistema aire, y el subsistema del agua tuvo también una proporción baja de amenazas reportadas.

La Tabla 1 presenta las amenazas reportadas al subsistema agua. El problema más común fue el de sedimentación con 34 por ciento de los parques reportando su ocurrencia. La contaminación química fue también frecuentemente registrada. Algunas otras amenazas tales como cambios en los mantos freáticos, cantidad de temperatura y salinización, tuvieron tasas similares. La Tabla 2 muestra que las amenazas reportadas al subsistema aire (contaminación química, humo y polvo) tuvieron tasas parecidas, siendo reportadas por, respectivo, 16, 15, y 13 por ciento de los parques.

Tabla 1 Amenazas reportadas al subsistema agua

Rango	Amenaza	Respuestas reportado	
		(No.)	(%)
1	Sedimentación	41	34
2	Contaminación química	32	26
3	Cambios de nivel	20	16
4	Bloqueo de Cursos de agua	20	16
5	Cambios en la temperatura	18	15
6	Lluvia inadecuada	17	14
7	Salinización	15	12
8	Disminución de O ₂ (oxígeno)	12	10

²Dos cuestionarios fueron regresados como no entregados y comunicaciones adicionales indican que otras cinco áreas no han sido totalmente establecidas como parques nacionales. El total ajustado es igual a N = 176.

Tabla 2 Amenazas reportadas al subsistema aire

Rango	Amenaza	Respuestas reportado	
		(No.)	(%)
1	Contaminación química	20	16
2	Humo	18	15
3	Polvo	15	13

La Tabla 3 describe las amenazas al subsistema suelo. La erosión fue reportada en la mayoría de los parques (57 por ciento), algunas otras fueron reportadas en cerca de un tercio de los mismos: cubierta vegetal inadecuada, pérdida de nutrientes, compactación. Las amenazas al subsistema vegetación. La pérdida de la cobertura vegetal fue la más comúnmente reportada (48 por ciento), Neotropical; 58 por ciento de los parques reportaron disminución de poblaciones y 43 por ciento registraron especies no nativas (exóticas). Adicionalmente, algunas "sistémicas," esto es, que su impacto comúnmente se expresa al nivel del ecosistema: disminución en la diversidad de especies (44 por ciento de los parques), pérdida de hábitats (44 por ciento). La sobrepoblación de individuos de una especie, el bloqueo de rutas migratorias y las enfermedades fueron registradas en menos del 25 por ciento de los parques.

Tabla 3 Amenazas reportadas para el subsistema suelo

Rango	Amenaza	Respuestas reportado	
		(No.)	(%)
1	Erosión	70	57
2	Cobertura vegetal inadecuada	44	36
3	Pérdida de nutrientes	39	32
4	Compactación	39	32
5	Contaminación química	24	20
6	Cambios de pH	21	17
7	Salinización	12	10

Tabla 4 Amenazas reportadas para el Subsistema Fauna

Rango	Amenaza	Respuestas reportado	
		(No.)	(%)
1	Reducción de Poblaciones de una Especie	71	58
2	Disminución en la diversidad específica	56	46
3	Fuego	54	44
4	Pérdida de Hábitats	54	44
5	Extinción de Especies	54	44
6	Animals no nativos	53	43
7	Cantidad de alimento disponible Inadecuada	32	26
8	Contaminación química	25	20
9	Sobrepoblacion de una especie	23	19
10	Cantidad de agua disponible inadecuada	23	19
11	Bloqueo de rutas migratorias	22	18
12	Enfermedades	20	16
13	Inundaciones	15	12

La Tabla 5 muestra las amenazas reportadas al subsistema vegetación. La pérdida de la cobertura vegetal fue la más comúnmente reportada (48 por ciento), seguida por el fuego (46 por ciento) y las plantas exóticas (40 por ciento). Mas del 25 por ciento de los parques reportaron amenazas sistémicas parecidas a las descritas para el subsistema fauna: disminución de la diversidad de especies, cambios en la composición específica y extinción. La Tabla 6 muestra los resultados para el subsistema de manejo y administración. Muchas de personal capacitado fue reportado por el 70 por ciento de los parques en la Región Neotropical. Entre las amenazas

más comunmente reportadas están: la ausencia de recursos económicos e infraestructura (59 por ciento), apoyo público (56 por ciento), falta de coordinación interinstitucional (48 por ciento) y control y tenencia de la tierra (47 por ciento). Las amenazas menos reportadas incluían problemas con visitantes, con 21 por ciento de los parques reportando muy pocos visitantes, y 16 por ciento reportando demasiados.

Tabla 5 Amenazas reportadas al subsistema vegetación

Rango	Amenaza	Respuestas reportado	
		(No.)	(%)
1	Pérdida de cubierta vegetal	59	48
2	Fuego	56	46
3	Plantas Exóticas	49	40
4	Plantas pisoteadas	45	37
5	Disminución en la diversidad específica	42	34
6	Cambios en la composición específica	34	28
7	Extinción de especies	31	25
8	Contaminación química	21	17
9	Cantidad disponible de agua inadecuada	16	13
10	Inundaciones	13	11

Tabla 6 Amenazas reportadas para el subsistema de manejo y administración

Rango	Amenaza	Respuestas reportado	
		(No.)	(%)
1	Falta de personal capacitado	85	70
2	Falta de infraestructura	72	59
3	Falta de apoyo público	68	56
4	Falta de coordinación interinstitucional	58	48
5	Indefinición en el control y tenencia de la tierra	57	47
6	Leyes inadecuadas	45	37
7	Inadecuada organización de la institución responsable	40	33
8	Rutas de entrada y salida inadecuadas	34	28
9	Inadecuadas condiciones de seguridad	34	28
10	Muy pocos visitantes	26	21
11	Demasiados visitantes	19	16

La Tabla 7 enlista los resultados de la categoría nominada "otros." Treinta y cuatro por ciento de los parques reportaron la basura como una amenaza. Degradación en el paisaje y las características geológicas fueron reportadas por un 25 por ciento de los parques. Finalmente, las amenazas reportadas en forma escrita varían desde muy genéricas ("contaminación biológica") hasta muy específicas ("castores"). Las más comunes de estas fueron las relacionadas con la carencia de apoyo económico y presupuesto.

Un número importante de amenazas fueron reportadas repetidamente por los parques en la región. La Tabla 8 ordena las quince amenazas más comunmente reportadas. Muchas pertenecen al subsistema de manejo, con la carencia del personal capacitado (70 por ciento) e infraestructura (59 por ciento) siendo las más comunes. Sin embargo algunas amenazas a los subsistemas biológicos también fueron reportados por la mayoría de los parques: disminución en las poblaciones animales, erosión, pérdida de la cubierta vegetal e introducción de animales exóticos. Otras amenazas comunes fueron: disminución en la diversidad específica, pérdida de hábitats fuego y extinción de especies. Por esto, un "núcleo" importante

de amenazas es la variabilidad del ecosistema y la carencia de recursos para el manejo. Otras amenazas, tales como erosión, fuego y especies exóticas pueden contribuir a estas amenazas básicas.

Tabla 7 Otras Amenazas reportadas

Rango	Amenaza	Respuestas reportado	
		(No.)	(%)
1	Basura	41	34
2	Degradación el Paisaje	34	28
3	Degradación de Características Geológicas	31	25
4	Contaminación por Ruido	13	11
5	Aromas poco deseables	8	6

Tabla 8 Quince amenazas más comunmente reportadas

Subsistema	Amenaza	Respuestas reportado	
		N	(%)
Manejo	Falta de personal capacitado	85	70
Manejo	Carencia de infraestructura	72	59
Fauna	Reducción de población de una especie	71	58
Suelo	Erosión	70	57
Manejo	Carencia de apoyo público	68	56
Vegetación	Pérdida de la cobertura vegetal	59	48
Manejo	Carencia de coordinación interinstitucional	58	48
Manejo	Indefinición en el control y tenencia de la tierra	57	47
Vegetación	Fuego	56	46
Fauna	Disminución en la Diversidad específica	56	46
Fauna	Fuego	54	44
Fauna	Pérdida de hábitats	54	44
Fauna	Extinción	54	44
Fauna	Animales no nativos	53	43
Vegetación	Plantas no nativas	49	40

N = Número de parques que las reportan

Actividades dentro de y alrededor de los parques en el neotrópico

Una variedad importante de actividades humanas, desde agricultura tradicional hasta desarrollos urbanos, se llevan a cabo dentro de y alrededor de los parques en el neotrópico. La Tabla 9 lista el número de respuestas para cada actividad incluida en el cuestionario. Una gran mayoría (75 por ciento) incluyó el pastoreo dentro de o alrededor del parque. Además saqueo de fauna, desarrollos agrícolas y construcción de caminos también se reportan. Actividades agrícolas tales como agricultura itinerante y comercialización de madera fueron reportadas con una mayor frecuencia en relación a las actividades industriales tales como minería y manufactura. Actividades ilegales como tráfico y captura ilegal de fauna, variación en ocurrencia. Ocho parques reportaron conflictos armados en el presente.

Conclusiones

Los datos generados por esta investigación tienen implicaciones importantes. Presentamos estas como opiniones considerando el hecho de que las soluciones prácticas a los problemas que enfrentan los parques nacionales deberán definirse por aquellos que están familiarizados, con la situación de los mismos en el campo.

Primero, los parques nacionales en la Región Neotropical enfrentan amenazas serias. Los responsables comunmente reportaron problemas críticos de recursos: erosión, introducción de especies exóticas, pérdida de

Tabla 9 Actividades humanas reportadas

Rango	Actividad	Respuestas reportado	
		N	(%)
1	Pastoreo	91	75
2	Cacería ilegal de subsistencia	84	69
3	Agricultura	71	58
4	Construcción de Caminos	65	53
5	Desarrollos turísticos (Hoteles)	56	46
6	Captura ilegal de animales	51	42
7	Cultivo itinerante	46	38
8	Comercialización de madera	44	36
9	Colonización no planeada	43	35
10	Construcción de edificios	42	34
11	Cacería comercial de fauna (ilegal)	42	34
12	Colección ilegal de plantas	35	29
13	Desarrollos urbanos	35	29
14	Comercialización de piedra	34	28
15	Cacería legal de fauna	28	23
16	Minería	21	17
17	Tráfico	17	14
18	Generación de Energía hidroeléctrica	15	12
19	Manufactura industrial (fabricas)	15	12
20	Cultivo de drogas (Mariguana, cocaína)	13	11
21	Construcción de presas	11	9
22	Conflictos armados	8	7
23	Perforación petrolera y gas	6	5
24	Generación de energía con carbón	3	2

N = Número de parques que las reportan.

hábitats, fuego. Mientras que estos datos se basan en percepciones, es claro que los ecosistemas de los parques estan sufriendo cambios dañinos significativos. Mientras que las causas que generan estas amenazas continuen (tales como colonización fuego o pastoreo) se minimiza la posibilidad de que el ecosistema se recupere.

Estos retos resultarían bastante difíciles de atender aún con recursos humanos y financieros adecuados. Sin embargo, las amenazas más comunmente reportadas fueron en el subsistema de manejo mismo. Sin recursos de manejo adecuados, es dudoso que muchas de las amenazas que se identifican en este estudio, puedan ser resueltas. Este estudio proporciona evidencia preocupante.

Segundo, sugerimos que la acción internacional se oriente hacia la identificación de amenazas básicas y centrales. Como se mencionó anteriormente, las amenazas más comunmente reportadas fueron de tres tipos: erosión, reducción en la variabilidad del ecosistema y la carencia de recursos para el manejo. Actividades internacionales que se orienten a resolver estas amenazas tendrán importancia y valor para toda la región Neotropical. Por ejemplo, sugerimos que se desarrollen técnicas de manejo prácticas para solucionar el problema de la erosión, diseminándolas buscando su implementación por todo el neotrópico. Investigación comparativa interdisciplinaria en diversidad de especies y pérdida de hábitats deberá facilitarse, con el objetivo de proporcionar a los responsables de área de técnicas de monitoreo y estrategias de rehabilitación. Considerando las amenazas al manejo, la necesidad de preparar y contratar profesionales en el área de parques es una necesidad urgente. La aproximación, no original, es "pensar globalmente, actuar localmente." Los tópicos globales son las amenazas centrales, las soluciones deberan ser localizadas y particulares para cada país o parque.

Tercero, las actividades dentro de y alrededor de los

parques nacionales en el neotrópico, sugieren que las estrategias para el manejo serán una, necesidad durante la década de los 1990 y despues. Actividades agrícolas importantes se desarrollan dentro de los parques pastoreo, agricultura, agricultura itinerante, extracción comercial de madera, cultivo de drogas. El patrón alrededor del parque es parecido. Más importantemente, muchas actividades se llevan a cabo dentro de y, alrededor del parque, sugiriendo que algunos de los limites son frágiles, permeables o incluso que no se pueden definir y aplicar. Conforme estas actividades continuen por el resto del siglo, así continuaran las amenazas asociadas.

Por esto, las estrategias de manejo que tratan de manipular creativamente las presiones humanas son herramientas necesarias, ahora y en el futuro. Sugerimos que los responsables de los parques ganarían mucho comparado con las poblaciones locales. Los datos muestran que el manejo del parque en la Región Neotropical no puede estar aislado de los desarrollos rurales que lo rodean. El hecho de que el 56 por ciento de los responsables citen la carencia de apoyo público como una amenaza, hace que la relación con las comunidades sea obvia e importante. Anteriormente hemos sugerido:

"... los parques deberán ser vistos como áreas de uso múltiple proporcionando protección a las cuencas hidrográficas dentro del sistema socio-económico regional es, pensamos, un elemento crucial que los mantendrá a largo plazo, independientemente del estado de desarrollo del país. Algunos beneficios medibles objetivamente deberán de fluir del parque a la región en general. Cuando una amenaza a un parque nacional sea percibida como una amenaza a la población de la región, esta integración será completa. Facilitando que el manejo inteligente de los parques se lleve a cabo (Machlis y Tichnell, 1985, p.97).

Finalmente, las respuestas proporcionadas por los responsables de las áreas, en los cuestionarios, indica que estos son profesionales responsables, y juegan un papel importante en el movimiento mundial de conservación. No solo la respuesta fue excelente, los cuidados con que fueron respondidos sugiere una preocupacion real para compartir ese conocimiento. Comunmente, los responsables escriben problemas que enfrentan, sus fracasos y sus éxitos. Si las amenazas a los parques nacionales en el neotrópico se reconocen, manejan y, en algunos casos se resuelven, un paso muy importante será el de apoyar y reconocer el trabajo de estos profesionales.

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Referencias

- Black, M. J. 1976. Galapagos National Park, problems and solutions, *Parks* 1 (1): 2-4.
- Buchanan, A. 1985. *Costa Rica's wild west*. Sierra. July-August: 32-35.
- Budowski, G. and MacFarland, C. 1984. Keynote address: the Neotropical Realm. In *National parks, conservation, and development: the role of protected areas in sustaining society*, J. A. McNeely and K. R. Miller, eds. pp. 552-560
- Darling F. F. and Eichhorn, N. D. 1967. *Man and nature in the national parks—reflections on policy*. Washington DC: Conservation Foundation.

- Defler, T. R. 1983. A remote park in Columbia, *Oryx* 17 (1): 15–17.
- deGroot, R. S. 1983. Tourism and conservation in the Galapagos Islands, *Biol. Conserv.* 26 (4): 291–300.
- Dourojeanni, M. J. 1984. Future directions for the Neotropical Realm. *National parks, conservation, and development: the role of protected areas in sustaining society*, J. A. McNeely and K. R. Miller, eds, pp. 621–625.
- Elliot, H., ed. 1974. *Second World Conference on National Parks*. Morges, Switzerland: IUCN.
- Fearnside, P. M. and Ferreira, G. L. 1984. Roads to Rondonia: highway construction and the farce of unprotected reserves in Brazil's Amazonian forest, *Envir. Conserv.* 11 (4): 358–360.
- Frome, M. 1981. What is happening to our national parks? *National Parks* 55: 10–15.
- Goddard, M. K. 1961. What the United States can learn. *Comparisons in resource management—six notable programs in other countries and their possible U.S. application*. H. Jarrett, ed. Baltimore: Johns Hopkins University Press.
- Hamilton, L.S. 1976. Tropical rainforest use and the preservation: a study of problems and approaches in Venezuela. *International Series* No 4. Sierra Club Special Publications.
- Hart, W. J. 1966. A systems approach to park planning, *IUCN, Publ. New Series: Suppl. Paper* No. 4. Morges, Switzerland: IUCN.
- Hendrix, G. Y. and Morehead, J. M. 1983. Everglades National Park: an imperiled wetland, *Ambio* 12 (3): 153–57.
- International Union for the Conservation of Nature and Natural Resources. 1981. *IUCN directory of neotropical protected areas*. Dublin: Tycooly International Publishing Limited.
- Jefferies, B. E. 1982. Sagarmatha National Park: the impact of tourism in the Himalayas, *Ambio* 11 (5): 247–281.
- Kramer, P. 1983. The Galapagos: islands under siege, *Ambio* 12 (3): 186–90.
- Le Monde. 1985. La NASA souhaite utiliser Isle de Paques pour sa navette spatiale, *Le Monde* 21 May, Chile.
- Lusigi, W. J. 1981. New approaches to wildlife conservation in Kenya, *Ambio* 109 (2–3): 87–92.
- Machlis, G. E., Field, D. R. and Campbell, F. L. 1981. The human ecology of parks, *Leis. Sci.* 4 (3): 195–212.
- Machlis, G. E. 1984. Protection forestry. In *The human factors affecting forestry/fuelwood projects: an agenda for research and development*. U.S. AID workshop, 11–13 February 1984, Washington DC.
- Machlis, G. E. and Tichnell, D. L. 1985. *The state of the world's parks: an international assessment for resource management, policy and research*. Boulder: Westview Press.
- McCloskey, M. 1984. *World parks*. Sierra. 69 (6): 36–42.
- Meganek, R. A. and Goebel, J. M. 1979. Shifting cultivation: problems in parks in Latin America, *Parks* 4 (2): 4–8.
- Mishra, H. R. 1982. Balancing human needs and conservation in Nepal's Royal Chitwan Park, *Ambio* 11 (5): 246–251.
- Myers, N. 1972. National parks in savannah Africa, *Science* 178 (4067): 1255–1263.
- Nelson, J. G., Needham, R. D. and Mann, D. L., eds. 1978. *International experience with national parks and related reserves*. Ontario: Department of Geography, University of Waterloo.
- Olwig, K. F. 1980. National parks, tourism and local development: a West Indian case, *Human Organization* 39 (1): 22–30.
- Perry, R. 1972. Parks and problems in Columbia, *Oryx* 11 (6): 433–440.
- Sax, J. L. 1980. *Mountains without handrails—reflections on the national parks*. Ann Arbor: University of Michigan Press.
- Tichnell, D. L., Machlis, G. E. and Fazio, J. R. 1983. Threats to national parks: a preliminary survey, *Parks* 8 (1): 14–17.
- Tichnell, D. L. and Machlis, G. E. 1984. Threats to national parks: an international survey. *Cooperative Parks Studies Unit Report CPSU/UI S84-1*. Moscow: University of Idaho.
- Udvardy, M. D. F. 1975. A classification of the biogeographical provinces of the world. *IUCN Occasional Paper* No. 18. Morges, Switzerland: IUCN.
- U. S. Department of the Interior. 1985. *Decade of progress for South American national parks 1974–1984*. Washington DC.
- Vogt, W. 1946. Mexico's national parks, *National Parks Magazine* (April–June): 13–16.
- Wielgolaski, F. E. 1971. National parks and other protected areas in North America in relation to those in Norway and Sweden, *Biol. Conserv.* 3 (4): 285–291.
- Wolf, R. 1982. Crisis in the national parks, *Rocky Mountain Magazine* 4 (11): 49–55.
- Wright, R. G. and Machlis, G. E. 1984. Potential indicators for monitoring biosphere reserves. *The biosphere: Problems and solutions*. Amsterdam: Elsevier Science Publishers, pp. 49–63.

Convocatoria

28ava Sesión de Trabajo de la Comisión sobre Parques Nacionales y Areas Protegidas (CPNAP) de la UICN llevada a cabo en el Parque Nacional "W", Niger, 18–22 Marzo 1987.

Esta fué la tercera reunión respaldada pro la CPNAP para examinar temas sobre áreas protegidas en la Región Afrotropical. Alrededor de 40 oficiales de agencias de parques de 17 países se reunieron durante cinco días. Incluidos en el grupo estuvieron representantes de cuatro agencias de ayuda, indicando el creciente interés de donadores en apoyar proyectos de diversidad biológica. También incluidos estuvieron representantes de los dos últimos países en Africa que todavía no han creado áreas protegidas—Guinea Ecuatorial y Guinea Bissau.

La sesión de trabajo fué inaugurada en Niamey por M. Attaher Darkoyé, Ministro del Medio Ambiente, quién fué co-anfitrión de la reunión. Las secciones técnicas fueron presididas por Harold Eidsvik, Presidente de la CPNAP y Abdu Admou, Jefe de la Dirección de Bosques y Fauna de Niger.

El propósito de la reunión fué el de revisar el estado actual de las áreas protegidas en la región Africana de

habla Francesa. Doce países de Africa Occidental presentaron reportes sobre el estado de varios aspectos de la administración de áreas protegidas en sus respectivos países, los cuales están siendo publicados en un volumen de actas.

Un segundo producto de la sesión de trabajo fué la muy revisada tercera edición de la "Estrategia de Acción para Areas Protegidas de la Región Afrotropical". Este documento, el cual se ha desarrollado durante los últimos seis meses por los miembros de CPNAP en Africa, fué modificado por los participantes para reflejar mejor las prioridades como son definidas actualmente en Africa Occidental. La estrategia analiza numerosos objetivos y actividades detallados a nivel nacional e internacional los cuales deben fortalecerse o iniciarse para lograr mayor alcance representativo, y mayor administración efectiva de parques y reservas en el futuro. La estrategia misma construye y refuerza el Plan de Acción Bali de la UICN y el Plan de Acción de las Reservas de la Biósfera y complementa planes de acción preparados para otras regiones tropicales.

Consciente que los esfuerzos para proteger el patrimonio natural de Africa Occidental frecuentemente pasan

desapercibidos, la CPNAP presentó también premios especiales por actos de valor a los oficiales de campo en Chad, Senegal, Costa de Marfil y Niger quienes han relaizado actos especiales de valor y mérito en el cumplimiento de sus labores. Estos incluyen un premio simbólico en efectivo y fueron dados a los siguientes:

- Robert Thei de la Costa de Marfil, quien fuera herido seriamente al interceptar a tres cazadores ilegales en el Parque Nacional Tai.
- Ahmed Tcholli ha sido instrumental en interesar a la gente local en la planeada Reserva Air Ténéré en Niger, demostrando una habilidad excepcional para integrar áreas protegidas con el desarrollo sostenido en el Sahel.
- Los guardias del Parque Nacional Zakouma en Chad quienes continuaron protegiendo el parque a pesar del período de alteración civil muchas veces sin equipo ni salarios.
- Mamadou Sadio, un guardián en el Parque Nacional Nikila Koba en Senegal for esfuerzos excepcionales por combatir el contrabando en el parque.

New directions for parks? Issues from the 20th International Parks Seminar

John Hough

The International Seminar on National Parks and other Protected Areas provides a setting for discussion of some of the fundamental issues in protected area policy and management. In addition to the formal technical programmes of the seminar, some key issues raised informally during the 20th seminar were; the problem of recreation becoming a deleterious use of park resources; the cultural specificity of park systems; the dilemma of park professionals to be managers or politicians; the implications of a linkage between conservation and religion; the effects of the increasing role of women in park management; and the importance of input from all parts of the world into discussions on world conservation.

El Seminario Internacional sobre Parques Nacionales y otras Areas Protegidas provee un marco de discusión de algunos de los temas fundamentales en los principios y la administración de áreas protegidas. Junto con los programas técnicos del seminario, algunos de los temas claves tratados informalmente durante el 20vo seminario fueron: el problema de que la recreación llegara a ser un uso perjudicial de los recursos del parque; la especificidad cultural del sistema de parques; el dilema de los profesionistas de parques de ser administradores o políticos; las implicaciones de una conexión entre conservación y religión; los efectos del creciente papel de la mujer en el manejo de parques; y la importancia de contribuciones de todas partes del mundo en discusiones sobre conservación mundial.

Le Colloque international sur les parcs nationaux et autres aires protégées offre un cadre de discussion sur les questions fondamentales relatives à la politique et à la gestion des aires protégées. En marge des programmes techniques officiels, d'autres points essentiels ont été soulevés à titre informel, au cours du 20e colloque: le problème des activités de loisirs qui se muent en utilisation dommageable des ressources des parcs; la spécificité culturelle des parcs; les administrateurs des parcs placés devant le dilemme du choix entre politique et gestion; les conséquences des liens entre conservation et religion; les effets du rôle accru des femmes dans la gestion des parcs et l'importance de la participation mondiale, aux discussions portant sur la conservation mondiale.

Introduction

From 26 July to 27 August 1986, 29 professionals, leaders and senior administrators from protected area systems around the world travelled together through Canada, the USA and Costa Rica as participants in the 20th International Seminar on National Parks and Other Protected Areas. This annual seminar is run jointly by the University of Michigan School of Natural Resources, the United States National Parks Service and the Canadian Department of the Environment, Parks. For 20 years the seminar has provided a forum for the exchange of ideas and views on critical issues, worldwide, in protected areas policy, administration, planning and management.

Through a formal programme of field visits, expert speakers, classroom sessions and group discussions the seminar exposes participants to real issues in a diversity of settings covering life zones from alpine mountain tundra to tropical mangrove forests. Protected areas visited range in size, history and purpose from large, long-established, national parks to small, newly developed, local historical monuments. Whilst exchanging views and ideas based on this formal programme other deeper issues are raised which provide a major focus for informal discussion throughout the seminar.

The issues

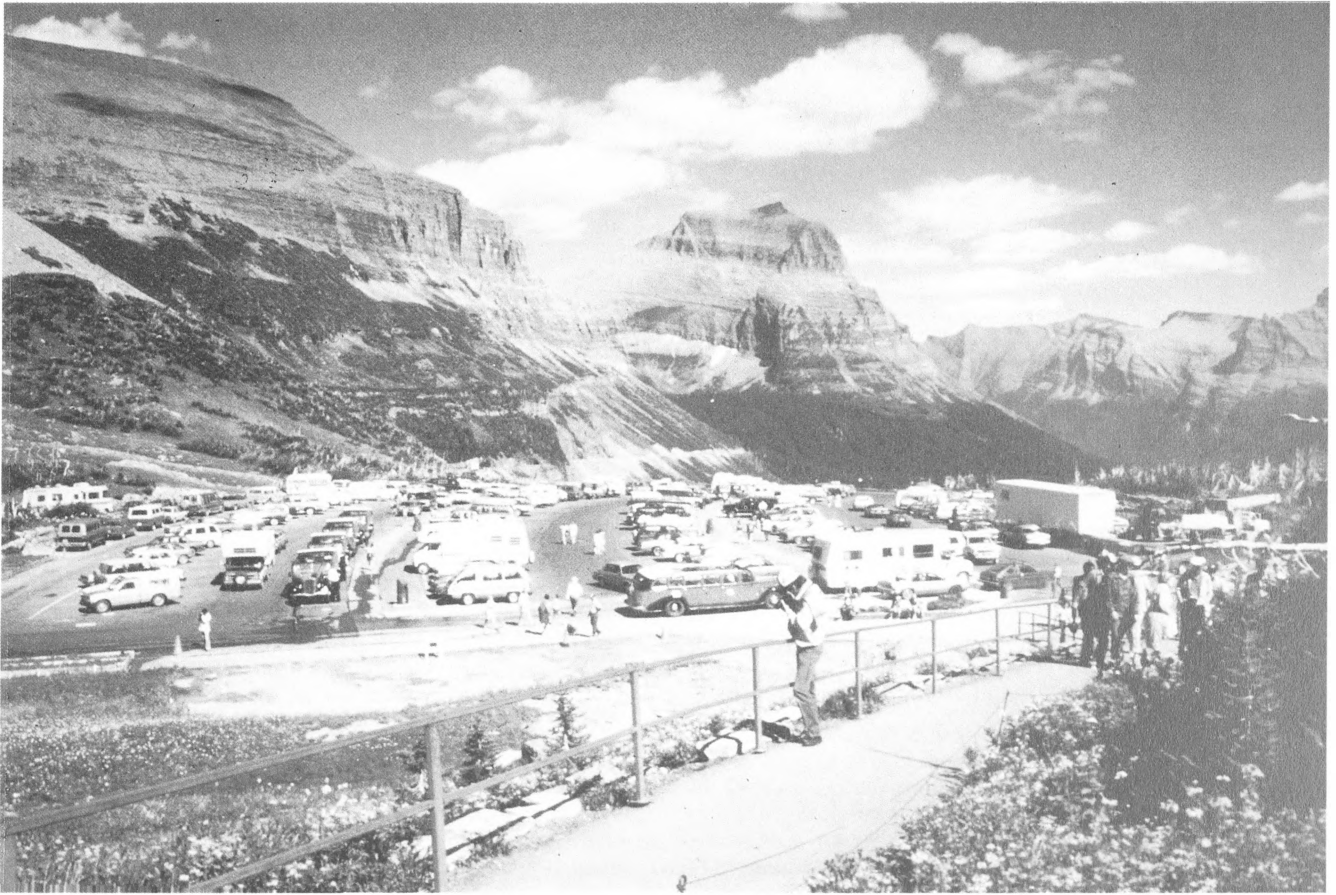
The 20th seminar started in Banff National Park, Canada, a park established partly to prevent continued timber and mineral extraction. Participants were surprised, however, to find the town of Banff right inside the park. The physical extent of the buildings, hotels, camp sites, roads,

shops and the like is considerable. Although it only represents a small fraction of the park area, the town clearly impinges on the natural character of the park and consumes a significant amount of the limited valley bottom habitat. A further surprise awaited us when we went by cable car up to an alpine meadow. Used as a ski-slope in winter, when damage to the habitat is limited, the private cable-car operator was now wanting to open up the fragile ecosystem to summer hikers. Apart from questions of how to minimize damage to the alpine meadow whilst promoting visitor enjoyment of it, some more fundamental questions were raised:

- Is the provision of recreational opportunities overriding, and detracting from, the conservation objectives of the park?
- Are the ecological effects of laying down concrete and buildings not similar to effects of timber and mineral extraction?
- Have we protected national parks from one form of deleterious use only to permit or even promote another?

This issue was also prominent at Yellowstone National Park where the spread of buildings, roads and other infrastructure seemed equally intrusive. However, some of the damage to the natural ecosystem was being repaired by closing and dismantling at least one visitor facility.

A comparison was also made between the long-term impacts of loss of habitat and ecosystem damage caused by park infrastructure and visitor facilities in North American parks, and the impact of sustainable harvesting of large mammal populations in African national parks. Construction of surfaced roads, car parks and buildings permanently reduces the effective size of functioning



Are recreational facilities impinging on other park values? *Top*: Car park at the top of a mountain pass in Glacier National Park, USA. *Bottom*: Many Glacier Hotel, Glacier National Park, USA (photos, John Hough).

ecosystems, whilst harvesting is an intrusion into the dynamics of ecosystems.

Intensive recreational use of parks raised further questions of who benefits from the recreational and educa-

tional opportunities parks provide. The warden of Masai Mara National park in Kenya reported a comment from one foreign tourist

“this is nice, *I hope you keep it this way*. In my

country (the USA) the national parks are so crowded that I have to come all the way here (to Kenya) to enjoy nature”

Providing the type of recreational opportunities foreigners want may conflict with the type of recreational opportunities local people want. Yet the foreign currency income tourism generates in countries like Kenya and Costa Rica is of major significance to the economy of these countries.

In Santa Rosa National Park, Costa Rica, we passed a lone backpacker walking down to the Pacific coast beach, “Cultural pollution” said a Costa Rican parks officer, “no one in our country would traditionally engage into such a form of recreation”.

In this case, there is an apparent cultural conflict in the type of recreational opportunities desired in national parks.

A Nigerian asked: “What is the role of national parks and national park interpretation in countries with significant non-literate and non-mobile human populations?”

The assumption is clearly that in North America most people are able to visit and enjoy parks. In developing countries the story is very different.

Clearly each nation must design its park system to address the needs, desires and aspirations of its own people, whether economic or otherwise. In the years ahead, it is the park systems in developing countries which will be providing the leadership in defining the role of national parks in the lives of poor, non-literate and non-mobile human populations, and we can expect some new ideas and concepts in recreation and use of parks.

The importance of recreational use of North American parks is closely linked to the need to maintain political and public support for parks, both locally and nationally. This need was discussed extensively during the course of the seminar and two real examples of the role of Park Superintendents in cultivating this support were examined. The first, in Banff National Park, was the Park Superintendent actually being the mayor of the town of Banff. Although the town lies wholly within the park the influence of the park on the town government can be facilitated at a person to person level by the close involvement of the superintendent in town government. Later, at Waterton Lakes International Biosphere Reserve, the close relationships and friendships between the Park Superintendent and local ranchers resulted in the seminar participants being invited to a local ranchers’ barbecue and rodeo. The ranchers are the people the Park Superintendent deals with on a day to day basis yet some of their values differ radically from those of the park staff. The success of a superintendent in bridging the gap between the park and its surrounding human communities is critical to the success of any park but particularly to a Biosphere Reserve where much of the conservation is intended to occur outside the reserve boundaries. At Waterton Lakes, the Park Superintendent was clearly being successful in generating local public support for his park. The key question for seminar participants was: “How can we train people for these roles?” Traditionally park staff are trained in biological, recreational and administrative skills; however, we must not neglect political skills.

Participants further recognized a dilemma facing themselves. How much should they concentrate on being outstanding park managers and how much they concentrate on being outstanding politicians: ie. how much of

the future of national parks will be decided by what happens inside the park, and how much will be decided by what happens outside?

Although the role of politics in protected areas management is not a new factor, the role of religion might be. This year was the seminar’s first visit to Costa Rica and its visit coincided with the celebration of that country’s national parks day. The seminar was invited to attend a special ceremony on this day during which a Catholic priest, in the presence of the nation’s president, dedicated the national parks of the country to Saint Francis of Assisi. Religion has always been a fundamental link in man’s relationship to his environment. Where does a link-up between protected areas and religion lead in a world in which many regions are undergoing a fundamental religious revival?

In addition to discussing the changing role of religion, seminar participants also discussed the changing role of women in protected areas management. The presence of only two women participants on the seminar, compared with 27 men, was felt to reflect the general preponderance of men in the world’s protected area systems. With the increased status of women worldwide, a change in this proportion can be anticipated in the near future. The implications of the different values and priorities women would bring to protected areas management worldwide was a subject of some speculation.

Recognition of the difference women might make to protected areas systems worldwide was associated with a common concern for the recognition of the different cultural approaches to conservation. As noted earlier, intense demand for recreation is a North American issue. In Europe, the parks are small and threatened by issues such as acid precipitation. In Africa, the issues are associated with the urgent need for economic development and managing large mammal populations. Unless these different priorities are recognized and local representatives are fully involved in the working groups of international agencies and organizations such as IUCN, participants felt that a bias would inevitably result towards the views, issues and priorities of the North Americans and Europeans who tend to dominate such institutions.

Conclusion

The formal programme of the International Park Seminar provides for an exchange of technical ideas on real issues. However, the seminar also provides a crucible for the identification and discussion of some fundamental issues in conservation. This breadth, and the ability to transcend political differences between nation states because of a common commitment to conservation, continue to make the International Park Seminar a unique and crucial programme in the world conservation movement.

Acknowledgements

This paper resulted from discussions amongst participants and staff whilst the author was working as programme assistant to the 20th International Park Seminar. Whilst the perceptions expressed here are those of the author and do not necessarily represent a consensus amongst the seminar participants, the official views of the seminar organisers, or those of its sponsors, I hope that they do convey the essence of many of the informal discussions of the seminar. I would like to thank both the director, the other staff, and the seminar participants for the opportunity to participate in these discussions.

Game cropping in the Serengeti region

I. S. C. Parker

Utilization of fauna and flora in or around protected areas is often a real or potential management consideration. Whether, or how, it should be done depends on local circumstances. The feasibility of cropping the megaherd game populations of the Serengeti plain is assessed in terms of their biology, possible cropping techniques and interactions with the local human communities.

El uso de la fauna y flora dentro o alrededor de las áreas protegidas es frecuentemente una consideración administrativa real o potencial. Si se hace, o como se hace depende de circunstancias locales. Se evalúa la posibilidad de explotar las grandes manadas de las poblaciones de caza que están en la llanura del Serengeti, en términos de su biología, técnicas de explotación y las interacciones con las comunidades humanas locales.

L'exploitation de la fauna et de la flore à l'intérieur et autour des aires protégées pose souvent un problème réel ou potentiel pour la gestion. La forme et la nécessité de cette exploitation dépendent des circonstances locales. Le bien-fondé de l'exploitation des grands troupeaux de la plaine du Serengeti est évalué en fonction de la biologie des espèces, des éventuelles techniques d'exploitation et des interactions avec les communautés humaines locales.

Expertise

The peasant population around the Serengeti National Park is poaching the region's wildlife on a substantial scale. While this activity is unequivocally illegal and therefore undesirable, there are aspects that warrant objective consideration. The poachers are operating in response to a demand for a product – principally game meat. That they do so and have done so for an extended period of many years indicates that, at least in the terms of their own rural economies, they are experiencing sufficient success for the work to be worthwhile. *De facto*, these people are experts and constitute the single largest source of information on the technique, marketing and demand in the operation of game meat industry in the region. It should be tapped, particularly as they will presumably be the selected beneficiaries of any government-sponsored programme to harvest wild meat in the region.

Economics

There have been a number of government or international aid organization schemes for producing cheap game meat in East and Central Africa. They have all failed economically (Parker, 1964; 1972; 1984). In every instance, they never did produce cheap meat and, in those cases where it was sold cheaply, the product price was subsidised either through valuable byproducts such as zebra hide, ivory etc., or by governments not costing in the full range of services involved. At the core of the failures lies an assumption that the work may only be undertaken by a centralized authority, such as a government conservation authority. This assumption, peculiar to Africa, was introduced during the colonial era and is challenged by the success of decentralized undertakings on other continents. The technological problems that attend a centralized operation responsible for harvesting, processing, storing, distributing and selling game meat are such that it can never be cheap, relative to what the peasant hunter can acquire for himself, in his own time and to his own requirements. This was illustrated classically in Zambia when the Government organized a game-cropping programme in the Luangwa Valley and offered

the meat at give-away prices to the local "protein-deficient" peasant farmers. Hardly any was purchased and the project failed dismally. Subsequently, it was shown that the "market" was not protein-deficient and obtained adequate game meat through peasant hunting (Parker, 1972; Marks, 1975). The salient point is that in a rural situation where the local farming community constitutes the demand and market for game meat, the cheapest and most effective production is to let the peasants take it for themselves.

Disturbance

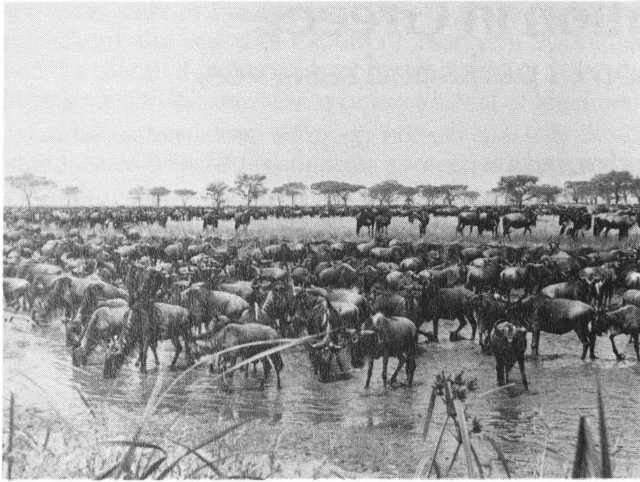
The result of disturbance upon domestic animals is well documented and can be expected to be the same, physiologically, in wild animals as well. Geist (1971) listed references and addressed the problem in some depth. Quoting from him:

"... disturbance is likely to be most detrimental if it is frequent and unpredictable, so that the animal cannot escape it. In experimental animals this unpredictability causes neurosis, loss of weight, loss of appetite, malfunctioning horn growth, susceptibility to predation, reduced reproduction or death."

To be successful a hunter has to be unpredictable to his quarry because, if he is predictable, it will avoid him. A hunter's unpredictability is, therefore, a source of disturbance. The number of animals to be taken will determine the frequency of this disturbance.

Hunting technique also has bearing on disturbance. Snaring, for example, is subtle, quiet and has little influence upon a herd that has lost a member in this way. There is nothing subtle about gunfire. It is intrinsically disturbing. Through association with no harmful result or an outright reward, animals can be conditioned to tolerate it up to certain levels, e.g. sportsmen, gun dogs and stalking horses. However, its offensive properties are much magnified to animals that are shot at, or wounded. Associated with predation, gunfire is perhaps the most disturbing of all hunting techniques.

The foregoing notwithstanding, many animal populations are hunted extensively yet survive. However, those sustaining large sport-hunting or commercial offtakes (other than shoaling fish) have certain features in common. Most are either solitary or associate in small groups.



Wildebeest herd; Serengeti Plain (photo, WWF/Myler Turner)

Where mammals are concerned, they are predominantly animals of forest, woodland or broken terrain. Both through social organization and environment, their populations are divided into numerous subunits. When one of these is disturbed by a hunter, the disturbance is largely confined to that sub-unit. By themselves the social and environmental barriers to disturbance may be adequate to prevent it from becoming a major influence on population parameters.

A number of devices are commonly used in the management of game populations that also reduce disturbance. Among them one of the most prominent is a restricted hunting season. This confines the frequency of hunting to a (small) proportion of any year. Another is only taking males, which reduces or entirely eliminates disturbance on females and young. In certain cases, special measures are appropriate; thus predictability is removed completely when elephants are culled by the whole herd.

There have been few, if any, major sport-hunting or commercial success cropping or culling "megaherd" animal populations. The term is applied to those open lands where grazing ungulates associate in herds that run into many thousands and where the greater part of a population is close-packed in a small part of its range. Megaherd situations have never been widespread and have only been recorded from the North American prairies (a single species, bison); the upper Nile flood plains (mainly white-eared kob); the Masai short grasslands of Uasin Gishu (zebra, topi and others), Laikipia (zebra, gazelle and other) the Rift Valley, Mara, Kapiti plains (wildebeest, zebra and others) in Kenya; the Serengeti/Ngorongoro complex (wildebeest, zebra and gazelle) in Tanzania and the highveld of South Africa (wildebeest, zebra and springbok). Of these only two survive; the Sudan's white-eared kob populations and the Mara/Serengeti/Ngorongoro complex. The others have disappeared and a major feature of their going was its rapidity. Conventionally this was attributed to "over-hunting"; the implication being that more were shot than were born. I dispute this.

When actual kills are considered, relative to population sizes, they should have been reproductively sustainable. It seems more likely that, with the evidence quoted by Geist (1971) in mind, these megaherds were disturbed to extinction.

It is not difficult to envisage how this came about. Clustered in their thousands, one bullet will make

thousands run. Frequent bullets will make thousands run frequently. If the Serengeti ungulates (2.5 million) were to yield an offtake of 10 per cent, climate and other factors would dictate that it be taken in 4 months at the outside. This would call for an offtake of 2,083 animals per day for a 120-day period. It would be reasonable to expect an average of two rounds of ammunition to be expended per animal shot, a total of 500,000 would therefore be fired in the vicinity of the megaherds (i.e. 4,167 per 24 hours or 3 per minute throughout daylight and dark). Even if the offtake was spread evenly through the year (i.e. 685 animals per day, 1,370 rounds per day or one shot per minute), the influence would be intense. Suffice it to say that the 90 per cent of the wildebeest not shot at would nonetheless be put to the gallop at least once and perhaps several times a day! They would become wild and evasive and very difficult to approach. The list of probable outcomes—abortions through excessive exertion (Liddell, 1954; 1958; 1961) pulmonary oedema through pursuit by hunting cars (Nishikawa and Hafez, 1968) and muscular dystrophy through over stress (Bell, personal communication) among them—is considerable. Indeed, it would be extremely unexpected if massive offtake from the Serengeti megaherds did not result in the same outcome as elsewhere where intensive hunting brought about population crashes

Suffice it to say that, where megaherds are concerned—as in the Serengeti—snaring would be a far less disturbing means of harvesting than gunfire. Indeed, the already widespread use of the technique is likely to be as much in favour of its efficiency as for any other reason. The point is made, however, as an observation and not a recommendation. Snaring, too, has numerous disadvantages and, taking the principles of animal production science into consideration, if ungulates are to be managed to provide sustainable offtakes of meat at their reproductive potentials, they would have to be totally tamed. Only under these conditions could population trauma be avoided. And while the principles are obvious, underlying the whole phenomenon of domestication, they contradict the Serengeti's purpose.

References

- Geist, V. 1971. A behavioural approach to the management of wild ungulates. In *The Scientific Management of Animal and Plant Communities for Conservation*, E. Duffey and A. S. Watt, eds. Oxford: Blackwell Scientific.
- Liddell, H. S. 1954. Sheep and goats: the psychological effects of laboratory experiences of deprivation and stress upon certain experimental animals. In *Beyond the Germ Theory*, J. Galdston, ed. New York: Health Education Council. pp. 106–119.
- Liddell, H. S. 1958. A biological basis for psychopathology. In *Problems of Addiction and Habituation*, P. H. Hoch and J. Zubin, eds. New York: Grune and Stratton. pp. 120–133.
- Liddell, H. S. 1961. Contributions of conditioning in the sheep and goat to an understanding of stress, anxiety and illness. In *Lectures on Experimental Psychiatry*. University of Pittsburgh Press.
- Marks, S. A. 1975. *Large Mammals and a Brave People*. University of Washington Press.
- Nishikawa, Y. and Hafez, E. S. E. 1968. Reproduction of horses. In *Reproduction in Farm Animals*, E. S. E. Hafez, ed. Philadelphia: Lea and Febiger. pp. 289–300.
- Parker, I. S. C. 1964. The Galana Game Management Scheme. *Bull. epizoot. Dis. Afr.* 12: 21–31.
- Parker, I. S. C. 1972. *Perspectives on Elephant and Hippo Cropping in the Luangwa Valley*. Rome: FAO.
- Parker, I. S. C. 1984. Perspectives of wildlife cropping or culling. *Proc. U.S. Peacecorps Workshop on wildlife management*, Malawi, October 1984. Washington: US Peace Corps.

Nature conservation in Greece

(legislation and administration of parks and reserves)

Costas Kassioumis

As well as important historical and archaeological sites, Greece has unique biotopes and many rare and endemic species. The legislative authority governing the protection of areas of natural and cultural significance is described and the method of its application discussed.

Ademas de importantes sitios históricos y arqueológicos, Grecia tiene biotopos únicos y muchas especies raras y endémicas. Se describe la autoridad legislativa gobernante de la protección de áreas significativas naturales y culturales y se discute su método de uso.

La Grèce qui compte tant de sites archéologiques et historiques importants possède aussi de nombreuses espèces rares et endémiques. Les instruments législatifs régissant la protection des régions d'importance naturelle et culturelle sont décrits ici, de même que leur mode d'application.

As well as its important historical and archaeological interest, Greece is endowed with splendid scenery, a rich and diverse flora and fauna, with many rare and endemic species, and biotopes and ecosystems of worldwide significance. Important colonies of aquatic birds, endangered birds of prey and rare animal species such as sea turtles, monk seal and Cretan wild goat are found in wide estuaries and lakes, on remote islands, in almost untouched sand dunes and beaches and in mountains and forests which have remained largely unexploited. The plant life is even more diverse. With more than 6,000 species, it represents an immense range of genetic resources, ecosystems and natural beauty. A wide variety of marvellous landscapes of both aesthetic and cultural significance completes this rich and unique natural environment of Greece.

One of the first laws conferring protective status on certain areas in Greece was the archaeological law (Law 5351/32), enacted in 1932 to protect all antiquities together with the area within a radius of 500 metres around them. This law, which is still valid, strictly prohibits damage or alterations to ancient monuments themselves and also any operations in the surrounding areas which pose any potential danger to them. All sites of antiquity are automatically protected by law and require no special designation. Their management is the responsibility of the Ministry of Culture. This archaeological law, although not in itself particularly relevant to nature protection, has, however, been applied to certain areas of special historical interest, called "historical places" and later extended (supplemented by law 1496/1950) to modern monuments and to "landscapes of natural beauty". It has thus been useful to nature protection. "Landscapes of natural beauty" form a separate category of protected areas specially designated by Ministerial Decision. Some 300 sites have been designated as either "landscapes of natural beauty" or "historical places" throughout all the districts of the country, although in most cases there are no specific measures for their protection. Although responsibility for administration and management of "historical places" remains with the Ministry of Culture, that for "landscapes of natural beauty" was transferred to the Ministry of Environment, Planning and Public Works in 1984.

With reference to nature protection, the most important law is Law decree 996/1971, initially enacted in 1937, which recommended the establishment of five national parks, defined as: "forested areas presenting special interest in terms of flora and fauna, geomorphology, subsoil, waters and their general natural environment; and whose conservation is necessary for aesthetic, psychological and healthy enjoyment, tourism and scientific reasons." The present law recognizes two more categories of protected areas, One is "aesthetic forests", being "forests suitable for recreation, physical exercise, health and hiking, or landscapes of natural beauty, which possess a particular aesthetic, hygienic and touristic significance, together with such characteristics that demand the protection of their fauna, flora and particular natural beauty". The other category includes the "protected natural monuments" which are "areas which present a special palaeontological, geomorphological and historical significance; or trees, clumps of trees, wetlands as well as rare species of plants with special botanical, phytogeographical, aesthetic and historical significance."

These national parks, aesthetic forests and protected natural monuments are administered by the Forest Service of the Ministry of Agriculture, their actual protection and management being the responsibility of local Forest District Offices, supervised by the Section of National Parks and Aesthetic Forests.

The Forest Service, which is also the authority controlling hunting in Greece, establishes special areas such as game refuges, game breeding stations and controlled hunting areas which are important in the conservation of flora and fauna.

More than 500 areas are designated as game refuges where hunting is prohibited, covering about 800,000 hectares and including different types of areas such as the estuary of river Nestos (districts of Kavala and Xanthi), the Evros delta, Lake Kerkini (district of Serres) and the Gulf of Amvrakikos, all being also Ramsar areas; the forests of Dadia-Lefkimi and Soufli (district of Evros); the estuary of river Pinios (district of Thessaly) and the area around the peaks of mount Timfi (district of Ioannina) in the Vicos-Aoos National Park. There are also 21 game breeding stations, covering an area of about 13,000 hectares and comprising areas such as the Antimilos island in Cyclades, the area around the monastery of Agathona (district of Fthiotida) and the island of Thodorou (district of Chania). In addition there are eight controlled hunting areas covering about 120,000 hectares which include import-

Ministry of Agriculture, National Parks Section, 3-5 Ippokratous str., GR-101 64 Athens, Greece

ant areas such as the island of Dias in Crete (district of Heraclion), the island of Gioura (in Northern Sporades) and the island of Sapienza (part of which is also a Natural Monument) in Western Peloponese (district of Messinia).

Certain other areas, although not yet specially designated, have a widely recognized protective status either through decisions of the National Council for Planning and the Environment authorizing appropriate authorities to take necessary protective measures, or by international conventions ratified by Greece and EEC Directives.

For many of these areas there is no special legislation providing for their administration and management, although certain measures aiming their conservation are taken by responsible bodies, applying various legislations for this purpose such as the Forestry Code, planning laws, etc.

Decisions of the National Council for Planning and Environment identify more than 20 sites for protection, including important wetlands, a marine park and some known biogenetic reserves.

As far as international conventions are concerned, Greece was one of the first states to ratify the Ramsar Convention on Wetlands. However, only five wetlands are subject to formal legal and administrative protection, being Lake Mikri Prespa which has been designated as a National Park since 1974, and the four areas already mentioned as being designated Game Refuges.

Greece is Party to the World Cultural and Natural Heritage Convention, has signed the Bern Convention on the Conservation of European Wildlife and Natural Habitats and also the Protocol on Mediterranean Specially Protected Areas. It is in the process of including

certain areas in the relevant lists.

It is recognized, however, that nature protection legislation and administration in Greece has many deficiencies. New criteria have to be established to ensure that all ecosystems and habitats of rare species are adequately represented. Responsibilities of the respective bodies for nature protection have to be clarified and the need for new measures for protection and management of certain areas must be fully recognized.

A new institutional law "for the protection of the environment" recently ratified by the Greek Parliament contains a special chapter for the protection of nature and landscapes and introduces certain changes in existing laws (especially Law 1469/1950 on landscapes of natural beauty and Law decree 996/1971 on national parks, aesthetic forests and natural monuments). These changes refer mainly to the categories of protected areas, recommending five new categories: Absolutely protected natural areas (nature reserves); Protected natural areas; National parks; Protected natural monuments, protected landscapes and elements of landscapes; and Areas for ecodevelopment. Changes also provide for the application of certain economic measures for the protection and management of these areas and for the authority to establish new areas in the above categories, which now become the responsibility of three Ministries (Agriculture, Environment Planning and Public Works, and also Manufacture, Energy and Technology). However, the actual responsibilities and the inclusion of already protected areas within the new law remain to be clarified by special presidential decrees. Till then, the new law is not operative and the existing laws are still valid.

Conferences

Ocean Wilderness Seminar: Fourth World Wilderness Congress, Colorado, USA, 9–18 September 1987.

When the Fourth World Wilderness Congress meets in Denver and Estes Park, it will consider for the first time, the management and protection of ocean resources. Dr Nancy Foster, National Oceanic and Atmospheric Administration (NOAA), will lead the Ocean Wilderness Seminar. Users and managers of ocean resources and conservation leaders will examine whether community support and getting people involved can change the way nations manage their ocean systems—systems with common property resources, overlapping jurisdictions, and complex economic, cultural, and ecological links. For anyone involved or concerned about the marine environment, the seminar is an opportunity to develop more promising approaches to managing the resources of small island nations, large marine ecosystems, ocean frontiers such as the Arctic and the Antarctic, and oceans that are rich food and energy producers. The congress officially opens on 11 September in Denver with a 3-day forum and the release of the "Denver

Declaration", a call for new actions and structures to stimulate worldwide conservation. The congress continues in Estes Park with a 5-day convention of delegates which will feature scientific workshops and seminars such as "Ocean Wilderness." On 9–10 September, NOAA in cooperation with the International Marine Protected Area Network, will present a 2-day course on "Interpretive Techniques for Marine Protected Areas" as one of several training opportunities preceding the congress. For more information, contact Dr Nancy Foster, Director, Office of Protected Species and Habitat Conservation, National Marine Fisheries Service, NOAA, Washington DC 20235, USA.

29th Working Session of IUCN's CNPPA

The 29th Working Session of the Commission on National Parks and Protected Areas (CNPPA) is one of a number of events being held in New Zealand this year to coincide with the centennial of Tongariro National Park, the first park established in New

Zealand. The meeting is planned for 16–21 August at Wairakei in the centre of the North Island and will concentrate on the Antarctic Realm (New Zealand, the Sub-Antarctic Islands and Antarctica), with sessions also on marine protection and the Oceanian Realm. The programme will include a mid-week inspection of Tongariro National Park and there will be an optional one-day post-session field visit to sites of interest in the vicinity of Wairakei on 22 August. Other activities may include special interest tours covering other national parks and protected areas following the working session if sufficient numbers are interested. These may be either of 3 or 7 to 10 days duration. Those interested in participating in the working session and/or other activities should contact: Jan Simmons, Organizing Secretary CNPPA Working Session, PO Box 210, Hamilton, New Zealand.

18 August–11 September 1987

21st International Seminar on National Parks. Contact: Hugh Bell Muller, Director, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109, USA.

28th Working Session of the IUCN Commission on National Parks and Protected Areas

This meeting, held in "W" National Park, Niger, was the third to be sponsored by the Commission on National Parks and Protected Areas (CNPPA) to review protected area issues in the Afrotropical Realm. Some 40 senior park agency officials from 17 countries gathered for the 5-day session (18–22 March 1987). Included in the group were representatives from four aid agencies, indicating the growing donor interest in supporting biological diversity projects. Also included were representatives from the last two countries in Africa which have not yet created protected areas—Equatorial Guinea and Guinea Bissau.

The working session was inaugurated in Niamey by M. Attaher Darkoyé, Minister of Environment, who co-hosted the meeting. The technical sessions were co-chaired by Harold Eidsvik, Chairman of CNPPA and Abdu Admou, Chief of Niger's Direction des Forêts et de la Faune.

The main purpose of the meeting was to review the current status of protected areas in the francophone African region. Twelve countries from West Africa presented status reports on various aspects of protected area management in their respective countries, which are being published in a proceedings volume.

A second output from the working session was a much revised third edition of an "Action Strategy for Protected Areas of the Afrotropical Realm". This document, which has been developed over the past 6 months by CNPPA members in Africa, was modified by the participants to better reflect the priorities as currently



Participants in session in Tapoa Lodge "W" National Park (photo, J. W. Thorsell)

defined in West Africa. The strategy spells out numerous detailed objectives and activities at both national and international levels that must be strengthened or initiated to achieve more representative coverage and more effective management of parks and reserves in future. The strategy itself builds on and reinforces IUCN's Bali Action Plan and the Biosphere Reserve Action Plan and complements other protected area action plans prepared for other tropical realms.

Aware that efforts to protect West Africa's natural heritage often go unrecognized, CNPPA also presented special valour awards for field officers in Tchad, Senegal, Ivory Coast and Niger who have performed special acts of bravery and merit in carrying out their duties. These include a token cash

prize and were given to the following:

- Robert Thei of Ivory Coast, who was seriously wounded when intercepting three armed poachers in the Tai National Park.
- Ahmed Tcholli, who has been instrumental in involving local people in the Air Ténéré Reserve in Niger, demonstrating an exceptional ability to integrate protected areas with sustainable development in the Sahel.
- The wardens of the Zakouma National Park in Tchad, who continued to protect the park despite the period of civil disturbances, often without equipment and salaries.
- Mamadou Sadio, a warden in the Nikola Koba National Park in Senegal, for exceptional efforts in combatting poaching in the park.



Ahmed Tcholli, warden of the Air Ténéré Reserve (proposed) in Niger, recipient of IUCN's Packard Award for Merit (photo, J. W. Thorsell)



Tchad's Director of Tourism, National Parks and Wildlife Reserves, Ban-Ymary Daboulayé, accepts the IUCN Packard Valour Award on behalf of the rangers of the Zakouma National Park from M. Attaher Darkoyé, Minister of the Environment (photo, J. W. Thorsell)

Advice to contributors

Contribution of manuscripts to PARKS

Authors are usually professional people engaged in management of, or in the many disciplines associated with, parks and protected areas. Authors may be invited to write on subjects selected by the editor, but those who wish to submit for consideration articles based on their own experience are encouraged to do so in consultation with the editor.

At present, manuscripts can be accepted only in English or Spanish, and will be published in the original language.

Suitability for publication is determined by many factors; including factual and technical content, timeliness and potential value to an international readership.

Letters to the editor are invited. These may refer to the subject matter of articles, introduce new ideas, or comment on topics of general interest. They may be published at the editor's discretion.

The editor would be pleased to be placed on the mailing list of magazines published by national park organizations with a view to reprinting appropriate articles in PARKS to enable them to reach an international readership.

General: Two copies of the manuscript should be submitted on paper of uniform size. Pages should be numbered consecutively. Each manuscript should be headed by a title, the author's full name, and the full postal address. Author's biodata should accompany the manuscript. Footnotes should not normally be used, but where considered to be essential they should be kept as brief as possible.

Nomenclature: Where the scientific name of a plant or animal follows the first mention of its common English or vernacular name, the scientific name should be underlined and enclosed within brackets. Common names should not be given initial capital letters unless they incorporate proper names, or, where confusion could otherwise result.

Names: Except where the anglicized version is well-established, for example "Rome" or "Moscow", the locally and presently used spelling or its accepted English transliteration should be used. In this, the National Geographic Society maps (US) or Times Atlas may generally be followed. The initials of organizations, for example, IUCN, UNESCO and ICSU, and abbreviations for countries, such as USSR, USA, DDR, and UK, require no full stops.

Units: The metric system should be used. Where, for any reason, figures based on other systems are quoted, the metric equivalents should always follow in brackets. The abbreviated forms—cm, kg, ha and so on—should not be followed by a full stop except at the end of a sentence. In dates, the full name of the month should be used.

Illustrations: Photographic prints should be glossy and should be identified by the author's name and caption reference lightly written in soft pencil on the back. Captions should be provided typed on a separate sheet, clearly identified. Tables should be included in the main body of the manuscript. Line drawings, maps or diagrams should be professionally prepared with black ink on white paper. Photos, drawings and other materials intended for reproduction should be mailed flat with protective stiffener or enclosed in a mailing tube. They should never be folded.

References: References should be cited in the text by naming the authors (or with *et al.* replacing all the names after the first if there are more than two) followed by the year of publication, for example:

(Smith, 1971); or (Smith & Jones, 1971); or (Smith *et al.*, 1971).

The reference list at the end of the text should be arranged in alphabetical order of authors surnames, in the following form:

- (1) for a scientific periodical:
Gee, E. P. 1956. Report on the status of the Kashmir stag, October 1966 *J. Bombay Nat. Hist. Soc.* 62(3): 379–393.
- (2) for a single author book:
Schaller, G. B. 1967. *The deer and the tiger*. Chicago & London: University of Chicago Press.
- (3) for a chapter from an edited book:
Packard, R. L. 1967. Octodontoid, Bathyergoid and Ctenodactyloid rodents. In *Recent Mammals of the World*, S. Anderson and J. Knox-Jones, eds. New York: Ronald Press. pp. 273–290.

Abbreviations of scientific journals should follow *The World List of Scientific Periodicals*. If this is not available the name of the journal should be given in full.

Proofs: Printers proofs will not normally be submitted for checking by authors as short time and often infrequent or interrupted mails make this practice unacceptable. Proofs will be read by the editors.

Communications

SIR—I was very pleased to see my article on Białowieża in PARKS, Volume 11, 2/3. The text is very good and the photographs better than I could have believed possible. I did, however, find one mistake: on page 7, second column, line 13, it is stated that 443 species are endemic. This is not true, since conditions for endemic animals and plants are not found in the

forest complex, which is flat and without natural ecological barriers. It should have been stated there are 443 native species.

CZESLAW OKOŁOW
Białowieża National Park, 17–230
Białowieża, Poland
Thank you for drawing attention to this error, I am sure our readers will take note of this correction.—*Editor*

Corrigendum

On page 21 of the English Section PARKS Volume 11, 2/3, 1986 we regret that a transposition occurred of the captions illustrating David Cheal's article "A park with a kangaroo problem"; the right-hand photo is of King's Billabong, and the left-hand photo is of Hattah-Kulkyne National Park.

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