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Legal and Administrative Frameworks for Managing
Coastal Environmental Conservation Units in
the State of Paraná, Brazil: A Review

Frederick W. Cubbage, José Milton Andriguetto-Filho,
Erin O. Sills, Maude Motta, and Vitória Yamada Müller

FPEI Working Paper No. 56



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FOR MANAGING COASTAL ENVIRONMENTAL CONSERVATION UNITS
IN THE STATE OF PARANÁ, BRAZIL: A REVIEW**

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Prepared as part of ongoing USDA Forest Service/Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental project on Assessing and Planning for Ecotourism in the Atlantic Coastal Forests of Paraná, Brazil.

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ABSTRACT

The laws, resolutions, and regulations governing the Atlantic Coastal Forests in the Área de Proteção Ambiental (APA) de Guaraqueçaba in the state of Paraná, Brazil are reviewed. The forests are among the world's most biologically diverse and endangered ecosystems. Numerous federal and state laws directly regulate land use and mandate protection in the APA de Guaraqueçaba, as do several related federal and state laws. The contents, administration, and effectiveness of these laws are discussed. Improved resource protection in the APA will depend on improved coordination among laws and better support for administrative agencies, as well as developing economically viable and sustainable means for local residents to receive the income generated from natural resource use and management.

**UM REVISÃO DOS MODELOS LEGAIS E ADMINISTRATIVOS PARA O MANEJO
AMBIENTAL DAS UNIDADES DE CONSERVAÇÃO
NO ESTADO DO PARANÁ, BRASIL**

RESUMO

As leis, resoluções, e normas que regulamentam o uso e conservação da Mata Atlântica na Área de Proteção Ambiental (APA) de Guaraqueçaba, Estado do Paraná, Brasil são revisadas. A Floresta Atlântica está simultaneamente entre os ecossistemas mais ricos em diversidade biológica e mais ameaçados do mundo. Há uma lista numerosa de leis federais e estaduais regulamentado o uso e proteção da APA de Guaraqueçaba; além disso há diversas outras leis indiretas que também exercem influência sobre a jurisdição da APA. O conteúdo, a administração, e a efetividade dessas leis são discutidas. A melhoria da proteção da APA irá depender da compatibilização da legislação, do fortalecimento dos órgãos públicos responsáveis pela APA, bem como do desenvolvimento de uma economia viável e sustentável que possibilite aos moradores locais um aumento da renda a partir do uso e manejo dos recursos naturais.

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**LIST OF SELECTED ORGANIZATIONS AND TERMS
IN PORTUGUESE AND ENGLISH**

Área de Proteção Ambiental (APA) de Guaraqueçaba (Decreto Federal 90.883/85)
Environmental Protection Area of Guaraqueçaba (Federal)

Área de Relevante Interesse Ecológico (ARIE) of Ilhas de Pinheiro and Pinheirinho (Decreto Federal 91888/85)
The Relevant Ecological Interest Area of Pinheiro and Pinheirinho Islands (Federal)

Assembléia Estadual
State Legislature

Batalhão de Polícia Florestal
Forest Military Police (State)

Comissão Interministerial para os Recursos do Mar
Commission between Ministries for Ocean Resources

Conselho do Desenvolvimento Territorial do Litoral Paranaense
Council for the Territorial Development of the Littoral (State)

Conselho Nacional do Meio Ambiente (CONAMA)
National Counsel for the Environment

Código Florestal (Lei 4771/65, e Lei 7803/89)
Forest Code, as revised (Federal)

Congresso Nacional
National Congress

Decreto
Decree (Executive Branch)

Decreto Mata Atlântica (Decreto Federal 99547/90 e 750/93)
Mata Atlântica Decree, as revised (Federal); 750/93 replaces 99547/90

Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA)
Brazilian Organization for Agriculture Research (Federal)

Estação Ecológica de Guaraqueçaba (Decreto Federal No. 87.222/82)
Ecological Station of Guaraqueçaba (Federal)

Estudo e Relatório de Impactos Sobre o Ambiente (EIA/RIMA) (Resolução 001/86 do Conselho do Meio Ambiente)

Environmental Impact Statement (Federal)

Imposto sobre Circulação de Mercadorias (ICMS)

The State Value-Added Tax on the Circulation of Goods and Services

Instituto Ambiental do Paraná (IAP)

Environmental Institute of Paraná (State Environmental Protection Agency)

Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA)

Brazilian Institute for Environment and Renewable Natural Resources (Federal Environmental Protection Agency)

Instituto Paranaense de Desenvolvimento Econômico e Social (IPARDES)

Institute of Paraná for Economic and Social Development (State Planning Agency)

Lei

Law (Legislative Branch)

Lei Beraldin, (Lei Complementar no. 59/1991)

Beraldin Law, authorizing distribution of a share of the state value-added tax back to qualifying municipalities for environmental protection

Palmito

Heart-of-Palm Tree

Parque Nacional do Superagüí (Decreto Federal 97688/89)

National Park of Superagüí (Federal)

Plano Nacional de Gerenciamento Costeiro (PNGC) (Lei 7661/88)

The National Plan on Coastal Zone Management Act (Federal)

Política Nacional do Meio Ambiente (Lei 6938/81, e 7804/89)

National Environmental Policy Act, as amended (Federal)

Pontifícia Universidade Católica (PUC)

Catholic Pontifical University

Portaria

Administrative Agency Order

Resolução

Resolution

Regulamento de Áreas e Locais Considerados de Interesse Turístico (Decreto 2722/84)
State Regulations to Define the Areas and Locations of Tourist Interest (A Mix of Zoning and Setbacks) and Specify Conditions of Use

Regulamento do Macro-Zoneamento da Região do Litoral Paranaense (Decreto 5040/89)
State Regulations to Establish Macro-Zoning for the Litoral Region of Paraná

Serviço Florestal dos Estados Unidos
United States Forest Service (USFS)

Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental (SPVS)
Wildlife Research and Environmental Education Society

Tombamento da Serra do Mar
Safeguarded Natural Area of the Serra do Mar

Universidade Federal do Paraná (UFPR)
Federal University of Paraná

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INTRODUCTION

The Atlantic Coastal Forests of Brazil have been identified by international assessment studies as one of the world's most endangered ecosystems, with perhaps the highest rates of biodiversity to be found anywhere (Myers 1988, 1990). The forests, which originally spanned the entire coast of Brazil from the state of Rio Grande do Norte south to Santa Catarina, have lost most of their original area. A large portion of the remaining forests exists in the state of Paraná (Figure 1). The forest contains many rare and endemic species of flora and fauna, and is included in a United Nations (UNESCO) Biosphere Reserve. Pressures for development from the local residents; external business, farming, and ranching interests; and commercialized intensive tourism threaten the forest and maritime environments of the Atlantic Coastal Forests.

The northern littoral region of the state of Paraná is protected from resource exploitation by a number of federal and state statutes. Both the federal and state governments have declared the region to be an Área de Proteção Ambiental (APA), or environmental protection area. Most of the APA falls in the municipality of Guaraqueçaba. This legal framework authorizes the federal and state environmental protection agencies to

strictly regulate land use and resource extraction activities in the APA. Laws in the APA also are enforced by the forest police, a branch of the state military. Enforcement and implementation of these strict state and federal statutes, however, is one of the larger challenges in actually protecting the forests, along with providing income and economic benefits for local inhabitants.

As one of many studies of protection in the APA Guaraqueçaba, the U.S. Forest Service (USFS) and the Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental (SPVS) have been performing work on the prospects for ecotourism in the APA Guaraqueçaba (Cubbage et al. 1994). The legal and institutional bases governing ecotourism in the APA are important in determining its viability. These aspects provide the framework in which ongoing protection, conservation, and development activities, including ecotourism, must take place. Accordingly, this paper provides a brief overview of the laws and organizations protecting the natural resources of the Northern Littoral Region of Paraná, and makes some preliminary inferences about their application to the development of ecotourism.

The information presented here about the relevant laws and organizations that govern resource management and protection in the APA is drawn from three principal legal reviews, from personal interviews with individuals in Paraná, and from research by the coauthors. The first legal review used was Chapter 10, "The Agents of Regulation and the Natural Patrimony", in the Integrated Plan for the Conservation of the Guaraqueçaba Region, Paraná, Brazil (Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental (SPVS) 1992). The

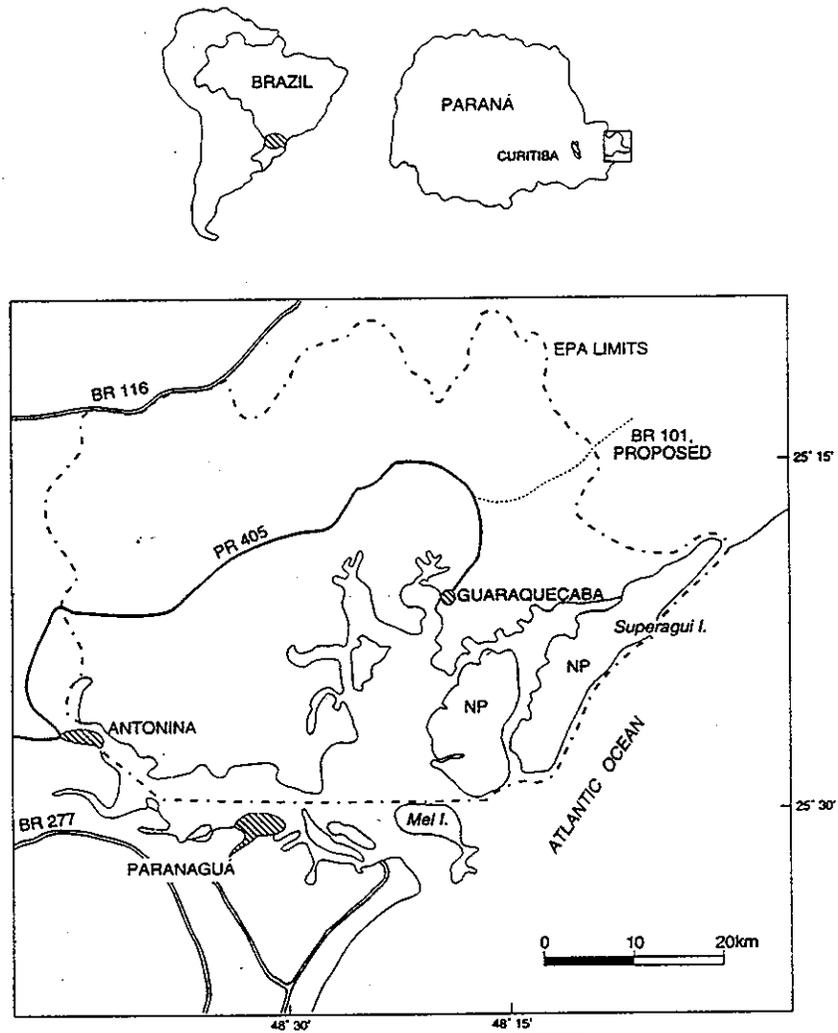


Figure 1. Northern coast of Paraná State, Brazil. Antonina, Paranaguá and Guaraqueçaba are major towns; EPA=Environmental Protection Area of Guaraqueçaba; BR=paved federal highways; PR=unpaved state road; NP=National Park of Superagui Island. Other conservation units not shown. Northern EPA limits coincide with the border between the states of Paraná and São Paulo.

second was a paper by José Milton Andriguetto-Filho (1993) on the "Institutional Prospects for Managing Coastal Environmental Conservation Units in Paraná State, Brasil." The third was Coletânea de Legislação Ambiental, compiled by Farias and Lima (1990). These related sources provided the basis for information in this paper unless noted otherwise, so will not be cited after each paragraph in order to avoid further duplication, except in the conclusions, where matters of opinion need clear documentation. Structured interviews covering an earlier draft of this manuscript provided the basis for updating and expanding the information contained in the published references.¹

The paper is intended to provide background for the larger project on ecotourism in Brazil by the joint USFS/SPVS project cooperators. It could be updated periodically based on reviews and comments from individuals familiar with the institutions and laws in Paraná and Brazil. It also can serve as a current English language version² of the status of laws

¹ Interviews were conducted among the authors of this paper with various individuals in Curitiba, regarding the contents of the paper in whole or in part. Particular thanks for their critiques and suggestions are due to Paulo Fisher, formerly of IBAMA (Instituto Brasileiro de Meio Ambiente), and Antonio Nunes de Melo of IBAMA; Clóvis Ricardo Schrappe Borges of the Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental; and Sérgio Ahrens of Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA). Ahrens also provided a copy of the seminal book on the collection of environmental legislation (Farias and Lima 1990). João Batista, Director of the Divisão de Conservação de Ecossistemas (DICOE) of IBAMA, also provided information on the status of federal APAs in Brazil in an interview in Brasília.

² This working paper uses many Portuguese words in order to clarify specific meanings. In order to minimize confusion, we will italicize Portuguese terms other than specific laws or organizations in order to clearly identify their use.

governing the Área de Proteção Ambiental, which may be used for reference by individuals in Paraná for this or other projects.³

THE NATURAL AND SOCIAL ENVIRONMENT

Geography

The Atlantic Coastal Forests and the maritime environments in the northern littoral of Paraná are largely encompassed by the Área de Proteção Ambiental de Guaraqueçaba, which is a federally protected conservation unit. The federal APA encompasses 313,406 hectares, ranging from marine continental shelf and estuarine systems to high altitude forests. Pico do Paraná, the highest peak in the state, at 1,922 meters above sea level, is located just beyond the western border of the APA. The principal natural systems are: (1) 10,000 ha of high sierras (up to 1,500 m); (2) 123,000 ha of low sierras (up to 1,000 m); (3) 46,000 ha of plateaus (up to 770 m); (4) 32,00 ha of river plains; (5) 62,000 ha of coastal plains and wetlands (mangroves, restingas, and beach vegetation); and (6) 38,000 ha of estuaries.

About 40% of the ecosystems in the APA remain intact, including 13% of the remaining Atlantic Coastal Forests in Brazil. Unlike most other Brazilian estuaries, industrial pollution is minimal in the APA. The varied ecosystems shelter a high diversity of

³ The review is a thorough examination of the laws governing resource use and protection in the APA Guaraqueçaba, and of the current status of their implementation. It should provide a good reference for anyone who reads English; perhaps it can be translated into Portuguese if future demands in Brazil warrant.

wildlife. At least 224 bird species have been identified in the area, including the endemic and endangered blue-cheeked parrot, Amazona brasiliensis. Other species continue to be discovered. These unique ecological features make the APA valuable for protecting a natural ecosystem and for serving as a model for control and restoration of similar systems in Brazil.

Social Systems

The human and social systems of the APA were described in detail by Andriguetto-Filho (1993), as paraphrased and updated below.

The APA Guaraqueçaba encompasses all of the municipality of Guaraqueçaba, part of the municipality of Antonina, and small portions of the municipalities of Paranaguá and Campina Grande do Sul. Approximately 9,000 people live in the APA, including 2,000 in the town of Guaraqueçaba and many in the 50 other villages in the APA. A boat service run by the local government and an all-weather unpaved road link Guaraqueçaba to larger towns outside the APA. Most of the villages on the coast are accessible only by boat.

About half the people who live in the APA are artisanal fishers and their families. Other than some merchants, government employees, and the few employees of construction companies, fish processors, and buffalo ranches, the majority of the population consists of small farmers and land tenants who cultivate mostly subsistence crops. Manioc is the principal crop, and bananas are grown as a cash crop. The palm heart industry is also important, but is now threatened by depletion of the wild heart-of-palm (*palmito*) trees. The

industry is now regulated in order to protect the remaining supplies. In contrast to Guaraqueçaba, the southern coast of Paraná has a highly developed tourism and recreation industry.

The town of Guaraqueçaba was a major economic center in Paraná until the beginning of this century. Guaraqueçaba was declared an independent municipality in 1880, and an agricultural community of Swiss, German, and French settlers existed on the Ilha de Superagüf from 1852 to 1915. In this century, commerce and development shifted inland and south in the state of Paraná. Modern harbor facilities were built across the bay in Paranaguá, and development shifted inland to the rich soils of the interior plateaus. Curitiba, the state's capital, now has a population of about 1.3 million, and Paranaguá has about 110,000 inhabitants.

The modern isolation and stagnant economy of the Guaraqueçaba region have contributed to its relatively unspoiled environment, but the area has very poor living conditions. Per capita income in 1990 was about one-sixth of the state average; there are no trash or sewage collection or water treatment systems; and only a few villages have even rudimentary water supply systems. Schools exist only for elementary children; teachers are scarce; health services are only available in the town of Guaraqueçaba; malnutrition is a concern; and communication systems are poor. However, electrification of much of the continental APA has occurred and a few towns on islands near Paranaguá, in contrast to much of the rest of Brazil.

Land Use

Land use in the APA region has consisted mostly of subsistence farming, buffalo ranches, artisanal fishing, hunting for food, and harvesting timber or other forest products. Local resource use is a low-intensity, probably sustainable activity at the current population density. However, slash-and-burn agriculture has damaged some riparian areas and steep slopes, and there appears to be some illegal wildlife poaching to serve foreign markets. Game hunting by outsiders also seems to be intense.

Current fishing efforts are too high to maintain fish populations, and catch rates have dropped considerably in the last ten years. Commercial fishery on the coastal shelf--mostly bottom trawling and sardine seining--has contributed to fisheries problems. The sardine fishery has collapsed as a result of over-fishing, and the stocks are only now recovering. That is deleteriously affecting other fish populations higher in the food chain. Bottom trawlers also are causing fisheries population depletion. For practical purposes, there is almost no enforced regulation of fishing.

Some highly prized timber species for export sales have been nearly eliminated by selective harvests. So has the *palmito* or heart-of-palm tree (*Euterpe edulis*), which is a key food chain species, and is harvested commercially for the succulent inner wood in the upper portions of the tree. Removal of this important midstory species also allows greater undergrowth, and adverse effects of forest structure. There is at least one legal *palmito* processing plant in the area that has obtained government operating permits, and there are

numerous small, illegally operated ones. *Palmito* obtains high prices in the international market, and is a major income source for locals. This has led to illegal harvesting on government and private lands.

Water buffalo grazing is a major factor in deforestation, especially because there is no sound management and poor fencing. Forests are cleared for buffalo pastures, and degraded when buffalo are allowed to run free in the unfenced adjacent forests. The animals also have adverse effects on the soils, the vegetation, and the water quality. In addition, buffaloes may destroy the crops of small farmers.

External factors also threaten the environment in the APA. The most important is the proposed, but delayed, construction of a major highway from São Paulo (the largest city in South America) to Guaraqueçaba. The project has been delayed due to opposition from sectors of the government and interest groups, as well as lack of money, since international funding has been denied due to the preservation status of the area. Completion would damage the area near the highway and prompt extensive development of the coasts.

The approximately 3 to 4 hour drive from Curitiba to Guaraqueçaba and the equally long boat rides to island beaches have prevented large-scale tourism, but tourism is increasing significantly. However, the one private organization that promoted tourism in the area to the international market ceased operations. Some land speculation for beach property has already started, including in national park lands, and a marina is proposed.

The port of Paranaguá at the APA's southern limit has facilities to load grain, fuels, and industrial chemicals. The harbor also is dredged periodically. Environmental effects from this port have not been determined, but surely are adverse. There are plans for expanding both the harbors of Paranaguá and the neighboring Antonina.

LAWS AND DECREES

Many federal and state laws govern land use and protection in the northern littoral region of Paraná. The following overview of these laws describes their principal contents and their administration. A brief chronological listing of selected laws relevant to environmental protection in the APA Guaraqueçaba is included as Appendix A to this paper. The laws stem from the general authority granted by the federal and state constitutions, as well as from specific acts of national and state legislatures and local governments. Rules and regulations are promulgated by agencies in all three levels of government under the authority of these laws. A general legal distinction worth noting initially is that a law (*Lei*) is enacted by the federal congress (Congresso Nacional) or state legislature (Assembléia Estadual), while decrees (*Decretos*) are administrative acts made by the president, governor, or a minister of an agency, which is then signed by the president or governor, as relevant. Resolutions (*Resoluções*) and Orders (*Portarias*) are somewhat less authoritative, but still legally binding instruments of law promulgated by administrative agencies.

The Brazilian government has traditionally been centralized at the federal level, but the 1988 Constitution granted more authority and revenues to the state and local levels. State and municipal assemblies can enact laws and ordinances, but not in conflict with national laws. Therefore much of the legislation is uniform throughout the country, with most major policy decisions formalized at the federal level, and many policies dictated by the federal constitution. In 1994, the federal legislature attempted to rewrite the Constitution, as mandated in 1988. This effort, however, failed because the different interests could not reach consensus, so the 1988 Constitution will remain in effect.

The 1988 Constitution not only distributed more revenues to state and local governments, but also attempted to increase the authority of the legislative branch of government. Nevertheless, at all levels of government, the executive remains more powerful than the legislature. The new federal constitution and the new state and municipal constitutions also legally guarantee the right of public participation in the policy process.

The Constitution also prompted the creation and organization of environmental and land use planning agencies. The 1988 Constitution has an extensive and well-written chapter on the environment. Environmental agencies and authorities have been rather unstable, however. For example, federal environmental authority has alternated four times between a Bureau in the President's office and an independent Ministry of the Environment.

Conservation Laws and Units

Federal Law.—There are many federal laws that provide general authorities for environmental conservation or establish specific conservation units. Article 225 of the 1988 Federal Constitution established the right to an ecologically balanced environment for the citizens of Brazil. It continues to state in the fourth paragraph that the Mata Atlântica (Atlantic Coastal Forests) and Serra do Mar (Coastal Mountain Range), among others, are areas of national patrimony and that the use of their resources will be regulated to preserve the environment. Several federal conservation laws stemming from this constitutional authority apply to the Guaraqueçaba region.

(1) Law 6902/81 and Decree 90.883/85, The Environmental Protection Area of Guaraqueçaba (Área de Proteção Ambiental (APA) de Guaraqueçaba, Decreto Federal 90.883/85, under authority of Federal Lei 6902/81).⁴ The APA Guaraqueçaba is the largest among all the conservation units in the region. The federal APAs are a category of

⁴ Laws and decrees are referred to in full by their number and the year in which they were enacted, e.g. *Decreto Federal* No. 90.883, 31 *de janeiro de* 1985 (The Área de Proteção Ambiental de Guaraqueçaba Decree). For ease of reference, each law (*lei*) and decree (*decreto*) in this paper will generally be referred to as a law or decree with its number/year and popular name. The *decreto* creating the APA Guaraqueçaba was promulgated by the now extinct SEMA, Secretaria do Meio Ambiente. Guaraqueçaba is one of 19 federal APAs.

conservation units⁵ that govern activities on privately-owned land. It is one of the most advanced in the country in terms of administration and organization.

APAs can be and have been created by all levels of government, because they are relatively easy to declare and incur little direct government costs. APAs are intended to promote multiple use and protection of the landscape. They restrict human uses and prohibit activities most likely to cause adverse impacts, such as industries and biocide-based agriculture, but do not expropriate private land-holders. APAs try to identify and promote appropriate land uses, such as honey production, fruit and nut growing, fish or shellfish culture, non-timber forest product use, etc. Even agriculture is acceptable if it employs little fertilizer and no biocides. All other types of federal conservation units restrict uses to low intensity recreation, research, and education.

Private landholders can request appropriation and compensation by proving in court that they have lost the right to any productive use of their land. This process is termed *indenização indireta*. None of the administrators interviewed were aware of any cases of landowners requesting expropriation to date.

⁵ The other principal types of federal conservation units are (1) Ecological Stations (*Estação Ecológica*), (2) Relevant Ecological Interest Areas (*Área de Relevante Interesse Ecológico, ARIE*), (3) National Parks (*Parque Nacional*), and (4) National Forests (*Floresta Nacional*).

The APA de Guaraqueçaba decree mandates:

- (1) protection of local flora and fauna;
- (2) retention of traditional communities;
- (3) protection of the Paranaguá Bay estuary complex;
- (4) restrictions on and prohibitions of activities that could place the integrity of the region in danger; and
- (5) the exclusion of the city of Guaraqueçaba from the APA.

The regulations for the APA are supposed to be expanded and described in detail in zoning and land management plans for the APA. Although the Instituto Paranaense de Desenvolvimento Econômico e Social (IPARDES), the state planning agency, developed a zoning plan for the APA, the Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA), the federal environmental protection agency, has not issued a *portaria* to authorize the plan, and plans to revise the IPARDES version. Thus the rules that are currently in force for the APA Guaraqueçaba include those that are in the original 1982 law that authorized APAs in general, and the specific *decreto* for the APA Guaraqueçaba, in addition to any specific or more strict state or municipal laws.

Supplemental decrees governing land use within the APA de Guaraqueçaba boundaries (313,406 ha, 1985) include the following.

(2) Law 4771/65, the Forest Code Law (*Código Florestal*), as modified by Law 7803/89. This nation-wide law places existing forests in the national territory under special

protection, as well as other forms of vegetation that are recognized as being useful to the land that they cover. The Forest Code is the fundamental federal code governing use and protection of forests in Brazil. In most forests in Brazil, the Forest Code does allow selective timber harvesting. The Forest Code does not mention the Atlantic Coastal Forests specifically, but they do fall under this harvest regulation (inside and outside the APA). To cut timber, landowners must prepare a sustained yield forest management plan, which must be approved by IBAMA. Different APAs may have different regulations regarding timber harvest, depending on the particular zoning plan and implementing regulations. The state or federal government can override that plan with even more restrictive rules protecting the environment.

IBAMA regulates most other kinds of use of vegetation as well. This includes the cutting of *Cipós*, the hanging tendrils of epiphytic plants that grow in the canopy of the forest, and *Taquaras*, a kind of bamboo that is used in handicrafts. The *caxeta* tree—a fast growing pioneer species that renews quickly by sprouting—and *palmito* also may be harvested in the Atlantic Forest and in the APA Guaraqueçaba if a permit from IBAMA is granted. Additionally, some kinds of vegetation, such as mangroves, riparian vegetation, and *restingas* are protected by the Forest Code (1965, 1989) and other federal regulations.

(3) **Law 5197/67, The Law for Fauna Protection (*Lei de Proteção à Fauna*).** The law for the protection of the fauna regulates hunting. Hunting in the Atlantic Coastal Forest is forbidden even for food. If caught, "food hunters" can legally claim their necessity of

hunting for food, and usually avoid penalties. Hunting for sport is clearly illegal. Some people capture and sell the threatened blue-cheeked parrot, in violation of the law.

(4) Decree 87222/82, The Ecological Station (*Estação Ecológica*) of Guaraqueçaba (14,000 ha, 1982). The Ecological Station of Guaraqueçaba, which was declared before the APA, protects all the mangroves in the Guaraqueçaba region. The decree overlays the federal *Código Florestal*, which protected the mangroves indirectly as part of broader forests. The Ecological Station protects the mangroves in the APA with the most rigorous protection allowed under Brazilian law.⁶ The law does not expropriate private land per se, since the mangroves already are federally-owned by law, at least in theory. Technically, the fishing families who live on the mangrove islands should be removed from the area, but IBAMA has not attempted to do so.

(5) Decree 97688/89, The National Park (*Parque Nacional*) of Superagüí Island, including lands from the islands of Superagüí and Peças (30,000 ha, 1989). This law authorized the expropriation and stringent protection of the lands of Superagüí and Peças Islands, again exceeding that of the general APA legislation. A strip along the coasts, including all of the island's beaches, was excluded from the National Park.

⁶ The ecological stations and biological reserves are very strict, although some experts believe the biological reserve could be slightly more restrictive. Ecological stations are supposed to be managed to promote scientific research and environmental education, while the purpose of biological reserves is conservation of ecosystems. Unlike the APA designation, which allows private property, the ecological stations and biological reserves are owned by the government and any private landowners must be expropriated, with compensation.

(6) Decree 91888/85, The Relevant Ecological Interest Area (*Área de Relevante Interesse Ecológico* (ARIE)) of Pinheiro and Pinheirinho Islands (109 ha, 1985). These islands are protected as the roosting site for the "papagaio-chauá" (*Amazona brasiliensis*), or blue-cheeked parrot.⁷

(7) Decree 99547/90, the *Mata Atlântica* (Atlantic Forest) Decree. This decree forbade, for an indeterminate period of time, the cutting and exploitation of the Mata Atlântica's native vegetation. This law created considerable controversy and opposition by individual landowners throughout the APA Guaraqueçaba, because it restricted their ability to lawfully practice the conventional methods they used for agriculture. The law was superseded by Decree No. 750/93, of 10 February 1993, which is described next.

(8) Decree 750/93, the *Mata Atlântica* Decree (revised). The revised Mata Atlântica decree was enacted to correct problems that were created by the overly strict 1990 decree. It still provides considerable protection for the Atlantic Coastal Forests throughout Brazil, but provides for some limited traditional uses of the forests. The new decree prohibits the cutting of primary or secondary forest vegetation in advanced or intermediate stages of growth. Criteria to define the stages of growth were not included in the decree, but rather left to be defined by administrative agencies. IBAMA had general authority to define the forest stages of growth unilaterally, but because of the controversies surrounding the

⁷ This relevant ecological interest area protects these small areas; some individuals interpret the Guaraqueçaba Ecological Station decree as covering these islands also.

earlier law, sought more involvement in the development of definitions from other government and nongovernment organizations.

The final rules regarding the stages of forest growth and limits on tree cutting were being developed in 1994; the general provisions have been outlined for discussion. Limited timber harvests/clearing will be allowed again in the Mata Atlântica, with authorization. Clear cutting may be allowed near small towns--for new buildings, for firewood, and for some small timber products.

Classification of the stages of forest growth was based on Roderjan and Kuniyoshi (1988), who divided forests in the APA into at least four different categories: (1) *capoeirinha*--brush up to 4 years old, and 1 to 2 meters tall; (2) *capoeira*--trees from 10 to 15 meters tall and 5 to 20 years old; (3) *capoeirão*--trees 15 to 20 meters tall and 30 to 40 years old; and (4) *floresta secundária*--second growth forests comprised of large trees.

The Roderjan and Kuniyoshi classification was slightly revised as stated in Resolução 002/94 do Conselho Nacional do Meio Ambiente (CONAMA) de 18 de março de 1994, which divided the forest vegetation into three states of initial, medium, and advanced. The initial stage included forests comprised of trees up to 10 m in height and diameters between 5 and 15 cm; the second stage consists of trees from 8 to 17 m tall and diameters from 10 to 40 cm; the third stage consists of trees taller than 15 m and diameters from 20 to 60 cm. Some restricted harvests of the initial class or classes of forest cover, for traditional

agricultural uses, are likely to be allowed under the new administrative rules, but not of the latter classes. Land use in all forested areas will continue to be controlled by IBAMA in some fashion.

State Law.--State legislation governing the APA includes various laws, conservation units, and decrees. Initially, much of the APA consisted of areas--namely the Serra do Mar and Ilha do Superagüf--that were termed *tombadas* by the state government in 1985 in São Paulo and 1986 in Paraná. Declaring an area *tombado* indicates that an area is declared to be important for the national or state heritage, and is officially registered in a federal, state, or local book of *Tombo*. *Tombamento* severely limits the use rights of private property holders in order to ensure the preservation of important state heritage values. Initially, areas could be declared *tombados* in Portugal for important archeological, artistic, or historic values, and the concept has been now extended in Brazil to areas with significant landscape, scenic, or environmental values.

The principal state legislative actions regarding the APA Guaraqueçaba are:

(1) Decree 2693/80, Protection of Areas of Special Interest (*Áreas de Especial Interesse*). This decree stated the general intent of interest and protection in special areas in the municipalities of the littoral of Paraná. It expressed the purpose of protecting archeological sites, historical sites, and beaches in the municipalities in the littoral.

(2) **Law 7389/80, Law of Coastal Land Use and Tourist Interest (*Áreas e Locais de Interesse Turístico-Lei de Uso do Solo do Litoral*)**. This law addressed land use in areas of tourist interest, including regulations about building of houses, sanitary conditions, protection of flora, and preservation of historic sites. It declared a band of lands 2,000 meters wide on the ocean margin and 400 meters wide on the margins of other water bodies on the coastal zone to be Areas of Special Touristic Interest. It also established setbacks and construction standards. This was later incorporated in state laws and decrees that follow.

(3) **Decree 2722/84, Law Governing Land Use in Areas of Tourist Interest (*Áreas e Locais de Interesse Turístico-Lei de Uso do Solo do Litoral*)**. This law stated detailed regulations to implement the principles stated in the preceding law of 1980. It included great details on localities covered by the law; reserves, ecological stations, and water resources; and the objectives of zoning and rationalizing land uses.

(4) **Decree 6754/85, Safeguarded Natural Areas, Serra do Mar and Artificial Island of Superagüí**. This decree provided protection for the areas of Serra do Mar and the Island of Superagüí. The following year, the Serra do Mar was declared *tombado*, one of the highest levels of natural resource protection available for private land, by *Edital de Tombamento do Serra da Mar, de 25 de julho de 1986*, under this decree.

(5) **Decree 5040/89, Approving the Regulations to Define Macro-Zoning for the Littoral Region of the Paraná (*Macrozoneamento da Região do Litoral Paranaense*)**. This

law acknowledged the necessity to make production activities compatible with the potential of natural resources and protection of the environment, as well as guarantee development of the littoral region of Paraná. The law issued detailed regulations governing land use in the littoral, including activities involving silviculture, agriculture, aquaculture, mining industry, and infrastructure. Scientific, cultural, sport, tourism, and public services were also addressed.

The state macro-zoning law was based on a plan by the state planning agency, IPARDES. Thirteen "natural environmental units" were defined, and restrictions and guidelines were set for the above list of land uses. Although many of those regulations were applied without difficulty, others are not complete or do not provide adequate detail to be effective and enforced.

Implementation of the Areas of Special Tourist Interest and coastal macrozoning laws was assigned to the Council for the Territorial Development of the Littoral (Conselho de Desenvolvimento Territorial do Litoral Paranaense, CDTLP),⁸ which has remained essentially non-operative except for controlling construction in urban areas on the southern coast. The CDTLP was created in 1984 under the State Bureau of Environment, to advise and counsel the state's administration on a broad array of issues regarding the coastal zone. CDTLP is not an agency but a high level council with 24 members, including seven heads of state bureaus, the mayors of coastal towns, and 11 public interest group representatives.

⁸ The CDTLP was created by state decree 5605/84.

There also are a number of state conservation units, some of which overlap the federal areas. Two unique state units are the State Ecological Station of Mel (Honey) Island (Estação Ecológica da Ilha do Mel, 2,241 ha, Decree 5454/82), and the Área of Special Touristic Interest of Marumbi (Área de Interesse Turístico do Marumbi, 66,732 ha, Decree 4484/81), which borders on the APA and includes Marumbi and Paraná peaks. Another 345 ha on Mel Island that is not in the Ecological Station was declared *tombado* in 1972. In addition to the state APA de Guaraqueçaba, there also is a state APA de Guaratuba on the southern coast of Paraná. Other small state parks near the APA Guaraqueçaba include Serra da Graciosa, Pico do Marumbi, and Agudo da Cotia.

A couple of issues about the federal and state APA protection laws have not been resolved. The state APA was declared after the federal APA, and its legal status still is not completely clear. The state APA boundaries are slightly different than the federal APA because it includes some land on the border of the states of São Paulo and Paraná that both states claim as their own, as well as beaches that were excluded from the federal APA.

Related Laws

Various other laws related to environmental protection and conservation affect the APA region. Many Brazilian general environmental laws were enacted and implemented in the 1980s. These laws have often made environmental protection more important than traditional economic development, in principle at least. This includes the National Environmental Policy Act of 1981, which on paper is a model act. However, policies to

effect protection have not been implemented, regulations and standards are still lacking, and there is little enforcement of the act. The legislation that affects the coastal zone is discussed below.

Environmental Impact Assessments.--Brazil has a National Environmental Policy Act (*Política Nacional do Meio Ambiente*, Law 6938/81, as amended by Law 7804/89), which requires environmental assessments. The environmental impact assessment (EIA) or environmental impact statement (EIS) process is established by a federal resolution (Resolução 001/86 do Conselho Nacional do Meio Ambiente--CONAMA), which leads to a "RIMA" (*Relatório de Impactos sobre o Meio Ambiente*) report. The RIMA documents are similar to the EIS/EA requirements in the United States' National Environmental Protection Act. There are extensive "ad hoc" ordinances, mostly established at the state level, and Paraná and São Paulo are the leaders in the nation in this respect. The 1988 Constitution requires environmental impact studies for any project or activity that could cause substantial degradation of the environment. Decree 468/92 established further rules for RIMAs. This RIMA process is developing, although there is a lack of environmental information and are no special provisions for the coastal zone. The RIMA can be considered the only integrated planning tool in effect so far. The state constitution of Paraná also requires environmental impact statements.

The federal/state environmental impact assessment process differs somewhat from that of the United States in implementation. RIMAs are prepared by private consulting firms,

and approved by state agencies (the Instituto Ambiental do Paraná (IAP) in Paraná). A RIMA is required for all major projects that could potentially or actually degrade the environment on public or private lands. The state environmental protection agency has authority to declare what will require a RIMA. Actions specifically requiring RIMAs have been listed, such as power dams or even pine plantations exceeding 100 ha. While it would be a matter of interpretation, it is unlikely that development of most minor ecotourism activities such as trails, picnic, or camping sites would require a RIMA.

Fisheries and Pollution.—As noted before, fishing and fisheries are mostly regulated by the federal environmental protection agency's (IBAMA) ordinances, which are uniform throughout the country. The uniformity does present some problems, however. Closed seasons for shrimp, for example, do not consider regional characteristics and fishers in Paraná complain that they are not profiting, but that the resource is not being protected.

Legislation on pollution also is extensive, addressing all major pollutants and substances, their production, transportation, etc. Legislation setting water quality standards and water body categories is national. States have enforcement responsibilities and authority to pass additional ordinances. Lack of equipment, expertise, and personnel are limiting factors. Paraná also is a leader in pollution control, but has neglected the coastal zone, especially estuarine water.

Coastal Zone Planning.—Most other coastal issues are addressed in sectoral legislation, including ports and harbors and marine transport. In 1988, the National Plan on Coastal Zone Management Act (*Plano Nacional de Gerenciamento Costeiro*, or PNGC, Law 7661/88) specified that beaches are public property and mandated open access, except for "national security areas" and "protected areas." PNGC was enacted after six years of public, scientific, and legislative discussions, thanks to the democratic efforts of CIRM (Comissão Interministerial para os Recursos do Mar). The PNGC does not grant specific new regulatory powers, but was intended to provide improved administration and coordination of coastal conservation units. Plans developed under the PNGC framework, however, could eventually lead to establishment of other specific or more strict regulations.

The PNGC can be considered the coastal counterpart of the National Environmental Policy Act. The law calls for the country, and allows states and municipalities, to develop coastal zone management plans and programs, with the primary goal of disciplining the use of the coastal zone, by coupling social and economic development to the preservation of the quality of life, to the carrying capacity of the natural environment, and to the ethnic, cultural, historical, and natural heritage of the coastal zone. Of special concern in Paraná, are the about 50 *sambaquis* (shell mounds made by ancient Indians) in the APA, which are protected by laws governing archeological sites (Law 3924/61).

The PNGC requires penalties and fines to be established; enforces the government requirement to prepare a RIMA; authorizes creation of a national system of coastal

environment information; and assists in administering the existing preservation areas. The national PNGC plan was to be prepared by a high-level federal bureaucratic coordinating group, with input from the scientific community. To date, however, the only substantive accomplishment of the PNGC has been the preparation of thematic charts and existing land use mapping for coastal sectors in a few states. The necessary implementing laws have not been passed, and the process has been halted since 1991. In Paraná, some planning has been renewed at the state level recently.

Ecological Royalties.—In addition to the previous laws, Law 059/91, The Beraldin Law (*Lei Complementar no. 59, de 1 outubro 1991, or Lei Beraldin*) and the State Value-Added Tax (*Imposto sobre Circulação de Mercadorias e Serviços, ICMS*) bear explanation. The Beraldin law is designed to benefit the municipalities (*municípios*) that hold important natural resources such as the conservation units. Those municipalities (about the area of a U.S. county) are supposed to receive a special distribution from the Beraldin Law, called "ecological royalties." These royalties are special distributions taken from the 17% state value added tax on the Circulation of Goods and Services. This special distribution helps provide income to municipalities who have a large share of their lands in a protected status, somewhat to compensate for economic activities that may be foregone by that status. The tax transfers are intended to be used for environmental protection activities in the relevant municipalities.

The state ICMS tax distributes 25% of all the funds collected to municipalities throughout the state. According to the Beraldin Law, 5% of the 25% distributed to municipalities (a net of 1.25% of total ICMS receipts) are to be distributed among counties with protected watersheds or other conservation units, based on the area protected. This is in addition to the local receipts the counties already receive from the ICMS. Guaraqueçaba's 1992 receipts of \$209,000 U.S. from the ICMS increased by more than 500% from 1991 due to the Beraldin Law⁹.

Land Tenure

Despite its classification as state and federal environmental protection area, most land areas in the APA are privately owned. As indicated above, landowners have rights to use their land, but are limited to a great extent by many federal and state laws. Landowners can exclude other individuals from their property, although this is not common. Many large *fazendas* (ranches) do not permit public access, especially if there is *palmito* growing on the property. Local farmers and communities are less protective of access onto or across their property.

There are many problems associated with land tenure in the region. During the 1970s, large outside interests such as logging corporations, water buffalo farmers, and

⁹ There is some concern about the use of these additional funds for environmental protection versus development purposes. Some have reportedly been spent to open roads in new areas, while others have been targeted for more environmental protection activities such as building trails.

palmito growers gained title to tracts as large as 30,000 ha. Evictions of small farmers and fishing families were frequent, disrupting traditional cultivation systems. Some of these large holdings are still relatively well preserved in their prior natural state. Small farmers are now working on marginal lands, unable to rotate crop areas, and frequently plowing slopes. Since the beginning of this century, farm families have been migrating to coastal communities to become fishers. Interestingly, the fishing communities on the islands have been more effective than farmers in protecting the area from outside pressures and evictions. Nevertheless, land remains very unequally distributed, with less than 1% of the landowners holding about two-thirds of the land area in the APA (Andriguetto-Filho 1993).

Inefficiency in the state's land property administration has led to a chaotic situation regarding actual title and ownership of private property in the APA. Problems include difficulty in determining and clearing prior titles to land, failure to record actual sales, and inability to identify the physical boundaries of sales. Different government administrative units have often granted different sets of rights to the same geographic area. Almost all areas in the APA have multiple--sometimes as many as four to six--legal owners. Precise estimates of overlapping land tenure are not available, but it is believed that only about one-quarter to one-third of the lands in the APA actually have clear title.

The creation of the preservation areas (National Park and Ecological Station) further increased land tenure problems, since privately owned lands have not been expropriated. The process of removing the private property rights in these areas has not started yet. In

fact, three large corporations have been fighting in court for property on Superagüí Island since 1981¹⁰.

Beaches and water bodies are common, publicly-owned areas under federal jurisdiction. Areas bordering the sea, estuaries, and river courses with tidal influences are "Union-owned" (federally-owned), from the shoreline up to 33 m inland (shoreline is defined as the mean high tide of 1831). The federal government can grant use rights (not property rights) in this zone. This has been done for all fishing villages in Guaraqueçaba.

The variety of land tenure situations, laws governing use, and weak implementation make for interesting coastal zone management and planning. Basic laws and rules for governing land use are in place, but large gaps still exist in controlling or improving other areas, such as health and sanitation, agriculture, aquaculture, water pollution, and recreation and tourism. The coastal conservation units are considered largely paper parks even by those in charge of them.

¹⁰ Superagüí has not always been an island, but was created by the human-made Varadouro Canal dug across a peninsula. This contributed to the unclear status of some of the land ownership rights on the island. Some ownership disputes have been in court for over 20 years. In fact, some of the land is *devoluta*, meaning given back (to the government), because nobody really knows who owns the land.

ADMINISTRATION

The administration of the various classes of parks and protected areas in the APA Guaraqueçaba is handled by various federal and state agencies. These include environmental protection agencies, planning agencies, and military agencies, as indicated above.

Additionally, various problems that bear noting have occurred in implementation of the laws.

National Park of Superagüí

As mentioned, Federal Decree 97688/89 authorized stringent protection as national parks for the islands of Superagüí and Peças, but excluded most beaches, including the *Praia Deserta* on the eastern and northern sides of Superagüí Island. On the other hand, it partially includes the communities of Fátima Village, Canudal, Barbados and Barra do Superagüí on Superagüí Island, and Bertioga, Laranjeiras and Tibicanga, on Peças Island. The decree created a great deal of controversy because it included some populated areas and excluded most beaches.

Although the reasons for the illogical park boundaries are unclear, it is probably due to hasty passage of the law, combined with efforts to exclude the beaches granted at the behest of real estate interests, and the inclusion of some communities due to poor knowledge of local conditions. Also, the national park was created by a different sector of IBAMA than the one that administers the APA, and the lack of communication between the sectors probably contributed to the confusion. IBAMA has already made a proposal to redefine the

boundaries of the park, but it is still pending at the federal level. According to the Constitution, only federal laws can create or alter federal parks or areas of protection. Thus while some efforts have been made to have the beaches included in the National Park of Superagüí, there is some legal debate as to what is required. Some individuals think that it could be done by decree, but others believe that the more difficult enactment of a federal law is necessary.

The supervision, administration, and enforcement of the federal conservation units are the responsibility of IBAMA. IBAMA can sign agreements with public and private organizations in order to achieve established goals and define responsibilities, without impairing its legal authorities.

In the case of the National Park of Superagüí, IBAMA was directed to take the measures necessary and develop a management plan to implement the park status within five years of the 1989 decree that created the park. Although many necessary park projects have been identified, the park management plan has not been prepared yet due to lack of financial resources. It was due in theory in April 1994, five years after the decree setting aside the park. For now, the areas will remain under federal environmental protection, but without a formal plan.

Mata Atlântica Decrees

The 1965 Código Florestal, as amended, protects forests and other vegetation of the Mata Atlântica. The forest code regulates various activities that affect forest vegetation and establishes penalties for violations. The Forest Police, a branch of the state military police, enforce the Forest Code. They also cooperate with IBAMA and the Instituto Ambiental do Paraná (IAP) in implementing the Mata Atlântica decree.

The 1990 Mata Atlântica decree, which forbade cutting and exploitation of the forest's native vegetation, created great controversy in Paraná and the rest of Brazil. Enforcement of this law created serious problems in the region. The local population was outraged, since they depend in a large degree upon the forest's resources for their employment and income. The 1993 revisions to the decree discussed earlier, and the regulations to implement its new provisions, are intended to allow some economic uses of the forest by local inhabitants while still providing a high degree of environmental protection.

Of course, the mere passage and revision of the Mata Atlântica decrees does not guarantee effective protection for the area. Only their application, enforcement, and social acceptance will determine their real value. The effective environmental protection required for the APA to achieve its status as a conservation unit will require both development of laws and regulation and acceptance by the public.¹¹

¹¹ In addition to specific questions of implementation, one broader legal issue underlies the Mata Atlântica decrees. Namely, some individuals question whether the decrees are constitutional, since they govern federal park boundary establishment or revision. According

ENFORCEMENT

A large number of laws obviously either directly or indirectly regulate actions in the APA Guaraqueçaba. The enforcement of these laws is the ultimate factor that determines the degree of protection. Several agencies are involved in enforcement, but they are hampered by lack of compliance with the laws, limited personnel and operating budgets, and the extensive area requiring monitoring.

Agencies

The organizations that are currently involved in enforcement in the region include IBAMA, IAP, and the Forest Police (Batalhão de Polícia Florestal), which is a branch of the state military police. The Forest Police operate throughout the state in agreement with IBAMA. There is some overlapping of authority. This is beneficial since it represents a collective effort, but precludes assigning ultimate authority to a single organization, which presents problems. For example, recording any violation demands separate work from all three organizations. There is no comprehensive file of records exclusive to the APA or to the other units contained in the region.

to the Brazilian Constitution, such legislation should be passed as a law by the Congresso Nacional, not enacted by decree, such as both Mata Atlântica decrees were. Unless this is specifically challenged in court, however, the decrees will stand as law.

IAP.—The Instituto Ambiental do Paraná has regional headquarters in Paranaguá. There are two law-enforcement agents located in the local office at Guaraqueçaba. There also is an office in the municipality of Morretes. IAP is responsible for issuing deforestation permits and for authorizing selective wood cutting, among other assignments. The agents located in Paranaguá deal with law enforcement in the water and supplement the actions of the local agents. The Morretes office also acts in the region, and in Antonina and Morretes municipalities.

The Forest Police.—The Forest Police have four offices in or near the borders of the APA: in Guaraqueçaba, in Itaqui, on BR 116, and on the Varadouro Canal. Each office has a staff of at least two agents who rotate every eight days. They have police powers and can stop violators whenever they are caught. The Forest Police have no powers regarding the heart of palm processing industry, but cooperate with enforcement agents from other organizations in these cases. The Forest Police respond to complaints, and also conduct surprise visits to discover deforestation violations and illegal harvests of *palmitos*. Sometimes they are not able to use vehicles, so perform their operations on foot.

As an example of the types of enforcement actions taken, data were reported for the state of Paraná for January to September of 1991. The Forest Police reported 3,297 violations, including those related to traffic, fires, crimes, misdemeanors, attacks against property, drugs, etc. Of these, 63% were crimes against the flora or fauna, many of which occurred in Guaraqueçaba.

IBAMA.—IBAMA does not have any law enforcement agents in the area. The IBAMA agents in Paranaguá are in charge of all the work along the state coast, including regulating and issuing permits to professional fishers. Permits are issued in the Curitiba headquarters, and sent to the field agents for distribution.

IBAMA does have some administrative personnel and facilities in the APA. As of 1994, personnel included: (1) an APA chief, (2) an Ecological Station chief, (3) a National Park chief, (4) two general assistants, and (5) two pilots/boat crew. Facilities included: (1) an administrative office in Guaraqueçaba, (2) two headquarters for research and enforcement—one on the Pinheirinho Island and the other on Superagüf Island. It also had various motor vehicles, including about 5 small boats with motors, 2 large motor boats, and a truck. Keeping the vehicles all running in good operating condition is difficult.

Problems

In general, all the offices and headquarters of the different agencies are subordinate to their central offices in Curitiba, which are actually responsible for the bureaucratic processes and issuing documents dealing with commercial activities. The Curitiba offices of IBAMA, IAP, and the Forest Police do not always have regular or effective contact. Therefore it is not uncommon to find permits issued incorrectly, because a given department is unfamiliar with another's responsibilities. The lack of funds, equipment, and staff in all the organizations causes enforcement actions to focus on investigation of accused violations. In

fact, the limited funds often prevent even the equipment that is owned by the agencies from being maintained adequately.

Despite the limitations of enforcement organizations, the local population complains about the agents' actions. There is some fear of the enforcement agents, especially the Forest Police. Selective enforcement of laws might also prompt charges of bias or favoritism and undermine respect for the decrees.

Violations against the various federal and state laws are common. Cutting of trees without a permit was outlawed in all of the Atlantic Forests by the Mata Atlântica decree, but some cutting continued. The decree did force closure of a mill in Guaratuba that used *caxeta* trees. Local residents still do harvest some useful trees, which they saw up by hand for boards for houses or use for dugout boats made from entire tree trunks. Poaching of wildlife also is probably common, but not enough enforcement officers exist to even gauge the severity of this problem. In addition, recreational hunting appears to occur often in the APA, despite its illegal status.

The major violators are actually well organized and difficult to detect. The *palmito* harvesters, the *caxeta* extractors, and the industrial fishing boats have means to bypass the inconsistent law-enforcement effort. While official agents do not have an integrated system of action and information, violators prove to be well-organized, highly specialized, and well equipped.

The current system, which lacks an overall code of rules and uniform enforcement, has an adverse effect on the resources and people in the region. Forest and ocean exploitation is increasing, and governmental deficits, personnel, and equipment shortages exacerbate the lack of enforcement. In addition, other decrees still allow some extractive activities and enterprises, such as *palmito* harvest and processing, to be carried out in the region with a permit, making it difficult for enforcement agents to immediately determine whether a given activity is illegal.

ISSUES

Like any developing (or developed) nation, the Brazilian system of integrated resource management and protection has many problems and unresolved issues. The crux of these lies in the inherent conflict between immediate economic development and resource exploitation versus long-term protection and ecologically sustainable use of resources. These problems are compounded by the pressing needs of the people in areas such as the APA Guaraqueçaba and the limited resources and funds for government activities to provide social services and environmental protection. For Paraná's coastal conservation units, major barriers to sustainable resource protection can be summarized as follows.

- (1) The country and state lack political will, administrative continuity, and budgetary wherewithal to protect natural resources.

(2) Environmental protection legislation is inconsistent, lacks precision, and is not adequately implemented by associated agency regulations and actions. For example, many conservation units still do not have management plans, as required by law.

(3) The government lacks resources, especially technically skilled people, to address social and environmental problems confronting the area. For example, IBAMA has expanded its functions and responsibilities in the APA compared with the agencies from which it was formed recently. Yet the meager IBAMA resources were not expanded accordingly. In addition, lack of well-directed funds or enforcement personnel compromises the ability to implement even simple controls, and generates ill-will among people who require permits or other documents from IBAMA. For example, requests for agricultural use permits may take almost one year before they are processed. During this time, citizens must wait patiently or break laws in hopes they will not be prosecuted.

Local people have customs and values that make them uneasy with modern bureaucratic procedures. Thus they request assistance when needed, not in advance, leading to an overload of requests during the cultivation periods and making reasoned agency analysis difficult. Both private interests and administrative agencies also often lack the adequate knowledge to correctly submit and follow all the procedures required by law. This presents both an educational problem to get local residents to understand the regulations, and a need for change in the laws and agency procedures to make them better suited for the local situation.

(4) The country and state retain a centralized sectoral approach to deal with the management of natural resources and social processes that rely on the resources. The 1990 federal decree prohibiting cutting of vegetation in the Mata Atlântica throughout Brazil was aimed primarily at destruction on the northeast coast, such as in Bahia, where only small forest fragments remain. This created social problems in Paraná, by making it a crime for a small farmer clearing a plot for subsistence agriculture, even in secondary forests. The local population's outrage over their loss of resource rights has made law enforcement difficult at best. As another example, many fishing villages were left inside the National Park of Superagüí, which is still creating problems regarding land use versus protection.

(5) Overlapping jurisdictions often lead to turf battles. The Conservation Units are not integrated into a formal system. Thus agencies often can ignore legislation not related to their fields, as well each other's procedures. Usually, precedence is gained by the one that acts first or represents development interests. Management procedures are not integrated with the neighboring state of São Paulo, either, where other conservation units exist, despite the existence of an inter-state council on the Atlantic Forests (Consórcio Mata Atlântica). In fact, even a small area of the state boundaries between São Paulo and Paraná are still being disputed. The APA Guaraqueçaba borders on two São Paulo conservation Units--Parque Estadual de Jacupiranga and Parque Estadual Ilha do Cardoso. Formal agreements among agencies to cooperate do exist, but most cooperation has been informal, based on personal efforts of some officials.

(6) Local law enforcement focuses too much on catching and prosecuting violations and not enough on prevention and education. This creates a poor image for the law enforcement agencies, environmental agencies, and the conservation units. Reportedly even the mention of IBAMA can cause an adverse reaction from the disgruntled locals.

Long-standing problems about forest protection and use continue to exist. Some of these problems were reflected in the attempt to open highway BR-101 through the APA to São Paulo. IBAMA stopped construction of the road in the northern portion of the APA, but the local government sent a tractor to help the local villages to continue building the road. IBAMA came in with the press and stopped the activity, destroying at least one bridge. Other problems developed when there was a large influx of tourists buying land and building vacation houses on Peças Island, on national park land. This development met with opposition from environmental groups and some local residents, while other local interests favored the houses and commerce. By law, only the local fishing groups and community had rights to use this park land, and these were use rights, not ownership rights. For example, these groups could build homes on the land, but not sell them to outsiders. IBAMA won a court order ruling that one of the tourist homes would have to be destroyed, and it was removed. However, a court case must be instituted and won to remove each of the illegally built tourist homes.

(7) There has been an inability or unwillingness to involve the public in the decision-making process. This problem is important, because the largely non-educated local

population perceive overly restrictive conservation policies as the main reason for a stagnant development situation. Two reasons prompt this negative perception. First, the legislation and regulations are complex and confusing. Field agents and rangers are not well trained sometimes, and allegedly act violently without much discussion first. Fishers frequently complain about being treated as criminals. Second, the local elite, including private developers and business persons, persuade people already pressed by poverty to demand traditional development models of growth.

(8) There has been a lack of integration among management organizations and those that deal with research, extension, and social work, causing overlapping efforts and/or the absence of control. In addition, since legislation is composed of so many legal documents, law enforcement officers themselves rarely know of all its implications.

(9) There also is weak or inconsistent enforcement of existing permits. For example, permits are granted for *palmito* extraction, but there is little means of enforcing the limits on harvest. Informal estimates suggest that permittees may harvest up to two or three times the officially allowed number of trees, but it is simply not possible to monitor all harvests in such a large land area. There also is an underlying attitude that whatever is not prohibited is instead guaranteed or allowed, particularly in fisheries.

(10) Data bases about the APA are old and fragmentary in terms of spatial ranges, time periods, and type of information available. Mapping and computerized geographic data

bases are being developed now by IPARDES, which may improve the geographic information available substantially. Additionally, there is little or no environmental monitoring.

PROSPECTS

Protecting the resources in the APA Guaraqueçaba, while still meeting social needs and increasing welfare, obviously presents many challenges and difficulties. However, many current developments at least indicate that there is an interest and a willingness to meet this challenge in the APA and in the state of Paraná. Guaraqueçaba has drawn attention from the general public, nongovernment organizations (NGOs), and policy-makers at the state, national, and even international levels. Paraná's littoral region has long been valued as a natural heritage by affluent social classes in the state, especially in the environmentally-oriented capital of Curitiba. Political support for ecologically sound development of the region has grown at the local, state, and national levels.

State organizations are working together to consider conservation and sustainable development activities for the coastal zone, creating an atmosphere favorable to integrated planning and management. Realizing this potential will still take considerable effort, however. Two initiatives were started in 1992, but did not yield success. The Saneamento Company of Paraná State (SANEPAR) sought to develop an Interinstitutional Action Plan for

Guaraqueçaba, addressing social problems. IPARDES also proposed the creation of an integrated system of environmental management for the coastal zone. Neither initiative led to action.

Other efforts have been led by the Sociedade de Pesquisa em Vida Selvagem and Educação Ambiental (SPVS), a local NGO based in Curitiba, which has also built an office/meeting building in Guaraqueçaba. SPVS has been instrumental in coalescing groups interested in ecologically sustainable development in the APA. With assistance from The Nature Conservancy (TNC) and cooperation from IBAMA, SPVS prepared a preliminary management plan for Guaraqueçaba. The objectives of the plan were: (1) to identify conflicts, impacts, and conservation problems, and (2) to advance management guidelines consistent with the extent of the available knowledge. The SPVS project involved interviews with the local population, government officials, technicians, and business people; and a symposium attended by more than 50 organizations and interest groups. Special attention was given to local interests, mostly through fishers' and farmers' associations and syndicates.

The thorough SPVS report (1992) was distributed widely to citizens and politicians. It suggested creation of a coordinating management council for the APA, and proposed only general conservation guidelines initially. The political and public results of the effort were just as important as the document itself. The report was well received by the state government and by IBAMA--both technicians and decision-makers--as a planning tool. The

project also pioneered formal public participation, and promoted discussion among all interest groups and agencies.

Research and application projects assessing developments in the APA are being continued by SPVS, federal and state agencies, and many others. The SPVS Guaraqueçaba Program is underway through projects and activities supported by international NGOs, such as TNC and the MacArthur Foundation, and local government agencies and private partners. This paper is being written as part of a U.S. Department of Agriculture Forest Service grant to assess the prospects for ecotourism in the APA, in cooperation with SPVS. Scientific and technical support for integrated coastal zone management and planning also is available from two universities in Paraná. The Pontifical Universidade de Católica (PUC) has an Institute for Environmental Sanitation (Instituto de Saneamento Ambiental (ISAM)) that plans to develop research and extension activities in the coastal zone. The Universidade Federal do Paraná (UFPR) has an Integrated Center of Studies in Geographic Information Systems in Curitiba and a Marine Sciences Center (Centro de Estudos do Mar (CEM)), based in Pontal do Sul on the Paranaguá Bay. Many departments at UFPR are performing research and extension activities of some type in the APA Guaraqueçaba. In September 1993, UFPR initiated a post-graduate (doctoral) program in environment and sustainable development, under its Interdisciplinary Center of Environment and Development (Núcleo Interdisciplinar de Meio Ambiente e Desenvolvimento), in cooperation with two French universities--Paris 7 and Bordeaux 2. The area of priority for research and field dissertation work will be the coastal zone of Paraná.

SUGGESTIONS

As this overview suggests, the APA Guaraqueçaba is an important natural resource for the state of Paraná and for the country of Brazil. As one of the few remaining areas of the once-extensive Atlantic Coastal Forests in Brazil, the APA is important for biological diversity, and to ensure that development in the region remains ecologically sustainable.

There is interest in Brazil, Paraná, and Guaraqueçaba in enhanced environmental protection, as well as improved living standards for the people in the APA region. But the mechanisms to achieve these goals need to be improved through the cooperation of public and private sectors in the area and elsewhere. Improved legislation and implementation of policies to manage the APA in a sound manner certainly are an important component of sustainable development of the region. So is cooperation among agencies, local citizens, scientists, and business persons in achieving environmentally acceptable development. Some suggestions that could enhance resource management and protection in the APA are discussed below.

Legislative revisions certainly are necessary, albeit not sufficient, to improve resource management and social benefits in the APA. Specific improvements might include: (1) consolidation of the various types of federal and state conservation units in the northern littoral region (SPVS 1992); (2) simplification of the diverse and sometimes conflicting regulations under broader, more holistic laws that still allow for implementing regulations

designed for the particular circumstances of Guaraqueçaba; (3) definition and refinement of standards and criteria needed to measure compliance with laws and to measure success of governmental efforts; and (4) ample disclosure and public education programs on the legal basis and institutional arrangements governing resource use in the APA (Andriguetto-Filho 1993).

Specific emergency legislative and structural actions suggested by SPVS (1992) are enumerated below, and updated to reflect the current legal situation.

(1) Revise and update the federal and state legislation, so as to make it compatible with regional characteristics.

(2) Regularization of the Superagüí National Park. Specifically, land tenure should be clarified, by removing or expropriating those who shouldn't have land in the Park, and giving a clear legal status to those villages and people allowed to stay.

(3) Creation of specific legislation for the area, which considers the Conservation Units, the needs of the local population, and preservation and protection of natural areas.

(4) Revision, improvement, and regularization of the macro-zoning areas of the APA proposed earlier by IPARDES, the state planning agency.

(5) Simplification and acceleration of the system of permits and concessions for small landowners, designed to increase speed in the verification of the areas and in the process of issuing documents. This benefit should be limited to properties that do not exceed 30 ha.

(6) Making the regulations that apply to the region compatible with the concept of a international Biosphere Reserve, including solving differences and border litigations between the states of Paraná and São Paulo. Buffer zones for the Biosphere Reserves also would be helpful.

(7) Issue the implementing regulations for the decree Mata Atlântica 750/93 to clearly define the areas of relevant forest types and the uses allowed in each type.

(8) Inform the local population about current legislation in order to clarify the rights and responsibilities of the population and of enforcement agents and organizations.

(9) Subdivide the conservation units and identify appropriate zones for better management.

Other priority actions for infrastructure, enforcement, and research recommended by SPVS (1992) included:

(1) Provide each of the region's Conservation Units with a management structure and an administrative and technical body. These bodies must be capable of administering legal concessions, enforcing legal sanctions, and performing other management duties.

(2) Establish a Municipal Advisory Board in Guaraqueçaba, with the purpose of managing the financial resources coming from the "ecological royalties" due to the special distribution of ICMS receipts authorized by the Beraldin law. This board should include representatives from the local population, Town Council, IBAMA, and IAP.

(3) Establish a local advisory council or something similar. This council should be able to assist the management and enforcement organizations, speeding up bureaucratic processes and increasing respect for the law.

(4) Establish a system to revise the amount of fines against violators, and to ensure that the fines return to the Conservation Unit itself.

(5) Improve enforcement actions to protect the resources in the APA by (a) relocating the enforcement posts toward more efficient and strategic places; (b) training and educating the body of government officials, so that they can inform the local population regarding relevant laws and regulations; and (c) adequately furnishing the enforcement organizations with human resources and equipment necessary.

(6) Perform research (a) to evaluate the current land tenure situation, (b) to examine the needs of the local population and their effects on the environment; (c) to determine the viability and efficiency of the creation of a civil park vigilance system, which would rest in IBAMA as the existing management for the APA.

CONCLUSIONS

Andriguetto-Filho (1993) concludes his paper with a call to build upon existing interest and efforts to form a state Coastal Zone Management Program (CZMP), as a network of organizations. The existing Council of the Littoral and a proposed Operations Group could be unified as the coordinating mechanism for such a program. Many people agree on the general need for conservation and protection in the northern littoral of Paraná, and drawing in the public into coastal planning could help consolidate support for the concept. The role of NGOs and the universities also should be enhanced in these new efforts, as should training of officials and technicians on specific matters relating to coastal areas and environmental management.

Last, let us make a few observations about the resource and political situations in the APA Guaraqueçaba. In many ways, the problems of environmental protection and sustainable development in the northern littoral of Paraná reflect pervasive problems in developing and in developed countries. Fast and often exploitive resource and economic

development is often seen as a means to improve the standards of living of local residents and to promote economic health. Protection of the environment is seen as an important objective, but often subordinated to resource exploitation by unregulated market processes. However, wanton exploitation of natural resources can eventually become self-destructive, as the capacity of the environment to provide healthful goods and services is diminished or destroyed by over-development. Thus we must balance our needs for development and our wishes to protect the environment in an unaltered condition, leading to the pervasive present calls for sustainable development.

In many respects, the northern littoral of Paraná has many unique aspects that actually make the true achievement of sustainable development possible. First, it has ecologically valuable forests and diverse maritime ecosystems, which despite some European settlement for almost five centuries, have widely recovered from past use. Second, it has a modest population level that actually could live on the resources of the area sustainably. Third, while not a mecca of economic opportunity, the region does lie close enough to larger population centers that either low-intensity or high-intensity development could occur and raise living standards and improve economic well-being. The key here is to prevent unwise development that destroys the natural resource patrimony of the area, or the social systems of local residents. Fourth, the public in Paraná and indeed in Brazil and the world is interested in protecting areas such as the northern littoral from destructive overuse. Fifth, despite the very scarce operating budgets, there is a large body of technical experts and government and nongovernment organizations who are eager to help the people in the region find

environmentally compatible and economically acceptable means of managing the resources in the Guaraqueçaba region. And sixth, the state government of Paraná does favor environmental protection, and has some of the best-staffed and best-funded state environmental, planning, agricultural, tourism, and other sector agencies in Brazil.

These factors encouraging resource protection in the APA Guaraqueçaba must be complemented by substantial and well-focused public and private efforts for the sustainable development of the resources in the APA. Ecotourism certainly can play an important role in economic development that does not threaten the environment in the APA. However it must be managed so that the environment is protected and it generates more income locally. It also must be appropriately marketed to realize its potential and attract the appropriate groups of visitors to the region and not surpass the sustainable levels of visitation in the region.

Development efforts also must account for the problems threatening success. Obviously, new laws or revision and consolidation of old ones is one condition necessary for improved management and protection in the APA. However laws alone are not adequate. In fact, as this review suggests, there is a plethora of federal and state laws governing the APA. It also is important to have reasonably staffed and funded public agencies to administer the laws, and a receptive public that agrees with the tenets of the laws and their enforcement. If the laws are widely despised, such as the initial Mata Atlântica decree (or drug laws in some countries), legislation and police will have little effect. Local residents are of course more

apt to agree with environmental or developmental laws and policies when they agree that they provide benefits for them and the region. Equally important is improving the provision of the basic human needs for food, shelter, medical care, safe water and sewage treatment, and education. The risks of unwise public or private investments in infrastructure, which do not generate local benefits or attract appropriate development, also should be avoided.

Improving social services and infrastructure will require not only government programs, but also market development in order to generate more economic activity and income for the region. Furthermore, the government simply cannot provide more services to the region without either taxing local residents (who have almost no income) or transferring tax revenues from other parts of the state or country. Tax transfers can provide some relief, but large surpluses of income are obviously not available anywhere in Brazil (or in any other country). Thus calls to improve environmental protection services in the area will continue to be met with severe budget constraints in a country where inflation and institutional instability undermine private markets as well as public programs.

Calls for better laws and more enforcement, although certainly necessary, can only be part of the answer to sustainable development, management, and protection of the Mata Atlântica. Cautious development of private market activities that can generate local income in the APA Guaraqueçaba without attracting destructive overpopulation surely will be needed to help improve local standards of living and to encourage resource protection. These activities could include low-intensity tourism, which is being studied as part of our project.

They also could include enhanced development of markets for local *artesanato* (handicrafts), so that more income stays in the region. Sustainable agriculture, such as bananas or *palmito* plantations also should be encouraged, as should prudent use of the fishing resource, favoring local people. Extraction of timber or nontimber goods from the forest also may be necessary at low levels. Extractions might be limited to secondary forests. Reducing buffalo also would increase the area of forests. The development of local markets and of viable mechanisms to increase local income retention are important.

Last, one should note that much of the current focus on resource management and protection seems to emphasize regulation and enforcement, with some lesser discussion on environmental education. These efforts surely are needed. Regulation and enforcement simply cannot stop resource exploitation if local people do not support restrictions or are so poverty-stricken that they are unable to do so. Education can help change attitudes, and also should be pursued. If indeed other alternative sources of income are available for residents, education may help them realize and capitalize on these alternatives. Intermediate policy tools of providing some types of financial incentives to local residents--i.e., subsidies to grow desirable agricultural crops or practice land conservation, subsidized small amounts of fertilizer to increase productivity and reduce land clearing needs, below-cost land title or settlement programs, payments to decrease resource use--might also help protect resources. Technical assistance and extension programs to help farmers, fishers, and *artesanato* makers find better means to produce goods and services also may help increase income and protect the environment.

Overall, it will be this mix of public and private efforts, or government policies and market processes, that will ultimately decide whether sustainable development in the APA Guaraqueçaba can succeed in improving the living standards for people in the region, preserve their social systems and customs, and protect the environment from degradation. The region has the potential to be a model of successful environmental protection and economic development in a sensitive ecological, social, and political environment. Let us hope that the potential can be realized through public and private cooperation, as well as local to international efforts.

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**APPENDIX:
CHRONOLOGICAL SUMMARY OF SELECTED ENVIRONMENTAL
LEGISLATION AND DECREES RELATED
TO THE APA GUARAQUEÇABA, PARANÁ, BRAZIL**

FEDERAL LEGISLATION

1988

Constituição Federal, de 05 de outubro de 1988

- Includes a chapter on the environment

1965

Lei No. 4771, de 15 de setembro de 1965

- Institutes a new Forest Code

1967

Lei No. 5197, de 03 de janeiro de 1967

- Covers the protection of wildlife

Decreto No. 221, de 28 de fevereiro de 1967

- Covers the protection of fish

1977

Lei No. 6513, de 20 de dezembro de 1977

- Covers the creation of special areas and locations of tourist interest

1981

Lei No. 6902, de 27 de abril de 1981

- Covers the creation of ecological stations and areas of environmental protection (APAs)

Decreto No. 86.176, de 06 de julho de 1981

- Regulations to implement Lei No. 6513, creation of special areas and locations of tourist interest

1982

Decreto No. 87.222, de 31 de maio de 1982

- Creation of Ecological Station of Guaraqueçaba

1984

Decreto No. 89.336, de 31 de janeiro de 1984

- Covers ecological reserves and areas of relevant ecological interest (ARIEs)

1985

Decreto No. 90.883, de 31 de janeiro de 1985

- Covers implementation of the APA de Guaraqueçaba

Decreto No. 91.888, de 05 novembro de 1985

- Declaration regarding the areas of relevant ecological interests--ARIE as Ilhas de Pinheiro e Pinheirinho

1988

Lei No. 7661, de 16 de maio de 1988

- Institutes a national plan for management of the coasts

Decreto No. 96.660, de 06 de setembro de 1988

- Covers the coordination among groups and implementation procedures for the coastal management plan

1989

Lei No. 7735, de 22 de fevereiro de 1989

- Created the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA)

Decreto No. 97.628, de 10 de abril de 1989

Decreto No. 97.635, de 10 de abril de 1989

- Regulations based on Lei 4771/65, the Forest Code

Decreto No. 97.688, de 25 de abril de 1989

- Creation of the National Park of Superagüí

1990

Decreto No. 99.547, de 25 de setembro de 1990

- Covers the prevention of exploitation of the native vegetation of the Mata Atlântica

1993

Decreto No. 750

- Covers revisions to the Mata Atlântica decree and regulations

STATE LEGISLATION

1989

Constituição do Estado do Paraná, de 05 de outubro de 1989

- Constitution of the state of Paraná, including a section on the environment

1980

Decreto No. 2963, de 19 de setembro de 1980

- Declares interest and protection in special areas in the littoral of Paraná

1981

Decreto No. 4484, de 30 de novembro de 1981

- Approves the area of the Park of Marumbi

1982

Decreto No. 5454, de 21 de setembro de 1982

- Creates the ecological station at Ilha do Mel

1984

Lei No. 7919, de 22 de outubro de 1984

- Declares an area of special tourist interest at Marumbi

Decreto No. 4605, de 26 de dezembro de 1984

- Creates the Conselho de Desenvolvimento Territorial do Litoral Paranaense

1986

Edital de Tombamento da Serra do Mar, de 25 de julho de 1986

- Declares the Serra do Mar *tombamento*

1989

Decreto No. 5040, de 11 de maio de 1989

- Approves the regulations for macro-zoning of the littoral region of Paraná