World Heritage Sites

Protected Areas and World Heritage

ATLANTIC FOREST SOUTH-EAST RESERVES
BRAZIL

This serial site contains some of the largest and finest remaining tracts of Atlantic forest in Brazil. The 25 protected areas reveal their evolutionary history and exceptional biological wealth in high numbers of rare and endemic species. Its landscape runs from densely forested karst mountains with wild rivers and numerous waterfalls down to estuary wetlands, coastal islands and dunes and is extremely scenic though reduced and fragmented from its original extent.

COUNTRY
Brazil

NAME
Atlantic Forest South-East Reserves

NATURAL WORLD HERITAGE SERIAL SITE
1999: Inscribed on the World Heritage List under Natural Criteria vii, ix and x.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]
The UNESCO World Heritage Committee issued the following statement at the time of inscription::

Justification for Inscription
The Atlantic Forests (Southeast) contain the best and largest remaining examples of Atlantic forest in the southeast region of Brazil. The 25 protected areas that make up the site display the biological richness and evolutionary history of the few remaining areas of Atlantic forest of southeast Brazil. The area is also exceptionally diverse with high numbers of rare and endemic species. With its “mountains to the sea” attitudinal gradient, its estuary, wild rivers, karst and numerous waterfalls, the site also has exceptional scenic values.

INTERNATIONAL DESIGNATION
1993: *Mata Atlântica* Biosphere Reserve designated under the UNESCO Man and Biosphere Programme;
2002: Extended (1,223,557 ha, surrounding the site).

IUCN MANAGEMENT CATEGORY

Estaçao Ecologica Juréia-Itatins	Ia Strict nature Reserve: Ecological Station
Estaçao Ecologica Guarequeçaba	Ia Strict nature Reserve: Ecological Station
Estaçao Ecológica Xituê	Ia Strict nature Reserve: Ecological Station
Estaçao Ecologica Chauás	Ia Strict nature Reserve: Ecological Station
Estaçao Ecologica Ilha do Mel	Ia Strict nature Reserve: Ecological Station
Estaçao Ecologica Guaraguaçu	Ia Strict nature Reserve: Ecological Station
Parque Estadual Jacupiranga	II State Park
Parque Estadual Intervales	II State Park
Parque Estadual Carlos Botelho	II State Park
Parque Nacional Superagüi	II National Park
Parque Estadual Turístico do Alto Ribeira	II State Tourist Park
Parque Estadual Lauraceas	II State Park
Parque Estadual Ilha do Cardoso	II State Park
Parque Estadual Roberto E. Lange	II State Park
Parque Estadual Pariquera-Abaxio	II State Park
Parque Estadual Pico do Marumbi	II State Park
Parque Estadual Serra do Graciosa	II State Park

Parque Estadual Pau Oco	II	State Park
Ilha Comprida	II	Wildlife Zone in Environmental Protection Area
Serras de Arrepiado e Tombador	II	Wildlife Zone in Environmental Protection Area
Serras do Cordeiro, Paratiu, Itapuã e Itinga	II	Wildlife Zone in Environmental Protection Area
Serra do Itapitangui e Mandira	II	Wildlife Zone in Environmental Protection Area
Mangues	II	Wildlife Zone in Environmental Protection Area
Ilhas Oceânicas	II	Wildlife Zone in Environmental Protection Area
Salto Morato Reserva Particular de Patrimônio Natural	II	Private Natural Heritage Reserve
Area de Proteçao Ambiental Cananéia-Iguape-Peruibe	V	Prot.Landscape: Environmental Protection Area
Area de Proteçao Ambiental da Serra do Mar	V	Prot.Landscape: Environmental Protection Area
Area de Proteçao Ambiental Guaraqueçaba	V	Prot.Landscape: Environmental Protection Area
Area de Proteçao Ambiental Ilha Comprida	V	Prot.Landscape: Environmental Protection Area
Area de Proteçao Ambiental Marumbi	V	Tourist Preservation Zone: Env'l Protection Area

BIOGEOGRAPHICAL PROVINCE

Serra do Mar (8.7.1)

GEOGRAPHICAL LOCATION

The site is in the southeastern states of São Paulo and Paraná, between 100 and 280 km southwest of the city of São Paolo. It comprises 25 sub-sites between the Serra Paranapiacaba range of the Serra do Mar Mountains and the sea, between 24º10' to 25º40'S and 46º50' to 48º44'W.

DATES AND HISTORY OF ESTABLISHMENT

1958: Alta Ribeira State Park *(Parque Estadual Turistico do Alto Ribeira - PETAR)* in the Serra Paranapiacaba was the earliest site in the property to be designated, for its karst landscape;

1962: Ilha do Cardoso State Park, an offshore mountain island, designated;

1969: Jacupiranga State Park between the Ribeira valley and the coast designated;

1980s: Three-quarters (19) of the sites designated; 1990s: six sites designated;

1993: The area declared a UNESCO MAB Biosphere Reserve.

Site	Area (ha)	Date	Decree/Law
Jacupiranga State Park (part)	119,000	1969	São Paulo State Decree / Law 145
Intervales State Park	42,926	1995	São Paulo State Decrees 4926 &40135
Carlos Botelho State Park	37,644	1982	São Paulo State Decree 19499
Superagüi National Park	37,000	1997	Federal Decree 97688
Alto Ribeira State Tourist Park	35,884	1958/1960	São Paulo State Law 5973 / Decree 32283
Lauraceas State Park	27,524	1979/1989	Paraná State Decrees 10729 & 5894
Ilha do Cardoso State Park	22,500	1962	São Paulo State Decree 40319
Roberto E.Lange State Park/ Tourist Preservation Zone	2,698	1984 /1985	Paraná State Decrees 5308 & 4627
Pariquera-Abaxio State Park	2,360	1994	São Paulo State Law 8873
Pico do Marumbi State Park	2,342	1990	Paraná State Decree 7300

Serra da Graciosa State Park/ Tourist Preservation Zone	1,189	1985/1990	Paraná State Decrees 5308 & 7302
Pau Oco State Park/ Tourist Preservation Zone	905	1985/1994	Paraná State Decrees 5308 & 74266
Juréia-Itatins Ecological Station	119,270	1986/1987	São Paulo State Law 5649 / Decree 24646
Guarequeçaba Ecological Station	13,638	1982/1992	Federal Decree 87222
Xituê Ecological Station	3,095	1987	São Paulo State Decree 26890
Chauás Ecological Station	2,699	1987	São Paulo State Decree 26719
Ilha do Mel Ecological Station	2,241	1982	Paraná State Decree 5454
Guaraguaçu Ecological Station	1,150	1992	Paraná State Decree 1230
Ilha Comprida Wildlife Zone	7,687	1989	São Paulo State Decree 30817
Serras de Arrepiado e Tombador Wildlife Zone	5,125	1984 /1985	Federal Decrees 90347 & 91892
Serras do Cordeiro, Paratiu, Itapuã e Itinga Wildlife Zone	5,000	1984 /1985	Federal Decrees 90347 & 91892
Serra do Itapitangui e Mandira Wildlife Zone	3,437	1984 /1985	Federal Decrees 90347 & 91892
Mangues Wildlife Zone	1,070#	1984 /1985	Federal Decrees 90347 & 91892
Ilhas Oceânicas Wildlife Zone	93	1984 /1985	Federal Decrees 90347 & 91892
Salto Morato Private Natural Reserve	1,716	1994	Port. 132/94

* *Areas given in the Nomination document; # 11,070 ha is given but is probably a misprint.*

These Environmental Protection Areas form the buffer zone and UNESCO MAB Biosphere Reserve:

Cananéia-Iuape-Peruibe EPA	441,037	1984 /1985	Federal Decrees 90347 & 91892
Serra do Mar EPA	419,562	1984	Federal Decree 22717
Guaraqueçaba EPA	289,782	1985 /1990	Federal Decree 90883
Ilha Comprida EPA	11,236		São Paulo State Decree 30817
Marumbi EPA	61,940	1990	Paraná State Law 7919

Areas are as given in the Nomination document.

LAND TENURE

Land in the core area is owned by the Federal government and São Paulo and Paraná state governments except for private properties designated as Private Natural Heritage Reserves. The ownership of land in the buffer zone is a mixture of private and public.

AREA

The designated core area is 468,193 ha. With a 1,223,557 ha buffer zone the area is 1,691,750 ha. 71% of the site is in state or national parks, 21.8% in ecological stations and 7.3% in wildlife zones.

ALTITUDE

From sea level to 1,332m (Mt.Dedo de Deus, Serra dos Itatins)

PHYSICAL FEATURES

The sites of the *Mata Atlântica* southeastern reserves are concentrated in an area of some 200 km along the coast to 100 km inland within a semi-circle of mountains, the Serra Paranapiacaba, with a plateau, coastal ranges, lagoons and islands between tof hem and the sea, all surrounding the inland valley plains of the Ribeira de Iguape river.

Three formations dominate the site's uplands: the high mountain edge of the interior plateau, escarpment, and *serrania.* The plateau *(planalto)* comprises the ridge and topmost slopes of the rugged Serra Paranapiacaba Mountains, which run parallel to the Atlantic separating the plateau of the interior, from the coast. They are the tabular relics of a much dissected ancient plateau. They are accompanied by a lower belt of spectacular karstic landscape with deeply dissected forested river valleys scattered with streams, cascades, waterfalls and rapids. The scarp forms the edge of the plateau. Only the steepness of these slopes saved them from cultivation. The *serrania* in front of the Serra Paranapiacaba is a series of plateaus, mountain ridges and inselbergs which divide the wide valley of the Ribeira de Iguape from the sea. Monte Dedo de Deus, the site's highest point, is in one of these isolated ranges near the coast, the Serro dos Itatins. The region is centred on the catchment of this river which drains the southern tip of the state of Sao Paulo and the northeastern corner of the state of Paraná and includes its estuary and lagoon complex between Iguape and the Ilha do Cardoso. The sites cover a wide variety of wetlands, from the seasonally flooded river floodplains and marshes to saline lagoons. These are separated from the ocean by a line of sand-bar islands with sweeping white beaches on the ocean which run parallel to the shore. South of these is the headland of Superagüi with Peças Island and the islands of Guaraqueçaba and do Mel in the broad apparently drowned river valleys between Guaraqueçaba and Guaraguaçu.

Geologically, the mountains of the Serra do Mar are formed of very ancient folded rocks; which are here a very thick sequence of PreCambrian metasedimentary and metavolcanic rocks, granite porphyries and gneissic migmatites, intruded by granitic bodies from the Upper Proterozoic to the Ordovician periods. In the Serra Paranapiacaba ridge these rocks form the summits. Several hundred metres lower there is a PreCambrian calcareous belt which contains a wide range of dramatic karst forms. During tectonic activity in Tertiary times these ancient rocks were thrust up and the older rocks were cut by a swarm of northwest to southeast trending diabase dikes along which deep valleys have formed, especially in the limestones around Eldorado Paulista, Iporanga and Apiapí in the upper Ribeira valley. Alto Ribeira State Park contains more than 250 limestone caves, one 6.3 km long, and an abyssal pit 297m deep. The intensity of the rainfall and the region's high humidity explains the exceptionally large size and degree of development of these karst canyons and huge caves with their wide variety of stalactites, stalagmites, curtains and pillars. A detailed description of the cave system of the Park is given in Karmann & Ferrari (2000).

Near the coast, horsts of PreCambrian rock rise above the alluvial sands and clays, as in the Jureia-Itatins area, which was formed during the 3m post-glacial Cananéia marine transgression some 5,100 years ago, which submerged the plains and created conditions for speciation in the isolated mountain forests (Mamade *et al*, 1997). Except on some mountain tops where they can be 2m deep, soils are nutrient-poor yellow-red latosols, podsols and lithosols with richer colluvium and alluvium in the lowlands, and mobile sediments and sands from river and marine deposits along the coast.

The locations of the 25 sites are:

Serra Paranapiacaba:	Alto Ribeira, Intervales, Carlos Botelho, Xituê;
Serrania: the plateau:	Jacupiranga and Lauraceas;
Serrania: outliers of the plateau:	Serra da Graciosa, Roberto Lange, Pico do Marumbi, Pau Oco;
Serrania; coastal ranges or hills:	Juréia-Itatins (part), Serras do Cordeiro, Serras do Arrepiado, Serra do Itapitangui, Ilha do Cardoso, Superagui (part), Salto Morato;

Lagoons, marshes and islands: Chauás, Pariquera-Abaxio,, Juréia-Itatins (part), Ilha Comprida, Mangues, Ilha do Cardoso (part), Ilhas Oceânicas, Superagui (part), Guarequeçaba, Ilha do Mel, Guaraguaçu.

CLIMATE

The region has a humid sub-tropical oceanic climate influenced by the constant moist warm tradewinds of the south Atlantic, and by periodic intrusions of cold winds from the Patagonian anti-cyclone that condense tropical humidity in frontal rains and can cause frost at higher elevations. The average temperature in the hottest month is 22°C in February, falling to 18°C in July, though temperatures are 4-5°C colder at height, and at Paranagua on the coast it can reach 40°C and drop to 12°C. The average annual precipitation is 1,400-1.500mm but is much higher in the mountains where it is increased by convective condensation. Rains are well distributed throughout the year and there is no marked dry season. The relative humidity averages between 80 and 85%.

VEGETATION

The Atlantic forest was isolated from the Cerrado, and from the forests of Amazonia in the late Tertiary which explains why the regions share many species of plants; but its partial isolation since the Ice Age, its wide geographical and altitudinal ranges and the resulting wealth of climatic and ecological conditions also explain its exceptionally high endemism – 70% of the tree species, 27.3% of the mammals and 85% of the primates. The forests are among the world's richest forests for tree species, averaging almost 300 species per hectare (476 in southern Bahia). There are some 20,000 species of plants (8% of the total found on Earth), of which some 8,000 are endemic (CI, n.d.). It is also the forest ecosystem with the greatest number of endangered and threatened species on earth (IUCN, 1999; Mori, 1989; Prance, 1987) and has recently been given the highest priority for conservation.

The sites constitute the largest remaining spread of coastal rainforest due to a combination of poor soils, steep slopes and extreme humidity but with occasional frosts. They contain well preserved remnants of rainforest spread over a 1,300m gradient from 80 to 1,250m, many clustered or contiguous, which improves the chance that rare species will survive. The major vegetation types are tall montane and lower mountain Atlantic rainforest, a four-layer vegetation with emergent trees 30m high. Emergent and canopy layers are rich in trees of the Leguminosae, Sapotaceae, and Lauraceae, and in epiphytes, lianas, bromeliads and terrestrial orchids. The canopy along river valleys is taller, with isolated trees reaching 35m high. From 900 to 1,300m in the Serra Paranapiacaba there is also low mist forest 7-8m high extremely rich in epiphytes, terrestrial orchids and bromeliads dominated by *Podocarpus* sp. and *Clusia* sp. Above 1,300m, is grassland dominated by Ciperaceae and *Sphagnum* on wet exposed areas. A semi-deciduous dry Atlantic forest grows on the calcareous karst soils. The lower mountain forests between 80-900m are dominated by 25-30m trees of the Myrtaceae, Lauraceae Fabaceae and Euphorbiaceae, with the palm *Euterpe edulis* at lower altitudes (da Silva, 2001).

In the lowlands the partly isolated coastal mountain rainforest and plains of the Jureia-Itatins station has five main types of vegetation: open *campo* mountain-top grass-herb-subshrub fields, moist tall forest on the seaward slopes, littoral tall forest on alluvial and lacustrine clays, low to medium *restinga* forest**,** open and closed *restinga* scrub on sands**,** herbaceous evergreen grass-herb fields on low dunes and low mangrove forest and scrub which in places extends 5 km inland. Random samples there indicated a 53.5% endemism among tree species, 64% among palms and 37.5% in non-arborescent families -or 74.4% including Bromeliaceae. Atlantic forest endemism among palms is 49, 11 being considered threatened, and for bamboo genera 40.9%. It is estimated that there are 500-600 species in 111 families in the region (Mamade *et al*., 1997).

FAUNA

Despite 500 years of development this strip of coastal forests is one of the most remarkable centres of endemism in South America for plants (Prance, 1987), mammals (Mendes 1999), birds, butterflies, and amphibians. The Atlantic Forest which reaches from the far northeast to the Igauçu falls, of which this area is one of the most diverse components, has 264 species of mammals (72 endemic), 94 bird species (144 endemic), 456 species of amphibians (282 endemic), 311 species of reptiles (94 endemic), 350 species of freshwater fish (133 endemic) according to figures given by Conservation International (CI, n.d.); also over 10 million estimated species of insects, Notable mammals are the recently discovered blackfaced lion tamarin *Leontopithecus caissara* (CR) endemic to the area, woolly spider monkey *Brachyteles arachnoides* (EN), the golden-headed lion

tamarin *Leontopithecus chrysomelas* (EN), golden-rumped lion tamarin *Leontopithecus chrysopygus* (EN), black-fronted titi monkey *Callicebus nigrifrons* and southern brown howler monkey *Alouatta fusca;* also water opossum *Chironectes minimus,* bush dog *Speothos venaticus*, giant otter *Pteronura brasiliensis* (EN), long-tailed otter *Lontra longicaudis*, jaguar *Panthera onca,* oncilla *Leopardus tigrinus* (VU) and ocelot *L. pardalis.* Also present are 20 species of bats, giant armadillo *Priodontes maximus* (VU) and broad-snouted caiman *Caiman latirostris.*

The avifauna is very diverse, with 350 recorded species. On some places on the eastern slopes there can be as many as 70 endemic species and generic endemism is also high. The area is an important breeding ground for many rare and endangered species: harpy eagle *Harpia harpyja*, black-fronted piping guan *Pipile jacutinga* (EN) purple-winged ground-dove *Claravis godefrida* (CR), brown-backed parrotlet *Touit melanonota* (EN), golden-tailed parrotlet *Touit surdus* (VU), red-tailed amazon *Amazona brasiliensis* (VU), vinaceous amazon *A. vinacea* (EN), red-spectacled amazon *A. pretrei* (VU), blue-bellied parrot *Triclaria malachitacea*, scalloped antbird *Myrmeciza ruficauda* (EN), and white-bearded antshrike *Biatas nigropectus* (VU), Salvadori's antwren *Myrmotherula minor* (VU), restinga tyrranulet *Phylloscartes kronei,* (VU), russet-winged spadebill *Platyrinchus leucoryphus* (VU), black-capped piprites *Piprites pileata* (VU), buffy-fronted seedeater *Sporophila frontalis* (VU), Temminck's seedeater *Sporophila falcirostris* (VU), bare-throated bellbird *Procnias nudicollis* (VU) and black-backed tanager *Tangara peruviana* (VU). The system of caves gives shelter to an endemic micro-fauna, mainly arthropods and the blind fish *Pimeloda kronei*. A detailed species list is given in the nomination document.

CONSERVATION VALUE

This series of sites displays the great endemic biological richness and diverse evolutionary processes of the few large remaining areas of the highly endangered Atlantic forest of southeast Brazil, a large part of the remaining 7% of the forest's original extent in Brazil. The area gives shelter to several species of conservation concern, and contains the largest number of known karst caves in the country. The site lies within a Conservation International-designated Conservation Hotspot, a WWF Global 200 Eco-region, a WWF/IUCN Centre of Plant Diversity, a BirdLife-designated Endemic Bird Area and a UNESCO Biosphere Reserve.

CULTURAL HERITAGE

More than 50 Pleistocene palaeontological sites in the area have been unearthed containing *sambaqui* deposits, accumulations of shells, pottery and stone tools. Cananéia is thought to have been a settlement of the local Tupi-Guarani-speaking Indians dating from before the time of discoveries and probably the starting place of the Peabiru Trail to the west, which served the Inca empire (Maack 1968). It was also the terminus of the *Caminho do Imperador* along the coast linking with the first capital of the area, Sao Vicente near present day Santos. This local Indian language and culture was suppressed by the Portugese colonisers but the local natives are still Guarani and, near the coast, *caiçaras* of Amerindian-European descent. The historic centre of Iporanga has fine colonial architecture and nearby, on the banks of the Ribeira de Iguape, is the 17th century chapel of the Ivaporunduva *quilombo* community of descendants of runaway African slaves which still speaks Bantu and preserves its ancestral customs. This *quilombo* population was subject in the past to racial discrimination and violence from landowners but it remains a centre of traditional knowledge about the forest and its uses.

LOCAL HUMAN POPULATION

Economically the region is one of the poorest in either state and traditional rural communities form a third of the total population, living on subsistence agriculture, extraction of forest products, cattle breeding and fishing. The local *quilombo* lack schools, medical services and transportation but have recently combined to improve their lives. Private land is largely agricultural. The size of properties varies from 10 to 200 ha to more than 1,000ha for very large farms. Hundreds of families lived inside designated protected areas in 1999: 365 in 22 villages in Jureia-Itatins and 450 around Alto de Ribeira State Park. In buffer areas, the town of Iguape in 2008 has a population of 30,397, Cananéia has 12,377 and Guaraqueçaba, 7,890. The wide central Ribeira de Iguape valley, surrounded by protected areas, has a population of approximately 170,000 in several small towns. Paranagua and Antonina on the southern edge of the buffer zone have 138,748 and 17,891 people respectively, and Peruibe on the northern edge has 57,151.

VISITORS AND VISITOR FACILITIES

The entire area was visited by around 1.3 million people in 1997. However, forest conservation is the paramount aim of the reserves, so that visitation to many of the sites is restricted to certain areas or trails, as at the research stations. These latter do encourage ecotourism, ecological researchers and environmental education. However, there are also 16 visitors' centres in all, 7 being in the four Paranapiacaba reserves. The oldest, Alto Ribeira State Park, long visited for its caves, averaged 26,850 visitors a year between 1996 and 1998. It has three visitor centres with lodging facilities, auditorium and tourist routes: at the Nucleo Santana, at the great Santana Cave, at Ouro Grosso and its cave, and a third north of the range at Nucleo Caboclo. Thirty caves are opened to visitors, but cave excursions are made with experienced local guides. Many other caves are restricted to registered speleologists. Carlos Botelho and Intervales State Parks are also well equipped, have information centres with visitor facilities and good trails but access is otherwise limited. Camping is allowed on sites near visitor centres.

SCIENTIFIC RESEARCH AND FACILITIES

There are six Ecological Stations with research facilities. Their great value is in the preservation of genetic resources and good samples of Atlantic forest biodiversity, for research into speciation and into the future of sustainable exploitation of indigenous species, especially for their medical uses, already proven by the local people, also for the academic training of scientists and for environmental education through ecological tourism.

MANAGEMENT

All the Atlantic forest in Sao Paulo State was put under special protection by Resolution 40 of 1985 and Federal Decree 750 of 1990. The system of caves and karst formations is protected by Federal Decree 99556 of 1990. The coordination of management and planning for 25 separate sites, half of tem under 5,000 ha, is made easier since all the sites fall under the aegis of the Federal Program for the Preservation of the Atlantic Forests. The property is also the core of the *Mata Atlántica* Biosphere Reserve which facilitates buffer zone management and regional integration (IUCN, 1999). Management plans have been implemented in most of the protected areas. The 1985 management plan of Alto Ribeira State Park dealt with some of the most compelling constraints such as illegal mining, illegal extraction of palm trees and invasion by illegal settlers. The Guaraqueçaba Environment Protection Area management plan was drawn up in 1995 aiming to integrate public organisations and local societies in participatory planning for sustainable development. aiming for a management plan to integrate public organisations and local societies in participatory planning for sustainable development. Several other surveys aimed at improving management have been made: a Forest Inventory of Sao Paulo State in 1993, regulation of the Cananéia-Iguape-Peruibe Environmental Protection Area in 1996, a Macrodiagnostic Survey of the Brazilian Coastal Zone in 1996, Guidelines for an Ecological Tourism State Police in 1997 and Phase I of the Management Plans for Ilha do Cardoso and Parquera-Abaixo State Parks and Chauas Ecological Station in 1998.

During the 1990s NGOs such as the *Consórsio Mata Atlântica*, the *S.O.S. Mata Atlântica* foundation and local NGOs began to influence environmental policy, coordinate conservation authorities nationwide and publicise their work. The establishment of the UNESCO Biosphere Reserve was partly due to these efforts. Though so many of the sites are less than 5,000 ha, seven are contiguous and clustered which adds to their viability. To overcome the disadvantages of fragmentation, protection of the intervening semi-natural habitats in corridors and buffer areas is needed. WWF, the Ford Foundation, Conservation International (CI), and the Nature Conservancy all support a drive to increase the linkage of forest patches, establish participatory management and set up effective biodiversity conservation. The relatively low level of protection and high fragmentation of the forest prompted the Critical Ecosystem Partnership Fund (CEPF) to run a five-year Atlantic Forest Hotspot program 2002-2007 to enlist non-governmental organizations, community groups, and others in this protection of species, creation of protected areas and the conservation and restoration of biodiversity corridors (CEPF, 2001).

MANAGEMENT CONSTRAINTS

At present poaching and the illegal extraction of timber for construction and furniture and of palms for edible palm hearts are the most serious conservation problems. Many species are valuable timber trees and in places the deforestation rate is high. Slash and burn agriculture is frequent and contributes to the continuous loss of forest cover. Other conservation problems include mining for calcareous material, gold and lead, although the last two are in decline. The official nomination document indicates that many coastal habitats are threatened, including the hygrophilous forest, the

mangroves, dunes and shoals, the forests on the seaside plain, the swamps and lagoons. Traditional artisanal fishermen do not damage the fishing resources, but there is a serious threat from commercial fishing. Flooding sometimes occurs on the lower course of the Ribeira de Iguape River. And there is great pressure for industrial and urban development on the axis between Sao Paulo and Curitiba, the capital of Paraná state. For this reason, the very suitable but much disturbed Serro do Mar National Park has been excluded from the property until its management can overcome the effects of these impacts.

STAFF

In 1999 there was a shortage of trained personnel to manage the property, but the state system of protected areas had a reasonable number of staff and volunteers in charge of control and surveillance. A total of 326 people: 29 planners, 34 forest rangers, 100 park guards and 163 conservation technicians work in the area. To improve local skills, several training courses are run with the help of international conservation organisations.

BUDGET

The whole region was included in the *Programa Nacional do Meio Ambiente* (PNMA) and in 1995 received US$10 million plus ~US$300,000 from the state governments to implement projects for the sustainable use of resources, environmental education, research and protected area management. In 1999 the *Programa de Preservaçao da Floresta Atlântica* was being developed with Kreditanstalt für Wiederaufbau (KfW) from Germany. This US$20 million program was funded to improve protected area management and forest surveillance in the region. In 2001 the Critical Ecosystem Partnership Fund, a joint initiative of CI, GEF, the government of Japan, the MacArthur Foundation and the World Bank allocated US$8 million for the five-year corridor conservation program (CEPF, 2001).

LOCAL ADDRESSES

Federal level:
Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renovaveis (IBAMA), Diretoria da Ecossistemas (DIREC), Diretoria de Recursos Naturais Renovaveis (DIREN), Sain av.L4 norte, Edificio Sede do Ibama, 78.800-200, Distrito Federal, Brasilia.

Sao Paulo State:
Sao Paulo State Environmental Secretariat, Sao Palo Forest Institute, Sao Paulo Forest Foundation, 931, Rua do Horta, 02377-000 Horto Florestal. Sao Paulo, Brazil.
345, Alto de Pinheiros, Sao Paulo, 05489-900, Sao Paulo, BraZil.

Parana State:
Parana State Environment & Hydric Resources Secretariat, Parana Environment Institute, Rua Desembargador Motta, 3.384 Merces, Curitiba, Parana, Brasil.

REFERENCES

The principal source for the above information was the original nomination for World Heritage status. The nomination contains a full list of cited references, the most relevant of which are the following:

Conservation International (CI) (n.d.). *Biodiversity Hotspots. Atlantic Forest*. Washington, U.S.A.

Critical Ecosystem Partnership Fund (CEPF) (2001). *Assessing Five Years of CEPF Investment in the Atlantic Forest Biodiversity Hotspot Brazil.* A Special Report. Conservation Int'l, Arlington, VA, U.S.A.

da Costa, J. (2001). *Serro do Mar Coastal Forests (NT0160).* WWF WildWorld report. IUCN,Gland.

Goerck, J. (1995). *Birds of Atlantic forest of Brazil: Patterns of Rarity and Species Distribution along an Elevational Gradient*. MScThesis, University of Missouri, St. Louis.

Instituto Florestal de Sao Paulo (1998). *Paranapiacaba - Upper Ribeira Group of Protected Natural Areas and Notable Landscapes. Nomination of Properties for Inclusion on the World Heritage List.* 37 pp. + annexes.

IUCN (2009). *The IUCN Red List of Threatened Species*. Gland, Switzerland & Cambridge, U.K.

Jorge-Padua, M. (1998). *The Atlantic Forest in Brazil.* The New York Botanical Garden, New York.

Kronka, F., Matsukuma, C., Nalon, M., Del Cali, M., Rossi, I., Mattos, M., Shin-Ike,I. & Pontinhas, M. (1993). *Inventario Florestal do Estado de Sao Paulo.* Sao Paulo, Instituto Florestal, 313 pp.

Lara-Resende, S. & Noffs M. (1986). Curo bajo del Rio Ribeira, Iguape y lagunas de Cananéira. In *Inventario de Humedales de la Region Neotropical.* IWRB Slimbridge, Glos.U.K./ IUCN, Gland, Switzerland.

Lino, C. & Allievi, J. (1987). *Proposta de Manejo Turístico das Cavernas e Sitios Arqueológicos do Parque Estadual Turístico do Alto Ribeira - PETAR*. Convenio Instituto Florestal / Sociedade Brasileira de Espeleologia. 56 pp.

Karmann, I. & Ferrari, J. (2000). Karst and caves of the Upper Ribeira State Park (PETAR), southern São Paulo State. In Schobbenhaus,C., Campos, D., Queiroz, E, Winge, M. & Berbert-Born,M. (eds.) *Sítios Geológicos e Paleontológicos do Brasil.*

Mamede, M.,Cordeiro, I. & Rossi, L. (1997). *Juréia-Itatins Ecological Station South-Eastern Brazil*. *Mata Atlântica: CPD Site SA17.* Secretaria de Estado do Meio Ambiente, Instituto de Botânica,

Mattos, N. (1989). *A Regiao Lagunar-Estuarina de Iguape-Cananéia-Paranagua. Programa de Educaçao Ambiental do Vale do Ribeira*. Sao Paulo, Secretaria do Meio Ambiente. 44pp.

Mendes, S. (1999). Grupo mamíferos- documento preliminar. In Conservation International (ed.) *Workshop Avaliação e Ações Prioritárias para Conservação dos Biomas Floresta Atlântica e Campos Sulinos*, São Paulo. http//www.conservation.org.

Mori, S. (1989). Eastern extra-Amazonian Brazil pp.427-454. In Campbell, D. & Hammonds, D. (eds.). *Floristic Inventory of Tropical Countries: The Status of Plant Systematics, Collections and Vegetation, plus Recommendations for the Future*. New York Botanic Garden.

Nahas, A. (1977). *Parque Estadual Intervales. Plano de Gestao Ambiental Fase 1*. Fundaçao para a Conservaçao e a Produçao Florestal do Estado de Sao Paulo. 228 pp.

Prance, G. (1987). Biogeography of neotropical plants. Pp 46-65 &175-169. In Whitmore, T. & Prance, G. (eds) *Biogeography and Quaternary History in Tropical America*. Clarendon Press, Oxford.

Programa Nacional do Meio Ambiente (PNMA) (1996). *Subcomponente Floresta Atlântica. Projeto Sao Paulo*. Sintese de Realizaçoes. 24 pp.

Secretaria do Economia e Planejamiento do Estado de Sao Paulo (1997). *Plano de Açao Imediata para o Vale do Ribeira*. 76 pp.

Secretaria do Meio Ambiente do Estado de Sao Paulo (1987). *Sistematizaçao de Dados. Atividades em Desemvolvimiento*. 70 pp.

---------- (1990). *Levantamentos e Analise do Quadro Ambiental e Proposta de Zoneamiento da APA Serra Do Mar.* Volume I: *Diagnostico Ambiental.* Themag Engenharia. 134 pp.+ annexes.

---------- (1991). *Projeto PETAR: Parque Estadual Turístico do Alto Ribeira*. 57 pp.

Silva, J. & Dinnouti, A.(1999). Análise de representatividade das unidades de conservação federais de uso indireto na Floresta Atlântica e Campos Sulinos. In Conservation International (ed.) *Workshop Avaliação e Ações Prioritárias para Conservação dos Biomas Floresta Atlântica e Campos Sulinos*, São Paulo. http//www.conservation.org.

DATE

March 1999, 10-1999, 3-2009, 5-2011, January 2012.