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Caicedo, Mark D., M.S.

San Jose State University, 1993

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WILDLANDS CONSERVATION AND COMMUNITY RESOURCE MANAGEMENT:
A CRITICAL ANALYSIS OF THE PROPOSED
TAWAHKA BIOSPHERE RESERVE, LA MOSQUITIA, HONDURAS

A Thesis

Presented to

The Faculty of the Department of Geography and Environmental Studies
San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

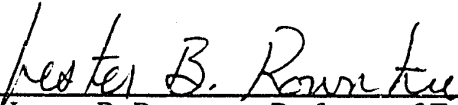
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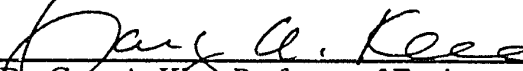
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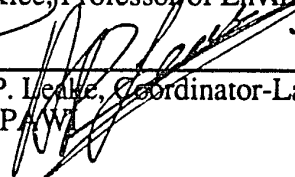
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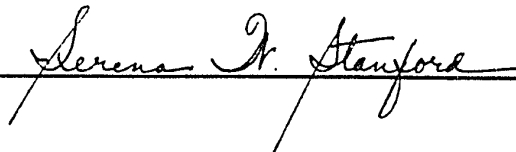


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Abstract

WILDLANDS CONSERVATION AND COMMUNITY RESOURCE MANAGEMENT: A CRITICAL ANALYSIS OF THE PROPOSED TAWAHKA BIOSPHERE RESERVE, LA MOSQUITIA, HONDURAS

by Mark D. Caicedo

The proposed Tawahka Biosphere Reserve (TBR) in the middle Río Patuca region of Honduras is critically analyzed as a wildlands conservation strategy aimed at protecting natural and cultural heritage. Ecologically destructive land use practices introduced by outside forces threaten the region's tropical rain forest as well as its indigenous inhabitants, the Tawahka Indians. The critical analysis covers four areas: 1) ecological threats, 2) Tawahka subsistence, 3) the TBR's feasibility, and 4) Tawahka involvement in the reserve's planning process. Study results reveal that outside influences are producing significant environmental and cultural change. The thesis' major conclusion is that wildlands conservation as an environmental and cultural protection strategy may be effective when fundamental guidelines are met.

Key Words: Tawahka Indians, Biosphere Reserve, wildlands conservation, rain forest, indigenous, La Mosquitia, Honduras.

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For Joscelyn

Central to the rain forest issue are people--those who have lived there traditionally, those who see the uninhabited territory as the sole hope of land ownership they have never experienced, and those in the cities who make the decisions regarding its resources.

Robert McC. Adams

One day you're waiting for the sky to fall, the next you're dazzled by the beauty of it all.

Bruce Cockburn

Introduction

Humanity today is challenged by a growing environmental and social crisis.

Environmentally, the destruction of tropical rain forest seriously endangers a major source of the planet's biological diversity. Socially, the livelihoods of millions of people living in tropical regions around the world are threatened by the irreversible loss of tropical forest.

Tropical rain forests provide services and benefits for people in a number of ways. They are a rich store of biodiversity that, potentially, could be a source for great material wealth including food, medicines, timber, and other commercially important products.¹ Likewise, they provide essential environmental services including the stabilization of water flows, control of hydrological cycles, and regulation of atmospheric carbon dioxide buildup.² For the people who live in the rain forest, it provides most of the products necessary for their survival. As ecologist Norman Myers points out, tropical rain forests are humanity's "primary source."³

Human populations, particularly indigenous groups, are important links in tropical forest ecosystems. Conservationists and indigenous groups rights activists have come to realize that habitat protection can be a powerful tool for preserving not only natural, but also cultural heritage. However, despite common goals, cross-disciplinary action is hampered by lack of research which records and analyzes the links between forest populations and the natural resources upon which they depend.⁴

This thesis examines wildlands conservation as a dual environmental and cultural protection strategy through critical analysis of the proposed Tawahka Biosphere Reserve (TBR) in Honduras, Central America. The TBR (see Map 1) would protect one of Central America's last remaining stands of old growth tropical rain forest. The reserve, located in La Mosquitia--a remote and wild area in northeastern Honduras--would preserve a vast

number of plant and animal species, many endemic. The rain forest in the middle Río Patuca region of La Mosquitia is also the primary resource base for the Tawahka Indians. The Tawahka are an indigenous group of approximately 700 whose land use practices have, over time, had little impact on the region's biodiversity and ecological integrity.

A rapidly advancing colonization front of small farmers now threatens the region's tropical rain forest as well as the Tawahka's traditional way of life.⁵ This colonization front is made up largely of Ladino peasants migrating from Honduras' environmentally impoverished southern region.⁶ Working as wage laborers, the migrants clear forest land for cattle ranchers eager to stake claims to what is seen as open, unoccupied land. The introduction of ecologically inappropriate land use practices not only destroys biodiversity but also deprives the Tawahka of their traditional resource base.

In 1989, FITH, *Federación Indígena Tawahka de Honduras* (Federation of Tawahka Indians), took the first steps toward making legal claim to their traditional agricultural and hunting lands. With the help and support of several governmental and non-governmental organizations including INA, *Instituto Nacional Agrario* (National Agrarian Institute), IHAH, *Instituto Hondureño de Antropología e Historia* (Honduran Institute of Anthropology and History), MOPAWI (Mosquitia Pawisa), and Cultural Survival, Inc., a proposal to grant the Tawahka ownership of their traditional lands was made.⁷ By 1991, a consensus emerged that creation of a reserve would be the most effective method to guarantee the protection of the middle Río Patuca region's environmental and cultural heritage.⁸ The Tawahka Biosphere Reserve was proposed with two primary objectives: 1) to guarantee the preservation of the region's rain forest ecosystems, and 2) allow the Tawahka to continue practicing their traditional natural resource use activities.⁹

This thesis examines wildlands conservation through the establishment of reserves as a strategy for environmental and cultural protection. A case study--the proposed TBR--is

critically analyzed as an example of this strategy. This analysis covers four areas: 1) the extent of environmental and cultural threats; 2) Tawahka land use patterns; 3) the capability of the TBR to halt the region's environmental threats; and 4) the extent to which the Tawahka have been involved in the reserve's planning.

Three major findings resulted from the research. These are: 1) environmental degradation, characterized by deforestation, is occurring in the middle Río Patuca region due to introduction of ecologically inappropriate land use practices; 2) Tawahka social use of the land is impacted as a result of external environmental threats; and 3) a complex bureaucratic and political process has hindered final establishment of the TBR. The thesis' major conclusion is that wildlands conservation as an environmental and cultural protection strategy may be effective given that specific guidelines are followed.

The intersection of dual environmental and cultural conservation is central to this thesis. Students of environmental studies need recognize the importance of reconciling two often conflicting goals: conservation of natural resources and protection of the peoples whose traditional cultures rely on those resources for survival. More so than any other discipline, environmental studies uses principles derived from ecology, biology, geography, and anthropology for purposes of developing pragmatic solutions, policies, and actions. Conservation strategies, like the proposed TBR that recognize and protect human needs while also guaranteeing the preservation of biodiversity, present a feasible option for protecting environmental and cultural heritage.

NOTES

¹Edward O. Wilson, "Threats to Biodiversity," Scientific American 261 (3, September, 1989): 60.

²Norman Myers, The Primary Source: Tropical Forests and Our Future, (New York: W.W. Norton & Company, 1992), 260-283.

³Ibid., 6.

⁴Kent H. Redford and Christine Padoch, eds., Conservation of Neotropical Forests: Working From Traditional Resource Use, (New York: Columbia University Press, 1992), ix.

⁵Peter H. Herlihy and Andrew P. Leake, "The Tawahka Sumu: A Delicate Balance in Mosquitia," Cultural Survival Quarterly 14 (4, 1990): 13.

⁶Andrew P. Leake, "Propuesta: Plan de Accion Forestal Tropical Centroamericano, Proyecto Binacional Rio Coco: Componente Hondureño, 'Reserva Tawahka y Parque Nacional Patuca: Estrategia de Conservacion y Desarrollo'," (Unpublished project proposal, MOPAWI, Tegucigalpa, Honduras, October, 1992), 2.

⁷Herlihy and Leake, "A Delicate Balance," 15.

⁸Peter H. Herlihy and Andrew P. Leake, "Propuesta: Reserva Forestal Tawahka Sumu," June, 1991, Offices of MOPAWI, Tegucigalpa, Honduras, and author's possession.

⁹MOPAWI, "Ante-proyecto de Decreto de Ley de Creación de la Reserva de la Biosfera Tawahka," TMs, 1992, MOPAWI Offices, Tegucigalpa, Honduras, article 1.

CHAPTER I
- LITERATURE REVIEW -

This thesis adds to a growing body of research that documents and analyzes habitat conservation strategies and includes the role cultural practices play in natural resource management. Integrating the study of cultural and social practices into biodiversity research is urgently needed.¹

Data from primary and secondary sources forms the basis of this thesis. Fieldwork conducted in Honduras from February through April, 1992, provides first-hand qualitative and quantitative data on the Tawahka Indians and the environment in which they live. During fieldwork, information was actively solicited from the Tawahka through observations, informal conversations, and in-depth interviews to determine perceived environmental and cultural threats, social land use practices, and their level of involvement during the TBR's planning.

Secondary sources provide data for the literature review describing indigenous peoples and the Tawahka, environmental protection strategies, and the thesis' conceptual framework. The bulk of the literature review (especially literature specific to the TBR) was carried out after primary data had been collected in the field. This was a conscious effort on the part of the investigator to minimize biases that might have resulted from "official" assessments of the proposed reserve. An ongoing review of current texts and journal, magazine, and newspaper articles proceeds throughout the thesis.

Material on the general background of indigenous culture opens the first section. Literature on the Tawahka, published and unpublished, includes anthropological

monographs and ethnographic studies documenting traditional subsistence and land use activities.

Environmental protection strategies are briefly described in this chapter. These protection schemes, incorporating several separate classifications and levels of protection, are reviewed. This section examines the biosphere reserve concept and briefly summarizes the current status of Honduras' Río Plátano Biosphere Reserve (RPBR).

The conceptual framework of this research is established through a review of selected literature on political ecology and sustainable development. Political ecology defines cultural and environmental degradation in political, economic, and social terms. Sustainable development is currently hailed as a way to improve living conditions in less developed countries (LDCs) while promoting rational use and management of natural resources.

Convergence--the concept of dual environmental and indigenous group protection--though not a scientifically documented body of theory, provides another framework upon which this research is based. Convergence assumes that indigenous peoples are the "best" managers of natural resources and, therefore, their land use systems need to be incorporated into environmental protection schemes.

Indigenous Peoples

Andrew Gray defines indigenous groups as the "descendants of inhabitants of a country prior to its colonisation."² There are approximately 200 million indigenous people throughout the world; roughly four percent of the total population.³ Living in extremely diverse environments on every continent except Antarctica, indigenous societies vary greatly in terms of organization, culture, and economy. Despite their hardiness and adaptive mechanisms, however, all are quite vulnerable to outside intervention, discrimination, exploitation, and oppression.

Generally, indigenous peoples see themselves as an integral part of the environment in which they live. This is reflected in subsistence patterns and land use activities which emphasize sustainability. Their relationship to the land is not only economic but spiritual, as beliefs in the sacredness of particular animals, plants, and places determine how land and resources may be used. This intimate relationship between the land and indigenous peoples' culture helps establish the need to link natural and cultural protection strategies.⁴

Indigenous populations frequently live in relatively far-removed regions; precisely the frontier lands that national governments and multinational corporations seek to develop for political, social, and/or economic purposes. In the process, indigenous peoples are marginalized, assimilated into the dominant national culture, or simply killed through disease or genocide. According to Gray, the conflict over land and resource use lies at the heart of the indigenous peoples rights' issue.⁵

Although there are numerous cases of indigenous peoples altering the environment in an ecologically harmful manner, there is general agreement that given the stability of social, demographic, and economic factors, indigenous peoples are "experts" in the sustainable management of the natural resources upon which they depend to survive.⁶ On the other hand, the belief that indigenous peoples are unwilling or unable to adapt to evolving environmental conditions is a mistake. Customs and practices developed over time that promote and maintain sustainable resource use can and do change.

Literature on the Tawahka Indians

The Tawahka Indians of Honduras' middle Río Patuca region are related to the *Ulwa/Tawahka-Panamaka* linguistic/indigenous group living in parts of Honduras and Nicaragua.⁷ Von Houwald, in his Diccionario Español-Sumo, Sumo-Español, points out that this indigenous group of 4000-8000 is widely distributed throughout the two countries with several sub-groups inhabiting upriver rain forest habitats.⁸ This geographic

separation has led to numerous isolated Tawahka/Sumu communities resulting in the formation of "small linguistic islets."⁹

Edward Conzemius' 1932 work, Ethnographical Survey of the Miskito and Sumu Indians of Honduras and Nicaragua, is the most complete and authoritative ethnographic work on the Tawahka Indians. In it, he describes Tawahka land use practices, social customs, and the geographical features of the region in which they lived in the early 1900s.¹⁰ Francisco Martinez Landero writes specifically about the Honduran Tawahka in La Lengua y Cultura de los Sumos de Honduras (The Language and Culture of the Sumos of Honduras).¹¹ Landero's study is based on his experiences with the Tawahka as a teacher in 1915, though it was published much later, in 1980. Landero's 1935 monograph in Antropos, "Los Taoajkas ó Sumos del Patuca y Wampú" (The Tawahkas or Sumos of the Patuca and Wampú) provides additional background information on the Tawahka.¹² Bell's 1899 work, Tangweera: Life and Adventures Among Gentle Savages, was based on experiences he had as a boy forty years earlier living among the Tawahka and other indigenous peoples in Nicaragua.¹³ More recently, a 1977 report by Calix and Cruz provides population and demographic data and documents aspects of traditional Tawahka culture and society.¹⁴

The most recent literature on the Tawahka includes cultural geographer Peter Herlihy's land use study conducted in the middle Río Patuca region between January and July of 1990. His research involved detailed mapping of current Tawahka land use activities and resulted in FITH's formal request for the establishment of a reserve for the legal protection of Tawahka lands. The 1991 preliminary draft of the "Propuesta: Reserva Forestal Tawahka Sumu" (unpublished) defines the goals, functions, and boundaries of the proposed reserve.¹⁵ Herlihy and Leake (1990), summarize Tawahka efforts to claim land rights through the establishment of the TBR.¹⁶ In this way, the national government and

the Tawahka could achieve two goals common to both: dual protection of Honduras' environmental and cultural heritage.¹⁷

Environmental Protection Strategies

Reid and Miller write that proper zoning and management allows resource use that maintains the biota's capacity to meet future generations' needs.¹⁸ To this end, the IUCN (International Union for Conservation of Nature and Natural Resources) and UNEP (United Nations Environmental Programme) have identified eight categories for designating protected areas.¹⁹ These are:

- 1) Scientific Reserve
- 2) National Park
- 3) Natural Monument
- 4) Wildlife Reserve
- 5) Protected Landscape
- 6) Resource Reserve
- 7) Anthropological Reserve
- 8) Multiple Use Area

Protected areas within the above classification system have one of two primary objectives: 1) areas created to maintain biodiversity are termed "strictly protected areas." (IUCN categories 1-3) and restrict almost all human activities; and 2) areas established for controlled resource exploitation but still maintain biodiversity make up the remaining IUCN categories (4-8).²⁰ Such protected areas rarely, if ever, fall neatly into any one category. Therefore, protected areas must be managed within a context of broad, overlapping objectives which together provide those services that people require, *including* the maintenance of biological diversity.²¹

United Nations Man and Biosphere Program

The United Nations' Man and Biosphere program (MAB) was started in 1970 to conserve and protect natural landscapes and traditional human land and resource use patterns.²² Administered under the United Nations Educational, Scientific, and Cultural Organization (UNESCO), there are now 269 biosphere reserves in 70 countries.²³ Gregg lists three main objectives of biosphere reserves: 1) to promote conservation of the earth's ecosystems and biodiversity; 2) to establish a global network of interdisciplinary information-sharing for research, training and technical purposes; and 3) to provide a scientific basis for linking environmental concerns and resource development activities.²⁴

A biosphere reserve is made up of three distinct zones (see Appendix B, Figure 1). The core area at a reserve's center is designed for absolute protection from human intervention and contains "minimally disturbed examples of the ecosystems characteristic of the biogeographical province, including, if possible, outstanding examples of mature or 'old growth' communities."²⁵ Ideally, a core area is large enough to sustain a wide variety of animal and plant species within a complex web of interaction.

Surrounding the core area is the buffer zone where management of specific human activities by an administrative body may take place. These activities include experimental research, recreation, silviculture, agriculture, recreation, small settlements, and other limited uses that should directly serve the conservation objectives of the biosphere reserve. The core area and buffer zone have legally defined boundaries.

The transition zone, the area surrounding the core and buffer zones, is designed to promote interaction and cooperation with local peoples through "culturally and ecologically sustainable types and patterns of development".²⁶ The transition zone is open-ended allowing flexibility in the delimitation of the bio-geographical or cultural region as it evolves over time.

The biosphere reserve concept is an example of *in situ* conservation, or the maintenance of plant and animal genetic material in the wild.²⁷ Biosphere reserves are designed to protect natural and semi-natural ecosystems provided that the impact of any given human activity is no greater than that of any other single biotic factor. Oldfield points out that the biosphere reserve program is the only protection strategy that conserves *natural* and *human-modified* ecosystems.²⁸ As such, their planning, implementation, and evaluation rely on local community input as much as input from outside experts. For example, naming biosphere reserves for regional biological and/or cultural attributes encourages local enthusiasm for the project.²⁹ Participation of those living in or around the biosphere reserve clearly must involve more than that, however. Gregg states:

For administrators of national parks and other conservation areas, a biosphere reserve can offer a bridge to the surrounding region, and an aegis for working with local people and institutions in developing a regional conservation strategy. For local people, it can provide access to education and training, as well as technical and financial resources for appropriate development. For traditional societies, it can provide an incentive for documenting land use practices and cultural history, [and] foster cultural pride...³⁰

The Río Plátano Biosphere Reserve

The Río Plátano Biosphere Reserve (RPBR) is situated in La Mosquitia adjacent to where the proposed TBR would be located (see Map 2). As such, a brief examination of the RPBR's current status may serve as a comparative example of wildlands conservation as a conservation strategy in the region.

The RPBR was established in 1980 by the Honduran government and UNESCO under the MAB program. It was the first protected area of its type in Central America and was designated a World Heritage Site in 1982 because of its unique combination of "natural and cultural elements."³¹ According to Kolankiewicz, the RPBR was established with three goals: 1) to provide a refuge for the flora and fauna of the area, 2) to protect the Pesch and Miskito Indians who have lived in the region for centuries without destroying its resources,

and 3) to preserve the Plátano's extensive but little researched archeological resources.³² Covering 525,100 hectares, it protects extensive regions in the departments of Olancho, Colon, and Gracias a Dios in northeastern Honduras. It is the largest protected area in Honduras and includes lowland and upland tropical rain forest, coastal marine wetlands, and savanna pine woodland habitats.

Glick and Betancourt describe how a comprehensive management plan was developed for the RPBR by indigenous peoples, environmental and development specialists, and MAB representatives.³³ The plan, reflecting the twin objectives of protecting biological and cultural resources, includes goals and objectives, a zoning scheme, public use, resident eco-development, and integrated development programs.³⁴

A primary reason for establishing the reserve was to halt a colonization front of "migrating agriculturalists" converging on the RPBR's southern border.³⁵ Yet, Salaverri writes that this migration still continues today.³⁶ Recent, unpublished, and word of mouth reports show that much of the southern border continues to be penetrated by commercial logging interests, Ladino colonists, and large-scale cattle ranchers. As Herlihy points out:

Thousands of agricultural colonists have invaded the Río Plátano Biosphere Reserve along its southern...and western...boundaries. The appearance of this colonization front has not only caused the destruction of pristine tropical rain forest, but it places...native [populations] at odds with these advancing colonists over issues of land tenure and resource exploitation.³⁷

This invasion has resulted in significant environmental destruction. In 1989, Easton found that migrants and large-scale timber interests had begun moving into the core protected area: "Powerful lumberman [*sic*], migrant campesino families, and unsustainable land use practices are contributing to the rapid destruction of one of Central America's largest and most diverse forest areas."³⁸ MOPAWI has documented large numbers of migrants arriving from the departments of Valle and Choluteca in southern Honduras. Desertification in the south has been so severe that inhabitants of this region migrate to the

virgin forest of the RPBR at the rate of a truck load every other day.³⁹ A 1988 MOPAWI expedition found illegal timber cutting to be on the increase, as well. Arriving at a boundary marker at the Reserve's outer limit, the expedition found a new logging road heading directly into the RPBR.⁴⁰ The expedition also verified the existence within the RPBR's boundaries of "...ranch after ranch cut out of the jungle to make pasture for raising Brahma cattle."⁴¹ MOPAWI representatives believe that if the destruction is not halted soon irreversible damage could occur in the biosphere's core within three to five years.⁴²

The current status of the RPBR serves to reinforce the notion that active local involvement in the planning process is essential for long-term survival of environmental protection strategies. According to Jacques, much of the environmental degradation occurring in the RPBR today is because input from the region's indigenous peoples was neglected during its planning stages.⁴³ The TBR is to be established adjacent to the RPBR and would serve to form a continuous protected corridor of rain forest through Honduras. However, local community input is imperative if the problems being encountered in the RPBR are to be minimized in the middle Río Patuca region.

The TBR, as currently proposed, incorporates aspects of the U.N.'s MAB program but was originally modeled after the *comarca* concept among the Kuna Indians of Panama.⁴⁴ For legal establishment, the TBR must first receive official recognition by the Honduran government. It would then be submitted to UNESCO for inclusion in the MAB program, pending the acceptance of a comprehensive management plan. However, the Tawahka themselves must be closely involved in the planning and implementation process so that they become stakeholders in the TBR's long-term viability. As anthropologist Jason Clay points out, "...there is a behind-the-scenes role for international organizations but the indigenous groups call the shots."⁴⁵

Conceptual Framework

Two areas of theoretical research provide the conceptual framework for this study. The first, political ecology, provides a broad context for analyzing the factors driving environmental change in the middle Río Patuca. Political ecology explicitly considers the distribution and allocation of political and economic power at the national and/or international level as a device for analyzing the cultural and environmental impacts at the local or regional level.

The second area of theory is the notion that development programs are sustainable. Sustainable (or eco-) development postulates that economic growth may occur within environmental limits, primarily by not depleting the natural resources upon which such growth depends. The concept of development sustainability has recently come under intense scrutiny by some ecologists.⁴⁶

The concept of "convergence" as a protection strategy is discussed in this section. Convergence attempts to reconcile the sometimes conflicting goals of environmental and cultural protection; providing a more specific examination of Tawahka culture and the ecosystem of which they are a part, as well as efforts to protect that region's natural and cultural heritage.

Political Ecology

Political ecology analyzes the distribution and allocation of political, social, and economic power at a national (and international) level affecting indigenous groups' adaptations to changing ecological conditions. That indigenous groups respond to changes in their surrounding environment implies that such societies are an integral part of the ecosystem. Machlis and Tichnell write: "Human ecosystems are dynamic and adaptive:

The relations linking human populations to the environment can structurally change over time."⁴⁷ Political ecology analyzes factors that disrupt traditional resource management systems outside a culture's control. In this way, external economic and political pressures may force change at a pace not consistent with an indigenous peoples normal adaptive mechanisms, which in turn may bring unforeseen (and usually unavoidable) environmental consequences.

The role of the state is key to understanding how land ownership is distributed and maintained in a given society and how state run land tenure systems impact traditional indigenous land ownership patterns. In traditional, kin-based societies, communal ownership of land ensures minimal acquisition by outsiders.⁴⁸ However, government policies in many less developed countries encourage colonization and development of virgin territories which, many times, have been held and worked by indigenous peoples for generations. Furthermore, the same government policies regarding land ownership favor outside intervention onto indigenous lands for the sake of economic development, often resulting in destructive environmental processes. As Schmink and Wood point out: "Indigenous groups and other long-standing inhabitants...have been on the losing side of most of these confrontations [i.e., land tenure conflicts, development projects, military intervention]. Not only are their lands being taken away, but *their well-adapted resource management strategies have been ignored...*" (italics mine)⁴⁹

Research in political economy provides a basis for the political ecology perspective. The political ecologist considers significant human/environment activities (timber use, agriculture, hunting) within a broader social, political, and economic framework in a process Vayda calls "progressive contextualization."⁵⁰ Contextualization involves identifying and analyzing economic activities in a given region, the social group(s) involved, and how each group interacts with the environment. Schmink and Wood state:

"A political economy perspective further draws attention to the relationships between different social groups and the potential for conflicts which, in turn, may have important consequences for the natural environment."⁵¹ At this point, ecology and other natural sciences are drawn upon to identify the environmental consequences of these potential conflicts.

George Ledec writes of the need to understand political and economic incentives that lead to tropical rain forest destruction that, in turn, form barriers discouraging and preventing control of the deforestation problem.⁵² He also points out that "countries [with less than 100,000 km² of rain forest area] should not be neglected, as their [forests] are locally important and often biologically unique."⁵³ Although a continuous corridor of Honduras' rain forest survives intact⁵⁴, it is a relatively small area when compared with the vast forests of countries like Brazil, Zaire, and Malaysia. Nonetheless, it is "locally important and biologically unique."

Blaikie defines environmental degradation, in this case soil erosion, as a political and economic issue.⁵⁵ He writes that though small farmers cultivating on hillsides are assigned blame for creating increased soil erosion rates, their poverty and desperation leave them no choice but to cultivate marginal lands.⁵⁶ Increasingly, however, environmental degradation is due to outside large-scale intervention that results in the "increasing removal of control, both cultural, economic and political from the local to the national and international."⁵⁷

Clearly, the ability of local peoples to adapt to changing environmental conditions needs to be analyzed in terms of a larger political, economic, and ecological framework. As Redclift states:

The structural linkages which exist between economic development and the environment in the North and South [more developed countries in the northern hemisphere and less developed countries in the southern]...radically affect the environment in the South. The penetration of the South by new agricultural

technologies, marketing and contract farming, have also served to shift agriculture...away from traditional, environmentally sustainable systems towards greater specialization and economic dependency...Changes in the environments of the South need to be understood, then, in terms of the *international redivision of labour*. (italics mine).⁵⁸

The environmental threats (see Chapter IV) facing the Tawahka and the middle Río Patuca region may be seen in the context articulated by political ecology. As these threats are driven by outside political, social, and economic factors beyond the Tawahka's control, their natural cultural adaptive mechanisms are unlikely to cope with the speed and enormity of the ensuing social and environmental changes.

Sustainable Development

Sustainable development is the idea that natural resources be exploited and/or managed so that they may adequately renew themselves for future human use.⁵⁹ Bishop defines sustainability in terms of "time paths" or the intergenerational availability of resources. He states that "Time paths of endowments [resources] and technology that lead to constant or increasing economic opportunities over the indefinite future are taken as sustainable."⁶⁰ He goes on to say that sustainability requires the maintenance of a "safe minimum standard" (SMS) of biodiversity to ensure that natural resources are conserved for future generations' use.⁶¹

Timothy O'Riordan remarks that the concept of sustainability seems to be a "mediating term" between developers and environmentalists. "Developmental interests now recognise that much more serious attention must be paid to incorporating a thorough understanding of environmental processes into project investment calculus, if for no other reason than failure to do so may result in environmental side-effects that carry economic losses."⁶² Pearce, et al. attempt to define sustainable development in terms of cost-benefit analysis. The key necessary condition is the "constancy of the natural capital stock" or, in other words, sustainability cannot be achieved if the environment is degraded beyond its ability to renew

itself.⁶³ Bishop, however, rejects the notion that "benefit-cost" analysis may be used to calculate or predict the sustainability of exploiting a given resource because it is a static measurement that fails to account for intergenerational use of natural resources and so violates the principle of maintaining SMS.⁶⁴

Michael Redclift's Sustainable Development: Exploring the Contradictions (1987) outlines the fundamental tenants of sustainable development. Development, he suggests, is normally defined in terms of economic growth. Growth is primarily measured as gross national product (GNP) but may include other social and economic indicators such as inflation rates, life expectancy at birth, and food production. However, using GNP to measure development, or the increase in a country's productive capacity, has severe limitations. GNP measures "formal" productive capacity such as agricultural or manufacturing output while ignoring the "informal" sector.⁶⁵ The informal sector includes household and market activities that are not statistically reported but which, nonetheless, have a very real effect on people's livelihoods. Perhaps most troubling about GNP statistics is the failure to distinguish adequately between renewable and nonrenewable resource use. Redclift states:

From an environmental standpoint, then, GNP is a particularly inadequate guide to development since it treats sustainable and unsustainable production alike and compounds the error by including the costs of unsustainable economic activity on the credit side, while largely ignoring processes of recycling and energy conversion which do not lead to the production of goods or marketable services.⁶⁶

Incorporating indigenous or local peoples' land use practices, to the extent possible, is key to designing sustainable management strategies.⁶⁷ Browder identifies three common themes in resource management strategies of indigenous peoples.⁶⁸ First, traditional production systems effectively mimic, rather than replace, the forest ecosystem. Second, indigenous recognition of the natural environment's role in traditional subsistence activities *may allow* such practices to function indefinitely in the ecological and cultural contexts

where they are found. The third common theme is that traditional resource management strategies may be quantified in terms of cost benefit analyses and that, contrary to preconceived notions, they "withstand the test of modern financial profitability and *also* conserve fragile natural resources..."⁶⁹

Incorporating "traditional knowledge" into development strategies means including more than just sustainable farming techniques or indigenous use of medicinal plants. Rather, as Chapin points out, it "also encompasses the social, economic, physical, technical, and political environment within which peasants and indigenous peoples live."⁷⁰ In this sense, a "bottom-up" approach stemming from the overall needs, ideas, and desires of the beneficiaries must be built into the design of development projects.

Schmink, et al., state that development and conservation organizations now recognize the need for "development-oriented conservation" to promote the sustained use of resources.⁷¹

The ideas and practices of traditional peoples are based on historical processes of adaptation to local settings, using principles and strategies whose effectiveness can be measured and tested. We need not assume that traditional peoples are perfect resource managers in order to recognize their important role as partners in the effort to improve the conservation of tropical forests.⁷²

Convergence

In recent years the attempt to reconcile conflicting conservation strategies espoused by conservationists and indigenous groups' rights activists has grown. "Convergence" suggests that environmental protection strategies must consider the total ecosystem of a region, including those traditional human societies who live and depend on the area's natural resources for survival. Linking these viewpoints can result in a more complete and effective strategy for environmental and cultural protection.⁷³

Clad states that conservationists and indigenous peoples may be considered "natural allies," especially in regard to protection of tropical rain forest lands.⁷⁴ Clad outlines "four

management options" for protected areas: 1) reserves, 2) native-owned lands, 3) buffer zones, and 4) research stations, with the benefits for indigenous peoples clearly formulated in each case.⁷⁵

Recently, the role of indigenous peoples in a protected area's ecosystem has become increasingly acknowledged with the realization that their abrupt removal may cause harmful changes to the local ecology.⁷⁶ As the cause of tropical rain forest destruction became largely attributed to shifting cultivators, little differentiation was made between sustainable indigenous agricultural systems and migratory slash and burn farming. Indigenous peoples were regarded as destructive agents counterproductive to the protection of the natural environment. Now, however, natural and cultural protection "should be an important part of an overall conservation strategy, and may be the only means of attaining these goals."⁷⁷

Activists for indigenous groups' rights insist that traditional cultures are an integral part of local ecosystems and that forced relocation is a violation of their fundamental human rights. "...As a major aspect of environmental protection and conservation, indigenous peoples' rights have to be recognised and respected and brought right into the centre of the discussion on biodiversity."⁷⁸ This position makes the assumption that indigenous peoples are the best managers of local resources. Indeed, proof exists in the fact that indigenous peoples have subsisted on lands where their production systems have enabled a coexistence with the environment for hundreds, or even, thousands of years.⁷⁹

Chapter Summary

In Chapter I, the literature review provides an overview of the background material relevant to the ecological and cultural changes occurring in the middle Río Patuca region. Particularly important to note is the relationship between indigenous peoples, the

environment, and the nation-state in which they exist, for it is this interrelated set of factors that ultimately determines the effectiveness of protected areas like the TBR.

NOTES

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- ³John Beauclerk and Jeremy Narby with Janet Townsend, Indigenous Peoples: A Fieldguide for Development, (Oxford: Oxfam Printing Unit, May, 1988), 3.
- ⁴Gray, Between the Spice of Life and the Melting Pot, 7.
- ⁵Ibid., 9.
- ⁶Ibid., 5.
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- ¹⁷Ibid.
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- ¹⁹IUCN/UNEP (International Union for Conservation of Nature and Natural Resources/United Nations Environmental Programme), Managing Protected Areas in the Tropics, (IUCN: Gland, Switzerland and Cambridge, U.K., 1986), quoted in Walter V.

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- ²⁰Reid and Miller, Keeping Options Alive, 59.
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CHAPTER II
- THE RESEARCH -

The goal of this thesis is to examine the dual environmental and cultural protection strategy of wildlands conservation through the critical analysis of a specific case study: the proposed Tawahka Biosphere Reserve. The problem statement questions whether this strategy is the most appropriate or effective to attain the Reserve's stated objectives given the political, social, economic, and environmental conditions in the region. Specific questions and research methods designed to gather information directly related to the TBR's background, history, and purpose are described in this chapter. Field research methods included census surveys, photographic documentation of socio-ecological patterns, participant observation, and in-depth interviewing.

Problem Statement

This thesis examines wildlands conservation as a dual environmental and cultural protection strategy. A critical analysis of the proposed Tawahka Biosphere Reserve provides a case study upon which to draw conclusions regarding the strategy's effectiveness. The hypothesis guiding this research is that the proposed TBR will contribute to the protection of the natural and cultural environment in the middle Río Patuca region because it serves Tawahka interests while conserving a significant area of tropical rain forest. This position is tested through examination and documentation of Tawahka land use practices, analysis of Tawahka participation in the TBR's planning and

implementation process, and assessing the TBR's ability to counteract environmental threats through effective management and administration.

The TBR's first two objectives are the primary focus of this study. They are: 1) to provide the Tawahka with a legally defined homeland thus enabling them to maintain their unique culture and continue their sustainable land use activities, and 2) to protect the biodiversity and ecological integrity of the flora and fauna in the middle Río Patuca region.¹

Study of these objectives is guided by four specific research questions:

- 1) What are the primary environmental threats facing the middle Río Patuca region?
- 2) What is the basis of Tawahka land use and subsistence activities in the region?
- 3) To what extent will the proposed TBR contribute to halting the advancing environmental threats in the region?
- 4) To what extent have the Tawahka been involved in planning and creating the TBR?

Methodology

Fieldwork in La Mosquitia was conducted over an eight week period from February through April, 1992. Research methods were chosen to elicit a broad spectrum of qualitative and quantitative information that, upon subsequent analysis, provided additional direction and focus to the study. An inductive approach to data collection was used to allow unanticipated areas of inquiry to emerge as the research progressed. Data collection proceeded on two levels: 1) a census survey and photographic documentation provided a broad overview of population dynamics and land use/geographical features, respectively, and 2) through participant observation and in-depth interviewing, detailed information was gathered regarding land use practices, social customs and traditions, local history, and Tawahka opinions about the proposed TBR.

Field research was approved by IHAH. Cooperation and support from this agency was required for research involving a Honduran indigenous group. Similarly, logistical support was provided through MOPAWI. Because MOPAWI has coordinated the Tawahka's land legalization efforts since 1989, their input was essential to this research. Finally, the Tawahka social and political organization, FITH, was consulted and permission secured to conduct research in the Tawahka communities.

Certain ethical issues were explicitly recognized and addressed at the outset of this study. Because much of this research is based on information gathered from human subjects, great care was taken to ensure that the privacy and dignity of the Tawahka were safeguarded by following guidelines outlined by Nelson and Knight: The research must respect 1) the privacy and dignity of the people, 2) the knowledge and experience of the people, and 3) the language traditions and standards of the community.²

Fieldwork activities were conducted out of Kraosirpe in the eastern Honduran department of Gracias a Dios (see Map 3). Kraosirpe was chosen as the research site after consulting individuals with previous research experience in the region, MOPAWI, and FITH. Criteria determining site selection included a location that afforded relative ease of access into and out of the region, a large Tawahka population, coordination with FITH, and availability of food staples and basic amenities.

At the outset of fieldwork, the study's goals were outlined to FITH members, community leaders, and village citizens. Because other researchers had engaged in similar studies in Kraosirpe in the past, a groundwork had been laid for assigning an informant (through FITH), making arrangements for room and board, and coordinating travel plans. FITH assigned a principal informant to assist with the research. This person was male, a FITH member, farmer, and household head. His primary function was to work with the

investigator daily, facilitating entree into the community and providing access to residents and activities.

Finally, the study incorporated principles of participatory action research. Participatory action research combines the goals of social science investigation with the immediate needs and concerns of those involved with and/or effected by the research.³ As FITH was closely involved in approving the research and selecting a principal informant, this organization helped set the focus and direction of the research. Secondary informants participated in much the same way. The open-ended nature of questioning during the interviews allowed informants to speak about what was important to them.

Census Survey

A census survey was conducted in March, 1992 throughout all the Tawahka communities along the middle Río Patuca. These data were deemed necessary to supplement the description of Tawahka land use practices and to determine population pressures in the region. The census information also serves to define broad demographic trends, changes over time, and have in hand a current count of Tawahka inhabitants in the middle Río Patuca region. The principal informant assisted in setting the agenda and protocol for gathering the data.

Results of the census survey are summarized in Appendix A. The population data presented in the appendix are estimates and should not be construed as official census figures. Census data is discussed and analyzed in Chapter VI. The protocol for surveying each community is outlined below.

- 1) Kraosirpe--Each house in the community was visited and asked the following questions:
 - Who is the head of the household or owner of this house?
 - How many people sleep in this house?
 - What is the gender and age of each person in this house?

- 2) Krautara--The vice president of FITH, a resident of Krautara, provided all information regarding the community's inhabitants.
- 3) Yapuwas--The FITH representative in this community provided all census data.
- 4) Kamakasna--The primary informant's sister (a long-time resident of the village) provided all census data.
- 5) Wasparasni--The same procedure as in Kraosirpe was followed in this community.

Photographic Documentation

The photographic record serves three study purposes: 1) to describe, graphically, the ecology of the region; 2) to document specific land use activities; and 3) to preserve details impossible to record accurately in field notes. John Collier outlines three phases of photographic documentation that serve as a cycle of operations that pinpoint, with increasing accuracy, information relevant to the study: 1) gaining entry into the community and establishing an overall view of the study area; 2) defining more clearly specific subject matter pertinent to the goals of the research; and 3) the images themselves becoming data.⁴ This study went through a similar iterative process wherein, upon later examination of the photographs, subjects and themes such as regional ecology, subsistence activities, and social interactions, were coded and categorized.

The first purpose--documenting the region's ecology--consists of oblique aerial photographs, photographs of the region's geography and selected shots of flora and fauna. Aerial shots taken by the researcher during several airplane flights over the region document topography, settlement patterns, and land use activities. In Fields of the Tzotzil, George Collier demonstrates how aerial photography is an effective tool for analysis of land use patterns and long-term ecological change.⁵ Principles developed in his analysis of processes of deforestation are used in this research. Finally, photographs of flora and fauna were taken during trips on the Río Patuca and hikes into the surrounding forest.

The second purpose--documentation of Tawahka land use practices--consists of photographs of specific subsistence activities, the goal being to record, step by step, certain practices and illustrate their relationship to the culture as a whole. The information contained in the images was then used to track and measure the activities' relevance to the TBR's design.

The third purpose of photographic documentation lies in recording and preserving details not necessarily captured in the field notes. Later inspection of photographs of specific agricultural techniques revealed details and subtleties not recorded at the time of data collection. Judd, et al., write in Research Methods in Social Relations that later analysis of field data depends on recalling details not readily apparent while the data is being gathered. "...Details that seem irrelevant at the time helps the researcher recall other details that are clearly relevant; each piece of information acts as a cue for recalling other pieces of the setting and is, therefore, worth recording as a device to activate memory."⁶ This study relied upon photographs to recall, confirm, and analyze relevant information months after fieldwork was completed.

Participant Observation

Ethnography, as characterized by participant observation, is a research process used by the anthropologist to observe, record, and engage in the daily life of another culture.⁷ This method was chosen to gather detailed information on agricultural patterns, daily household activities, and hunting and fishing practices.

Gaining the trust and confidence of informants as quickly as possible was essential since time in the field was limited. Therefore, much time was spent directly observing and participating in agricultural and other subsistence activities. Daily activities often included accompanying informants to agricultural plots, on fishing ventures, or while performing miscellaneous household chores. An appreciable amount of time was spent by the

researcher visiting (and being visited by) villagers other than "designated" informants. Depending on the specific activity, observation sessions generally lasted for 2-6 hours. An average of 2-3 observations were recorded daily as part of the field notes, either during the session or immediately afterwards.

In addition to observing subsistence practices (as described above), day and overnight trips were made to other Tawahka villages and into the rain forest to record geographical, ecological, and demographic data. The census survey was conducted during a six-day trip by pipante to the other Tawahka villages upriver from Kraosirpe. Seven day trips were made on foot out of Kraosirpe over the course of the fieldwork. Each trip was planned to explore a different geographical area of the surrounding rain forest. Information recorded during these trips included observations of deforestation, amount and types of vegetation, numbers of animal species, and regional topographic features.

In-Depth Interviews

Three in-depth interview techniques described by Bernard were used in this research. Bernard outlines four interview types making up a continuum based on the amount of control the researcher wants to exercise over the informants' responses: 1) informal interviewing, 2) unstructured interviewing, 3) semistructured interviewing and, 4) structured interviewing.⁸ All interview techniques were used except the fourth one, as it was deemed unsuitable given the cultural context (see below) and research design.

Informal interviews--conversations with informants on general topics--took place during the first two weeks in the field. Unstructured interviews were conducted once mutual trust and confidence had been established between the researcher and informant(s). Although unstructured interviews are generally "conversational," they proceed with a clear purpose and direction; the idea being to elicit information on specific points.⁹

All interviews in the field were conducted in Spanish. The two primary interview types were chosen because of their open-ended nature. Informants' answers generally contained more information than what a particular question had been intended to elicit. In this way, though the researcher maintained control over a specific topic area during the interview, the subjects of the study (the Tawahka) could also introduce or discuss additional topics of value or concern to them.

Semistructured interviews were conducted with representatives from MOPAWI, IHAH, and other independent researchers involved in the creation of the TBR. Representatives were asked a series of specific questions to document the viewpoints of those involved in the step by step, bureaucratic approval process for the proposed reserve. Interviews were designed to reflect the open-ended nature of the study and so respondents were not given pre-determined responses from which to choose. These questions appear in Appendix C.

Structured interviews generally involve administering to study subjects questionnaires and/or surveys with pre-determined responses. Interviews of this type were deemed inappropriate and, possibly, a hindrance to the research. Because many Tawahka do not read or write Spanish, it was virtually impossible to obtain written data from them. Furthermore, as noted above, a conscious effort was made by the researcher to allow the process of inquiry to stray into other areas and subjects.

Data Collection and Analysis

Interpretation and analysis of data contained in field notes proceeded on a daily basis. Field notes were taken in Spanish and English and coded daily according to specific subject areas using the Murdock cultural data classification system.¹⁰ During the rewriting and coding process further avenues of inquiry were determined and others discarded. Certain points needing more clarification were addressed with informants for further validation.

Three techniques were used to record information in the field: a journal, field jottings, and the field notes themselves. A journal was kept on a daily basis and consisted of personal observations, opinions, and further questions to pursue. Primarily a tool for self evaluation and reflection, the journal served as a record of events not necessarily related to the research. Field jottings were taken on a continual basis throughout the work day and provided the basis for many of the field notes themselves.

Field notes were written out by hand at the end of each day and included field data as well as observations about the progression of the research itself. In this way, the field notes also served as a log for "mapping out" further areas of investigation. Cultural anthropologist Russell H. Bernard describes this process as "forc[ing] you to think hard about the questions you really want to answer...You will start any field research project knowing some of the questions you are interested in. But those questions may change; you may add some, and drop others--or your entire emphasis may shift."¹¹

During the thesis writing process, patterns and themes were extracted from reading and re-reading field notes. A similar process took place through repeated examination of the photographic record. Quantitative and qualitative data provides the basis for the descriptive material in Chapters III through V. In Chapter VI, the critical analysis centers on three primary findings that emerged from the data: 1) environmental degradation in the middle Rio Patuca due to ecologically inappropriate land use practices, 2) changing Tawahka social use of the land resulting from external environmental threats, and 3) hindrance of the TBR's final establishment due to a tedious and complex political process. These findings are divided into seven specific categories and addressed separately.

Chapter Summary

The thesis problem statement examines the creation of reserves for environmental and cultural protection through the analysis of a case study: the proposed Tawahka Biosphere Reserve. The methods selected for this research are participant observation, in-depth interviewing, census surveying, and photographic documentation. In addition, principles from participatory action research were built into the study's design. Data gathered from primary and secondary sources is the basis of the descriptive material in Chapters III through V, and provides the framework for the critical analysis in Chapter VI.

NOTES

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²J.G. Nelson and K. Drew Knight, eds., Research, Resources, and the Environment in Third World Development. Department of Geography Publication Series No. 27, (University of Waterloo: Department of Geography, 1987), 23.

³L. David Brown, Rajesh Tandon, "Ideology and Political Economy in Inquiry: Action Research and Participatory Research," The Journal of Applied Behavioral Science 19 (3, 1983): 278-280.

⁴John Collier, Jr., Visual Anthropology: Photography as a Research Method (San Francisco: Holt, Rinehart and Winston, 1967), 7.

⁵George A. Collier, Fields of the Tzotzil: The Ecological Bases of Tradition in Highland Chiapas, (Austin: University of Texas Press, 1975).

⁶Charles M. Judd, et al, Research Methods in Social Relations, 6th Edition, (Ft. Worth: Holt, Rinehart and Winston, Inc., 1991), 306.

⁷George E. Marcus and Michael M. J. Fischer, Anthropology as Cultural Critique: An Experimental Moment in the Human Sciences, (Chicago: The University of Chicago Press, 1986), 18.

⁸Russell H. Bernard, Research Methods, 204.

⁹Ibid.

¹⁰George P. Murdock, et al., Guia Para la Clasificacion de los Datos Culturales, (Washington, D.C.: Oficina de Ciencias Sociales, Departamento de Asuntos Culturales, Union Panamericana, 1954).

¹¹Russell H. Bernard, Research Methods in Cultural Anthropology, (Newbury Park, California: Sage Publications, 1988), 187.

CHAPTER III
- THE CULTURAL CONTEXT -

This chapter reviews primary cultural aspects of Honduras, La Mosquitia, and the Tawahka Indians. A brief overview of Honduras' general background and history are presented in the first section. The second section describes the cultural background of La Mosquitia, focusing on the the region's recent history and its dominant indigenous group, the Miskito Indians. Finally, a summary of background historical and cultural information on the Tawahka concludes the chapter.

Honduras

Background

Honduras is located in Central America bordered by Nicaragua on the east, Guatemala on the west, and El Salvador to the southwest. Its total area is 112,088 square kilometers (km²). To the north, a 640 kilometer (km) northern coastline borders the Caribbean Sea. The small southern coastline on the Gulf of Fonseca gives Honduras limited access to the Pacific Ocean. The climate is tropical with the driest areas in the department of Choluteca to the south and the wettest regions in La Mosquitia to the east and along the north coast. The rainy season generally lasts from May through December. Temperatures average 25 to 30 Centigrade (°C) depending on the time of year and region. Honduras' topography is mountainous with altitudes ranging between 900 and 1,800 meters (m), the highest point being Las Minas with an altitude of 2,849 m.¹ The country's two major cities are the capital, Tegucigalpa, and the north coast economic center, San Pedro Sula.

Honduras' population is 5.1 million inhabitants with a growth rate of about 3.5 percent annually.² Approximately 90 percent of Honduras' population is *Ladino*.³ Ladinos (also known as *Mestizos*) are peasants of mixed Indian and Spanish ancestry, and as small farmers forming Honduras' agricultural base, produce the great majority of the country's foodstuffs: rice, red beans, and corn.

Honduras' population is concentrated in the western half of the country where arable soils suitable for large-scale agriculture exist and an extensive distribution infrastructure has developed. Helms describes Honduras' Ladino population as fitting the theoretical framework of a classic peasant society.⁴ According to Redfield's definition, "peasantry" refers to a segment of a society that farms as a traditional way of life, but whose production is used by the state to support its own structure and economy.⁵ In other words, "...the starting point...include[s] a more complex and more powerful society, a state, with which the local society or community interacts."⁶

History

Ever since Christopher Columbus reached its north coast in 1502, Honduras has been subject to outside intervention that has resulted in profound social and environmental impact. Soon after Columbus' initial discovery of the New World, Spanish exploration and conquest of Central and South America resulted in the massive looting of much of the continent's native wealth. In the process, through disease, assimilation, and outright genocide, the indigenous population was greatly reduced.

In the early 1800s the countries of Central America were briefly united in a broad confederation. However, internal bickering soon led to the collapse of the "United Provinces of the Center of America" leaving Honduras inadequately prepared to cope with the rigors of functioning as an independent, autonomous state.⁷ It had no government infrastructure, no established stable economy, and no sense of national identification.⁸

These circumstances led to a century of civil strife lasting through the mid-1920s that, ever since, has left Honduras vulnerable to outside intervention.

Throughout the first half of the twentieth century, Honduras came to be regarded as the classic "banana republic." Up through the 1940s, these companies controlled vast regions of banana producing lands in the north and exerted a tremendous amount of economic and political power over Honduran government and society. By 1930, United Fruit, the strongest of the multinationals, had assets totaling \$242 million and owned over 1.2 million hectares of land.⁹

In response to the growing labor movement in Honduras, the fruit companies began moving their operations out of the country in the 1950s.¹⁰ The aim was to transfer more power to national banana producers and integrate Hondurans into management positions within the fruit companies. Unfortunately, nationalization led to company mismanagement, official corruption, and a concentration of wealth in the hands of a select group of individuals.

Honduras was the recipient of large amounts of aid throughout the 1950s, 60s, and 70s as United States foreign policy placed a high priority on maintaining political and economic influence in Central America.¹¹ The Peace Corps and the United States Agency for International Development (USAID) had, and continue to have, large programs in Honduras. U.S. economic and military aid throughout this period was nearly \$300 million.¹² However, this amount paled in comparison to what followed in the succeeding decade.

The 1980s were an especially traumatic period for the countries of Central America, and Honduras in particular. Geopolitical cold war struggles, experiments with democratically elected governments, and massive amounts of economic and military aid (over \$1.5 billion¹³) dramatically transformed Honduran society. Though these social, economic, and

political changes were felt throughout the country, it was perhaps La Mosquitia which was, and continues to be, affected most profoundly.

La Mosquitia

The region known as La Mosquitia is located in the northeast section of Honduras in the department of Gracias a Dios (see Maps 3 and 4). It is largely populated by the indigenous Miskito Indians numbering approximately 30,000.¹⁴ La Mosquitia consists of pine savanna, wetlands, and tropical rain forest, much of which remains unsettled or unexplored. Vast areas are inaccessible to outsiders and, due to lack of roads, transportation into the interior is restricted to either air or river travel.

During the 1980s, La Mosquitia became a staging area for *contra* raids against Sandinista forces in Nicaragua. Weinberg argues that politics played a central role in the disruption of indigenous peoples' traditional subsistence patterns in the region.¹⁵ Military activity during this period, particularly road-building, opened up previously inaccessible areas of La Mosquitia to outside development with the potential for widespread environmental and cultural destruction.¹⁶

Although little fighting actually took place on Honduran territory, a significant number of refugees from Nicaragua flooded into La Mosquitia. Dodds estimates that over 40,000 refugees entered Honduras between 1981 and 1986.¹⁷ This sudden, massive influx of people put an unprecedented strain on the natural resources of the region.

Repatriation of the Nicaraguan refugees began in 1987 and, with the election of the Chamorro government in Nicaragua in 1990, tensions eased between Honduras and Nicaragua. Today, virtually no Nicaraguan refugees remain in Honduras.¹⁸ Additionally, much of the infrastructure previously installed by the United Nations High Commissioner

for Refugees (UNHCR) to handle the influx was dismantled. According to several informants, of the several medical clinics previously set up in the middle Río Patuca region, only one continues to function.

La Mosquitia today remains a rugged frontier land. Conflict continues, however, not in the geopolitical arena, but over the distribution of economic gain through exploitation of the region's vast store of natural resources. More than a question of who or what companies can stake their claims first, this issue now turns on the growing demand for social and economic justice from the region's primarily indigenous inhabitants.

Indigenous groups make up the great majority of the population in La Mosquitia.¹⁹ The Tawahka Indians are one of the four groups of indigenous peoples who live in the region. The other main groups are the Miskito, Pesch (Paya), and Garífuna.²⁰ Though the Constitution of Honduras guarantees legal protection for indigenous peoples,²¹ groups in other, more populated regions of Honduras have lost much of what makes their cultures distinctive. Due largely to their geographic isolation from the rest of the country, the indigenous peoples of La Mosquitia have managed to retain much of their distinctive language, traditions, and land use patterns.

The Miskito Indians are linguistically and culturally dominant throughout the Honduran and Nicaraguan Mosquitia regions. Although they are primarily a coastal peoples, their influence extends well inland into both countries. The Nicaraguan Miskito, numbering about 45,000, have been extensively studied and documented.²² The Honduran group, with a population around 30,000, is generally less well-known. Cultural and historical research has shown, however, that the Miskito have traditionally been an expansionist society wielding economic and social power over smaller, neighboring indigenous groups.²³

The Tawahka Indians

This indigenous group has been referred to variously as the Taguaca, Taoajkas, Tawahka Sumo, and Sumu. This variability may be due to the fact that the Tawahka are divided into two distinct regional populations. One group numbering approximately 9,000-10,000, (in contrast to Von Houwald's population figures) lives in several small villages throughout the eastern part of Nicaragua.²⁴ Like their Honduran counterparts, they are an upland, river-bank dwelling culture practicing subsistence agricultural, hunting, and fishing activities. The Honduran Sumu, or Tawahka as they call themselves, are a much smaller group living along the middle Río Patuca in La Mosquitia (see Map 3).

The Tawahka Indians have lived in the middle Río Patuca region since at least the early 17th century. Historical documents indicate first contact by outsiders with the Tawahka in 1604.²⁵ Subsequent records demonstrate a permanent and stable Tawahka population living continuously in the region. Davidson and Cruz conclude that this indigenous group has dominated the area for at least four hundred years.²⁶

Brunt writes that the Sumu--the tribe from which the Tawahka descended--originally lived on the Mosquitia coast during the 17th century. Beginning in the mid-1600s, they were forced to retreat inland from the coast. "...They came under the dominion of the more powerful Miskito and were gradually pushed inland and uphill, leading a semi-nomadic forest existence, paying tribute to the Miskitos."²⁷ In 1916, they established 'Sumal,' the first permanent Tawahka village, near the mouth of the Río Wampú.²⁸ However, in the late 1940s or early 1950s, the Tawahka were forced to move downriver by Honduran authorities. As a result, Kraosirpe (which in Tawahka means "little tree") was established at its present site in 1952 by the Cardona family (see Map 3).²⁹

The Tawahka have been strongly influenced by Miskito culture. There is evidence that economic ties have existed between the two groups for hundreds of years.³⁰ River trade

up and down the Patuca continues today. Indeed, the Tawahka acknowledge that, historically, there has been so much intermarriage between themselves and the Miskito that there are very few "pure" Tawahka remaining. This cultural influence manifests itself in the fact that Tawahka men primarily speak Miskito among themselves. The Tawahka language, on the other hand, is spoken mainly in the home by women. Spanish is considered a third language by both sexes and is spoken only as needed with Ladinos and other outsiders.

Until recently, the relative inaccessibility of the middle Río Patuca region assured the Tawahka of minimal contact with outsiders. The nature of this relationship with the national society is now changing, however. The dilemma for the Tawahka lies in how to maintain the values, traditions, and cultural practices that make them unique while resisting the pressures of change from outside that could ultimately destroy their society.

Chapter Summary

In Chapter III, a discussion of Honduran history and society provides a background for examining the cultural context of the proposed TBR. Drawing attention to how outside influences have been responsible for much resource exploitation sets the stage for examining the dynamics proposed by political ecology. Within Honduras, La Mosquitia's unique status derives from the fact that it is geographically and somewhat politically removed from the rest of the country. Yet, it is this uniqueness that makes natural resource development so attractive in the region. The indigenous peoples of the region, particularly the Tawahka, are now faced with choices that could affect their survival as a culture.

NOTES

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- ³Ibid.
- ⁴Mary Helms, Asang: Adaptations to Culture Contact in a Miskito Community, (Gainesville: University of Florida Press, 1971), 4.
- ⁵Ibid.
- ⁶Ibid.
- ⁷Alison Acker, Honduras: The Making of a Banana Republic, (Boston: South End Press, 1988), 35.
- ⁸Ibid.
- ⁹Ibid., 63.
- ¹⁰Ibid., 78.
- ¹¹Tom Barry and Kent Norsworthy, Honduras: A Country Guide, (Albuquerque, New Mexico: The Inter-Hemispheric Education Resource Center, 1990), 109.
- ¹²Ibid., 150.
- ¹³Ibid.
- ¹⁴David Dodds, "Tropical Resource Use and the Miskito Indians of Honduras: Management or Opportunism?" Ph.D.. Dissertation proposal, TMs, [1991], IHAH Offices, Tegucigalpa, Honduras, 3.
- ¹⁵Bill Weinberg, War on the Land: Ecology and Politics in Central America (London: Zed Books Ltd., 1991), 72.
- ¹⁶Ibid., 71.
- ¹⁷David Dodds, "Miskito and Sumo Refugees: Caught in Conflict in Honduras," Cultural Survival Quarterly 13 (3, 1989): 4.
- ¹⁸Peter H. Herlihy and Andrew P. Leake, "The Tawahka Sumu: A Delicate Balance in Mosquitia," Cultural Survival Quarterly 14 (4, 1990): 13.
- ¹⁹William V. Davidson and Melanie A. Counce, "Mapping the Distribution of Indians in Central America," Cultural Survival Quarterly 13 (3, 1989): 38-39.
- ²⁰Mac Chapin, "Indigenous Peoples and the Environment in Central America," Map Supplement, National Geographic Research and Exploration 8 (2, 1992): 232-234.
- ²¹Constitution of Honduras, Decree Number 81-84.
- ²²See Bernard Nietschmann's Between Land and Water: The Subsistence Ecology of the Miskito Indians, Eastern Nicaragua (New York: Seminar Press, 1973) and Mary Helms' Asang: Adaptations to Culture Contact in a Miskito Community, (Gainesville: University of Florida Press, 1971).
- ²³David Dodds, "Tropical Resource Use," 5.
- ²⁴Americas Watch, The Sumus in Nicaragua and Honduras: An Endangered People, An Americas Watch Report (Washington, D.C.: The Americas Watch Committee, September, 1987), 5.
- ²⁵William V. Davidson and Fernando Cruz S. "Delimitacion de la Region Habitada por los Sumos Taguaca de Honduras 1600-1990," Yaxkin (Tegucigalpa: Instituto Hondureño de Antropología e Historia, [1992]): 126, TMs [photocopy].

²⁶Ibid., 129.

²⁷M.A. Brunt, ed., La Mosquitia, Honduras: Resources and Development Potential, Volume 1: The Environment, (Surbiton, England: Land Resource Development Centre, Overseas Development Administration, 1981), 52.

²⁸Francisco Martínez Landero, "Los Taoajkas ó Sumos del Patuca y Wampú," Antropos XXX (1935), 35.

²⁹Peter H. Herlihy, personal communication, 1992.

³⁰Fernando Cruz, personal communication, 1992.

CHAPTER IV
- THE ENVIRONMENTAL CONTEXT -

Pressure to develop La Mosquitia's natural resources is increasing. A recent controversy over the Stone Container Corporation's large-scale logging proposal clearly demonstrates the stakes involved (see below). In the first section of Chapter IV, the ecology of the Mosquitia rain forest is summarized. The environmental threats facing the region are briefly documented in the second section. The conservation (or rational development) of La Mosquitia's resources depends on further research documenting and analyzing the region's biodiversity, ecology, and socio-cultural background.

The Mosquitia Rain Forest

Rain Forest Biodiversity

Biodiversity, according to Dasmann, is the total number of species, communities and ecosystems, both wild and domesticated, that make up the life of any one area.¹ Although levels of biodiversity have fluctuated throughout earth's history, human expansion and the consequent alteration of the natural environment are causing the greatest loss of biological diversity since the Mesozoic era, 65 million years ago.² Wilson writes in "Threats to Biodiversity" that the current "biodiversity crisis [is] the most important process of environmental change" occurring today because it is completely irreversible and its consequences are wholly unpredictable.³

A nation has three types of wealth: material, cultural, and biological.⁴ The first two, material and cultural, play central roles in everyday life and so are highly valued.

Biological wealth, on the other hand, is frequently neglected. This is a serious error for two reasons. In the first place, a country's biological diversity is part of its natural heritage, one that has evolved over millions of years and so deserves as much pride and concern as the nation's economy, language, and culture. The second reason is that a nation's biodiversity is a potential source of untapped wealth that could provide food, medicine, and other important goods.⁵

Rain forests contain the planet's highest level of biological diversity. Though rain forests cover only six to seven percent of the earth's surface, they contain more than half of the world's known species.⁶ This estimate is based on the fact that two extremely rich species groups, plants and insects, are found in their highest concentrations in rain forests. Wilson identified forty three ant species on a single tree in the Peruvian rain forest, while in 1988, Alwyn H. Gentry counted approximately three hundred tree species in two one hectare plots, also in Peru's rain forest.⁷

Tropical rain forests exist in a belt that circles the earth between 23 1/2 degrees north and 23 1/2 degrees south of the equator. The monthly temperature in rain forests averages between 25-30°C year-round while rainfall varies between 3-6000 mm annually, allowing broad-leaved evergreen trees to flourish. Structurally, mature or old-growth rain forest is organized vertically into three horizons or stories, each characterized by the distinctive flora and fauna found within that zone (see Illustration 1, p. 46).

The lower story--the forest floor--is made up of decaying organic matter, root systems, trees, plants, mosses, bacteria, and fungi. Geologically, it may contain unique rock formations, rivers, streams, lagoons, ponds, and different soil types.⁸ A key feature of the forest floor is that although a wide variety of plant and animal life is found at this level, the underlying soil is relatively poor in nutrients. Practically all the moisture and minerals

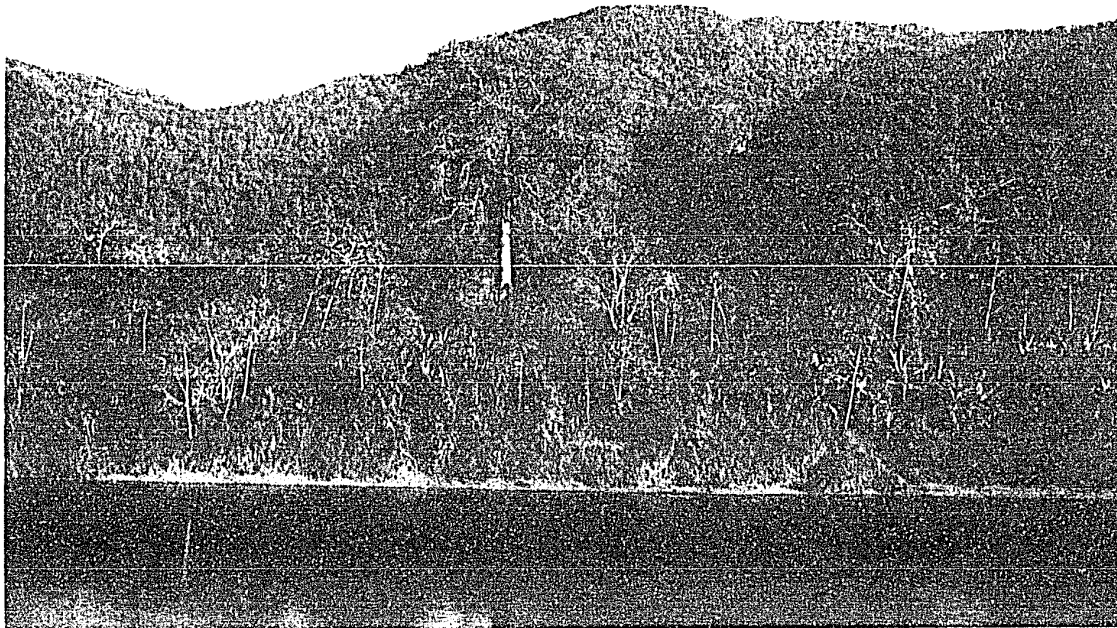


Illustration 1. Representational view of tropical rain forest along Río Patuca and surrounding mountains in La Mosquitia, Honduras. Secondary regrowth may be observed in the foreground while old-growth forest covers the mountains.

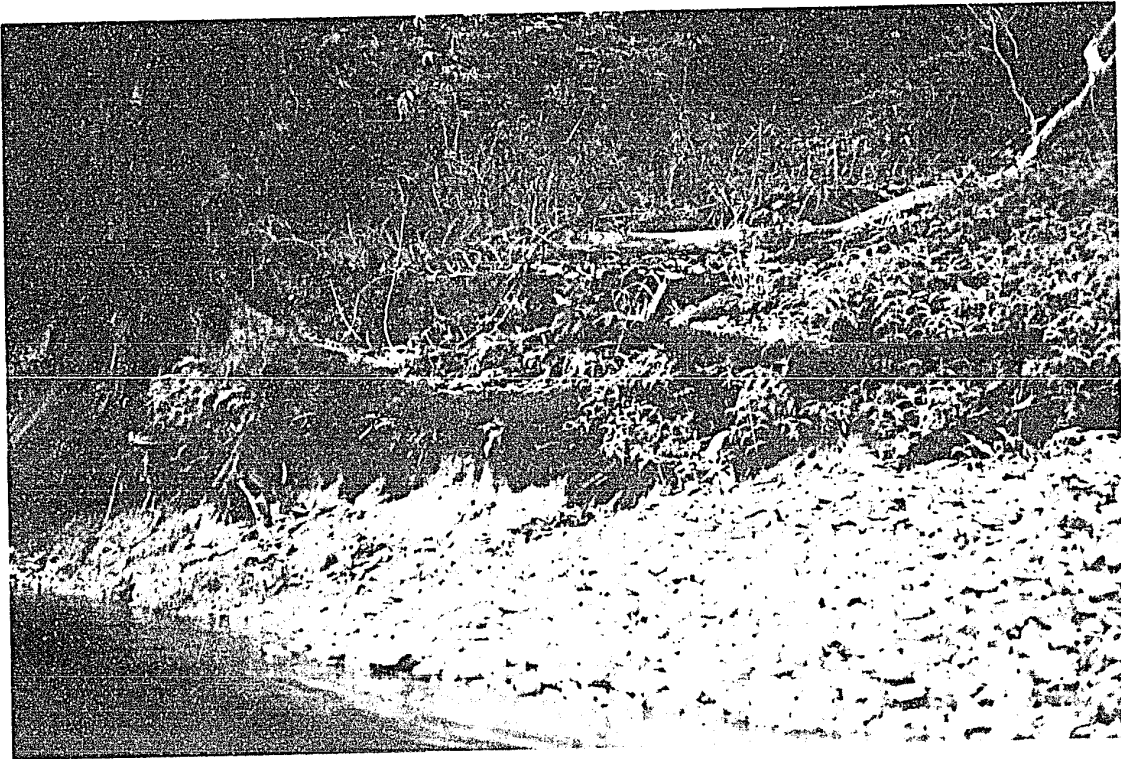


Illustration 2. Rain forest tree root system. Note how roots spread out horizontally in order to absorb nutrients as well as provide tree support.

needed to support life is concentrated in the layer of decaying organic material covering the floor itself. These nutrients are quickly recycled into the upper horizons of the rain forest. The fact that tree roots spread out radially in great arcs, rather than penetrating deeply into the ground, is one indication of this cyclical system (see Illustration 2, p. 47).

The middle story occupies the area between one and twenty meters above the ground. Life found at this level includes medium sized trees, vines, birds, and insects. This horizon tends to be an open, uncluttered space heavy with humid, stagnant air. Because little direct sunlight actually reaches the forest floor, there is limited opportunity for plants and trees of medium height to take root and flourish in the middle story.

The upper story, or canopy, stands 30 to 40 meters above the forest floor. The crowns of the trees at this level provide habitat for a wide variety of large and small mammals, birds, and insects. Rather than soil being the depository for nutrients, it is the living organisms of the forest canopy where minerals, vitamins, amino acids, and other biochemical materials are stored. As dead material falls steadily to the ground it brings nitrogen, phosphorous, and other nutrients that are absorbed by tree roots and eventually returned to the canopy to restart the life cycle.⁹ From the air, the canopy is a lush green carpet blanketing the landscape (see Illustration 3, p. 49). Below the canopy lack of sunlight inhibits the development of undergrowth, leaving large open areas through which one may walk with relative ease.

Tropical Rain Forest Destruction

The degradation and/or destruction of the world's rain forests is occurring at a rate unequalled in modern history. According to Norman Myers, 142,000 km² of forest cover was destroyed in 1989.¹⁰ Wilson estimates that 45 percent of the planet's original forest lands have already been removed, with an area approximately the size of Switzerland and

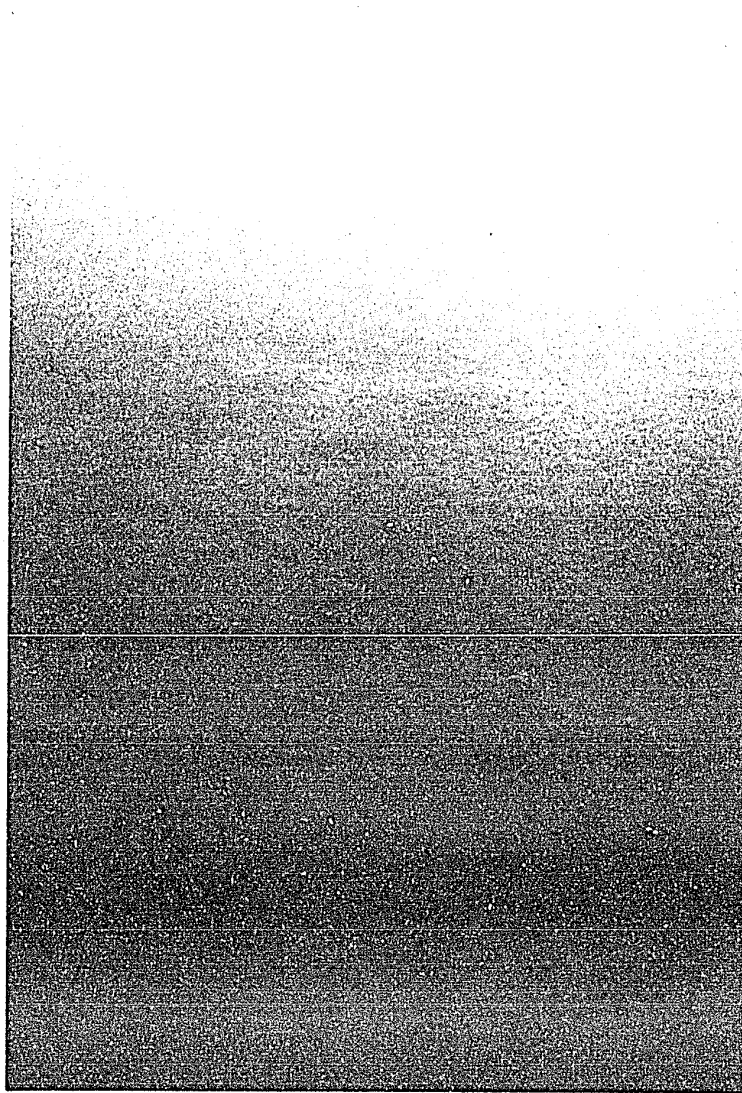


Illustration 3. Oblique aerial photograph of undisturbed La Mosquitia rain forest.

the Netherlands combined, being destroyed on average each year.¹¹ Myers goes on to point out that increasing population pressure now accounts for the majority of forest destruction. The 1990s will see global population expand by as much as one billion people, and of this total, 60 percent will be in countries with tropical forest.¹² This increase is resulting in migration to rain forest lands by displaced peasants seeking new agricultural opportunities. These "shifted cultivators," as Myers calls them, are responsible for over half the forest destruction now occurring. He continues:

This means that if we put an end to all commercial logging and cattle ranching forthwith, we shall have solved only a small and indeed diminishing part of the problem overall. Nor are they [migrant farmers] to be reproached for what they do. They are no more to be blamed for their activities than a soldier is to be held responsible for starting a war.¹³

The destruction of rain forest habitat has serious implications for the survival of biodiversity. Island biogeography theory states that a given number of species will fluctuate around an equilibrium.¹⁴ As long as habitat in a given area is not disturbed significantly, the rate of new species immigration will remain constant with the natural extinction rate of species already there. If, however, the area is reduced, the diversity of species will suffer a corresponding reduction. "As a rough rule of thumb, a tenfold increase in area results in a doubling of the number of species. Put the other way, if the island area is diminished tenfold, the number of species will be cut in half."¹⁵ Wilson goes on to estimate that at the present one percent rate of forest destruction, .2 to .3 percent of species are being lost each year. This is on the order of 10,000 times greater than the natural extinction rate that existed before the appearance of humans.¹⁶

The issue of biodiversity loss includes, in addition to an area's flora and fauna, the livelihoods of people who depend on a region's natural resources for survival. Wilson acknowledges "that merely setting aside reserves, without regard for the needs of the local population, is but a short-term solution to the biodiversity crisis."¹⁷

Middle Río Patuca Rain Forest

Of La Mosquitia's three major watersheds (Aguan-Sico, Segovia-Caratasca, and Guayape-Patuca)¹⁸ the Guayape-Patuca is the region's largest drainage system.¹⁹ Beginning in southern Olancho department, the Patuca meanders some three hundred kilometers to Honduras' north coast. For the first half of its course, the river flows between the Montañas del Patuca on the northwest and the Cordillera Entre Rios to the southeast. The mountains form a corridor that closely border the river on each side. Hence, the rugged terrain with its vast cover of largely impenetrable rain forest has prevented the establishment of large population centers. At the confluence with the Río Wampú, the Patuca becomes much broader with a vast floodplain opening up on the west bank. Along this stretch to the east, the forest-covered Montañas de Colon rise almost directly up from the river. At this point, the river enters the department of Gracias a Dios. Gradually, the mountains give way to flatland savanna as the river winds its last two hundred kilometers to the Caribbean Sea.

In the area to be covered by the TBR, life is highly dependent on the Patuca. The river's yearly cycle regulates Tawahka commerce and agricultural patterns, wildlife distribution and abundance, and the availability of water resources throughout the region. In the wet season between May and December, rainfall may exceed 2500 mm.²⁰ This causes the Patuca's depth to increase to over ten meters in places and heavy flooding occurs. During the dry months between January and April, though the river retains its width of 80-100 meters, it runs slower due to its shallowness (less than one meter deep in places).

Scientific studies and species inventories in the middle Río Patuca region have yet to be completed. However, based on interviews with the region's Tawahka residents, the abundance of biological diversity in the area is extensive. Wildlife in the region includes

tapir, deer, parrots and macaws, birds of prey, turtles, at least three species of monkeys (white-faced, spider, and howler), snakes, iguanas, caimans, feral pigs, jaguar, and ocelot. Many species are endemic to the region. In 1992, a pair of harpy eagles (thought to be extinct in the area) was sighted by outsiders for the first time in several years.²¹

Environmental Threats

The long and short-term stability of the middle Río Patuca ecosystem faces numerous outside environmental threats. External threats like the invasion of the region by large-scale cattle ranching, a colonization front of landless Ladino farmers and other "ecological refugees,"²² and industries' plans for large-scale logging operations, could permanently destroy the last remaining rain forest in Honduras in a matter of years.

Deforestation is defined as "the clearing of forest or other natural wood vegetation either to create agricultural holding or through the over-exploitation of the forest resources."²³ Degradation, on the other hand, refers to a process of general ecological decline resulting in the gradual loss of vegetation and wildlife, air and water contamination, and soil depletion and nutrient loss. The latter process threatens the ecology of the region, and hence the Tawahka way of life, much more profoundly.

Large-Scale Cattle Ranching

In past years researchers have blamed rain forest destruction on slash and burn subsistence farmers.²⁴ Recently, however, this view has changed, with greater responsibility being placed instead on large-scale cattle ranching.²⁵ In Central America, subsistence farming accounts for about 35 percent of tropical deforestation, while cattle ranching is responsible for most of the other 65 percent.²⁶ Partridge, exposing several "myths" that blame small-scale farmers for the destruction of tropical rain forest in Latin

America, contends that the agricultural frontier is expanding because of large cattle ranching estates (see below). "Casual observers too often mistake the army of landless sharecroppers working for cattle ranchers as small-scale farmers."²⁷ Such an "army" now threatens the ecology of the middle Río Patuca region.

According to Tawahka informants, in the department of Olancho on the upper Patuca, cattle ranchers convert large tracts (over one hundred hectares) of virgin forest to pasture by directly paying Ladino colonists to clear forest lands. But instead of farming a parcel, the colonists are obliged to continue moving, converting land in return for cash wages. Then, as cattle are introduced the ranchers receive title to the land because they have put it to "social use."

Partridge attributes this process of deforestation to a cultural tradition found throughout Latin America: the "*colono* system."²⁸ Cattle ranchers allow, encourage, or require landless peasants to clear forest land on cattle estates. The peasants then attempt to cultivate a small parcel on the cleared land for one or two years, paying a portion of the harvest to the landowner as rent. The *colono* system has been documented in Latin America since colonial times:

...the role of landless sharecroppers in creating and maintaining pasture has been continuous in the American tropics for centuries...In fact, throughout the tropics of Latin America sharecropping and extensive cattle ranching are intertwined in a cultural symbiosis.²⁹

Durham, analyzing the distribution and use of natural resources in Honduras, confirms this assessment stating that traditional political, social, and economic realities, rather than population pressures, determine resource use: "...[in] Honduras, competition for land is not a simple density-dependent process. Indeed, evidence...suggests that competition does not occur so much among peasants as between peasants and large landowners."³⁰

The colono system has the potential to greatly accelerate the permanent destruction of forest lands. Colonists must continually move on, clearing virgin rain forest as their dependence on wage earnings fuel the cycle. Because each head of cattle requires at least one hectare of grazing land,³¹ large, continuous tracts of rain forest are threatened. In contrast, slash and burn migrant cultivation normally results in a patchwork pattern of deforestation (see Illustrations 4 and 5, p. 55-56).

Until now, the usurpation of land by cattle ranchers has been confined largely to the upper Río Patuca region, although expansion is occurring downriver where the Río Wampú joins the Patuca (see Map 4). The introduction of large-scale cattle ranching has the potential to greatly impact biodiversity and ecological stability in the middle Río Patuca region.

Colonization Front

A colonization front made up largely of Ladino peasant farmers has begun to penetrate the western Río Patuca region from Olancho department (see Map 4). According to MOPAWI, the migrants come from Honduras' southern region where agricultural lands have been severely degraded.³² The small farmers and their families who make up the colonization front arrive in frontier lands and, using logging roads and river routes, enter previously inaccessible forested regions.³³ Attempting to sustain themselves and their families using slash and burn agriculture, they cultivate corn and beans using traditional Ladino methods. However, exposure of the fragile rain forest soil to the hot tropical sun destroys nutrients and the land soon becomes unsuitable for agriculture.³⁴ Additionally, heavy tropical rains quickly wash away the unprotected thin layer of topsoil and, as a result, the small farmer is forced to continue moving on, clearing and burning more forest land. Their struggle to survive dictates that the cycle perpetuate itself. Thus, the colonization front marches on.

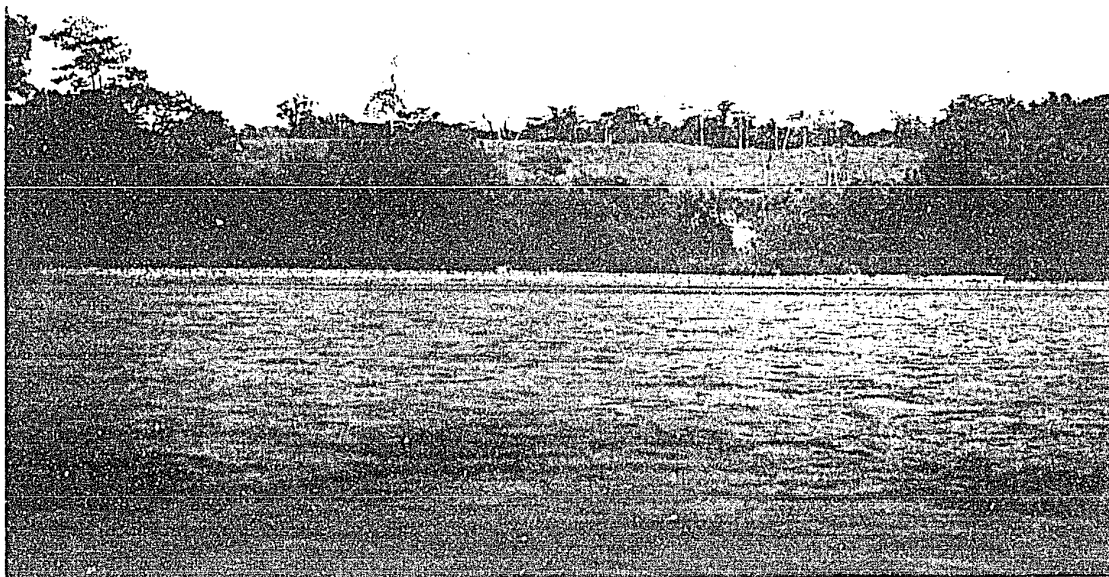


Illustration 4. Tabacón, a large cattle ranch established along the middle Río Patuca. This type of land use activity is inappropriate for the ecology of the region and presents a grave threat to Tawahka resource use practices.

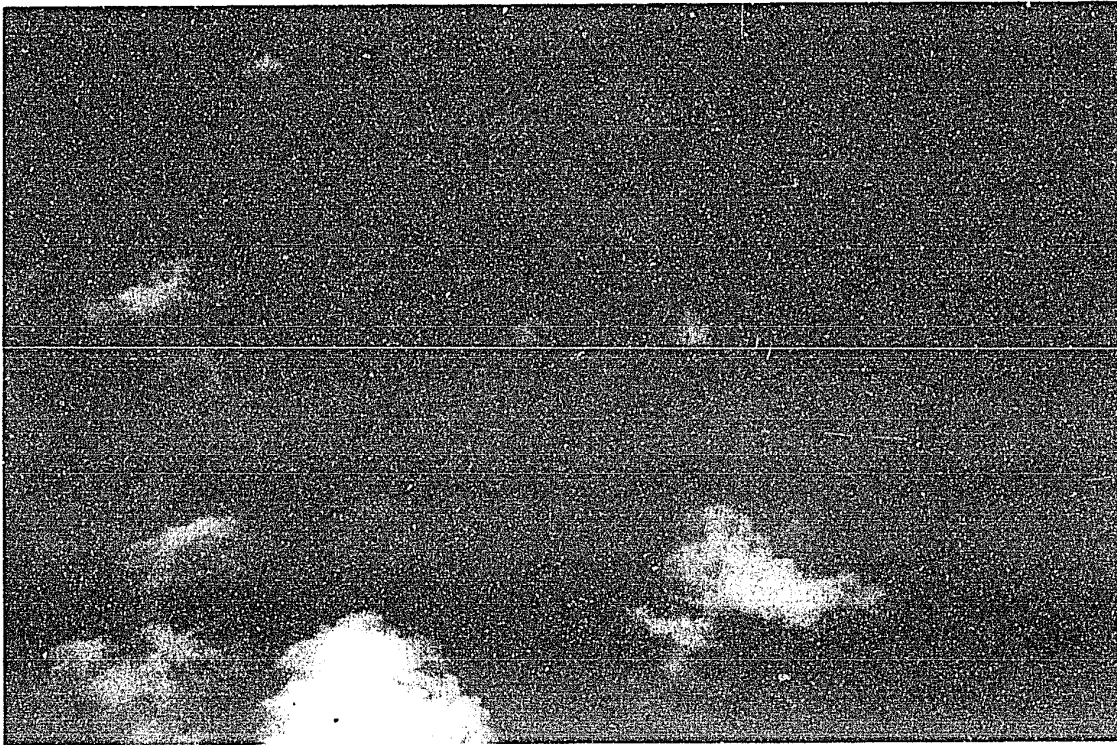


Illustration 5. Oblique aerial photograph of small-scale Ladino farm plots. Note checkerboard pattern of deforestation.

Collier's research in the Mexican highlands of Chiapas using aerial photography demonstrated the link between social use of the land and environmentally destructive processes.³⁵ Collier described a pattern, or progression, that forest destruction normally follows that may be applied to the situation in the upper and middle Río Patuca regions. This process begins with colonization of frontier lands by small farmers, usually fleeing population pressure or environmental degradation in other areas of the country. The slash and burn agriculture they traditionally practice results in forest soils becoming rapidly depleted and within two to three years, failing harvests force them to move on, clearing more forest land to support themselves. This cycle illustrates why small-scale farmers have received the bulk of the blame for tropical deforestation. After land is abandoned, invasion by grasses converts it to pasture for cattle production. At this point, cattle ranchers buy up or simply take over the land. Gradually, the soil continues to degrade as it loses more nutrients and becomes compacted by cattle. Erosion eventually makes the land unsuitable even as pasture. The final stage in Collier's progression is total abandonment, the land being unfit for any use.

Stonich has found that environmental degradation in the heavily populated southern region of Honduras is due primarily to overexploitation of natural resources "shaped by the dictates of capitalist accumulation."³⁶ Small farmers face dwindling prospects as they are forced to choose between 1) farming landholdings more intensively resulting in greater environmental degradation or, 2) migrating to urban areas or frontier lands in other parts of the country.³⁷ Stonich describes how intensified agricultural practices (especially on marginal lands) have resulted in environmental degradation in southern Honduras.³⁸ One consequence of this process is outmigration to tropical forest areas (including the upper Río Patuca region) resulting in increased pressure on those resources.³⁹ Stonich attributes

deforestation to a set of complex causes arising through Honduras' fundamental social structure:

It is simplistic to point to the agricultural practices of one group or another when assessing 'blame.' For example, the practices of renters and the smallest landholders in southern Honduras appear to be the most destructive; yet, given their environmental, economic, and demographic limitations, such farmers have little alternative and in fact frequently act as agents of the more powerful, larger landholders in the process of forest-to-pasture conversion.⁴⁰

In Honduras, the advance of the colonization front into the rain forest regions of La Mosquitia is tied to large-scale cattle ranching. The colono system described by Partridge (see above) is a major driving force behind tropical rain forest destruction in the middle Río Patuca region. This is borne out by the observation of one Tawahka informant: "...The land grabbers in the Wampú area are from Tegucigalpa and Juticalpa. They pay peasants to clear land for cattle pasture."

Though Ladino owned farms and ranches vary in size they all have in common the fact that the farmer lives on the land s/he cultivates. According to Honduran law, gaining legal title to unoccupied state land depends on putting it to "social use," under which farming qualifies.⁴¹ Hence, the small farmers migrating to frontier lands use slash and burn to produce subsistence crops as well as to make claim to a particular parcel.

Large-Scale Logging

Because most of La Mosquitia is covered with tropical hardwood forest or pine tree savanna, resource development and exploitation recommendations have focused on forestry.⁴² The debate over development of this resource centers on land tenure and legal questions, poor access, and the absence of research data.⁴³ Recent events have raised important questions about logging in La Mosquitia.

In the fall of 1991, a Chicago based paper and pulp company, the Stone Container Corporation (SCC), made a proposal to the Honduran government to log nearly one million

hectares (2.4 million acres) of pine forest in La Mosquitia. Although the terms of the contract were never made public, certain details were nonetheless leaked. The project allowed the SCC to lease the land over a forty year period and included comprehensive forest management practices, the construction of a pulp mill in Puerto Lempira on the Mosquitia coast, and long-term employment for over 1,000 Hondurans.⁴⁴ Approval of the contract required the President's signature as well as Congressional ratification.

In part due to public opposition to the Stone proposal, Honduran President Leonardo Callejas announced on February 28, 1992, that negotiations with the SCC had been cancelled. Instead, he called for alternative management plans for La Mosquitia's pine and tropical rain forests. Despite the rejection of the SCC proposal, the eventual exploitation of La Mosquitia's timber resources most likely will go forward.

A bid to log hardwoods in western Nicaragua was defeated about the same time the SCC project was cancelled.⁴⁵ However, in Honduras a hardwood logging proposal is currently being considered that would conflict directly with the TBR. In April, 1991, the Wellington Hall Caribbean Corporation (WHCC) proposed to log as much as 67,600 hectares of mahogany, cedar, and other valuable furniture and construction hardwoods in the middle Río Patuca region. In a letter to COHDEFOR, the Corporación Hondureña de Desarrollo Forestal (Honduran Forestry Development Corporation), dated July 23, 1991, the general manager of Muebles Wellington Hall, S.A. proposes two areas within the TBR's proposed boundaries for large-scale logging.⁴⁶ Even less has been publicly disclosed about the Wellington Hall plan than was known about the SCC proposal. Unlike the SCC project, the Tawahka could be impacted directly by Wellington Hall's logging activity because it would occur on lands the Tawahka claim as theirs. However, WHCC has recently revised their concession maps so as not to conflict with the TBR.⁴⁷

Petroleum Exploration

Petroleum exploration in La Mosquitia has continued intermittently for many years. Currently there is one exploration well outside the town of Ahuas on the Mosquitia plain. However, the existence of petroleum reserves large enough for commercial production remains unknown.

Large-scale oil production has the potential to inflict extensive environmental damage. In Ecuador's Amazonian rain forest, large-scale oil production has resulted in permanent ecological contamination as well as severe human health problems for indigenous and local peoples.⁴⁸ Judith Kimerling, in a report with the Natural Resources Defense Council (NRDC) graphically demonstrates how large-scale oil development has been the primary agent responsible for forest destruction in Amazonian Ecuador.⁴⁹ In addition to the contamination and health problems created by spills, open waste pits, and fires, road building by oil companies opens up previously inaccessible areas to colonization and other potentially harmful development schemes.

The likelihood of large-scale oil development in La Mosquitia depends on two factors: 1) the existence of proven reserves, and 2) the economic feasibility of extracting such reserves. Despite current exploration, Brunt concludes that "onshore Mosquitia [petroleum production] cannot be regarded as prospective."⁵⁰

Mineral Exploration

Honduras possesses nine known mineral deposits with the potential for commercial exploitation.⁵¹ Believed to have considerable reserves of gold, silver, lead, zinc, iron, tin, copper, coal, and antimony, only the first four are currently mined for export purposes.⁵² Most mineral and geology studies have been carried out in the more accessible and prospective western and central regions of the country. Again, Brunt concludes that "in the

national context, developments in the mineral sector in Mosquitia can only be considered as a long-term proposition, requiring costly basic exploration."⁵³

At present, the only mining activity taking place in La Mosquitia is placer gold prospecting on several of the region's rivers, including the Patuca. This consists mainly of individuals panning for gold dust along the riverbanks. On the headwaters of the Patuca, several larger operations provide temporary wage labor jobs for local men. For the foreseeable future, however, large-scale mineral exploration in La Mosquitia is unlikely.

Chapter Summary

In Chapter IV, the discussion has focused on the ecology and environmental threats in the middle Río Patuca region. The first section summarizes the extent of the area's biological diversity. The two primary environmental threats to the region's natural and cultural landscape--large-scale cattle ranching and the colonization front--could result in the irreversible destruction of the region's biological diversity in the near future. The other environmental threats in La Mosquitia (logging, petroleum production, and mining) could have long-term impacts, as well.

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CHAPTER V
- TAWAHKA RESOURCE MANAGEMENT -

Chapter V describes Tawahka resource management practices, population and demographics, and background information on the proposed TBR. This overview of findings, based largely on data gathered by the author during fieldwork in La Mosquitia between February and April, 1992, provides a basis for examining the extent to which Tawahka social use of the land has been included in the TBR's planning process. The first section describes the proposed reserve's stated purpose and geographic background. The second section documents findings regarding Tawahka population and specific land use practices.

Purpose, Location, and Size

Purpose

Creating the TBR would achieve five primary objectives. These objectives, as stated in the official proposal for the reserve, are as follows:¹

- 1) To guarantee the protection of an area vital to Tawahka tradition, culture, economy, and subsistence activities and to provide the necessary security to maintain their sustainable use of the region's natural resources.
- 2) To establish the protection of biodiversity and maintain the ecological integrity of the flora and fauna in the middle Río Patuca region.
- 3) To help deter the advance of the colonization front in La Mosquitia and encourage the development of sustainable management strategies for the region's natural resources.
- 4) To assure the protection of the region's ecology with the aim of promoting ecotourism.

- 5) To complete a continuous corridor of protected rain forest formed by the Río Plátano Biosphere Reserve, the proposed TBR, and the proposed Bosawas Reserve in Nicaragua.

Location

The proposed TBR is located in the eastern region of Honduras known as La Mosquitia. Geographically centered at the confluence of the Río Patuca and Río Wampú, it would cover areas in the departments of Gracias a Dios, Olancho, and Colon (see Map 1).

Size

The total area of the TBR is 233,142 hectares or 2,331 km². It covers the region used by the Tawahka for their traditional subsistence activities in addition to placing an extensive area of virgin rain forest under protection. The boundaries of the TBR would largely follow natural geographic features such as mountain ranges and rivers to the north, south, and west. On the eastern front, the Reserve would reach the Río Coco (Segovia) bordering Nicaragua.² Ideally, the TBR would extend the corridor of protected lands from the Río Plátano Biosphere Reserve to the proposed Bosawas Biosphere Reserve in Nicaragua. Such a corridor would establish the largest continuously protected area in Central America.

The Tawahka

Historical records show that, at one time, the Tawahka Indians' occupation of the middle Río Patuca region extended over an area of approximately 9,300 square kilometers.³ While many indigenous groups have been able to maintain sustainable land use practices for long periods of time, increasing population and resource management pressures on the people living within protected areas must be addressed to ensure that their needs are met.⁴ In the following section, Tawahka population, demographics and subsistence activities are described.

Population and Demographics

The Tawahka live in five main villages along the Río Patuca (see Map 1). Their total population in March, 1992 was 726 (see Appendix A, Table 1). As Table 1 indicates, the Tawahka's numbers have steadily risen over time, with a growth rate of 6.59 percent from 1990 to 1992. By the same token, population density has risen from nearly five square kilometers per person to just over one square kilometer per person (see Appendix A, Table 2). Furthermore, over half (53.6%) of the Tawahka population is estimated to be under fifteen years of age (see Appendix A, Table 3).

Two of the communities--Kraosirpe and Krautara--are located to the north of the Patuca's confluence with the Río Wampú in the department of Gracias a Dios. The largest of these villages, Kraosirpe, has a total population of 445. The remaining three settlements are situated upriver (southwards) of the confluence in the department of Olancho. As one travels upriver the villages become smaller. The smallest Tawahka village, Wasparasni, has a total population of 26 inhabitants (see Appendix A, Table 3). Three smaller settlements--Malawas, Wasurun, and Komako--consist of one or two families whose members are of mixed Tawahka descent.

The number of households in each of the five main villages varies widely from 3 to 54. Nonetheless, the per village average number of persons in a household is at least seven, with the average for all villages 8.2 persons per household (see Appendix A, Table 3). In Kraosirpe, though the number of households decreased (-4%) from 1990 to 1992, the total number of inhabitants grew (+14.1%). In all the other Tawahka villages, however, there was an increase in both households and population. Much of this increase is due to immigration rather than a rise in the birthrate. For instance, the inhabitants of the now abandoned village of Dimikian (which had a population of 40 according to Herlihy's 1990 census) relocated to Yapuwas, more than doubling its population.⁵ The settlement of

Wasparasni has experienced a 160 percent rise in population due to the arrival of sixteen persons from a Tawahka village in Olancho department. More are expected to arrive.

Other census surveys conducted over the years, though imprecise, show relatively small populations of the Honduran Tawahka. A census taken in April, 1967 counted 162 Tawahka living in the middle Río Patuca region.⁶ In 1977, Cruz estimated that there were between 260 and 300 Tawahka living along the Río Patuca with 253 living in Kraosirpe.⁷ FITH completed a population survey of 285 people in Kraosirpe in the late 1980s. As part of a national census in June, 1989, FITH counted some 376 people living in Kraosirpe.⁸

Subsistence Activities

A discussion of community land use and subsistence activities must begin by defining *traditional management* within the context of Tawahka resource use. This thesis uses a broad-based definition of *traditional management* taken from Schmink, et al. that allows for the diversity of indigenous adaptations: historically based techniques, technologies, and practices which respond to local environmental conditions, internal cultural demands and values, and outside social and economic forces. Such practices are designed to modify an ecosystem with specific goals in mind and are based upon and reinforce group identity. Further, they depend very little on the use of fossil fuels and tend to be "low-input, low-output" systems.⁹

In the past, indigenous resource management practices have carried the connotation of static and unchanging methods that place "modern" and "traditional" at opposite ends of a spectrum.¹⁰ Schmink, et al., point out two major problems inherent in this view: 1) that traditional peoples do not change, and 2) all traditional societies are homogeneous in their behavior.¹¹ In fact, indigenous peoples continually adapt to new and evolving environmental conditions, reflecting the diversity of traditional management systems developed by indigenous groups throughout the world. For instance, Rappaport has

shown how pig husbandry by the Tsembaga of New Guinea helps to regulate forest garden production.¹² Pigs are "regularly penned in abandoned gardens, where they root up unharvested tubers and where, by eliminating herbaceous growth that competes with tree seedlings...may hasten the return of the forest."¹³ The Tawahka use a similar system of forest gardens but do not rely on animal husbandry as a component of their land use practices.

The Tawahka have a combined cash and subsistence economy. As pressure from Honduran society has become more keenly felt in La Mosquitia, the national cash economy's influence has also increased. What sets the Tawahka apart, however, is their traditional economy that includes the primary subsistence activities of agriculture, fishing, hunting, collection and extraction (harvesting of non-timber forest products), and small-scale timber production. Though the majority of these activities are carried out solely for subsistence purposes, some products and goods are sold on outside markets.

Shifting agriculture is the most prominent and important Tawahka land use activity. It is characterized as a bush-fallow system¹⁴ known as the *guamil*. The *guamil* is a parcel of land that is under active agricultural use but not currently under cultivation. In contrast to the Ladino farmer who lives on the land he farms, the *guamil* is always located some distance from the community requiring a one to three hour hike to reach it.

The fallow period of the *guamil* is normally five years, although this may vary. A field may be put into production at three years or allowed to stay fallow for eight or more years. A *guamil* under active cultivation is considered private property with the farmer and his/her family owning the land and the crops it produces. However, a certain amount of access by outsiders is guaranteed to a *guamil* that is fallow (though it still "belongs" to the original owner). As one informant said, "You just can't plant anywhere. It has to be on your own

land...[but] anyone can hunt anywhere. Because it's up in the bush it doesn't matter. You can also hunt in any guamil."

Though a guamil is a field that remains in fallow, it continues to generate subsistence goods. The secondary regrowth provides habitat for animal species hunted by the Tawahka. This source of supplemental protein, along with continued output from a guamil's perennial crops (e.g., coconuts, cacao, citrus, mango, yuca, and others) is an important aspect of Tawahka land use.

The size of a guamil is usually one to two *tareas*. A *tarea* is approximately one quarter hectare. Two *tareas* make up a *manzana*, the usual size of an area cultivated by one farmer. The variance in guamil size is a function of the time needed by one man to clear it, the time of year, and the type of crops grown.

After a farmer decides which guamil(es) to put into production that year, the parcel is cleared by hand. Using only a machete, thick secondary regrowth is cleared away leaving only larger trees standing. Clearing takes place during the first two weeks of February and is normally done by one person, although other family members may assist. The cut debris is left to become tinder dry during the hot, rainless months of February and March. Burning takes place during the first or second week of April. Sometimes the farmer clears a fire barrier along the edge(s) so that neighboring guamiles will not burn. With a pitch pine torch, s/he walks through the cleared area setting small patches aflame. The farmer determines the direction of the burn according to weather conditions, the topography of the cleared plot, and the distribution of debris throughout the guamil. (See Illustrations 6-11, pp. 70-75 for a graphic description of this process).

Fire moves through the guamil relatively quickly leaving, unburned, the larger felled trees and branches. Some of these logs are carried back to the farmer's house to serve as



Illustration 6. Three members of a family clearing a guamil by hand using only machetes.



Illustration 7. Guamil with cut debris during first week after initial clearing. Note larger trees left standing.



Illustration 8. Guamil with cut debris six weeks after initial clearing. The guamil is ready for burning.



Illustration 9. Farmer setting setting fire to the guamil. He uses a species of quick burning pine (*ocote*) as a torch to set small fires throughout the guamil.



Illustration 10. Burning the guamil. Because the fire moves quickly through the cut debris, larger trees left standing are not significantly harmed.

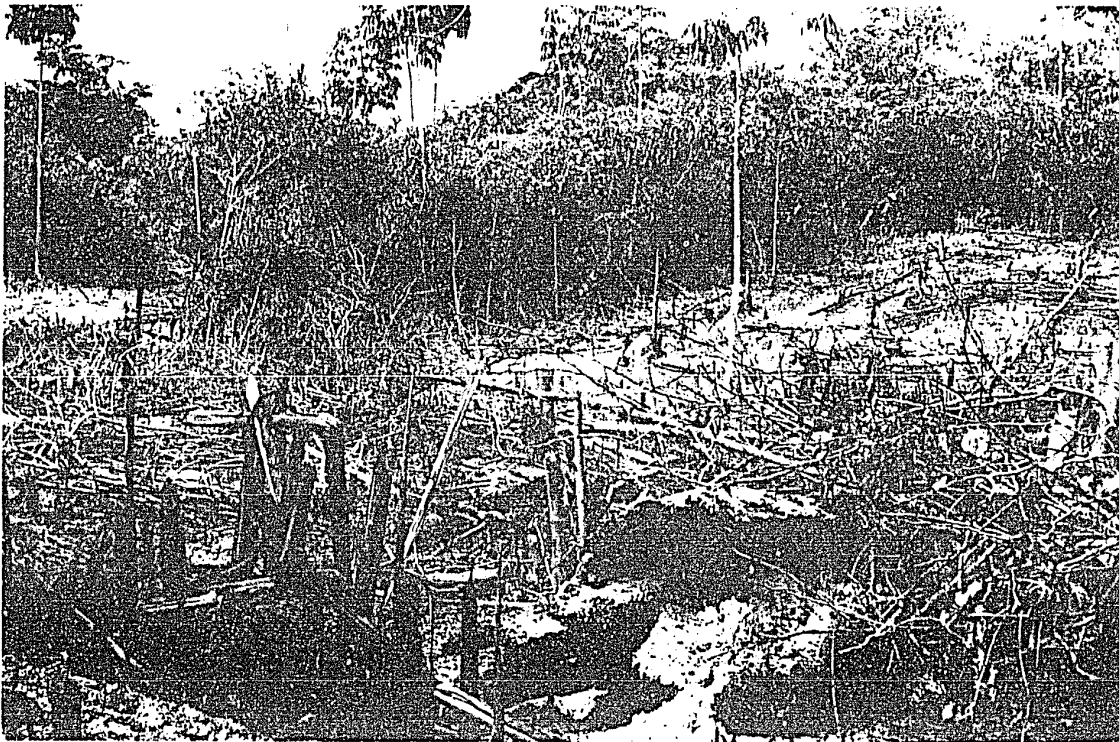


Illustration 11. The guamil after burning. Note the fine layer of ash blanketing the ground and larger, unburned logs.

firewood. Otherwise, they are left to regenerate through coppicing when the guamil goes fallow again.¹⁵ The fine layer of remaining ash is quickly absorbed into the soil once the rainy season begins in May.

Soon after burning the field is planted. A cultivated plot is called a *milpa* (see Illustration 12, p. 77). A wide range of crops are sown in the milpa simultaneously. These include several varieties of beans, rice, corn, bananas, plantains, yuca (manioc), coconuts, cacao, tobacco, coffee, and sugar cane. For some crops, such as rice, beans, and corn there are well-defined growing seasons when harvesting must occur at a particular time. Other milpa products, such as yuca, bananas, coconuts, and sugar cane may be harvested on a continual basis over several years.

This method of shifting cultivation, the Tawahka bush fallow system, contributes to the long-term ecological stability of the middle Río Patuca ecosystem. Tawahka farmers consciously avoid the overuse of a particular guamil, recognizing the fact that forest soils quickly become *cansado* or exhausted. Rarely is virgin forest cleared for agricultural use. Until now, stable population pressure has allowed reuse of traditional agricultural lands without the need to clear additional guamiles.

The Tawahka keep several types of domesticated animals including dogs, roosters, chickens, ducks, pigs, and cattle. Dogs help protect family property and play a primary role in hunting (see below) while other domesticates are kept primarily for consumption. Poultry is raised for meat and eggs. According to Tawahka informants and MOPAWI representatives, pigs were previously kept as a meat source but outbreaks of swine cholera in recent years prompted the Honduran government to eradicate all pigs in La Mosquitia. Now, very few pigs are kept by the Tawahka.

Approximately a quarter of the families in Kraosirpe own one to three head of cattle.



Illustration 12. Milpa cultivated with young bean plants.

Cattle are used primarily as an investment or "hedge" against future debts, to provide beef for special occasions, and to provide milk and cream on a semi continual basis. Cows are allowed to graze freely throughout the village and in the central commons.

The Tawahka hunt a wide variety of forest animals, primarily for subsistence purposes. These animals include deer, tapir, feral pig, white-faced and spider monkey, iguana, river turtle, wild turkey, macaw, and various other small mammals and birds. According to older residents of Kraosirpe, bow and arrow was formerly used to hunt, but for at least the past thirty years .22 caliber rifles have been used.

Protein obtained through hunting appears to make up a relatively small part of the diet. Aside from the fact that the Tawahka are primarily agriculturalists, three factors regulate hunting. First, bullets and rifles are difficult and expensive to obtain thus limiting the number and frequency of hunting trips into the forest. Secondly, the rifles themselves are old and faulty. This unreliability causes many bullets to go off the mark, resulting in many missed shots and/or animals that have been injured and fled. Rogers has described Tawahka unwillingness to track animals under these circumstances.¹⁶ Third, several years ago the Honduran military prohibited weapons in the area in response to the military situation in the region. However, with the easing of border tensions and the difficulty of enforcement, rifles are now fairly common.

Turtles and iguanas are hunted and captured on a regular basis. Because these animals live primarily along stretches of sand along the riverbanks they are easily spotted and tracked. Often dogs are used to run down and catch iguanas. Turtles are easily caught by hand along the shallows and butchered by machete. During the dry season turtle and iguana eggs are collected. The eggs are found buried in the sandy areas along the banks of the river.

Fish, unlike animals obtained through hunting, provide a major source of protein in the Tawahka diet. Various species are taken from the Río Patuca, the surrounding streams, and ponds. During the dry season, a large edible type of crayfish is trapped as well. Fishing involves a variety of methods. These techniques include casting into the river a hook and line, harpoons and/or arrows, spear guns, nets, and "hand-harvesting." These methods are limited to the dry season when the river runs slow and shallow, allowing clear visibility.

The hand-harvesting technique appears to be the most efficient practiced by the Tawahka. By contrast, hook and line casting is probably the most inefficient. In addition to the difficulty of casting a line more than two to three meters out into the river, hooks and fishing line are expensive and not readily available. Harpoons and arrows can be used while fishing from *pipantes* and require considerable skill to use successfully. Home made spearguns are used by men to catch large fish. This method, used by a skilled practitioner, can be highly successful. Nets are used only on particular occasions.

As the river level drops during the dry season, large ponds or *lagunas*, form on upland banks stranding large numbers of river fish in them. On predetermined days, groups of 15 to 25 men, women, and children will spend about two hours clearing a laguna of hyacinths, vines, and other debris. Then, in a coordinated effort, they move slowly through the muddy, knee-deep water scooping fish up with their hands (see Illustrations 13-14, pp. 80-81). Small cast nets may also be used to complement this technique. Although the laguna is depleted after one such event, this hand-harvesting technique yields a large number of edible size fish (about 10-12 per person) for many people in a short period of time.

Another simple yet effective technique involves wading through shallow water along a pond, stream, or river's edge splashing minnows and small fish up onto the bank. Usually



Illustration 13. Men, women, and children clearing a lagoon. Once the lagoon is freed of floating plants and other debris, fish will be harvested by hand.



Illustration 14. Women wade through a laguna gathering fish using hand-harvesting technique.

practiced by women as they bathe and/or wash clothes, this method yields a small but consistent source of protein (see below).

A large species of crayfish inhabits the Río Patuca and is considered somewhat of a delicacy in the Tawahka diet. Larger specimens have tails 15-20 centimeters long and appear similar to a medium sized lobster (see Illustration 15, p. 83). Crayfish are caught at night in the shallows along the riverbank. By using a burning piece of *ocote*, or pitch pine, to cast light on the water, the crayfish are easily spotted as they slowly roam the river bottom. Then, with a machete they are pinned and caught by hand. In a productive evening up to twenty crayfish may be caught over a period of two to three hours.

Tawahka knowledge and use of forest resources is extremely detailed and intimate. The guamil system is one manifestation of such knowledge. Tawahka familiarity with the region's geography is another example of their awareness of the environment. Though their primary land use activities (agriculture, hunting, fishing, extraction) occur over an area of approximately 77,000 hectares¹⁷, detailed knowledge of the region's geography extends to over three times that area.

The absence of roads in the region limits travel to three methods: by air, by river, and by foot. Scattered airstrips throughout the region are used primarily by light planes to transport cargo and/or outsiders in and out of the region. The Tawahka depend heavily on travel by river and by foot. Though they live in permanent settlements, the Tawahka are a highly mobile society travelling for commercial purposes, agriculture, hunting, collecting, and personal business. Over generations, these journeys have given the Tawahka an intimate knowledge of the lay of the land.

After repeated forays into the rain forest, the Tawahka learn the locations of particular landmarks: trees, outcroppings, streams, and vegetation stands. Though the heavy forest



Illustration 15. Río Patuca crayfish. The larger specimen is approximately 25 cm long.

canopy makes locating one's position by triangulation nearly impossible and the virtual inaccessibility of mountaintops makes directional surveys equally difficult, their detailed knowledge of the rain forest's landscape give the Tawahka an extraordinary ability to hike long distances and know their exact location at all times. Each mountain peak has a Tawahkan name and native folklore associated with it. The same is true of creeks and streams. The Río Patuca is also the subject of such cultural geographical knowledge. As changes in the depth, width, and course of the river have occurred over time, they are noted and recorded in Tawahkan folk history. As one Tawahka man said, "...The river used to flow over there at the base of the mountains. You see where it flows now, there was a beach before. And up there further...when I was a kid the river flowed in two branches. Where those rocks are now there was an island and [river] branches flowed around it." All this translates into an extensive cultural database regarding the movement and abundance of game animals, wild food resources, the availability of timber, potable water sources, seasonal climatic variations, and long and short term environmental change.

Hardwoods and other trees play a key role in Tawahka resource use activities. Because trees grow so rapidly in the region the supply of wood is virtually inexhaustible--so long as the forest remains intact. Lumber, vines, broad leaves, and roots are used in construction. Tawahka families construct their own houses (see Illustration 16, p. 86) using, except for basic tools and nails, only forest resources. Trees are felled and sawed into planks in the forest and then hauled to the prospective house site. Thatched roofing consists of *suita* (latin unknown), a broad-leafed plant that is dried and woven for use as roof thatching. Stoves, made from sturdy branches, clay, and mud, are built as part of the house itself.

The most important use of timber is for the construction of *pipantes* and *cayucos*, the two types of dugout canoes used by the Tawahka for transportation (see Illustrations 17-20, pp. 87-90). Historically, the Tawahka have been known for their skill at making these

traditional craft. Young noted in 1842 that, "...General Lowry carried about twenty-five [Tawahka men] away from the Patook, and placed them some distance up Black River, contiguous to Polyer River, for the purpose of making him doreys and pitpans."¹⁸ They are made either from *caoba* (mahogany-family Meliaceae), *cedro*, or *cedro blanco* (cedar or white cedar-genus *Cedrus*). *Caoba* is preferred because of its durability, strength, color, and value, but *cedro* is more commonly used because of its relative abundance. The pipante is long, narrow, and relatively lightweight and is used for river and stream travel. Cayucos are heavier, wider, and used on the coast for ocean travel. Cayucos are normally sold on the Mosquitia coast as a means of obtaining much needed cash.

The pipante plays a vital socioeconomic role in Tawahka culture. Because it is the primary mode of transportation for nearly all subsistence tasks, the Tawahka learn from an early age how to handle this versatile but unwieldy craft. Normally, two persons work together to pilot a pipante. The person at the stern uses an oar, or *canelete* to steer while another at the bow propels the pipante with a pole or *palanca*. By pushing the *palanca* against the shallow river bottom along the bank, slow progress may be made upstream. This mode of transportation is used primarily during the dry season when the shallow Patuca runs more slowly.

Tree selection for pipante and cayuco construction is based on type, height, girth, age, and location. Once a tree (or trees) has been selected entire family groups, including men, women, children, and friends, travel together by foot and/or pipante to the construction site. These sites may require a journey of up to four days to reach. Upon arrival at the site, a temporary camp is set up and work begins lasting anywhere from two to four weeks. Measuring up to 10-12 meters long and weighing up to several hundred kilograms (kg.), pipantes and cayucos are hollowed out using only axes, chisels, and machetes. The



Illustration 16. A typical Tawahka house in Kraosirpe is raised off the ground about one meter. Except for regular steel nails the house is constructed entirely of forest materials, including the cookstove visible on the left of the porch.



Illustration 17. Three pipantes moored along the riverbanks of the Río Patuca.

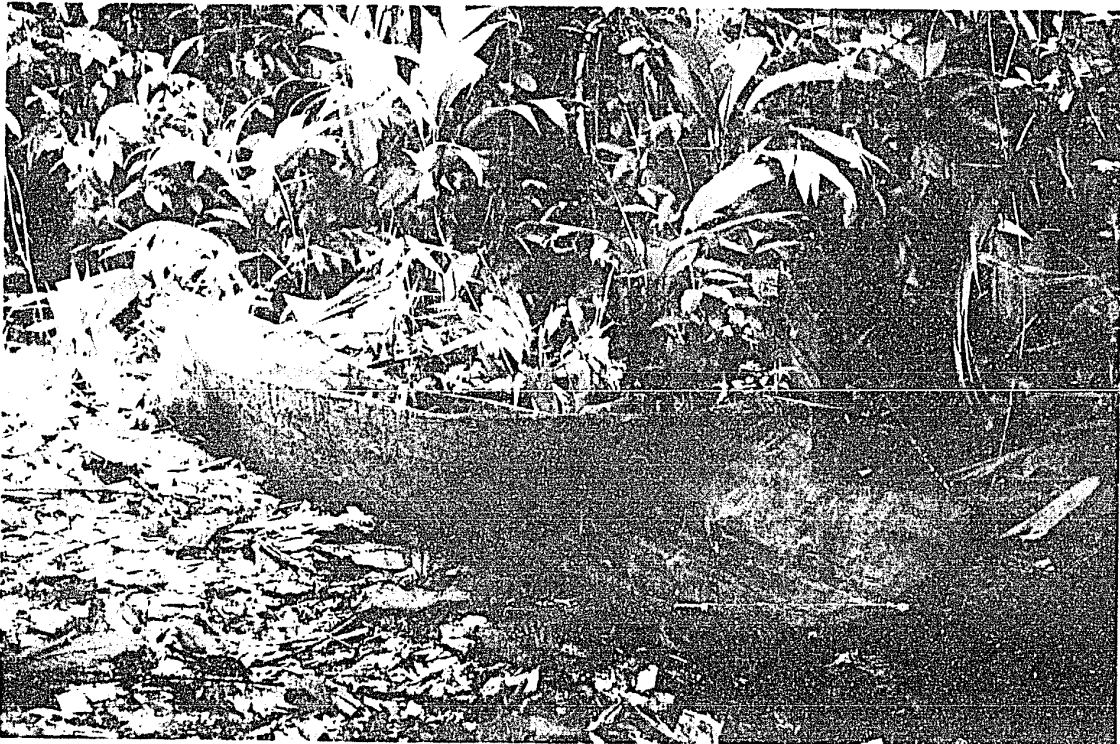


Illustration 18. Cayuco under construction. Note heavier, structural differences distinguishing it from the pipante.



Illustration 19. Women piloting pipante. Note child and bananas in center of craft.



Illustration 20. Two men piloting pipante through rapids. Note how poles (palancas) are used to propel craft against river current.

entire group participates in construction as well as in running the small community which has formed. When the pipante is completed it must be hauled back to the river. Carrying a 200-300 kg. dugout canoe over steep, muddy, and forested mountain slopes is an extremely arduous task, hence a further need for having many people on hand to assist.

Women participate in all Tawahka subsistence activities. In addition to being the primary child care-givers, women take part in the same agricultural and economic activities that men do. Working either with men or separately, women handle all facets of agriculture, pipante handling and construction, fishing, hunting, gathering, and house building.

Guamil activities including clearing and burning, weeding, and harvesting of milpas may be performed solely by the women in a household. Though hunting is largely a male-dominated activity, women do engage in this activity on occasion. Fishing, on the other hand, is commonly and successfully practiced by Tawahka women. Using the "wade and splash" method previously described, small fish and minnows are caught yielding a small, but consistent, source of protein in the diet. Two other techniques are also used: hook and line and small cast nets. Although not as efficient as the wade and splash technique, larger fish may be caught using these other methods.

Women are instrumental in the use of forest resources. They know the locations of and seasons during which to gather wild fruits, nuts, and other useful plants. They take part in house construction by felling trees, sawing lumber, and hauling the planks back to the village. Women are responsible for gathering and weaving *suita*, the plant used for roof thatching. Collecting and working clay used in the construction of cooking stoves is also women's responsibility.

The Tawahka cash economy, though relatively small, is nonetheless important. As contact with the outside world has increased, the exchange of goods has grown, also. The

sale of cayucos on the coast, mentioned above, is one example of this commercial exchange. There are various other ways by which hard currency enters the Tawahka economy.

Placer gold prospecting on the upper Río Patuca has grown to be a fairly large and important industry in the region. During the dry months from January through April, a significant number of Tawahka men travel upriver to work as laborers in the placer gold industry. These men may work for periods as brief as two weeks or up to the entire four months.

Cambio, C.A., an ecotourism agency based in San Pedro Sula, has been running river trips down the Patuca since late 1990. These two to three day trips carry a half dozen tourists downriver by motorized dugout canoe from Olancho to Wampusirpi. Though the primary attraction of these trips is the rain forest scenery in the TBR, little time is actually spent in the area. In early 1992, Cambio, C.A., had plans to build a small guest house in Krautara providing short term wage labor positions for some residents. Other than donations of clothes and school supplies, however, the Tawahka have yet to benefit economically (as guides, room and board providers, arts and crafts makers) from the emerging ecotourism industry on their traditional lands.

Since 1988, various researchers have conducted studies in the proposed reserve area. Local informants and/or guides are contracted to assist for the period of the study and are paid a standard daily wage. Depending on the length of the research period and the agreed upon wage, this work can be quite financially lucrative for the informant.

The sale of agricultural goods on outside markets is a small but steady source of cash for the Tawahka. The major cash crop sold is cacao; the bean from which chocolate is made. Large-scale cacao production has the potential to become the region's prime agricultural export.

In Kraosirpe, there have been various attempts at running small general stores to provide basic goods. At the time this research was undertaken a community cooperative operated one store in Kraosirpe that sold sugar, salt, flour, rice, beans, coffee, candles, matches, batteries, and other small items. However, in the past, attempts by the Tawahka at running small enterprises have generally been failures. Lack of business experience on the part of the store owners coupled with customers' unfamiliarity with the intricacies of exchanging cash for goods illustrates the larger difficulty of integrating Tawahka subsistence activities with the national Honduran cash economy.

Most resource use activities are, to a large extent, seasonally regulated. Between February and April (summer), the ground is relatively dry and mud-free making long distance foot travel easier. Activities centered around the Río Patuca such as foraging crayfish, collecting iguana and turtle eggs, and extensive pipante travel, are most intense during the dry season, as well. Once the heavy winter rains begin in May, the Patuca runs swiftly and deeply as debris, tree trunks, and sediment built up during the dry season are washed downstream making river travel somewhat hazardous. On the other hand, the rainy season is a time of plenty. Crop harvests are greater and wildlife is more abundant during this period. According to a Tawahka informant, wet debris on the forest floor reduces noise so hunting tends to be more successful.

The Tawahka were not observed to use beasts of burden. All subsistence goods taken from the forest or guamil (crops, hunted animals, fruits, timber) were transported to the village by pipante or carried on the person's back.

Chapter Summary

In Chapter V, the discussion has centered on a description of Tawahka land and resource use practices within the area to be covered by the TBR. Their traditional forms of resource management have evolved over hundreds of years to where they may be called self sufficient, if not sustainable. Tawahka resource management practices extend to approximately one third of the total proposed biosphere reserve area but as the population rises, increased pressures will be placed on the biodiversity as well as the allocation, distribution, and use of natural resources for the region's inhabitants.

NOTES

¹MOPAWI, "Ante-proyecto de Decreto de Ley de Creación de la Reserva de la Biosfera Tawahka," TMs, 1992, MOPAWI Offices, Tegucigalpa, Honduras, article 1.

²Peter H. Herlihy and Andrew P. Leake, "Propuesta: Reserva Forestal Tawahka Sumu," June, 1991, 10, Offices of MOPAWI, Tegucigalpa, Honduras, and author's possession.

³Ibid., 7.

⁴Peter H. Herlihy, " 'Wildlands' Conservation in Central America During the 1980s: A Geographical Perspective," in Geographic Research on Latin America: Benchmark 1990, ed Tom L. Martinson. (Proceedings of the Conference of Latin Americanist Geographers, No. 17). In press.

⁵Peter H. Herlihy, personal communication, 1992.

⁶"El Censo de los Sumos del Río Patuca," TMs, April 13, 1967, Offices of MOPAWI, Tegucigalpa, Honduras, and author's possession.

⁷Fernando Cruz, "Conociendo al Hondureño: Los Indios de Krausirpe," TMs, 1977, Offices of the Instituto Hondureño de Antropología e Historia, Tegucigalpa, Honduras, and author's possession.

⁸FITH, "Censo Comunitario de La Comunidad de Kraosirpi, Gracias a Dios," TMs, MOPAWI offices (Tegucigalpa, Honduras) and author's possession, Junio, 1989.

⁹Ibid., 7-8.

¹⁰Marianne Schmink, Kent H. Redford, and Christine Padoch, "Traditional Peoples and the Biosphere: Framing the Issues and Defining the Terms," in Conservation of Neotropical Forests: Working from Traditional Resource Use, eds. Kent H. Redford and Christine Padoch (New York: Columbia University Press, 1992), 7.

¹¹Ibid.

¹²Roy A Rappaport, "The Flow of Energy in an Agricultural Society," Scientific American 225 (3, September, 1971).

¹³Ibid., 76.

¹⁴Anthony Stocks, personal communication, 1992.

¹⁵For a detailed description of vegetative reproduction in rain forest agricultural systems, see A. Endre Nyerges, "Coppice Swidden Fallows in Tropical Deciduous Forest: Biological, Technological, and Sociocultural Determinants of Secondary Forest Successions." Human Ecology 17 (4, 1989): 379ff.

¹⁶Robert Rogers, personal communication, 1992.

¹⁷Herlihy and Leake, "Propuesta," 9.

¹⁸Thomas Young, Narrative of a Residence on the Mosquito Shore, During the Years 1839, 1840, and 1841: With an Account of Truxillo, and the Adjacent Island of Bonacca and Roatan, (London: Smith Elder and Co., 1842).

CHAPTER VI
- CRITICAL ANALYSIS -

Three major findings resulted from the study: 1) environmental degradation, characterized by deforestation, is occurring in the middle Río Patuca region due to the introduction of ecologically inappropriate land use practices; 2) Tawahka social use of the land is being impacted as a result of external environmental threats; and 3) the TBR's final establishment is being hindered by the complex and bureaucratic approval process. In Chapter VI, the findings are analyzed in terms of the following categories: 1) population and demographics; 2) Tawahka culture and environmental change; 3) the role of Tawahka women; 4) the political process; 5) reserve management; 6) sustainable development strategies; and 7) wildlands conservation and indigenous peoples. The extent to which these seven factors are integrated into the TBR's planning process will determine its long-term viability. On that basis, the critical analysis seeks to predict the TBR's effectiveness as an environmental and cultural protection strategy.

Discussion of Findings

Population and Demographics

The self sufficiency of Tawahka land use and subsistence patterns is tied directly to population pressure. Until now, Tawahka population has remained well below the carrying capacity of the natural resources upon which it depends. However, recent data indicate that internal population pressure is rising. Population increase, combined with

mounting outside pressures (i.e., the colonization front), could have major consequences for local ecosystems.

Results from the census survey conducted in March, 1992, reveal an extremely high growth rate. At an increase of 6.59 percent per year, the Tawahka population will double in just over ten years (see Appendix A, Calculations for Growth Rate and Doubling Time). Somewhat troubling is the fact that over half (53.6%) of the Tawahka population is under the age of fifteen. This means that 1) as this group is highly dependent, pressure to produce ever more amounts of subsistence goods will continue to rise for the foreseeable future, and that 2) population growth will accelerate during the next several years as children reach reproductive age.

What does Tawahka population growth mean in terms of TBR planning? Census figures gathered prior to Herlihy's 1990 population data are largely unreliable. However, in the last two decades there has been a substantial rise in the Tawahka population, with the sharpest increases in the past five years (see Appendix A, Table 4). Increased population pressures will have greater environmental impacts as larger amounts of subsistence goods will need to be produced. Without the guarantee that unoccupied territory will be available for additional agriculture, hunting, timber production, and extraction activities, traditional production methods and patterns will intensify on lands currently exploited. Shortened fallow periods, increased hunting, and greater timber use could result in the degradation of those natural resources.

Island biogeographical theory states that a reserve's size directly impacts on the number of species living within its borders. Wilson has predicted a 20 percent drop in species over a 50 year period in reserves of 20 square kilometers.¹ He goes on to state that in "regions where the natural habitat is highly fragmented, the rate of species loss is even greater."² Key to the viability of the proposed TBR is the protection of an extensive amount of land

surrounding the Tawahka's traditional territories. Of the TBR's 2,300 square kilometers, Tawahka land use practices (including hunting and agriculture) extend to only 770 km² of that area.³ These traditional subsistence lands would largely be protected for exclusive Tawahka use.⁴ Two thirds of the TBR's territory would strictly protect biological diversity while simultaneously promoting the survival of a culture that relies directly on the health of that ecosystem.

The increasing internal population pressure on resources, combined with outside environmental threats, could result in profound environmental and cultural changes in the middle Río Patuca region in the near future. Unknown at this time is what the carrying capacity of the region's resources are for the Tawahka population. However, calculations of the region's carrying capacity could be irrelevant if the pace of environmental degradation accelerates beyond the ability of the Tawahka to respond and adapt.

Tawahka Culture and Environmental Change

The Tawahka guamil system makes this indigenous group locally unique. As historically and presently practiced, this particular form of land use has many immediate and long-term benefits. First, as Rappaport has pointed out, crops maturing in the milpa "become(s) stratified and the plants make maximum use of surface area and of variations in vertical dimensions."⁵ This mimicking of the rain forest's structure (see Illustration 21, p. 99) encourages the protection of the thin tropical soil and promotes high photosynthetic efficiency.⁶ Second, continual harvesting over an extended period of time is possible because different crops reach maturity at different times. For example, the Tawahka cultivate eight types of beans. Some varieties mature in two months while others require at least three to four months before they can be harvested. In the case of perennial crops, continual harvesting may extend for several years. Third, the amount of loss due to plant-



Illustration 21. View of a milpa showing mimicking of multi-layered rain forest structure. Crops are sown simultaneously and continue to produce over a period of several years. This photograph shows banana trees, beans, and yuca being cultivated.

specific insect pests is reduced as crops are widely dispersed throughout the milpa. And fourth, as crops are harvested and plant debris decomposes in the milpa, essential nutrients are returned to the soil. These factors are key to the long-term efficiency of this particular land use pattern.

Besides providing food staples, the guamil is an ecotone: "As a boundary between cultivated field and primary forest, the guamil provides opportunities for genetic interchange and adaptive radiation."⁷ The guamil, although it continues to provide plant foods, is valuable as a gathering and breeding ground for selected game animals. As such, it may be called a managed wildlife area. The Tawahka specifically hunt certain animals known to congregate in the guamil. As Nations and Nigh have pointed out with the Lacandon Maya, "...certain species seem to have adapted to exploit this human-made niche, for they are found in larger numbers in acahual-bearing [guamil-bearing] areas than they are in totally wild situations."⁸ Changing land use patterns, however, could disrupt the cyclical nature of the guamil system, placing greater pressures on the regional ecology and Tawahka society.

Approximately one half to two thirds of Tawahka men migrate upriver during the dry season seeking wage labor jobs in the placer gold industry. These seasonal opportunities generally last from January through April and men may work part or all of that period. Although wages paid may bring hard currency into the Tawahka economy, this is usually not the case. Unless a Tawahka worker lives with friends or relatives, he stands little chance of actually returning home with saved earnings.

There is a significant social impact on Tawahka subsistence resulting from the placer gold industry. Collier has described this form of adaptation by traditional communities to changing economic conditions as the increasing need to work for money rather than for food.⁹ According to one informant:

It's not like it used to be. Now there are young men that go around just robbing food from others' milpas...It's different because there are more people and so more stealing goes on. Because they go up to wash gold through the dry season they don't have any milpas ready to plant once the rains start.

The fact that so many Tawahka men leave to seek wage labor positions in the placer gold industry has several possible explanations. First, because the need for hard currency within the Tawahka economy is pervasive and possibilities for earning cash wages through traditional means (selling crops, pipantes, cayucos) are limited, outside economic opportunities are sought. A second possible reason is that it may simply be "easier" to get a job upriver than clear and cultivate a guamil. A third possibility exists in that the Tawahka are simply taking advantage of an economic opportunity available to them. Regardless of these explanations, in the men's absence additional pressures are placed on women to maintain the home, care for children, and produce subsistence goods (see *The Role of Tawahka Women* below).

Logging rights in La Mosquitia are a particularly sensitive issue. Outside interests such as the Stone Container Corporation (SCC) and the Wellington Hall Caribbean Corporation view the region's forests as a vast source of potential income. Though their management plans ostensibly call for environmentally responsible policies and practices, local peoples have been excluded from the planning process. In addition, a formal environmental impact statement (EIS) for the SCC proposal was not required.¹⁰ In this case, the promise of new jobs was not enough to overcome widespread local and national resistance to the plan. In what was a first time occurrence in Honduras, a large-scale development scheme was shelved partly because the project planners failed to consult the very people who would be most affected by it.

Pipante and cayuco use and construction is a prime example of the role Tawahka cultural knowledge plays in maintaining their resource management system. The expenditure of time and energy in pipante and cayuco construction makes such a task

relatively costly, thereby limiting the number of trees felled and worked. Particularly important to note is how Tawahka social and cultural bonds are strengthened and renewed through this resource management practice. Pipante and cayuco construction reinforces social bonds and traditions that date back for generations while simultaneously regulating natural resource use. Large-scale logging would compete directly with pipante and cayuco construction by prohibiting, or excluding, free access to hardwood trees. Systematic removal of hardwoods would not only deny the Tawahka an essential--and traditional--source of income (the sale of cayucos) but would also destroy the social reciprocity created through pipante and cayuco construction. The environmental effects of large-scale logging could include biodiversity loss, erosion, and climate change. Social impacts on the Tawahka would include loss of income through the sale of pipantes and cayucos, a breakdown of relations among family and village members, and increased hardship in terms of transportation.

The colonization front and usurpation of forest lands by large-scale cattle ranchers is a threat the Tawahka have been confronting since 1989. The situation they face is summed up succinctly by one Tawahka man:

In 1989, the first colonists reached the Krautara zone. The idea of a reserve came about because of this--to keep the colonists from coming in. [Today] the problem in the Wampú is critical and the colonists are coming in quickly. I was there three days ago, hunting and fishing, and I saw many areas being deforested. The Wampú area is included in the Reserve and so the situation is urgent. At the river's edge is where there is deforestation. We think about how our children are going to be affected if we don't do something. We're worried that they won't be able to make pipantes, hunt, or fish. For now there is enough land for us older ones, but in the future there isn't going to be enough land for the little Tawahkas. We're worried about that.

Some argue that the Tawahka could themselves become cattle ranchers should legal title to vast areas of land in the middle Río Patuca region be awarded to them. Tawahka small-scale livestock activities differ from the environmentally threatening large-scale cattle ranching in two important ways: 1) In each Tawahka village no more than two to three

dozen head are kept at any one time negating the need to clear extensive pasture land. Though the Tawahka place great value on owning cattle, they lack the financial, technical, and practical means to purchase large herds and clear extensive tracts of land. Cattle roam freely throughout the community itself, grazing in grassy cleared areas. Large-scale operations depend on extensive tracts of pasture land. Furthermore, large-scale cattle production is an economic activity aimed at making money; not at providing subsistence goods. 2) The Tawahka see themselves primarily as farmers who tend the land rather than as ranchers who convert it. This philosophical mind-set is important in that it reveals a Tawahka "land ethic."¹¹ Put plainly, it is acceptable for an individual to own two or three cows, but bad to own more. One Tawahka man stated in response to this question that "...[we] aren't accustomed to having cattle. The land [when cleared] becomes very hot and loses its fertility." This statement reflects a world view shared by indigenous peoples around the world; that land and resources are to be passed on to succeeding generations. As Gray states: "...the community does not simply own the land as individual property, but its members are custodians of the land passing an inheritance received from the ancestors to the generations yet to be born."¹²

Environmental and social impacts could result as the Tawahka lose access to natural resources by 1) having to travel further to use them, or that 2) outsiders claim resources to the exclusion of the Tawahka. Environmental changes include: 1) deforestation and subsequent loss of biodiversity; 2) increased sedimentation of the Río Patuca; 3) air pollution from increased slash and burn activities; 4) watershed destruction; and 5) climate shifts. Tawahka society could undergo change in the following ways: 1) alteration of land/resource use patterns; 2) increased population pressure; 3) loss of cultural identity; 4) disintegration of social controls; and 5) a decline in subsistence farming as cash cropping is emphasized.

Adaptation to environmental changes depends on the rate at which the Tawahka are forced to confront them. As the consequences of the advancing colonization front, large-scale cattle ranching, and other outside resource exploitation schemes become clear, the Tawahka's ability to withstand, resist, or adapt to new environmental conditions will be tested. Indeed, the social impacts of these environmental threats are already being felt by the Tawahka.

The Role of Tawahka Women

Tawahka women are major contributors to Tawahka subsistence. As is the case with 90% of women in Less Developed Countries, their roles in agriculture, animal husbandry, the commercial sector, and the household intimately tie them to the environment.¹³ With growing numbers of men seeking outside employment for greater lengths of time, the burden of maintaining the household, managing guamiles, and providing other subsistence goods places increased pressure on women's roles and duties.

Women in indigenous societies are frequently assumed to automatically benefit if social and/or economic conditions improve for the group as a whole.¹⁴ Yet many times, such changes occur at the expense of women.¹⁵ This is especially true concerning issues of land use and ownership. If these types of issues are resolved based solely on male viewpoints and participation women can, as Rocheleau points out, lose traditional rights because of "poorly conceived land tenure reform or land settlement projects."¹⁶

Though women may, on the surface, agree with "improved" conditions, their true responses can result in profound social impacts. The impacts that women may endure include increased work duties and gender inequalities that, in turn, result in voluntary emigration, arranged or forced marriages, or even increased suicide rates.¹⁷ Including women's input in processes of change (especially regarding resource use) can help to avoid disastrous social consequences. To this end, Rocheleau outlines five key areas for policy

consideration: 1) the definition of tenure security must be broadened to include women's roles; 2) gathering activities must be legally recognized in regard to land use definitions; 3) recognizing and promoting women's roles in processing and marketing products; 4) recognizing and expanding women's access to decision-making roles regarding land and resources; and 5) strengthening the status and power of rural women's organizations.¹⁸

Future conservation and development projects in the region absolutely *must* take into account the role of Tawahka women in resource use and management. At the time this research was undertaken, there was one woman on FITH's governing board. However, input from women at large should be encouraged. Due to lack of time and other research limitations this study was unable to adequately determine, either through fieldwork or through secondary data, the amount of women's input into the TBR's planning process. The need for detailed research in this area is outlined in the Future Research Needs section of Chapter VII.

Political Process

Various plans for delimiting and implementing the TBR have undergone review by several national and international agencies, independent researchers, and Honduran government ministries.¹⁹ The TBR's establishment is based on a delicate and complicated political process wherein formal research and documentation is weighed along with national socioeconomic concerns, development strategies, and the needs of the Tawahka people themselves. Its permanent establishment is dependent on approval by the Honduran National Congress.

FITH was formed in 1987 to give a political voice to the Tawahka people in Honduran national society. Its directorate is made up of eight members: a president, vice-president, secretary, treasurer, comptroller, and three speakers who represent the other Tawahka villages. FITH outlines its overall goal as: "Seeing and studying the current reality of our

people, a profound urgency for unity arises in our hearts--if our ancestors united in their time to fight against the cruel conqueror, Tawahka unity is needed today to combat the giant wave of destruction brought on by modernization."²⁰ The first FITH congress was held the 19-21 of September, 1987, during which several objectives were defined:²¹

- 1) To develop the cultural identity and unity of the Tawahka people, and strengthen ties with other ethnic groups of the country.
- 2) To struggle for the observance of Article 346 of the Honduran constitution recognizing the rights and interests of indigenous communities.
- 3) To seek the protection and development of ethnic groups through direct representation.
- 4) To secure the land and natural resources which historically belong to the Tawahka.
- 5) To revive and strengthen the ethno-historical identity of the Tawahka to form an authentic historical and social consciousness.
- 6) To validate and strengthen the native Tawahka language through bilingual and bi-cultural education.
- 7) To improve living conditions in Tawahka communities through coordination with national and international agencies.

FITH received legal recognition from the Honduran government on April 18, 1988.²²

This official status awards the Tawahka the legal right to petition for the protection and development of resources which historically belong to them. Since then, FITH has had measured success in lobbying the national government for official recognition of their land claims (see Appendix B, Figure 2).

In 1989, the FITH directorate concluded that formal protection of the region was the only way to ensure survival of their culture with its traditional dependence on the rain forest's resources. That same year, a MOPAWI sponsored expedition along the upper Río Patuca gave FITH leaders the opportunity to see, firsthand, the "proximity and severity" of the influx of colonists (see Map 4). FITH requested that INA, the *Instituto Nacional Agrario* (National Agrarian Institute), which is charged with granting land tenure rights in Honduras, approve their case for a protected area. Over the next several months, INA

studied the situation and in July, 1989, agreed to provisionally legalize the Tawahka's land claims (see Appendix B, Figure 2). In November of that year, Kraosirpe was the first to be awarded direct control over a territory of 7,500 hectares under this agreement. As one FITH member recounted, "[Two FITH representatives] went to INA in response to 'colonos' coming into the Wankibila zone. They got the decree in the name of Kraosirpe as a provisional guarantee." More importantly, it was followed up with action to remove an initial group of Ladino colonists from the region.

However by 1990, as a result of land use studies conducted by cultural geographer Peter Herlihy, it became clear that land claims granted under the initial agreement between FITH and INA were not sufficient to guarantee the Tawahka access to lands essential to their subsistence strategies and patterns. The concept for a larger protected area grew out of Herlihy's study.²³ This idea was presented by Herlihy, MOPAWI, and FITH to INA, which concluded that Indian lands would have to include a larger, surrounding area of forest and agreed to consider establishing an "Indian Forest Reserve" in the region measuring approximately 2400 km².

Since the idea of a reserve first arose, several name changes have been considered and discarded. These changes reflect the larger difficulty of defining a specific legal and conceptual framework upon which such a protected area would be modeled. At various times the reserve has been labeled the Reserva Tawahka, Reserva Forestal Tawahka, Reserva Biologica Tawahka, Reserva Biologica/Cultural Tawahka, Reserva de Biosfera Tawahka, and Reserva Antropologica/Cultural Tawahka.²⁴ The ambiguous nature of defining the TBR's purpose is exacerbated by the fact that INA lacks a formal policy regarding granting collective land entitlement to indigenous groups. A series of national protected areas does exist in Honduras with the specific aim of environmental protection.²⁵

However, this program excludes human activities (agriculture, hunting, fishing, etc.) within a park's borders and would not necessarily apply to the TBR.

Since 1988, MOPAWI's Land Legalization program has worked with the Tawahka and the Honduran government to establish a formula for creating a protected area which combines strict environmental protection while simultaneously upholding the Tawahka's right to continue their traditional subsistence activities and land use patterns.²⁶ As a mediator between the Tawahka and the Honduran government, MOPAWI has provided technical support to both sides. MOPAWI's assistance has been key to raising Tawahka awareness regarding the need to pursue legal claims to their land.²⁷ Similarly, working within the Honduran government's established legal framework has allowed MOPAWI to maintain a measure of neutrality, thereby avoiding the pitfall of paternalism that can foster resentment of an outside organization's actions.

IHAH is charged with the protection of the country's cultural heritage and, indirectly, the preservation of its environment, as well. According to IHAH's chief ethnologist, Fernando Cruz, National Decree 81-84, *Ley Para la Protección del Patrimonio Cultural de la Nación* (National Cultural Heritage Protection Law), implies the simultaneous protection of Honduras' cultural and natural heritage.²⁸ In regard to the TBR, he goes on to state that land entitlement is not "giving land to the Indians but instead is an environmental and cultural solution to a potentially devastating problem if the colonization front reaches the Patuca."²⁹ Cruz proposes a protected area consisting of three zones similar to how United Nations' biosphere reserves are demarcated.³⁰

Two other plans for the creation of a Tawahka Reserve propose delimiting the protected area as part of the Río Plátano Biosphere Reserve. In the first plan, Salaverri and Murphy recommend a clearly defined protected core, an area designated exclusively for Tawahka land use activities, and a buffer zone to absorb the colonization front.³¹ Based on FITH's,

MOPAWI's, and Herlihy's TBR proposal, this idea enlarges the TBR area to include lands not traditionally used by the Tawahka. The second plan, proposed by the German consortium, GFA, would cut in half the Tawahka's traditional lands, in effect lumping the protected region in with the RPBR.³² This proposal mentions the establishment of an "Indigenous Reserve" for the Paya and Miskito Indians on the reserve's northern boundary but fails to include Tawahka land use patterns in its design.³³

Reserve Management

The long-term viability of a protected area depends in large part on the foundation laid during its planning stages. Such a foundation must include flora and fauna inventories and studies, land use mapping, historical antecedents, and input from local peoples. Such input should include leadership positions and decision making roles for indigenous peoples, as well as encouraging community involvement in the planning process.

Two criteria are implied within the definition of the TBR's management: 1) how will protection of the reserve area be carried out, and 2) who will be responsible for implementing it? Despite the rise in their population, natural resource exploitation by the Tawahka remains stable. Herlihy's figure of 77,000 hectares under active subsistence use (including all agriculture, hunting, fishing, and extraction activities) remains unchanged.³⁴ This figure accounts for less than a third of the total proposed TBR area.³⁵ In other words, the immediate threat to the region's ecosystem comes from external forces rather than Tawahka land use practices.

Management of the reserve, however, could prove to be problematic as the Tawahka perceive that they lack the administrative skills to carry out such a task. As one informant stated, "...The *ganaderos* [cattle ranchers] in Tabacón and in Wampú aren't going to be moved out easily. If the national government approves the reserve, then INA is going to have to help make them leave. We don't think we should have all the responsibility." A

FITH representative echoed this concern: "We're not prepared to manage the reserve because we haven't been trained. We were counting on national authorities to help us." Reserve management, in this context, includes delimiting, demarcating, and maintaining vigilance over the reserve's boundaries, documenting and reporting violations, approval and financial accounting of research and/or development projects, proposal writing, community organizing, and FITH's organizational functions. MOPAWI, Cultural Survival Inc., and (to some extent) CAHDEA, the *Consejo Asesor Hondureño para el Desarrollo de las Etnias Autóctonas* (Honduran Advisory Board for the Development of Autonomous Ethnic Groups) have, and continue, to provide training for FITH in administrative skills.

Two examples of indigenous management of forest reserves could provide a framework from which TBR management may be adapted: 1) the *comarca* system of the Kuna Indians in Panama, and 2) the Awá Indian Reserve in Ecuador. The *comarca* system in fact provided the original blueprint upon which the TBR is modeled.³⁶ Although significant cultural and resource use differences exist between these examples and the Tawahka, they each have in common the principle that indigenous management of the reserve area is central to long-term effectiveness.

The *comarca* "homeland" is a semi-autonomous territory administered and governed by the Kuna. However, a *comarca* can only be legally established through the approval of the national legislature and executive decree. The *comarca* is a geopolitical unit within the boundaries of a larger entity: the nation. Herlihy defines the *comarca* as "an Indian homeland with semiautonomous political organization under the jurisdiction of the federal government."³⁷ The *comarca* system provides a number of benefits for both the Indians and the State. These benefits include 1) conservation of natural resources, 2) national or frontier security, 3) stabilization of migration patterns, 4) scientific research, 5) economic benefits, and 6) protection of cultural heritage.³⁸ The primary advantage of the *comarca*

system is that the State may rule a minority population while recognizing the Indians' rights to land and self-determination, "thereby maintaining the natural and cultural heritage of the region and culture group."³⁹

In 1988, the Awá Ethnic Reserve was established in Ecuador to prevent the loss of native lands and biodiversity. In 1985, the Awá (also known as the Cuaiquer⁴⁰), an indigenous group of about 7,700 living along the Ecuadoran and Colombian border, began a campaign to claim their traditional lands.⁴¹ By clearing a 240 kilometer long *manga*, or swath, carved out of the rain forest, the Awá demarcated their territory prompting the national government to approve the Reserve. Current efforts to create a biosphere reserve--the Awá International Biosphere Reserve--under UNESCO's MAB program attempt to combine the Ethnic Reserve with the neighboring La Planada Nature Reserve in Colombia. The key to this project's success, however, is the Awá's continued involvement in its planning and implementation. In addition to incorporating "traditional [Awá] knowledge in regard to the management of natural resources...it is expected that in the coming years the interdependence of the Awa Indians and the *campesino/colono* segment of the population, can lead to mutual benefits and respect."⁴²

A tentative management hierarchy for the TBR has been proposed (see Appendix B, Figure 3).⁴³ A Directive Commission and Executive Secretariat would handle administrative duties at the national level. At the local level, the Directorship of Reserve would be sub-divided into three units: 1) a Protection Department, 2) a Development Department and, 3) an Education Department. Ideally, these positions would be staffed by Tawahka individuals and receive outside technical support.

Sustainable Development Strategies

Biosphere reserves may be considered a key component of a national sustainable development strategy. In addition to their environmental, social, and esthetic objectives,

the economic benefits of maintaining intact fragile ecosystems far outweigh the short term economic gains of extracting an area's natural resources. In Honduras, the TBR would preserve valuable biological and cultural wealth.

If development strategies use only GNP as the prime indicator of economic feasibility, the creation of forest reserves such as the TBR are expensive and wasteful investments. Because the natural resources protected by such reserves are not used (in a productive sense) the return on the original expenditure does not show up in GNP calculations. For less developed countries like Honduras, this is particularly problematic because it translates directly into sensitive social, political, and economic issues. For example, the only way to attach a monetary value to a tree in La Mosquitia is to put it to social use; log and sell it, cut it down and convert the land to pasture, and/or tally up the numbers of small peasant farmers "slashing and burning" that tree for agricultural purposes. Excluded from GNP calculations is the fact that La Mosquitia's forest resources *are* used in a productive capacity to support the region's indigenous societies. As Leake points out, La Mosquitia's forests are undervalued as a result of Honduras' current political and economic framework where long-term sustainable resource management strategies are forfeited at the expense of short-term financial gain.⁴⁴

As international financial bodies and national governments attempt to value the economic feasibility of *not* using a particular resource or resources, development strategies involving conservation/preservation goals will continue to struggle for institutional recognition and acceptance. In the case of the TBR, the political and economic aspect of land ownership rights further complicates the issue. Granting the Tawahka "ownership" of their traditional lands would signal a major step for other indigenous groups seeking greater autonomy.

The concept of sustainable natural resource management has recently come under increased scrutiny. Historical evidence documenting large-scale fisheries and forestry management suggests that maximum sustained yield (MSY) may be impossible to achieve.⁴⁵ Ludwig et al., claim four factors prevent sustainable resource management: 1) greed, 2) scientific uncertainty, 3) the complexity of natural systems and, 4) the tendency for overexploitation to be “masked” initially.⁴⁶ However, research that includes human motivations and responses as major components of natural resource use may help to more efficiently manage natural resources. "Resource problems are not really environmental problems: They are human problems that we have created at many times and in many places, under a variety of political, social, and economic systems."⁴⁷

A more urgent question is that posed by Southgate and Clark who ask if local communities can realistically be expected to support habitat conservation strategies.⁴⁸ Biodiversity conservation is hampered for several reasons, one of which is that "projects often reflect wishful thinking about local communities' regard for natural ecosystems."⁴⁹ They go on to state: "...attempts to set up...reserves or to demarcate park boundaries are unlikely to withstand the onslaught of loggers, farmers, ranchers, and prospectors."⁵⁰ Instead, programs encouraging efficient resource exploitation and agricultural production in areas away from frontier lands should be emphasized.

Wildlands Conservation and Indigenous Peoples

Herlihy calls for the protection of wildlands and indigenous peoples by creating "cultural parks" or "ethnic wildlands."⁵¹ Recognizing the common needs of natural and cultural environments is key to the convergence of the two interests in unified resource management plans. However, the perception that indigenous peoples are being confined to a "human zoo" and relegated to the role of cultural exhibits is a delicate issue that requires attention.

Though intended to benefit traditional peoples, "enforced isolation" of indigenous groups may actually cause irreparable harm.⁵² This approach has been used most notably with the Tasaday peoples of the Philippines.⁵³ Beauclerk, et al., outline the major drawbacks to this protection strategy: 1) invasion of indigenous lands often occurs prior to establishment of land rights making attempts to enforce isolationist policies impossible; 2) indigenous peoples usually have little or no input into the creation of such reserves, effectively depriving them of the right to self determination; 3) the acquisition of knowledge and new skills to defend themselves is denied to traditional peoples if they are forced into isolation; and 4) the creation of human zoos embodies the paternalistic viewpoint that top-down development strategies often use. Finally, he goes on to state:

Even though sincerely held, this argument [for enforced isolation] may lead to making a fetish of traditional culture--to treating it as a museum object or an endangered species. Cultures cannot "suffer"--people can. All societies, even the most remote, are continually changing, and those who live in indigenous societies are usually only too well aware of ways in which their lives could be improved.⁵⁴

Recently, the concept of the biosphere reserve's role has come under debate. Dyer and Holland argue that particular ecosystems are over-represented in the MAB program and, as a result, others are neglected though the need for protection is equally great.⁵⁵ Because of changing environmental concerns and needs that emerged during the 1970s and 80s, principles of landscape (or regional) ecology need to be included in biosphere reserve designs: "...[the biosphere reserve concept] should be built around landscape-level ecological and sociological paradigms that can address regional tasks. The approach also should be sufficiently flexible to allow additions and changes in direction as new problems and solutions are encountered."⁵⁶

The TBR incorporates aspects of the "landscape-level" planning to which Dyer and Holland refer. Tawahka involvement in land use mapping was considerable,⁵⁷ making the reserve's design a direct reflection of their resource management activities. It provides for

evolving land use patterns (i.e., changing hunting lands, clearing of new guamiles) to account for fluctuations in demographics and population.

Chapter Summary

In Chapter VI, the discussion has focused on a critical analysis of the findings in seven main categories: 1) population and demographics; 2) environmental change; 3) the role of Tawahka women; 4) the political process; 5) reserve management; 6) sustainable development strategies; and 7) wildlands conservation and the role of indigenous peoples. The Tawahka's traditional way of life is rapidly changing as a result of the above factors. Tawahka population will continue to rise in the coming years, with a disproportionate amount reaching child-bearing age in the near future. Traditional agricultural and timber use activities could be negatively altered if men continue to seek wage labor jobs outside the community. Greater burdens would, as a result, be placed on Tawahka women. Questions remain regarding the formal establishment of the reserve, and more importantly, how and by whom it will be managed. Though the Tawahka have played a key role in the TBR's planning process, predicting the reserve's long-term effectiveness on this basis alone is problematic. Finally, debate continues on the sustainability of development projects (including the establishment of nature reserves) as well as the role indigenous peoples and local communities play in habitat conservation.

NOTES

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CHAPTER VII
- CONCLUSION -

This thesis addresses four basic research questions that concern: 1) the region's primary environmental threats; 2) Tawahka land use and subsistence activities; 3) the extent to which the TBR will help to detain the advancing environmental threats; and 4) the Tawahka's role in planning the TBR. A colonization front and large-scale cattle ranching are the two primary environmental threats in the region. The Tawahka and the outside agencies involved in the TBR's establishment acknowledge that if these threats are not stopped, the region's environment will be irrevocably altered. Until now, Tawahka land use and subsistence systems have functioned in a manner that has had a minimal impact on the region's ecology. However, as internal population pressures rise and environmental threats from the outside continue to move into the area, this balance may be disrupted.

Conclusions and Implications

Conclusions

The major conclusion drawn from this study is that wildlands conservation as a dual environmental and cultural protection strategy may be viable when certain basic guidelines are followed. Few dispute the fact that habitat conservation is urgently needed for the protection of biodiversity. Likewise, the legitimate needs and rights of indigenous/local communities must also be recognized. A protection strategy, like the proposed Tawahka Biosphere Reserve, that strives to guarantee the long-term survival of a region's natural and cultural heritage should observe the basic guidelines outlined below:

- 1) Land use mapping of indigenous/local resource use must rely on input from those communities. Cultures cannot, indeed should not, be expected to change to meet the wishes of conservationists. Furthermore, reserves need to be established before invasion from outside environmental threats occurs.
- 2) Environmental threats must be clearly defined to determine appropriate responses for counteracting the effects of resource overexploitation, biodiversity loss, pollution, and population pressures.
- 3) All individuals and parties involved in the planning process must reach agreement on the protected area's objectives and long-term goals. This process involves research and documentation, education and training, and compromise and consensus-building.
- 4) Environmental protection strategies must be coupled with an overall national program designed to address issues of agricultural production, unemployment, and land tenure in other regions of a country.

As currently designed, the TBR will protect the natural resources upon which the Tawahka depend. However, as Southgate and Clark state, that may not be enough to detain the movement into the area of migrant farmers, cattle ranchers, loggers, and others seeking economic opportunities.¹ Furthermore, disagreement concerning the TBR's goals and purpose could serve to undermine its long-term viability. A common complaint encountered by the principal investigator was that "too much land was being given" to such a small indigenous group. Hence, political tensions have arisen as the focus on the land tenure issue has overshadowed the TBR's biodiversity conservation objectives.

Nonetheless, the TBR would place a large area under protective status, guaranteeing the Tawahka access to traditional land and resources while simultaneously preserving the Río Patuca ecosystem. Additionally, the TBR's planning process has, to some degree, included the guidelines proposed above. In Chapters III and IV, how the TBR's design incorporates cultural attributes and responds to the region's primary environmental threats is examined. The description of land use patterns in Chapter V is intended to complement existing studies of Tawahka resource management practices. Finally, in Chapter VI, analysis of the social, political, and economic factors shows various strengths and

shortcomings in the TBR's design. Strengths include local involvement, the relative absence of colonists in the reserve area, official INA support, and the link to a regional strategy for habitat conservation. On the other hand, the TBR's design cannot control or promote FITH's effectiveness as a political organization, the pervasiveness of outside economic opportunities for the Tawahka, or government implementation of policies that have exacerbated environmental degradation in other regions of Honduras.²

Controlling the migration of hundreds, even thousands, of disenfranchised peasants into frontier lands is, for all practical purposes, impossible. The volume of Ladino migrants into the region is prompted by factors that are outside the ability of the TBR to adequately address. The root causes of internal emigration (land tenure, natural resources scarcity, population pressures, economic hardship) are complicated issues to be resolved at a national, as well as regional, level. In other words, simply declaring a region "protected," regardless of local involvement, is not sufficient over the long-term if poverty-stricken outsiders, in their desperation, are intent on exploiting (apparently) available resources.

Implications

The establishment of the TBR has several implications for the future of the Tawahka, Honduras, and international conservation. The influence of national Honduran society will have an impact on Tawahka culture, regardless of conservation measures taken in the region. As their population grows and outside socioeconomic influences continue to be felt in the middle Río Patuca region, traditional Tawahka cultural adaptive mechanisms will be tested. At the same time, however, it is those very mechanisms that must be incorporated into the conservation and development strategies undertaken in the region.

Honduras as a nation is being forced to make difficult choices between conservation of its natural resources and sorely needed economic and social development. The TBR is an

environmental protection strategy which recognizes the immediate and long-term concerns of the indigenous peoples whose survival depends on the region's natural resources but also lays a groundwork upon which future economic development choices may be based. Additionally, establishment of the TBR would have positive implications for international cooperation in environmental protection serving as a key link between the Río Platano Biosphere Reserve to the north and the proposed Bosawas Biosphere Reserve to the south in Nicaragua.³

Limitations and Future Research

Limitations

Time in the field was limited to two months, thereby prohibiting the observation of most seasonally based subsistence activities. Also, as discussed above, this exacerbated the possibility that certain activities' were given unnecessary prominence by informants while insufficient time was available to verify this data. Though it was possible to draw particular conclusions during this time span, further observation and documentation is needed for a more complete analysis of guamil practices, timber use, extractive activities, and fishing and hunting.

Observation and analysis of a wide range of data were completed by a single researcher. On the one hand, this allows great freedom of movement in following up and concentrating on particular topics. In addition, because several data collection methods were used, cross-referencing and verification of results could be standardized. At the same time, however, the researcher runs the risk of being overwhelmed by the sheer volume of information gathered, thus neglecting points that could prove crucial upon later inspection.

The census survey was hampered by the inconsistency of the methodologies used in each village. In the largest and smallest villages--Krausirpe and Wampusirpi--firsthand data collection by the principal investigator was possible. However, in the other three main Tawahka villages--Krautara, Yapuwas, and Kamakasna--census data collection relied on third person accounts. Though overall population figures may be imprecise, they nonetheless reflect a significant increase among the Tawahka in recent years.

Fieldwork was hindered in that the principal investigator did not speak the native language(s). Many informal meetings and conversations at which the investigator was present took place in Tawahka and Miskito. This language barrier prevented the investigator from recording specific facts, viewpoints, opinions. Future research may be enhanced by emphasizing communication and interactions in the native languages.

Ethnographic studies are hampered by the, unintended but very real, cultural biases the researcher brings to such work. The researcher, being a product of his/her culture, carries values, opinions, and other cultural "baggage" that may be explicitly recognized from the outset but that, nonetheless, shapes the type and amount of data collected and reported. Decisions regarding which questions to ask, which activities to track, which informants' responses deserve more weight, and so on, are affected by priorities determined by the investigator. By extension, informants' responses will be conditioned by the perceived aims of the research. For example, in an effort to appear more cooperative, the informant may "enhance" certain aspects of an activity that, under different circumstances, would be irrelevant.

Patton describes four ways an investigator's presence may distort the findings of a qualitative study. These are: 1) participant reactions to the researcher, 2) changes in the researcher during the course of the study ("going native"), 3) researcher bias, and 4) researcher incompetence.⁴ In the case of the first two concerns, the investigator has the

responsibility to recognize and document the problem, and then decide how to handle it. Sufficient time in the field and careful monitoring (through daily observations, field notes, introspection, and conversations with informants and colleagues) provide the primary means by which to measure these effects.⁵ The third concern, investigator bias, presents a greater challenge to data collection, analysis, and interpretation. Although bias is impossible to avoid, Patton argues that firsthand experience inevitably produces perspective that is essential to qualitative research. He calls this "emphatic neutrality," or the idea that "an evaluator [is] perceived as caring about and interested in people but neutral about findings."⁶ A researcher's competence is demonstrated through past experience and their personal and professional qualifications. A track record that neither overpromises nor underproduces establishes the "quality of analysis" of a given study.⁷

Future Research Needs

As Herlihy states, documenting the social use of the land is the first step in environmental and cultural protection of indigenous occupied wildlands.⁸ A preliminary understanding of natural resource use by such groups and the resulting environmental impacts is essential to designing protection and/or sustainable use strategies in wildlands regions. Though current studies demonstrate the efficiency of Tawahka land use practices, further research is needed. As noted above, such studies should take place over extended periods of time.

Further documentation and analysis of the Tawahka guamil agricultural system is needed. Agroecology research and its practical application to development strategies should be a priority in regions where tropical rain forest is found. Traditional resource management systems as practiced by indigenous groups have much to offer in designing development strategies in wildlands areas. For instance, Tawahka guamil management needs to be monitored over long periods to determine precisely what services and benefits

are provided by this particular land use practice. This data may then be used to design strategies that address the resource management needs of small farmers, particularly Ladino immigrants.

Nations and Nigh demonstrated the role of the Lacandon Maya acahual agricultural system as an ecotone that maintains viable wildlife populations.⁹ The Tawahka guamil system is similar in many respects and plays an identical role in providing habitat for many animal and bird species. The guamil serves not only as a hunting ground for the Tawahka but also as a suitable breeding area for many species. This phenomena needs to be tested through observation over an extended period of time, however. Recording and tallying species found in selected guamiles would be the first step in documenting the guamil's role as an ecotone. Further study of the number, types, and frequency of species hunted in the guamil would be needed to complement the above data.

Wilson estimates that less than half the world's plant and animal species have been identified, collected, and/or catalogued.¹⁰ Baseline studies and wildlife inventories need to be undertaken in the middle Río Patuca rain forest. Though many species commonly found in rain forest habitats are known to exist there, a systematic study of the region's biodiversity has yet to be completed.

Ethnobotanical studies have, in recent years, become increasingly important as researchers seek to document indigenous knowledge of medicinal plants. The application of such knowledge to contemporary society holds great promise for treating a myriad of health problems. Indeed, Myers has estimated that pharmaceuticals derived from natural sources (in Southeast Asia alone) could be worth \$10 billion per year.¹¹

The need for ethnobotanical research among the Tawahka is particularly urgent. As Western medicines become cheaper and more readily available in the region, traditional cures and practices are gradually being discarded. There is one Tawahka man in Kraosirpe

who is generally acknowledged as one of the last remaining persons with extensive knowledge of traditional medicinal plants. For example, there is a root said to cure the effects of the bite of the fer-de-lance (*Bothrops atrox*), a highly venomous pit viper. The treatment involves pounding the root to a pulp and extracting the liquid. Leaves from the plant are then ground up and added, with water, to the root extract. This mixture is then administered to the victim in four doses at two hour intervals. According to this and other informants, this cure is quite effective but the knowledge is in danger of being lost if not passed on or somehow documented.

Division of natural resource use along gender lines demands extensive future study. As noted earlier, Tawahka women are intimately involved in all land use and subsistence practices. For instance, research is needed comparing the daily tasks of female heads of households with women's duties in households headed by males. Future development (including conservation/preservation) strategies must integrate women's roles into their designs.

The fact that so many men travel upriver in the dry season to work in the placer gold industry places additional burdens on Tawahka society, especially women. Monitoring this trend over an extended period of time (several seasons) could determine the number of men, their demographic profile (age, social position, economic needs), and the given reasons for seeking this type of work. In addition, two major aspects of this phenomena merit further investigation. One, if fewer guamiles are prepared, to what extent does the amount of foodstuffs harvested and/or hunted change? And if so, how? Two, if women now bear the burden of preparing and farming the guamil, how is their role in traditional resource management activities changing? These issues, viewed through a political ecology perspective, clearly demonstrate that external forces are affecting the Tawahka's ability to adapt to new environmental and cultural conditions.

Several practical and cultural concerns need to be addressed in the planning of future research, however. Very few Tawahka women speak Spanish so it is recommended that future investigators be conversant in Miskito and/or Tawahka. Given cultural considerations and gender issues, a female researcher would be more likely to establish trust with a communities' women than would a male researcher. Indeed, women fieldworkers are often the first requirement, though they may still find it difficult to obtain information.¹²

Two related types of research needed in the region are remote sensing surveys (both large and small-scale aerial photography) and development of a Geographic Information System (GIS) database for the middle Río Patuca. Both these technologies have a wide range of applications including environmental change, population and demographics tracking, geologic surveys, land use mapping, and botanical surveys.

As a component of any future study designs in the middle Río Patuca, photographic documentation of the region's environmental and cultural attributes should be a priority. Video and still photography are valuable tools for preserving images for contemporary and future scientific study.

Finally, the Tawahka themselves need to be actively incorporated into all future research activities, as well as reimbursed for their work and knowledge. Indigenous peoples' roles in scientific pursuits include acting as informants/guides, in data confirmation, or as experimenters themselves. In much the same way that development projects must include input from local peoples, so too must research projects. Schmink, et al., write:

There is an unfortunate tendency to see this partnership as a mandate to tap or appropriate indigenous knowledge. Because of its profound cultural and social roots, ethnobiological information is much more than just another commodity. Traditional concepts, analysis, and experimentation can suggest new directions for research and policy, especially in cases when local people are active participants in resource management projects and, for example, can themselves be the

experimenters. Traditional peoples can teach us a new appreciation for diversity in ways of seeing a changing world and our own place in it.¹³

The proposed TBR is but one example of the choices being faced by countries around the globe, including More Developed Countries (MDCs). Whether the issue is conserving the old-growth forests of the United States' Pacific Northwest or tropical rain forest in La Mosquitia, balancing ecological considerations with the needs of local peoples is central to the planning and implementation of all conservation development strategies. In regards to the "timber summit" held by U.S. President Bill Clinton in Portland, Oregon on April 2, 1993, the Christian Science Monitor editorialized that "The drama being played out in the Northwest is similar in many ways to the one being played out on the world stage in developing countries: Tensions arise in the attempt to balance environmental responsibility in exploiting natural resources with the legitimate need for economic growth."¹⁴

The Robert McC. Adams quote which opens this thesis makes clear that, above all else, the preservation of the planet's environmental and cultural heritage is a profound ethical issue. Environmental protection strategies, whether implemented for utilitarian or protectionist motives, to a greater or lesser degree, acknowledge nature's inherent right to exist. The people who depend on an area's natural resources for survival must also be guaranteed that right. Whether they are Tawahka Indians, Ladino farmers, or U.S. loggers, the link between their dignity and cultural freedom and the environment on which they depend must be explicitly recognized. Humans, as a species, cannot continue to exist without the world's great wildlands. It is indeed ironic that those wild places cannot exist without us.

NOTES

¹Douglas Southgate and Howard L. Cox, "Can Conservation Projects Save Biodiversity in South America?" Ambio 22 (2-3, May, 1993): 163.

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- ²Susan C. Stonich, "The Dynamics of Social Processes and Environmental Destruction: A Central American Case Study," Population and Development Review 15 (20, June, 1989): 281.
- ³Peter H. Herlihy, " 'Wildlands' Conservation in Central America During the 1980s: A Geographical Perspective," in Geographic Research on Latin America: Benchmark 1990, ed Tom L. Martinson. (Proceedings of the Conference of Latin Americanist Geographers, No. 17). In press.
- ⁴Michael Quinn Patton, Qualitative Evaluation and Research Methods, 2nd Ed., (Newbury Park, California: Sage Publications, 1990), 473.
- ⁵Ibid., 474.
- ⁶Ibid., 475.
- ⁷Ibid., 476.
- ⁸Herlihy, "'Wildlands' Conservation in Central America ."
- ⁹James D. Nations and Ronald B. Nigh, "The Evolutionary Potential of Lacandon Maya Sustained Yield Tropical Forest Agriculture," Journal of Anthropological Research 36, (1, Spring, 1980).
- ¹⁰Edward O. Wilson, "Threats to Biodiversity," Scientific American 261 (3, September, 1989): 60.
- ¹¹Norman Myers, The Primary Source: Tropical Forests and Our Future, (New York: W.W. Norton & Company, 1992), 224.
- ¹²John Beauclerk and Jeremy Narby with Janet Townsend, Indigenous Peoples: A Fieldguide for Development, (Oxford: Oxfam Printing Unit, May, 1988), 47.
- ¹³Marianne Schmink, Kent H. Redford, and Christine Padoch, "Traditional Peoples and the Biosphere: Framing the Issues and Defining the Terms" in Conservation of Neotropical Forests: Working from Traditional Resource Use, eds. Kent H. Redford and Christine Padoch (New York: Columbia University Press, 1992), 10.
- ¹⁴"Timber Decisions," Christian Science Monitor 85, April 5, 1993, 20.

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**Appendix A: Census Survey Data of Tawahka Indians in the Middle Rio
Patuca Region, La Mosquitia, Honduras**

Conducted by Mark D. Caicedo and Anastacio Gonzales, March, 1992

CALCULATION OF GROWTH RATE FOR TAWAHKA INDIAN POPULATION;
1990-1992

General formula: $\ln P_n/P_o = n \ln (1+a)$

Po=639 (Tawahka population; 1990)
Pn=726 (Tawahka population; 1992)
n=2 (# years between population figures)
A = rate of increase (%)
Ln=log of n

$$\ln 726/639 = n \ln (1+a)$$

$$\ln 726/639 = 2 \ln (1+a)$$

$$\ln 1.13615 = 2 \ln (1+a)$$

$$.127645 = 2 \ln (1+a)$$

$$\ln (1+a) = .127645/2$$

$$=.0638227$$

$$(1+a) = e^{.0638227}$$

$$(1+a) = 1.0659034$$

$$a = .0659034$$

$$A = .065934 (100)$$

$$A = 6.59\%$$

CALCULATION OF DOUBLING TIME FOR TAWAHKA INDIANS BASED ON
TOTAL POPULATION OF 726

General formula: $n = .69/a$

n=population doubling time

a=growth rate

$$n = .69/.0659$$

$$n = 10.5 \text{ years}$$

TABLE 1

TAWAHKA INDIAN POPULATION IN THE MIDDLE
RIO PATUCA REGION; 1916-1992

YEAR:	1916	1967	September, 1977	June, 1989	1990	February, 1991	March, 1992
TOTAL POPULATION	159*	162	338*	376**	639	704	726

(Sources: Landero, 1935; Anonymous, 1967; Calix, Fuentes, and Cruz, 1977; FITH, June, 1989; Herlihy, 1990 and 1991; Caicedo and Gonzales, 1992)

*estimated

**Kraosirpe only

TABLE 2
TAWAHKA POPULATION DENSITY BY YEAR; 1916-1992

Year	Population	Agricultural Lands (km ² /person)*	Territorial Lands (km ² /person)**
1916	159	4.8	58.5
1967	162	4.75	57.4
1977	338	2.3	27.5
1989	376 [∞]	2.0	24.7
1990	639	1.2	14.5
1991	704	1.09	13.2
1992	726	1.06	12.8

(Sources: Landero, 1935; Anonymous, 1967; Calix and Cruz, 1977; FITH, June, 1989; Herlihy, 1990 and 1991; Herlihy and Leake, 1991; Caicedo and Gonzales, 1992)

*based on total area of 770 km²

**based on total area of 9,300 km²

[∞]Kraosirpe only

TABLE 3
 DEMOGRAPHIC BREAKDOWN OF TAWAHKA POPULATION IN THE
 MIDDLE RIO PATUCA REGION BY VILLAGE;
 March, 1992

Village	% F (Total #)	% M (Total #)	% < age 15 (Total #)	# of Inhabitants	# of Households	Inhabitants/ Household
Kraosirpe	47.4 (211)	52.6 (234)	54.4 (242)	445	54	8.2
Krautara	56.6 (47)	43.4 (36)	51.7 (46)	89	12	7.4
Yapuwas	N/A	N/A	N/A	89	10	8.9
Kamakasna*	56.4 (22)	43.5 (17)	N/A	58	6	9.7
Wasparasni	50.0 (13)	50.0 (13)	46.2 (12)	26	3	8.7
Malawas	N/A	N/A	N/A	4	1	4
Wasurun	N/A	N/A	N/A	11	2	5.5
Komako	N/A	N/A	N/A	4	1	4
TOTAL	49.4** (293)	50.6** (300)	53.6[∞] (300)	726	89	8.2

(Source: Caicedo and Gonzales, 1992)

*Includes only Tawahka houses in village proper. Two households (19 inhabitants) on village outskirts did not provide gender data. Percentages based on population of 39.

**Based on total population of 593 reporting gender data.

[∞]Based on total population of 560 in households reporting age data.

N/A: data not available (not reported)

F: females

M: males

TABLE 4
TAWAHKA POPULATION GROWTH BY HOUSEHOLD AND INHABITANTS
ACCORDING TO VILLAGE; 1990-1992

Village	# Households '90	# Households '92	+/-	% Change	# Inhabitants '90	# Inhabitants '92	+/-	% Change
Kraosirpe	58	54	-4	-6.8	390	445	+55	+14.1
Krautara	10	12	+2	+20.0	110	89	-21	-19.9
Yapuwas	6	10	+4	+66.6	32	89	+57	+178.1
Kamakasma	5	6	+1	+20.0	57	58	+1	+1.7
Wasparasni	2	3	+1	+50.0	10	26	+16	+160.0
Malawas	N/A	1	+1	N/A	N/A	4	+4	N/A
Wasurun	N/A	2	+2	N/A	N/A	11	+11	N/A
Komako	N/A	1	+1	N/A	N/A	4	+4	N/A
TOTAL	85	89	+4	+4.7	639	726	+87	+13.6

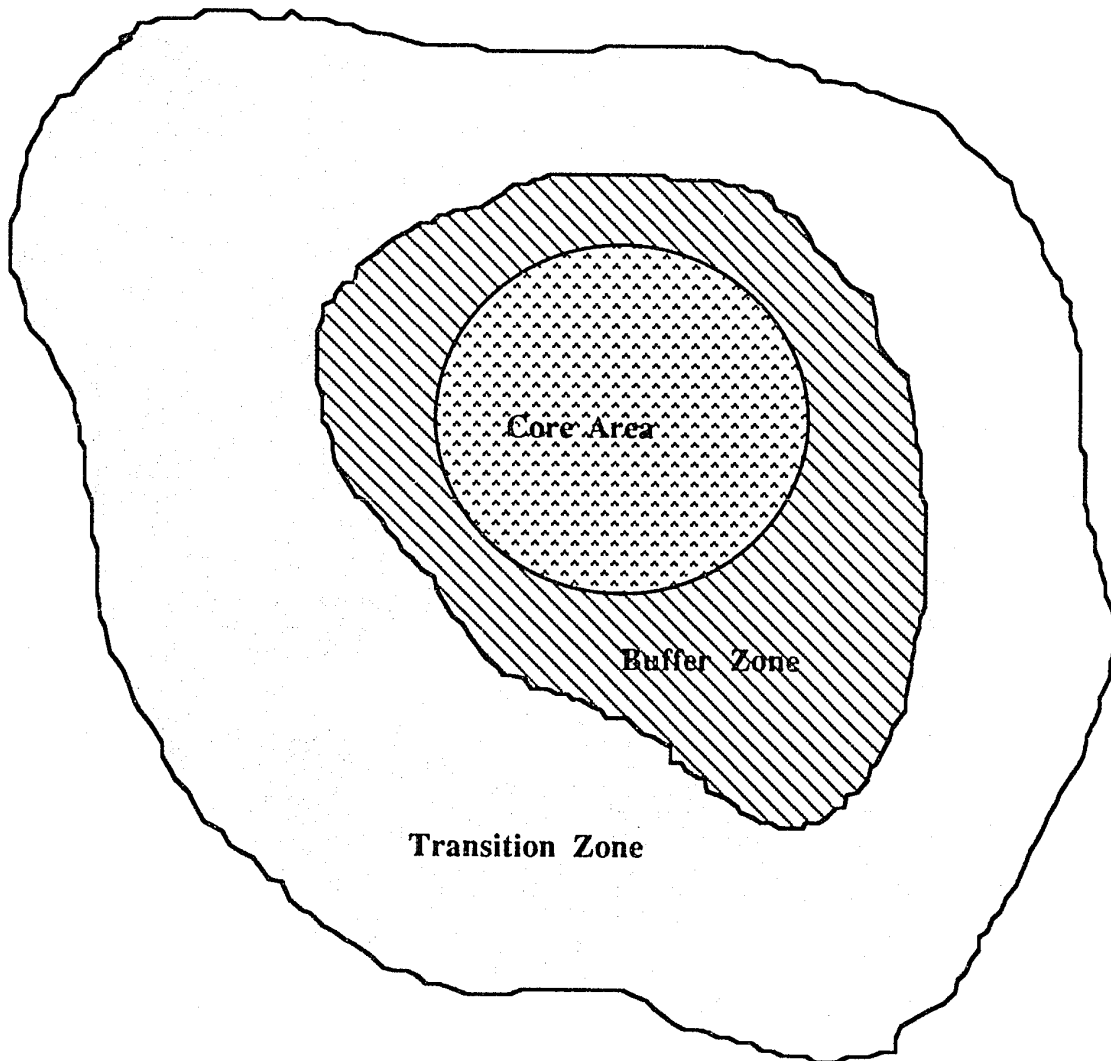
(Sources: Caicedo and Gonzales, 1992; Herlihy, 1990)

N/A: data not available

Appendix B: Figures

FIGURE 1

DIAGRAM OF BIOSPHERE RESERVE LAYOUT SHOWING
CORE AREA, BUFFER ZONE, AND TRANSITION ZONE



(Sources: Gordon H. Orians, et al., 1990; William P. Gregg, Jr., 1991)

FIGURE 2

DIAGRAM OF TAWAHKA LAND LEGALIZATION PROCESS

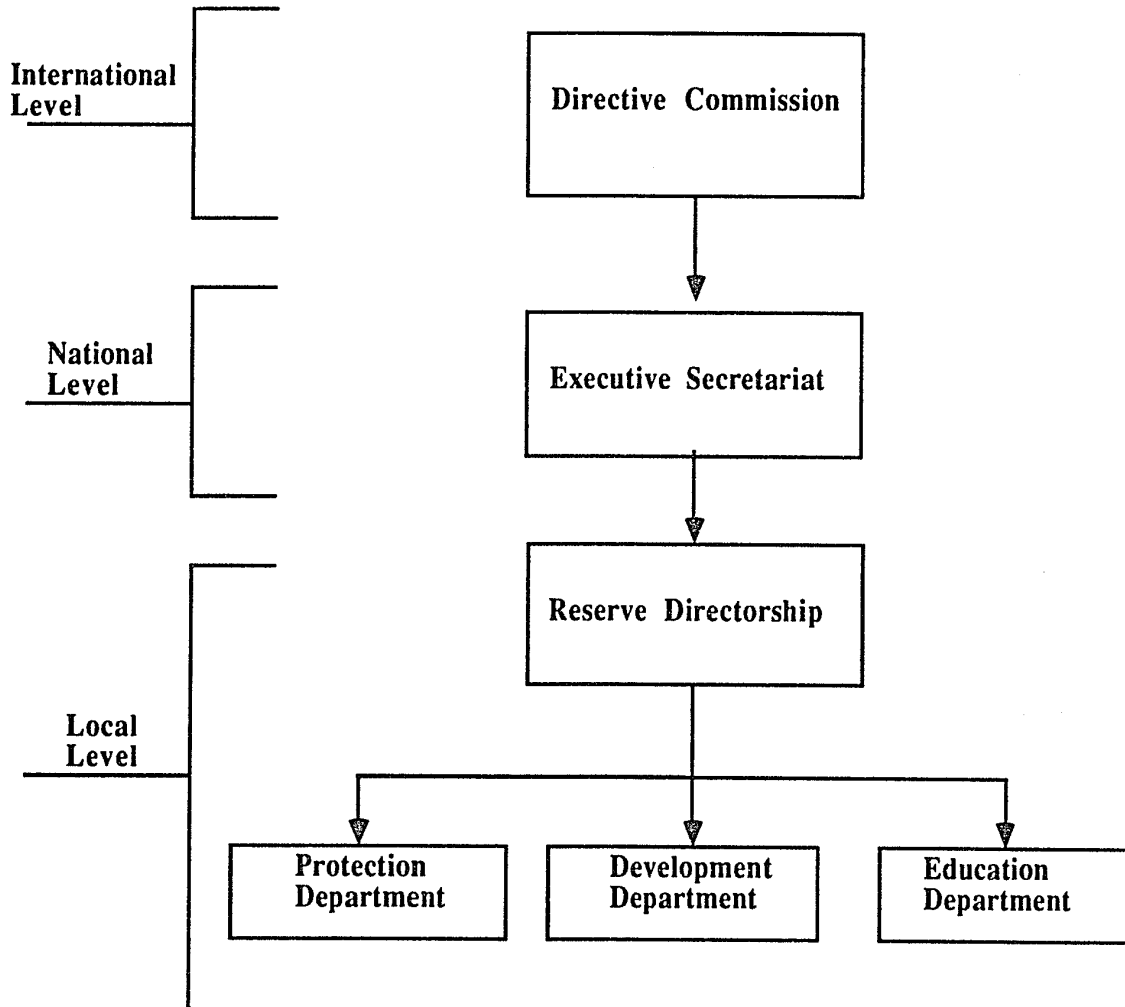
<p>Land Legalization Programme started by MOPAWI</p>	<p>Programme set up in response to colonists migrating into La Mosquitia from Honduras' interior.</p>
<p>1987-ongoing; Raising awareness</p>	<p>Through group meetings and exchange visits with other Indian groups, the Tawahka are encouraged to develop a critical awareness of the consequences of immigrants laying claim to their traditional hunting grounds and clearing forest. An expedition along the Rio Patuca (March, 1989) enables the Tawahka to assess the proximity and severity of the colonization front. FITH (Federación Tawahka Indígena de Honduras) representatives petition INA (Instituto Nacional Agrario) to review their case.</p>
<p>April, 1989; INA visits La Mosquitia</p>	<p>As a result of Tawahka petition, INA representatives inspect endangered lands. INA takes action, successfully removing initial settlers.</p>
<p>July, 1989; INA agrees to legalize Indigenous lands provisionally</p>	<p>INA, local government, and Indigenous organizations (including FITH) establish a written agreement whereby individual Indian communities can apply for provisional land guarantees. Provisional guarantees are valid until definitive titles are obtained.</p>
<p>November, 1989; First Tawahka village receives provisional land guarantee</p>	<p>INA grants provisional guarantee of 7,500 hectares to the village of Kraosirpe. However, this land used by the villagers for hunting and gathering is excluded from the provisional guarantee. It soon becomes clear that lands granted on a community basis fail to guarantee the Tawahka's rights of access to large forested regions.</p>
<p>January, 1990; Land use study demonstrates inadequacy of initial legalization efforts.</p>	<p>Land use survey of Tawahka territory demonstrates that large areas actively exploited by the Tawahka were omitted from the provisional guarantee. Documented results are presented to INA which accepts that Indian lands must include large areas of standing forest if they are to sustain traditional subsistence economy and culture.</p>
<p>August, 1990; 1989 INA agreement nullified and replaced with proposal for establishment of forest reserve.</p>	<p>As a result of meetings between the Director of INA and Tawahka leaders, the actual land area used by the Tawahka forms the basis for a proposed Indian Forest Reserve. An area of approximately 2400 km², stretching from the southern boundary of the Rio Platano Biosphere Reserve to the Rio Coco, is drawn up and presented to INA.</p>
<p>December, 1990; Tawahka present formal request for legalization of Indian Forest Reserve</p>	<p>Tawahka receive legal recognition of their claim and are authorized to initiate topographic demarcation of their land.</p>

March, 1991; Tawahka request MOPAWI assistance to conduct topographic land survey	Topographic land surveys are completed and proposal is submitted to Honduran National Congress for approval. Reserve area officially designated Tawahka Biosphere Reserve.
--	--

(Source: Andrew P. Leake & Simon Cremmer, MOPAWI, 1991)

FIGURE 3

PROPOSED HIERARCHY OF TAWAHKA BIOSPHERE RESERVE
MANAGEMENT STRUCTURE



(Source: MOPAWI, 1991)

Appendix C: Interview Questions

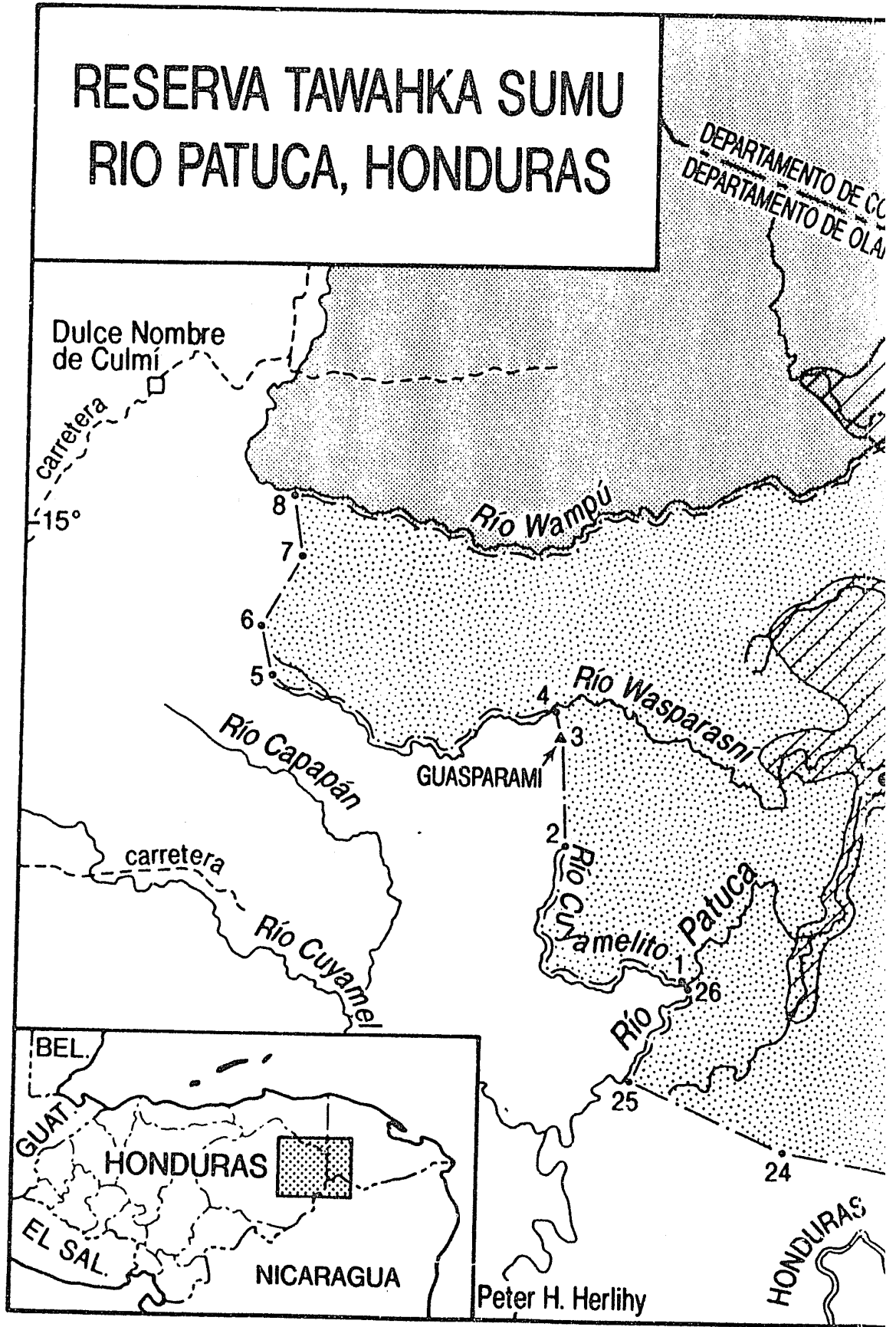
LIST OF QUESTIONS USED DURING
SEMISTRUCTURED INTERVIEWS

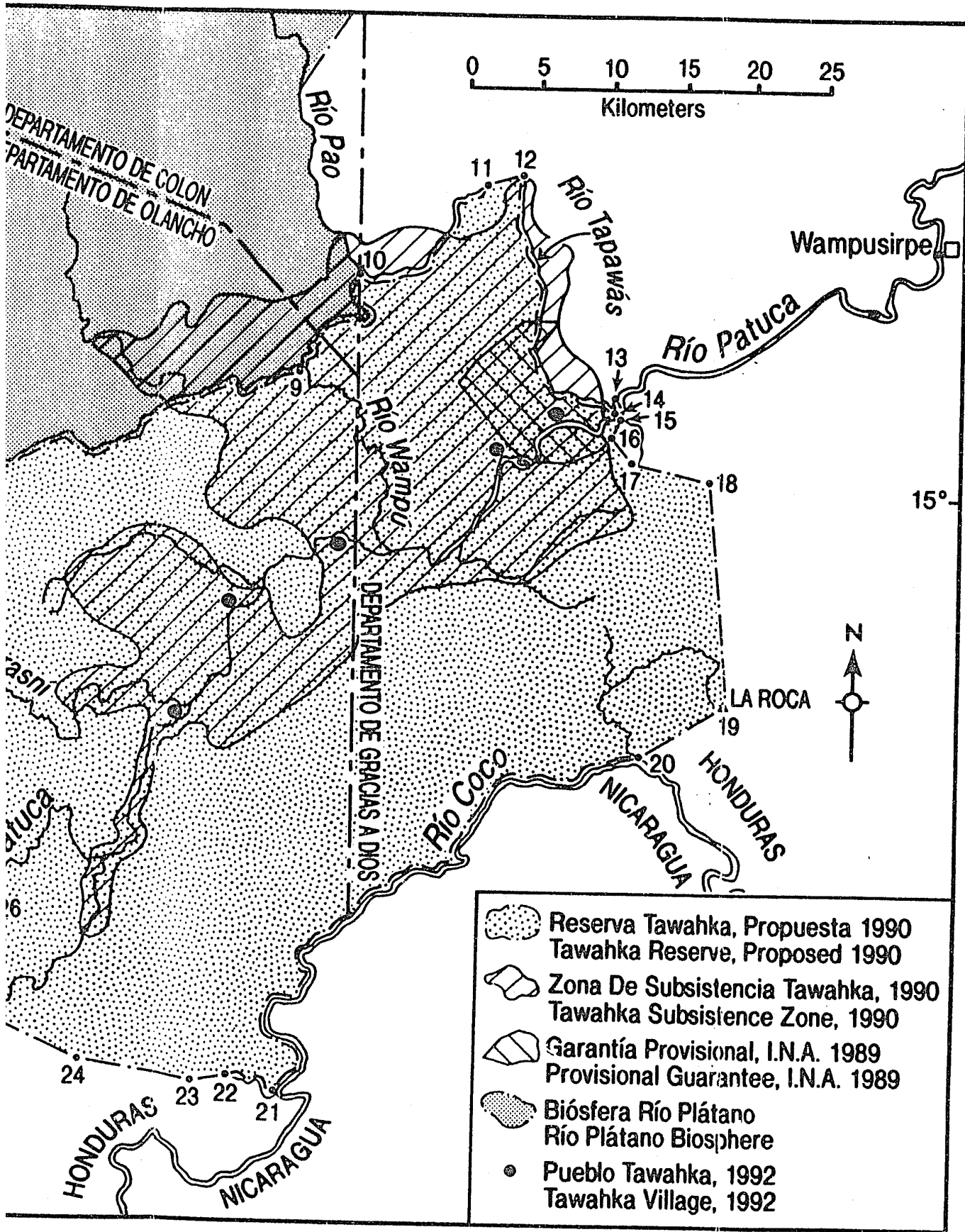
- What is your name?
- What is the agency with which you work?
- What is your position?
- How long have you been in that position?
- What is the agency's function?
- What is the agency's role in conservation work in Honduras?
- What is your role in conservation work in Honduras?
- What is the agency's role in relation to the Tawahka Biosphere Reserve?
- What is your role in relation to the Tawahka Biosphere Reserve?
- In your view, what is the current status of the Tawahka Biosphere Reserve?
- In your view, what would be the Tawahka Biosphere Reserve's function?






Maps

- Map 1. Tawahka Biosphere Reserve (Source: Peter H. Herlihy, c. 1992)
- Map 2. Rio Piatano Biosphere Reserve (Source: Peter H. Herlihy, 1991)
- Map 3. Indigenous Territories of Honduras (Source: Peter H. Herlihy and Andrew P. Leake, 1992)
- Map 4. Colonization Front in La Mosquitia (Source: Peter H. Herlihy, 1990)

RESERVA TAWAHKA SUMU RIO PATUCA, HONDURAS

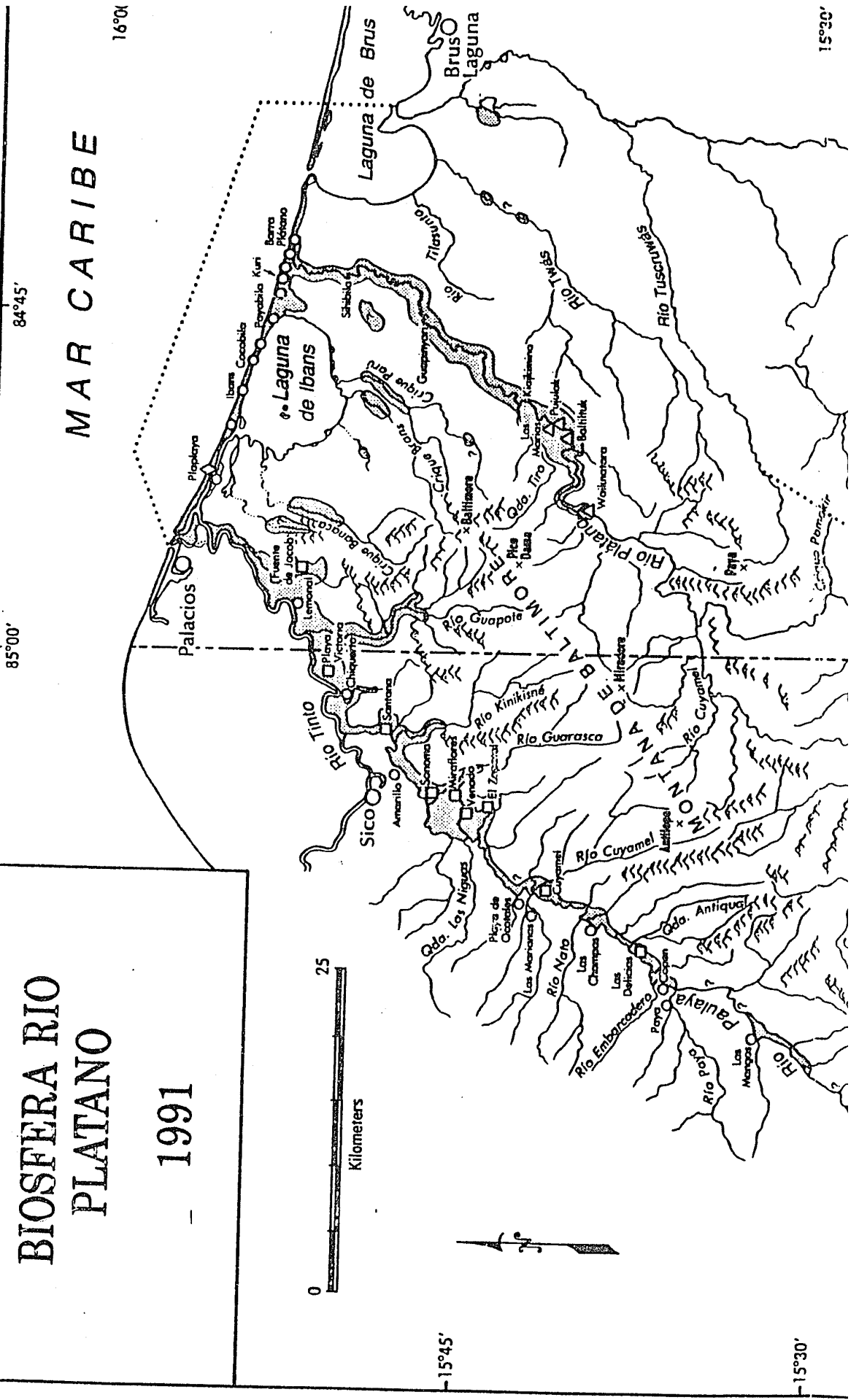




-  Reserva Tawahka, Propuesta 1990
Tawahka Reserve, Proposed 1990
-  Zona De Subsistencia Tawahka, 1990
Tawahka Subsistence Zone, 1990
-  Garantía Provisional, I.N.A. 1989
Provisional Guarantee, I.N.A. 1989
-  Biósfera Río Plátano
Río Plátano Biosphere
-  Pueblo Tawahka, 1992
Tawahka Village, 1992

BIOSFERA RIO PLATANO

1991



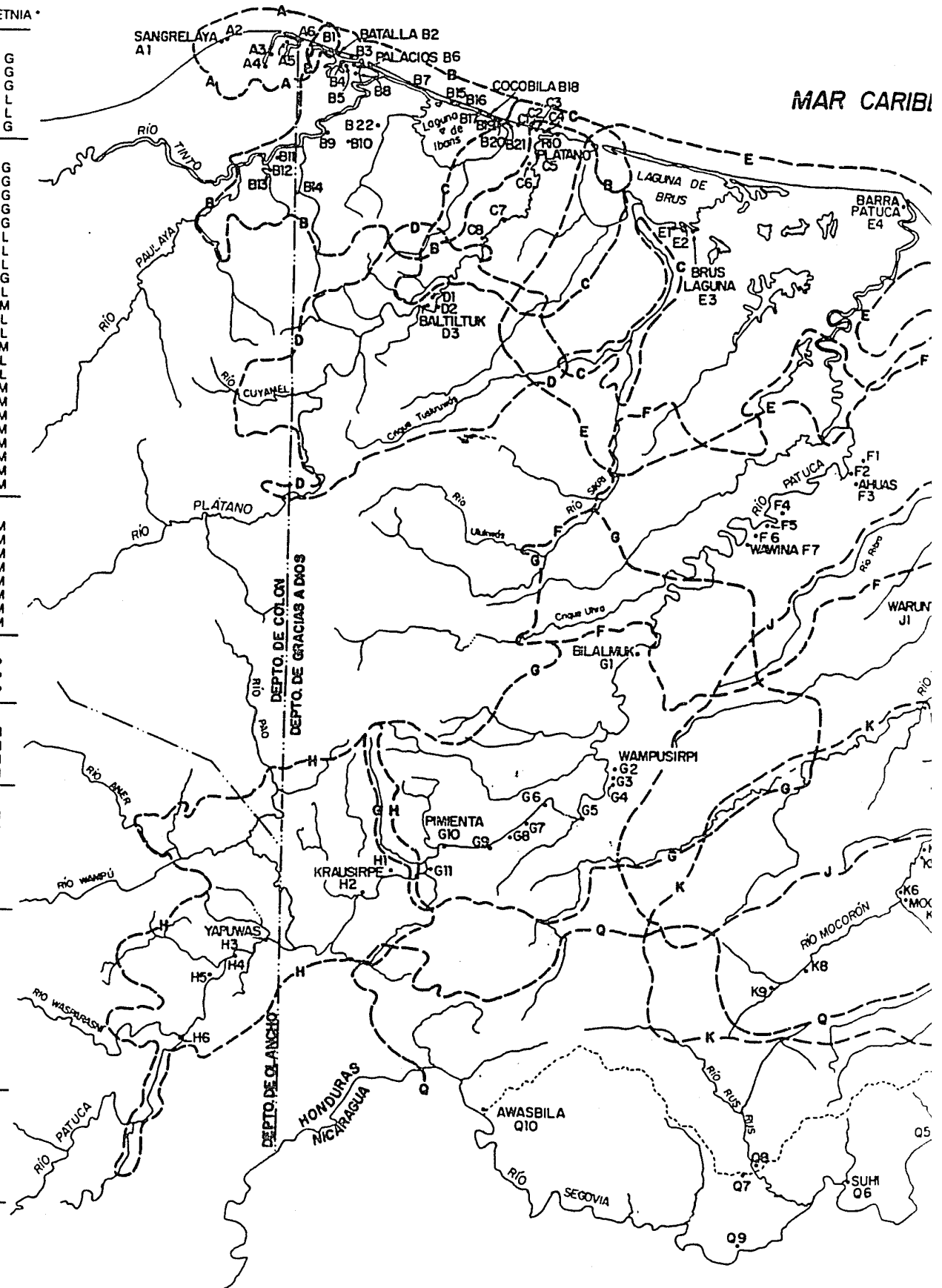
Tierras indígenas de La Mosquitia Hond

ZONA COMUNIDAD • ETNIA •

TOCAMACHO (A)		
A1	Sangrelaya	G
A2	Cocaito	G
A3	Claura Abajo	G
A4	Claura Arriba	L
A5	Chicacocha	L
A6	Tocamacho	G
TINTO - IBANS (B)		
B1	Coyoles	G
B2	Batalla	G
B3	Pueblo Nuevo	G
B4	Buena Vista	G
B5	La Fe	G
B6	Palacios	L
-	Comentero	L
-	Palacios Arriba	L
B7	Playa	L
B8	Naranjal	L
B9	El Limonal	L
B10	Fuente de Jacob	L
B11	Los Angeles	L
B12	Chicuerno	L
B13	Rancho Escondido	L
B14	Guapote	L
B15	Piñales	L
B16	Betania	M
B17	Ibans	M
B18	Cocobila	M
B19	Raistá	M
B20	Belén	M
B21	Payabita	M
B22	Banaka	M
RIO PLATANO (C)		
C1	Nueva Jerusalem	M
C2	Kun	M
C3	Ulla Almuk	M
C4	Tasbapauni	M
C5	Río Plátano	M
C6	Sisinayanhkan	M
C7	Wapnyan	M
C8	Las Marias Vieja	M
LAS MARIAS (D)		
D1	Las Marias	P
D2	Pujulak	P
D3	Batituk	P
BRUS LAGUNA (E)		
E1	Klauban	M
E2	Twintata	M
E3	Brus Laguna	M
E4	Barra Patuca	M
AHUAS (F)		
F1	Kroocuma	M
F2	Paptalaya	M
F3	Ahuas	M
F4	Waksma	M
F5	Usu Pumoura	M
F6	Kwinra	M
F7	Wawina	M
WAMPUSIRPI (G)		
G1	Bilalmuk	M
G2	Wampusirpi	M
G3	Raya	M
G4	Bodega	L
G5	Walbatanta	L
G6	Ratli	L
G7	Kurhpa	M
G8	Tuknun	M
G9	Arenas Blancas	M
G10	Pimienta	M
G11	Pansana	L
TAWAHKA (H)		
H1	Krausirpe	T
H2	Krautara	T
H3	Yapuwás	T
H4	Tabacón	L
H5	Kamakasná	T
H6	Wasparasni	T

• Comunidades con 5 o más viviendas

M = Miskito
G = Ganfuna
T = Tawahka
L = Ladino



Edición provisional para el Primer Congreso Sobre Tierras Indígenas de La Mosquitia, 22-23 de Septiembre de 1992.

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Mosquitia Hondureña - 1992: Zonas de Subsistencia

ZONA COMUNIDAD • ETNIA • ZONA COMUNIDAD • ETNIA •

Por: Peter H. Herlihy

Proyecto Patri Cultural Sur Mosquitia Asia Ta Mosquitia Paw

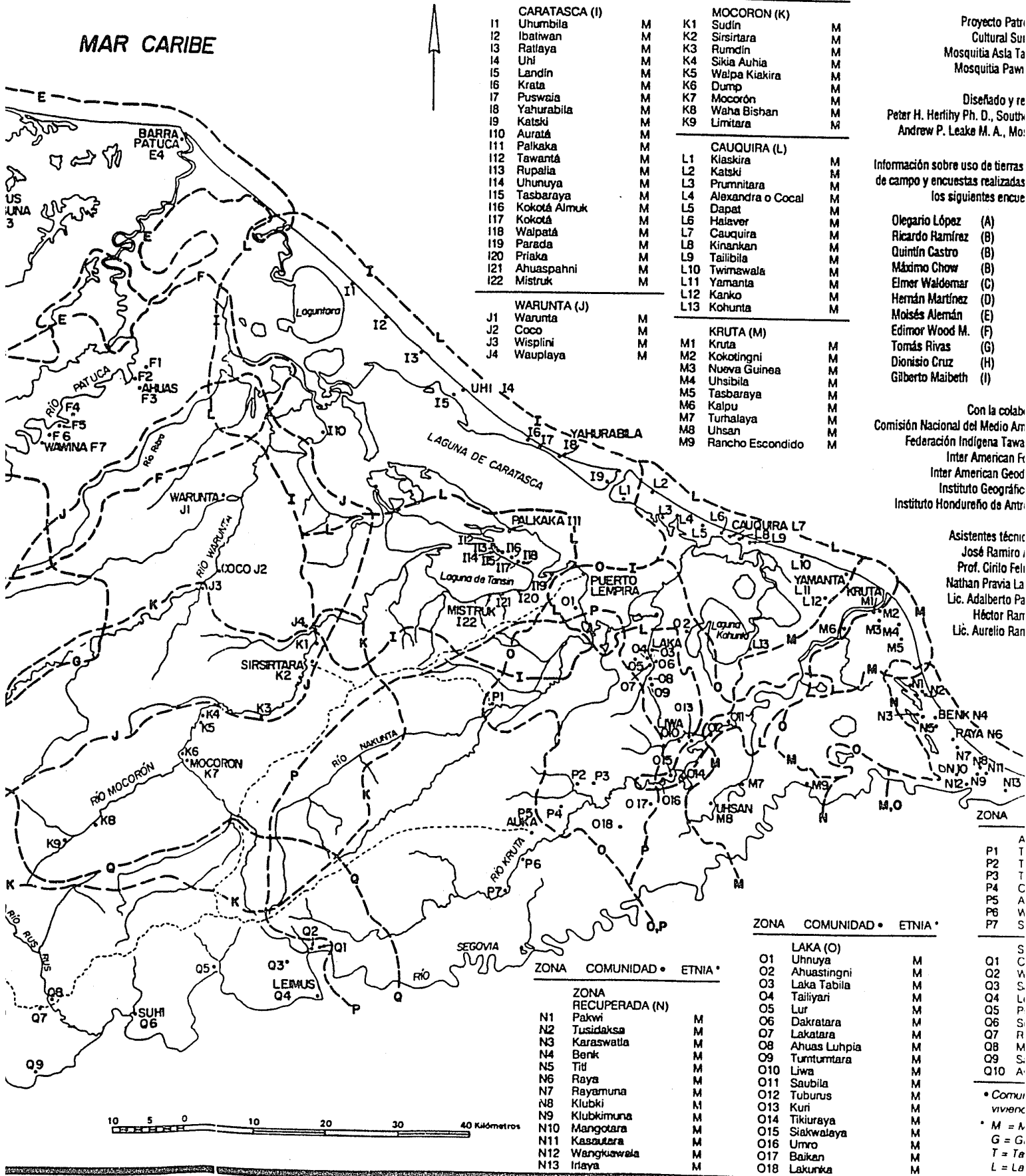
Diseñado y re Peter H. Herlihy Ph. D., South Andrew P. Leake M. A., Mo:

Información sobre uso de tierras de campo y encuestas realizadas los siguientes encue

- Olegario López (A)
- Ricardo Ramírez (B)
- Quintín Castro (B)
- Máximo Chow (B)
- Elmer Waldemar (C)
- Hernán Martínez (D)
- Moisés Alemán (E)
- Edimor Wood M. (F)
- Tomás Rivas (G)
- Dionisio Cruz (H)
- Gilberto Maibeth (I)

Con la colaboración de la Comisión Nacional del Medio Ambiente, Federación Indígena Tawana, Inter American Foundation, Inter American Geodetic Institute, Instituto Geográfico Hondureño de Antr

Asistentes técnicos: José Ramiro, Prof. Cirilo Feli, Nathan Pravia La, Lic. Adalberto Pa, Héctor Ran, Lic. Aurelio Ran



ZONA	COMUNIDAD •	ETNIA •
CARATASCA (I)		
11	Uhumbila	M
12	Ibatiwan	M
13	Rallaya	M
14	Uhi	M
15	Landin	M
16	Krata	M
17	Puswaia	M
18	Yahurabila	M
19	Katski	M
110	Auratá	M
111	Palkaka	M
112	Tawantá	M
113	Rupaila	M
114	Uhunuya	M
115	Tasbaraya	M
116	Kokotá Almuk	M
117	Kokotá	M
118	Walpatá	M
119	Parada	M
120	Priaka	M
121	Ahuaspahni	M
122	Mistruk	M

ZONA	COMUNIDAD •	ETNIA •
MOCORON (K)		
K1	Sudin	M
K2	Sirsirtara	M
K3	Rumdin	M
K4	Sikia Auhia	M
K5	Walpa Kiakira	M
K6	Dump	M
K7	Mocoron	M
K8	Waha Bishan	M
K9	Limitara	M
CAUQUIRA (L)		
L1	Klaskira	M
L2	Katski	M
L3	Prumnitara	M
L4	Alexandra o Cocal	M
L5	Dapat	M
L6	Halaver	M
L7	Cauquira	M
L8	Kinankan	M
L9	Tailibila	M
L10	Twimswala	M
L11	Yamanta	M
L12	Kanko	M
L13	Kohunta	M

ZONA	COMUNIDAD •	ETNIA •
WARUNTA (J)		
J1	Warunta	M
J2	Coco	M
J3	Wisplini	M
J4	Wauplaya	M

ZONA	COMUNIDAD •	ETNIA •
KRUTA (M)		
M1	Kruta	M
M2	Kokotingni	M
M3	Nueva Guinea	M
M4	Uhsibila	M
M5	Tasbaraya	M
M6	Kalpu	M
M7	Turhalaya	M
M8	Uhsan	M
M9	Rancho Escondido	M

ZONA	COMUNIDAD •	ETNIA •
RECUPERADA (N)		
N1	Pakwi	M
N2	Tusidaksa	M
N3	Karaswata	M
N4	Benk	M
N5	Titi	M
N6	Raya	M
N7	Rayamuna	M
N8	Klubki	M
N9	Klubkimuna	M
N10	Mangotara	M
N11	Kasutara	M
N12	Wanguawala	M
N13	Itaya	M

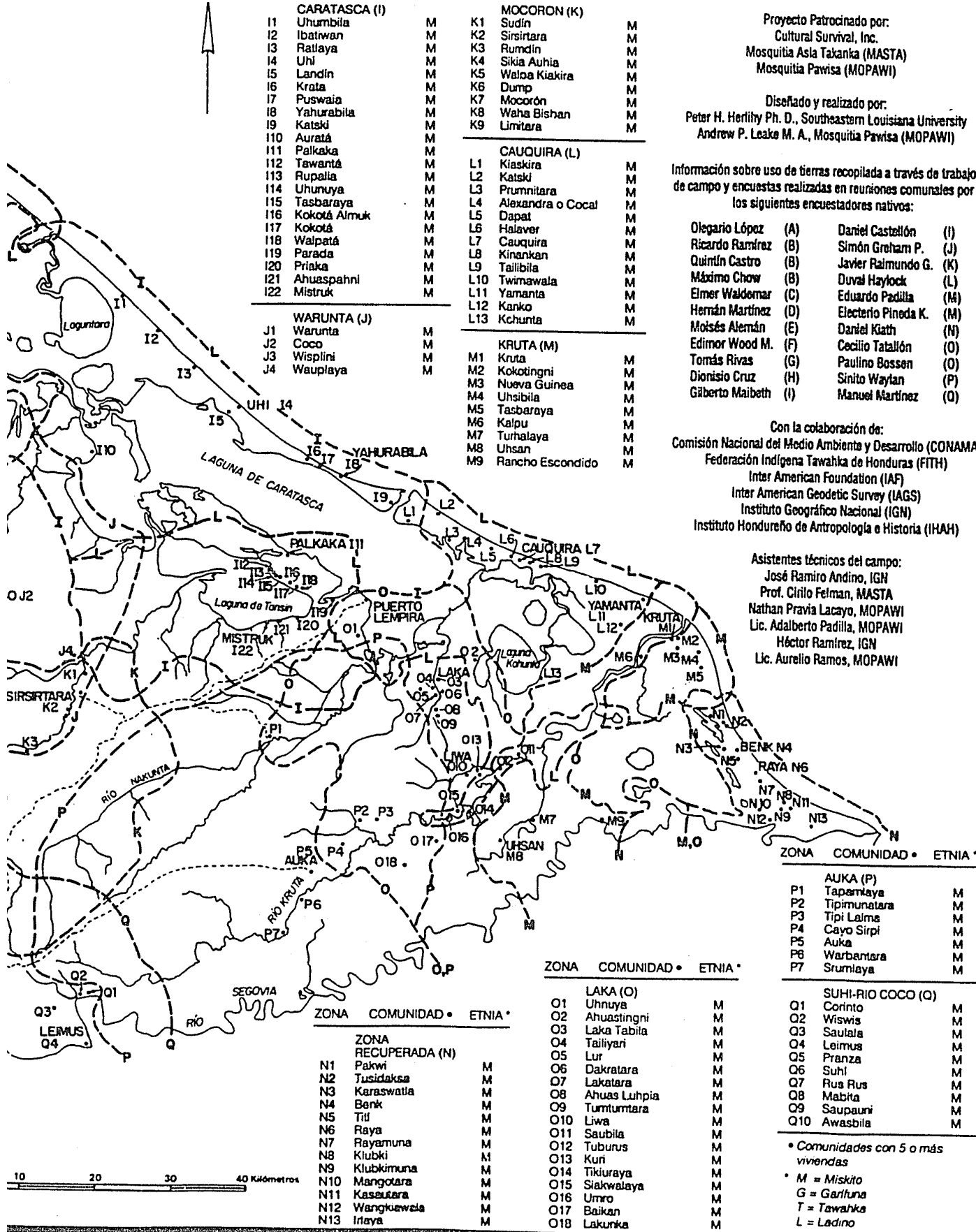
ZONA	COMUNIDAD •	ETNIA •
LAKA (O)		
O1	Uhnuya	M
O2	Ahuastingni	M
O3	Laka Tabila	M
O4	Tailiyari	M
O5	Lur	M
O6	Dakratara	M
O7	Lakatará	M
O8	Ahuas Luhpia	M
O9	Tumturtara	M
O10	Liwa	M
O11	Saubila	M
O12	Tuburus	M
O13	Kuri	M
O14	Tikiuraya	M
O15	Siakwalaya	M
O16	Umro	M
O17	Baikun	M
O18	Lakunka	M

ZONA	ETNIA •
P1	T
P2	T
P3	T
P4	C
P5	A
P6	V
P7	S
Q1	S
Q2	V
Q3	S
Q4	L
Q5	P
Q6	S
Q7	R
Q8	M
Q9	S
Q10	A

• Comuni vivenci
M = M
G = G
T = Te
L = La

ena - 1992: Zonas de Subsistencia

ZONA COMUNIDAD • ETNIA • ZONA COMUNIDAD • ETNIA •



ZONA	COMUNIDAD •	ETNIA •
11	Uhumbila	M
12	Ibatwan	M
13	Ratlaya	M
14	Uhi	M
15	Landin	M
16	Krata	M
17	Puswaia	M
18	Yahurabila	M
19	Katski	M
110	Auratá	M
111	Palkaka	M
112	Tawantá	M
113	Rupalla	M
114	Uhunuya	M
115	Tasbaraya	M
116	Kokotá Almuk	M
117	Kokotá	M
118	Walpatá	M
119	Parada	M
120	Priaka	M
121	Ahuaspahni	M
122	Mistruk	M

ZONA	COMUNIDAD •	ETNIA •
J1	Warunta	M
J2	Coco	M
J3	Wisplini	M
J4	Wauplaya	M

ZONA	COMUNIDAD •	ETNIA •
K1	MOCORON (K)	M
K2	Sudin	M
K3	Sirsintara	M
K4	Rumdin	M
K5	Sikia Auhia	M
K6	Waloa Kiakira	M
K7	Dump	M
K8	Mocoron	M
K9	Waha Bishan	M
	Limitara	M

ZONA	COMUNIDAD •	ETNIA •
L1	CAUQUIRA (L)	M
L2	Kiaskira	M
L3	Katski	M
L4	Prumritara	M
L5	Alexandra o Cocal	M
L6	Dapat	M
L7	Halaver	M
L8	Cauquira	M
L9	Kinankan	M
L10	Talibila	M
L11	Twimawala	M
L12	Yamanta	M
L13	Kanko	M
	Kchunta	M

ZONA	COMUNIDAD •	ETNIA •
M1	KRUTA (M)	M
M2	Kruta	M
M3	Kokotingni	M
M4	Nueva Guinea	M
M5	Uhsibia	M
M6	Tasbaraya	M
M7	Kalpu	M
M8	Turhalaya	M
M9	Uhsan	M
	Rancho Escondido	M

ZONA	COMUNIDAD •	ETNIA •
N1	RECUPERADA (N)	M
N2	Pakwi	M
N3	Tusidaksa	M
N4	Karaswata	M
N5	Benk	M
N6	Til	M
N7	Raya	M
N8	Rayamuna	M
N9	Klubki	M
N10	Klubkimuna	M
N11	Mangotara	M
N12	Kasakara	M
N13	Wangkewala	M
	Irtaya	M

ZONA	COMUNIDAD •	ETNIA •
O1	LAKA (O)	M
O2	Uhnuya	M
O3	Ahuastingni	M
O4	Laka Tabila	M
O5	Taliyari	M
O6	Lur	M
O7	Dakratará	M
O8	Lakatará	M
O9	Ahuas Luhpia	M
O10	Turturtara	M
O11	Liwa	M
O12	Saubila	M
O13	Tuburus	M
O14	Kuri	M
O15	Tikiuraya	M
O16	Siakwalaya	M
O17	Umro	M
O18	Baikan	M
	Lakunka	M

ZONA	COMUNIDAD •	ETNIA •
P1	AUKA (P)	M
P2	Tapamlaya	M
P3	Tipimunatará	M
P4	Tipi Lalme	M
P5	Cayo Sirpi	M
P6	Auka	M
P7	Warbantara	M
	Srumlaya	M

ZONA	COMUNIDAD •	ETNIA •
Q1	SUHI-RIO COCO (Q)	M
Q2	Corinto	M
Q3	Wiswis	M
Q4	Saulala	M
Q5	Leimus	M
Q6	Pranza	M
Q7	Suhl	M
Q8	Rus Rus	M
Q9	Mabita	M
Q10	Saupauri	M
	Awasbila	M

• Comunidades con 5 o más viviendas
 • M = Miskito
 G = Garífuna
 T = Tawahka
 L = Ladino

Por: Peter H. Herlihy y Andrew P. Leake

Proyecto Patrocinado por:
 Cultural Survival, Inc.
 Mosquitia Asla Takanka (MASTA)
 Mosquitia Pawisa (MOPAWI)

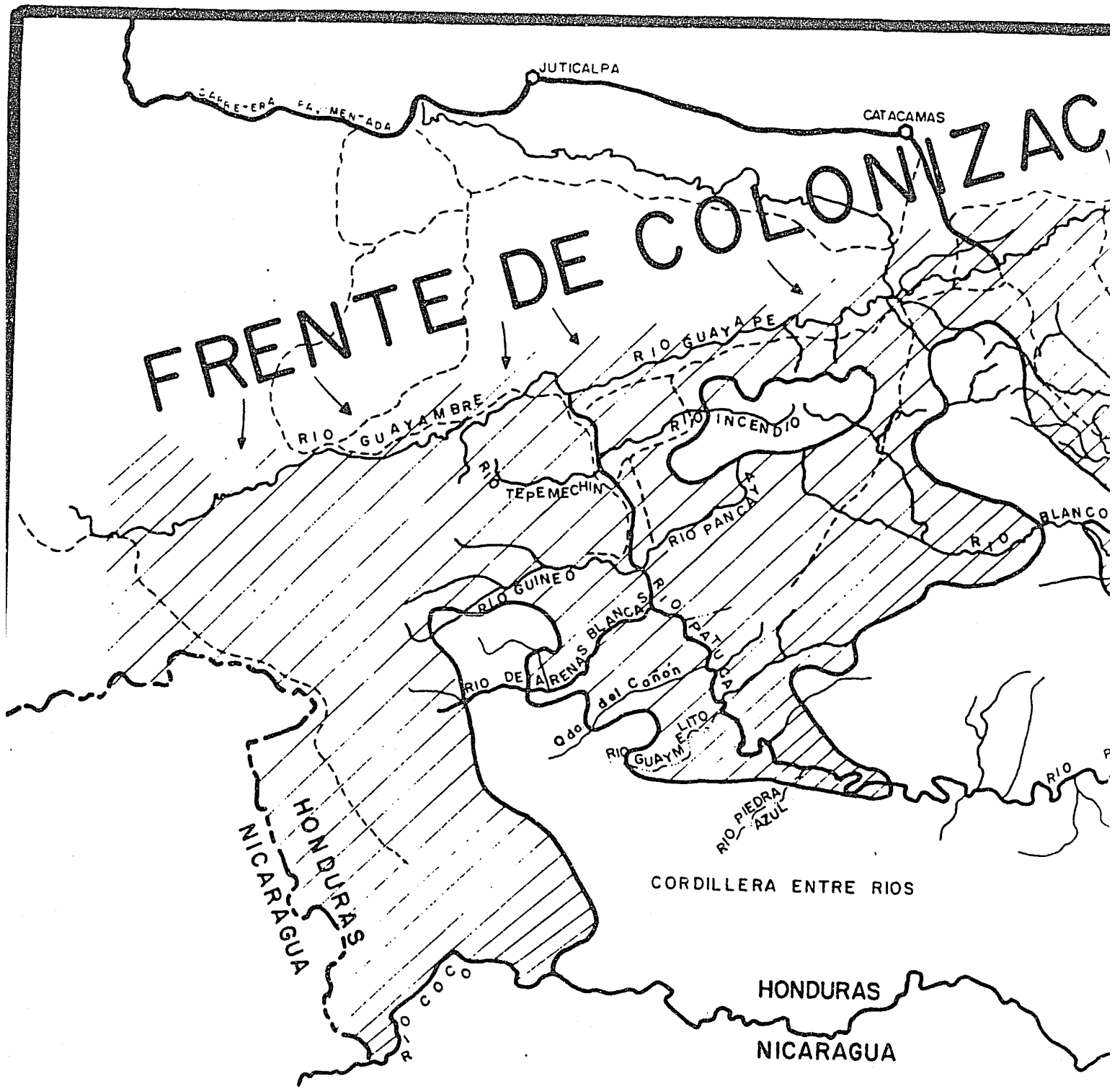
Diseñado y realizado por:
 Peter H. Herlihy Ph. D., Southeastern Louisiana University
 Andrew P. Leake M. A., Mosquitia Pawisa (MOPAWI)

Información sobre uso de tierras recopilada a través de trabajo de campo y encuestas realizadas en reuniones comunales por los siguientes encuestadores nativos:

- | | |
|----------------------|-------------------------|
| Olegario López (A) | Daniel Castellón (I) |
| Ricardo Ramírez (B) | Simón Groham P. (J) |
| Quintín Castro (B) | Javier Raimundo G. (K) |
| Máximo Chow (B) | Duval Haycock (L) |
| Elmer Waldemar (C) | Eduardo Padilla (M) |
| Hernán Martínez (D) | Electerio Pineda K. (M) |
| Moisés Alemán (E) | Daniel Kiath (N) |
| Edimor Wood M. (F) | Cecilio Tatalión (O) |
| Tomás Rivas (G) | Paulino Bossen (O) |
| Dionisio Cruz (H) | Sinito Waylan (P) |
| Gilberto Maibeth (I) | Manuel Martínez (O) |

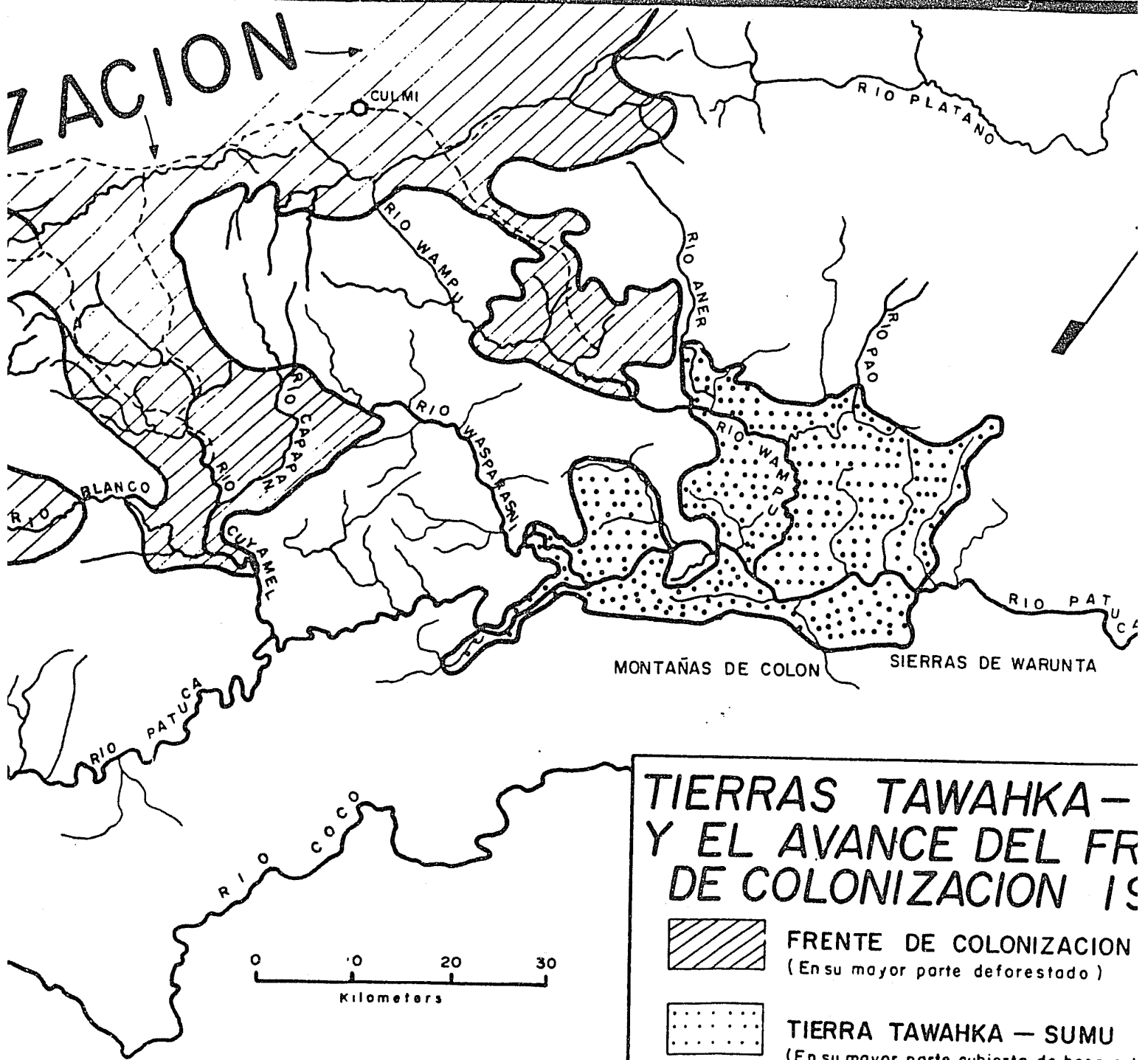
Con la colaboración de:
 Comisión Nacional del Medio Ambiente y Desarrollo (CONAMA)
 Federación Indígena Tawahka de Honduras (FITH)
 Inter American Foundation (IAF)
 Inter American Geodetic Survey (IAGS)
 Instituto Geográfico Nacional (IGN)
 Instituto Hondureño de Antropología e Historia (IHAI)

Asistentes técnicos del campo:
 José Ramiro Andino, IGN
 Prof. Cirilo Felman, MASTA
 Nathan Pravia Lacayo, MOPAWI
 Lic. Adalberto Padilla, MOPAWI
 Héctor Ramírez, IGN
 Lic. Aurelio Ramos, MOPAWI



Recopilado en trabajo de campo en 1990, y mapas preparados por la DIRECCION GENERAL DE ESTADISTICA Y CENSOS en 1987 - 1988

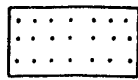
COLONIZACION



TIERRAS TAWAHKA - Y EL AVANCE DEL FRETE DE COLONIZACION 19



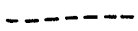
FRENTE DE COLONIZACION
(En su mayor parte deforestado)



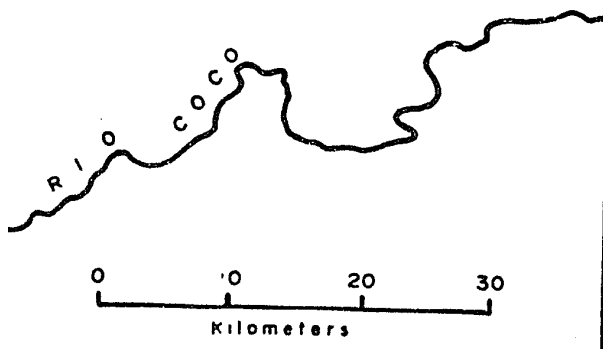
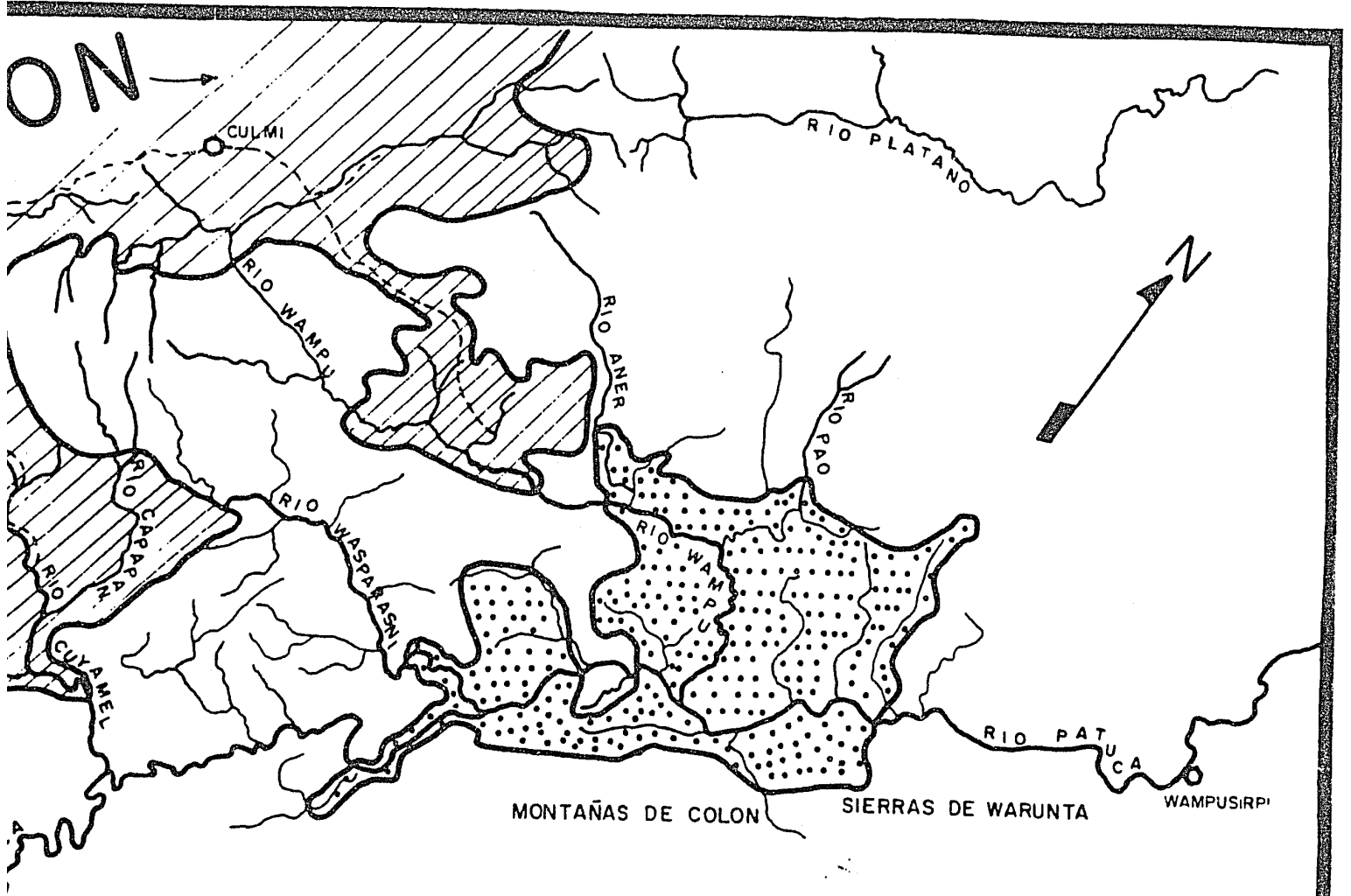
TIERRA TAWAHKA - SUMU
(En su mayor parte cubierta de bosque)






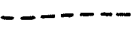
CARRETERA PAVIMENTADA



CARRETERA DE TIERRA (tod



TIERRAS TAWAHKA - SUMU Y EL AVANCE DEL FRENTE DE COLONIZACION 1990

-  **FRENTE DE COLONIZACION**
(En su mayor parte deforestado)
-  **TIERRA TAWAHKA - SUMU**
(En su mayor parte cubierta de bosque tropical)
-  **CARRETERA PAVIMENTADA**
-  **CARRETERA DE TIERRA (todo tiempo)**