

in 1997 as well. In 1988, the number of fires spotted by the satellite NOAA reflected a considerable increase in the rate of deforestation.

“The results of our study”, the IPAM report went on, “show that the average area per property burnt each year varied from 5% (properties over 5,000 ha) to 19% (properties under 100 ha). One fifth of the burnt area was, on average, the result of deforestation; cutting down and burning primary or selectively logged forest. We can say that some 70% of what is burnt today is in areas which have been deforested. These areas are generally comprised of pasture, forests in regeneration or other areas of non-forest vegetation. One tenth of the total area burnt is primary forest or exploited forest. Fires in these forests are difficult to detect by satellite, since they are limited to the understorey, affecting the forest structure and its biodiversity, but not destroying the canopy.”

The IPAM report foresees some risks. “The virgin forests of the Amazon region acts as huge firebreaks, preventing accidental or intentional fires spreading from farmland and pasture. If these forests lose their protective function, it is likely that large areas of the Amazon landscape will burn periodically; seriously impacting biodiversity, and reducing the forest biomass and the amount of water released into the atmosphere (essential to maintain the water and rain cycles). Whenever the forest burns, it becomes more susceptible to new fires due to the large amount of combustible material (leaves and dead branches) which accumulate on the forest floor. Increasing the frequency of forest fires increases the risk of turning enormous areas of dense Amazon forest into savannah.

**Tabela 2-24.** National Parks (PARNAs) in Brazil.

| Name                           | State  | Region              | Area (ha)        |
|--------------------------------|--------|---------------------|------------------|
| Caparaó                        | MG/ES  | South-east          | 26,000           |
| Grande Sertão Veredas          | MG     | South-east          | 84,000           |
| Ilha Grande                    | MS, PR | Central-west, south | 78,875           |
| Itatiaia                       | RJ/MG  | South-east          | 30,000           |
| Serra da Bocaina               | RJ     | South-east          | 100,000          |
| Serra da Canastra              | MG     | South-east          | 200,000          |
| Serra do Cipó                  | MG     | South-east          | 33,800           |
| Serra dos Órgãos               | RJ     | South-east          | 11,800           |
| Tijuca                         | RJ     | South-east          | 3,200            |
| Aparados Da Serra              | RS/SC  | South               | 10,250           |
| Iguaçu                         | PR     | South               | 185,262          |
| Lagoa do Peixe                 | RS     | South               | 34,400           |
| São Joaquim                    | SC     | South               | 49,300           |
| Serra Geral                    | RS/SC  | South               | 17,300           |
| Superagui                      | PR     | South               | 21,400           |
| Brasília                       | DF     | Central-west        | 30,000           |
| Chapada dos Guimarães          | MT     | Central-west        | 33,000           |
| Chapada dos Veadeiros          | GO     | Central-west        | 60,000           |
| Emas                           | GO     | Central-west        | 131,868          |
| Pantanal Mato-grossense        | MT     | Central-west        | 135,000          |
| Chapada Diamantina             | BA     | North-east          | 152,000          |
| Lençóis Maranhenses            | MA     | North-east          | 155,000          |
| Marinho de Abrolhos            | BA     | North-east          | 91,235           |
| Marinho de Fernando de Noronha | PE     | North-east          | 11,270           |
| Monte Pascoal                  | BA     | North-east          | 22,500           |
| Serra da Capivara              | PI     | North-east          | 100,000          |
| Sete Cidades                   | PI     | North-east          | 7,700            |
| Ubajara                        | CE     | North-east          | 563              |
| Amazônia                       | PA/AM  | North               | 994,000          |
| Araguaia                       | TO     | North               | 562,312          |
| Cabo Orange                    | AP     | North               | 619,000          |
| Jaú                            | AM     | North               | 2,272,000        |
| Monte Roraima                  | RR     | North               | 116,000          |
| Pacaás Novos                   | RO     | North               | 764,801          |
| Pico da Neblina                | AM     | North               | 2,200,000        |
| Serra do Divisor               | AC     | North               | 605,000          |
| <b>TOTAL: 36 PARNAs</b>        |        |                     | <b>9,948,836</b> |

See Figure 1-1 for Brazilian regions and states.

**Source:** Modified from IBAMA. *Relatório Nacional do Brasil, 2ª versão. In: Congresso Latino-Americano de Parques Nacionais e Outras Áreas Protegidas, 1.* Brasília (1997).

With regard to the causes for the increase of fires, IPAM and WHRC argued that “the two main factors making the Amazon forest combustible are logging and drought. Each year now the area affected by logging (over 11,000 km<sup>2</sup>/year in 1996) is close to that deforested between 1992 and 1994 (15,000 km<sup>2</sup>/year according to INPE). Logging makes the forests inflammable: due to gap in the forest canopy (up to 50%) allowing the sun to dry the forest floor, rapidly drying

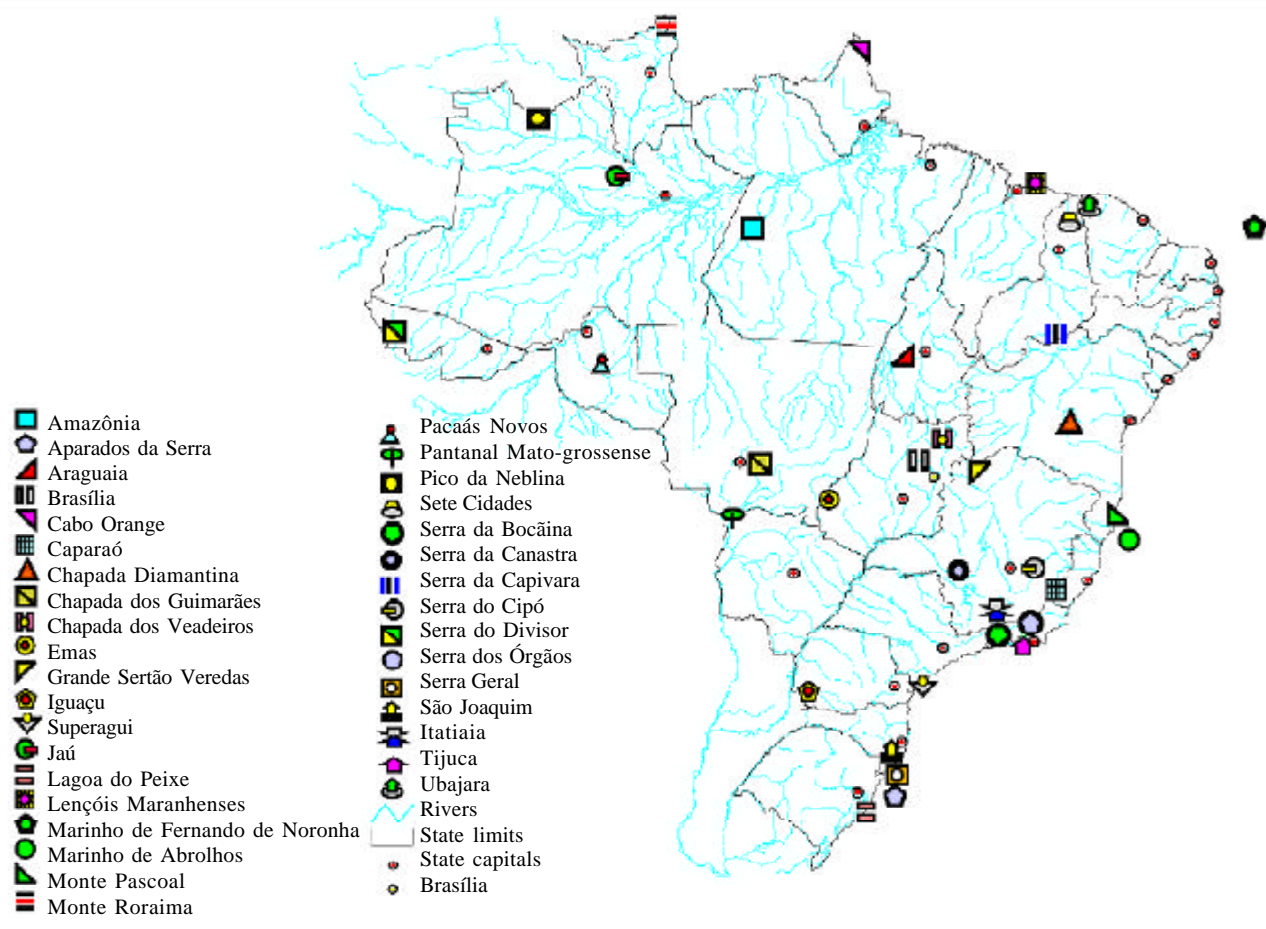


Figure 2-19. Location of Brazilian National Parks.

Source: Brazil, MMA (1997).

the organic material there. Our studies show that understory fires can kill-off up to one half of the fully-grown trees left in exploited forests and this in turn makes the forest more susceptible to future fires. Fire and the removal of trees affect transpiration by plants and the soil and a loss of water to the atmosphere. It results in more water draining to the streams and rivers and a greater risk of flood. Periods of severe drought can also make large areas of tropical forest prone to fires. One half of the four million km<sup>2</sup> of Brazilian Amazon forest may well be susceptible to small changes in rainfall.”

The factors, according to IPAM, can also lead to an underestimation of the rate of deforestation. Changes caused by selective logging and fires are difficult to detect through satellite images.

This report also concluded that the dry season in the Amazon region is more prolonged and severe when suffering such climatic phenomena such as El Niño (as in 1997). It recommends that local populations should be supported in

their efforts to prevent accidental fires; the cause of half the area burnt in 1994 and 1995. Such measures have proved promising. For example, the Del Rei Agricultural Community in eastern Amazonia has set up regulations for burning which demand that community members make firebreaks before using fire to clear their land and must warn their neighbours when they plan to burn. Indemnity for damages caused by fire are paid by the person responsible.

Studies by the World Bank and other agencies have shown that since 1994 the majority of fires occur when clearing and/or re-using areas already deforested, and not newly cleared areas (6% of the total), and as such do not affect primary forest directly.

Other studies, including those by INPE, have shown that clearing and burning in the Amazon region is concentrated in about 100 municipalities in the states of Pará, Mato Grosso, Rondônia, Acre and Maranhão (this last owing to the increase in soybean plantations).

## 2.3 Biodiversity Conservation *in situ*

### 2.3.1 The National Protected Areas System - SNUC

Today, Brazil has an extensive system of Protected Areas. In general terms, the National Council for Protected Areas (Conselho Nacional de Unidades de Conservação – CNUC) determines the policies for their creation, establishment and use. They form part of the National Protected Areas System (Sistema Nacional de Unidades de Conservação - SNUC), linked to the MMA and co-ordinated by IBAMA, the main executive agency for Brazilian environmental policy at the federal level.

There have been significant efforts in Brazil to expand the protected areas system, even though strictly protected areas cover only 2.61%, and protected areas for direct use cover 5.52%, to give a total of 8.13% of the area of the country. This is somewhat over-estimated because many Environmental Protection Areas (APAs) overlap with other categories. Even so, this demonstrates a considerable effort on behalf of *in situ* conservation of Brazilian biodiversity. Besides these protected areas is a large network of Indigenous Parks and Reserves, which represent 7.3% of the country and maintain their biodiversity largely intact. This 7.3% represents land officially registered and demarcated to date, and covers 61.3 million ha.

Excluding the Indigenous Reserves, there are 184 federal protected areas number covering an area of 39,068,211 ha (390.7 thousand km<sup>2</sup>) or 4.59% of the country (Table 2-23 and Figure 2-18).

Strictly Protected Areas (Áreas de Uso Indireto) are those in which exploitation or extractivism is strictly forbidden but where indirect use is permitted (Figure 2-18). They include National Parks (PARNAs) (Table 2-24 and Figure 2-19), Biological Reserves (REBIOs) (Table 2-25 and Figure 2-20), Ecological Reserves (RESECs) (Table 2-26 and Figure 2-21), Ecological Stations (ESECs) (Table 2-27 and Figure 2-22) and Areas of Relevant Ecological Interest (ARIEs) (Table 2-28).

Protected Areas of direct use (Áreas de Uso Direto) are those which allow for exploitation, but on a planned and regulated basis. They are seen as areas of sustainable use, and include the Areas of Environmental Protection Areas (APAs) (Table 2-29), National Forests (FLONAs) (Table 2-30 and Figure 2-23) and Extractivist Reserves - (RESEXs) (Table 2-31 and Figure 2-24).

Also important is the large number of conservation areas administered and protected by the states (Table 2-32), which number 451 and cover an area of 29.8 million ha. Some of

**Table 2-25.** Federal Biological Reserves (REBIOs) in Brazil.

| Name                   | State | Region     | Area (ha)        |
|------------------------|-------|------------|------------------|
| Augusto Ruschi         | ES    | South-east | 4,000            |
| Comboios               | ES    | South-east | 833              |
| Córrego do Veado       | ES    | South-east | 1,854            |
| Córrego Grande         | ES    | South-east | 1,504            |
| Poço das Antas         | RJ    | South-east | 5,000            |
| Sooretama              | ES    | South-east | 24,000           |
| Tinguá                 | RJ    | South-east | 26,000           |
| Marinha do Arvoredo    | SC    | South      | 17,600           |
| Atol das Rocas         | RN    | North-east | 36,242           |
| Guaribas               | PB    | North-east | 4,321            |
| Pedra Talhada          | PE/AL | North-east | 4,469            |
| Saltinho               | PE    | North-east | 548              |
| Santa Isabel           | SE    | North-east | 2,766            |
| Serra Negra            | PE    | North-east | 1,100            |
| Una                    | BA    | North-east | 11,400           |
| Abufari                | A M   | North      | 288,000          |
| Guaporé                | RO    | North      | 600,000          |
| Gurupi                 | MA    | North      | 341,650          |
| Jaru                   | RO    | North      | 268,150          |
| Lago Piratuba          | AP    | North      | 357,000          |
| Rio Trombetas          | PA    | North      | 385,000          |
| Tapirapé               | PA    | North      | 103,000          |
| Uatumã                 | A M   | North      | 560,000          |
| <b>Total 23 REBIOs</b> |       |            | <b>3,044,438</b> |

See Figure 1-1 for Brazilian regions and states.

**Source:** Modified from IBAMA. *Relatório Nacional do Brasil, 2ª versão. In: Congresso Latino-Americano de Parques Nacionais e Outras Áreas Protegidas, 1.* Brasília (1997).

these areas, such as the Sustainable Development Reserve of Amanã of 2.35 million ha, are very large. This reserve, along with the Sustainable Development Reserve of Mamirauá, the Jaú National Park, the Anavilhanas Ecological Station, the Rio Negro State Park and the Environmental Protection Areas of the Right Bank and the Left Bank of the Rio Negro, makes a continuous total protected area of 8.567.908 ha. This is larger than Austria, and the largest area of protected tropical forest in the world.

The largest state protected areas are in the north (Table 2-32), 49% in terms of area, although only 12% in terms of numbers. Seven of these state protected areas are over 1 million ha in size, and one, the Island of Marajó Environmental Protection Area, Pará, is nearly 6 million ha. In the south, state protected areas are more numerous but on the whole considerably smaller.

A study of the National Environment Program (Programa Nacional do Meio Ambiente - PNMA) inventoried all fede-

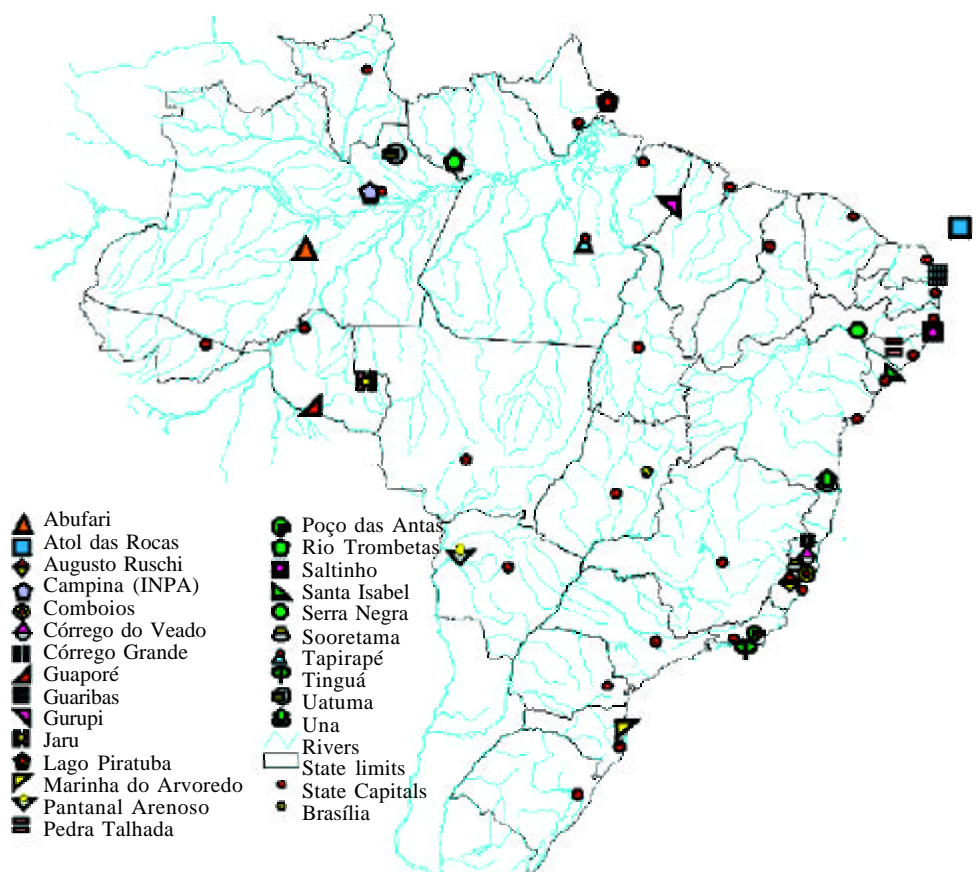


Figure 2-20. Location of Brazilian Federal Biological Reserves.

Source: Brazil, MMA (1997).

ral, state and some municipal protected areas. In terms of biomes (Figure 2-25 and Table 2-33), Amazonia has the largest area of protected areas (Figures 2-26 and 2-27 and Tables 2-34 and 2-35). In percentage terms, however, protected areas in the Coastal Zone and the Atlantic forest have comprise the highest proportion.

There are also some systems of protected areas at the

municipal level which are, in general, under the local Environment Secretariats and maintained by them. Many universities and research institutes also maintain areas reserved for scientific and experimental purposes as well as for conservation. Two examples are the Adolfo Ducke Forest Reserve (10,000 ha) in Manaus, which is administered by the National Institute for Amazon Research (Instituto Nacional de Pesquisas da Amazônia - INPA), and the IBGE Ecological Reserve (1,260 ha), in Brasília.

Table 2-26. Federal Ecological Reserves (RESECs) In Brazil.

| Name                   | State | Region     | Area (ha)      |
|------------------------|-------|------------|----------------|
| Ilha dos Lobos         | RS    | South      | 1.69           |
| Raso da Catarina       | BA    | North-east | 99,772         |
| Juami-Japurá           | A M   | North      | 265,000        |
| Jutaí-Solimões         | A M   | North      | 284,285        |
| Sauim-Castanheiras     | A M   | North      | 109            |
| <b>TOTAL: 5 RESECs</b> |       |            | <b>649,167</b> |

See Figure 1-1 for Brazilian regions and states.

Source: Modified from IBAMA. *Relatório Nacional do Brasil, 2ª versão*. In: *Congresso Latino-Americano de Parques Nacionais e Outras Áreas Protegidas, 1*. Brasília (1997).

Some private organizations, many of them involved in ecotourism, administer protected areas specifically for conservation. Many companies such as those involved in cellulose, mining, energy and forestry, also hold important reserves: either for environmental reasons to counterbalance their exploited areas or for management purposes. Paper and pulp companies reserve more than 1 million ha in the Atlantic Forest alone. The Linhares Forest Reserve of the Vale do Rio Doce mining company, with 21,787 ha, for example, is one of the most important protected areas in the Atlantic forest.

Some non governmental conservation organizations also own and administer reserves and sanctuaries. The Biological Station of Caratinga (880 ha) in the east of the state of Minas Gerais, is administered by the Biodiversitas Foundation (Fundação Biodiversitas). Likewise, the Salto Morato Natural



**Figure 2-21.** Location of Brazilian Federal Ecological Reserves.

**Source:** Brazil, MMA (1997).

Reserve of 1,716 ha in the east of the state of Paraná is administered by the Boticário Foundation (Fundação O Boticário de Proteção à Natureza). The Pro-Natureza Foundation (Fundação Pró-Natureza -FUNATURA) maintains a chain of wildlife sanctuaries throughout the country.

One of the unresolved problems is that many of the strictly protected areas are small, less than 100,000 ha, where it is difficult to maintain genetically viable populations of the larger, wide-ranging species such as top predators.

The greatest conceptual advance in recent years has been the increased involvement in conservation issues by Brazilian society in general. Through such as meetings and workshops, local communities and their representatives are now taking an active part in all stages of the planning and implementation

of protected areas, frequently carried out through partnerships between the Government and NGOs.

Understanding and co-operation between the Government, communities and NGOs has improved considerably. In the case of the management categories for which community participation was already the practice, Environmental Protection Areas, for example, the results have been significant for the development of the administration and management plans for these areas.

Another advance in recent years has been the creation of Marine Extractivist Reserves along the Brazilian coast. These reserves cover the open water only, quite separate from the land issues on the coast which are covered by a different legislation. Besides Marine Extractivist Reserves, there are a



number of federal protected areas for coastal and oceanic islands, as well as for beaches, dunes, coral reefs, marine feeding grounds, bays, estuaries, saltwater lagoons, mangrove swamps, sand bars, marshes, and coastal, sandy soil vegetation (*restinga*). Despite the marine Extractivist Reserves, however, conservation of the biological diversity of the marine and coastal zones is still highly precarious.

In recent years, recognition has been given to the importance of conserving the landscapes of areas adjacent to protected areas. Measures specifically concerning this aspect are now taken into account in the management plans for the protected areas, as determined in Resolution No. 13, 6th December 1990, of the National Environment Council (Conselho Nacional do Meio Ambiente - CONAMA).

Setting up mosaics of protected areas of different categories has been another way to improve the protection of natural resources over a large area. Examples of this strategy include the Fernando de Noronha Marine National Park and the Fernando de Noronha Environmental Protection Area; the Guaraqueçaba Ecological Station and the Superagüí National Park and the Guaraqueçaba Environmental Protection Area; the Tapirapé-Aquiri National Forest and the Igarapé Gelado Environmental Protection Area; the Serra do Cipó National Park and the Carste de Lagoa Santa Environmental Protection Area; the Serra dos Órgãos National Park and the Petrópolis Environmental Protection Area.

A number of new Environmental Protection Areas important for the conservation of biological diversity are in the process of being created by the Federal Government. They include the Serra de Ibiapaba (1,592,000 ha), the Delta do Parnaíba (318,000 ha), the Chapada do Araripe (1,500,000 ha) and Ibirapuitã (318,000 ha).

The principal difficulty encountered by IBAMA in protecting the integrity of the strictly protected areas is lack of personnel. On average, there is one IBAMA employee for every 27,560 ha of protected areas. Limiting factors for some protected areas are difficulty of access, insufficient means of transport, and lack of equipment. Support from the Army, the Federal and State Police, the local government and NGOs has been enlisted for some of the protected areas. In the Extractivist Reserves and Sustainable Development Reserves, IBAMA is able to enlist the support and participation of duly-trained and instructed volunteers and community leaders. Inspection of and control over coastal and marine areas has been made more difficult as the coastguards have little or no experience in environmental issues, although on many occasions IBAMA has been able to count on the collaboration of the Brazilian Navy.

IBAMA has 575 employees for the administration of strictly protected areas, 118 of which have a higher education. For the National Forests (direct use), there are 195 employees,

**Table 2-27.** Federal Ecological Stations (ESECs) in Brazil.

| Name                   | State | Region       | Area (ha)        |
|------------------------|-------|--------------|------------------|
| Pirapitinga            | MG    | South-east   | 1,090            |
| Tamoios                | RJ    | South-east   | 8,450            |
| Tupinambás             | SP    | South-east   | 27               |
| Tupiniquins            | SP    | South-east   | 43               |
| Aracuri-Esmeralda      | RS    | South        | 272              |
| Carijós                | SC    | South        | 712              |
| Guaraqueçaba           | PR    | South        | 13,652           |
| Taim                   | RS    | South        | 10,764           |
| Iquê                   | MT    | Central-west | 200,000          |
| Serra das Araras       | MT    | Central-west | 28,700           |
| Taiamã                 | MT    | Central-west | 11,200           |
| Seridó                 | RN    | North-east   | 1,166            |
| Uruçuí-Uná             | PI    | North-east   | 135,000          |
| Anavilhanas            | A M   | North        | 350,018          |
| Caracaráí              | RR    | North        | 80,560           |
| Jari                   | PA/AP | North        | 227,126          |
| Juami-Japurá           | A M   | North        | 572,650          |
| Maracá                 | RR    | North        | 101,312          |
| Maracá-Jipioca         | AP    | North        | 72,000           |
| Niquiá                 | RR    | North        | 286,600          |
| Rio Acre               | AC    | North        | 77,500           |
| <b>TOTAL: 21 ESECs</b> |       |              | <b>2,178,845</b> |

The Aiuaba ESEC, created in the state of Ceará with 12,000 ha, is not included as it has no legal title. See Figure 1-1 for Brazilian regions and states.

**Source:** Modified from IBAMA. *Relatório Nacional do Brasil, 2ª versão. In: Congresso Latino-Americano de Parques Nacionais e Outras Áreas Protegidas, 1.* Brasília (1997).

of which 41 have a higher education. Together, these employees represent about 13% of the IBAMA staff. Since 1991, 10 training courses have been organised for those working with strictly protected areas, involving 379 people throughout the country.

The amount of scientific research within the strictly protected areas has increased significantly, to the extent that IBAMA has set up a Research Nucleus in its Department of Protected Areas (Departamento de Unidades de Conservação - DEUC). Authorised research projects in strictly protected areas numbered 58 in 1994, more than 100 in 1995 and more than this in the period January-October 1996. Biomes with the most research projects are the Atlantic forest (29%), the Cerrado (25%), coastal areas (18%) and the Amazon (14%).

In partnership with IBAMA, the MMA has begun a project for training technicians to work in protected areas specifically with the methodologies involved in adding economic value to the natural resources of the region and to carry out case studies.



**Figure 2-22.** Location of Brazilian Federal Ecological Stations.  
**Source:** Brazil, MMA (1997).

One of the problems encountered by IBAMA, as well as state and municipal environmental agencies, is the legislation that regulates the different categories of protected areas in Brazil. It is highly complex and often lacks standardisation in its terminology and the administrative mechanisms in common (Box 2-3). For this reasons the approval of Draft Law No. 2.892/92 (Box 2-4) for the definition and regulation of a National System of Protected Areas (Sistema Nacional de Unidades de Conservação - SNUC) is vital. This law updates and consolidates the principles and guidelines concerning the application of public policies in relation to in situ conservation of biological diversity, and will substitute the set of laws currently existing on the subject. It has been in Congress since 1992.

The main priorities established by IBAMA for protected areas over the next year are as follows:

- The consolidation of the National System of Protected Areas - SNUC with its approval in the National Congress, and the creation of norms for each management category;
- Institutional strengthening of the public and private organizations responsible for protected areas;
- Progress in the monitoring of biodiversity in protected areas;

- The establishment of new areas and the effective implementation of those already existing;
- An increase in the number of protected areas, especially to form mosaics;
- An increasing in the protection of areas surrounding strictly protected areas;
- The resolution of land-ownership problems in strictly protected areas;
- The incorporation of protected areas in development plans at the regional, state and municipal levels;
- Recruitment and training of more employees;
- Environmental education;
- Training of those living in marine Extractivist Reserve areas for the sustainable use of resources, in vigilance, and in the elaboration of development plans;
- The introduction of private concessions for the sustainable exploitation of National Forests;
- Regional development (to create jobs and generate income);
- The development of ecotourism.
- An increase in funding for protected areas.

First estimates indicate that US\$ 100 million to US\$ 150 million will be needed for the federal system of protected areas over the next five years, and US\$ 20 million to US\$ 30 million for each state system. This means that the overall needs over the next five years will be between US\$ 600 million and US\$ 1,000 million for the National System.

The 785 federal and state protected areas and Private Natural Heritage Reserves - RPPNs total 69,174,600 ha, or 8.13% of the country (Table 2-36). Since the signing of the Convention on Biological Diversity, 27 new federal protected areas (7,798,048 ha) have been created along with 131 RPPNs (330,000 ha).

### 2.3.2 International Co-operation in Support of Protected Areas

Programmes of loans and international co-operation are the main source of funding for protected areas. They also receive considerable funding, however, from the State, for the expropriation of land, as well as for their maintenance and management. In addition, protected areas benefit from visitor's fees, and from concessions to exploit forest products and subproducts in the case of the National Forests and Extractivist Reserves.

**Table 2-28.** Areas of Relevant Ecological Interest (ARIE)

| Name   | State | Region       | Area (ha)     |
|--|-------|--------------|---------------|
| Floresta da Cicuta   | RJ    | South-east   | 131           |
| Ilha das Cagarras  | RJ    | South-east   | 200           |
| Ilha do Ameixal  | SP    | South-east   | 400           |
| Ilhas Queimada Grande e Queimada Pequena                                 | SP    | South-east   | 33            |
| Mata de Santa Genebra  | SP    | South-east   | 252           |
| Matão de Cosmópolis  | SP    | South-east   | 174           |
| Cerrado Pé de Gigante  | SP    | South-east   | 10,600        |
| Vassununga   | SP    | South-east   | 150           |
| Cocorobó   | BA    | North-east   | 7,500         |
| Manguezais da Foz do Rio Mamanguape                                      | PB    | North-east   | 5,721         |
| Murici   | AL    | North-east   | 10,000        |
| Vale dos Dinossauros   | PB    | North-east   | 5,000         |
| Javari Mirim   | A M   | North        | 15,000        |
| Projeto Dinâmica Biológicas de Fragmentos Florestais da Região Amazônica | A M   | North        | 3,288         |
| Ilha do Pinheiro e do Pinheirinho  | PR    | South        | 109           |
| Pontal dos Latinos e Pontal do Santiago                                  | RS    | South        | 2,995         |
| Serra das Abelhas/Rio da Prata   | SC    | South        | 4,604         |
| Capetinga/Taquara  | DF    | Central-west | 2,100         |
| <b>Total : 18 ARIES</b>  |       |              | <b>68,257</b> |

See Figure 1-1 for Brazilian regions and states.

**Source:** IBAMA (1998).

Visitors to National Parks numbered 1.48 million in 1994, 1.47 million in 1995, 1.82 million in 1996 and 1.2 million from January to August 1997; a total of 5.98 million from 1994 to August 1997 (Figure 2-28). The National Parks brought in some R\$9 million over this same period, roughly equivalent to US\$9 million.

From 1991 to 1996, the protected area component of the National Environment Programme (Programa Nacional do Meio Ambiente - PNMA), was the largest source of funding for federal protected areas. A part of Brazil's share for this component was financed by a donation from the German development Bank Kreditanstalt für Wiederaufbau - KfW.

Funding from the Treasury and KfW, and a loan from The World Bank enabled PNMA to finance programmes for 45 strictly protected areas and five Environmental Protection Areas, in various states. From 1991 to 1996, PNMA invested US\$ 25.69 million in protected areas.

Another important achievement has been the establishment and upkeep of the physical infrastructure and the purchase of equipment for protected areas, involving investments in 1996 and 1997 of about US\$ 12.6 million through the PNMA.