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, 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.

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
Caracaraí	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
TOTAL: 21 ESECs			**2,178,845**

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).

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
Total : 18 ARIES			**68,257**

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.

Inventories of landownership and the demarcation of the boundaries of three protected areas were also carried out for future expropriation.

The Inter-American Development Bank - IDB, USAID, WWF, and the governments of France and Canada have provided funds directly to non governmental organizations working in the areas surrounding protected areas, in general involving programmes for rural extension, co-operativism and environmental education.

Some of the programmes with international funding are:

- The Fundação Museu do Homem Americano received US$2 million from the IDB, for programmes in the Serra da Capivara National Park, Piauí;
- The Fundação Pro-Natureza - FUNATURA received US$500,000 from the IDB for the establishment of four Private Natural Heritage Reserves - RPPN in the Cerrado;
- The European Union provided US$254,770 for the elaboration of the management plan for the Anavilhanas Ecological Station, Amazonas;
- SOS Amazonia received US$700,000 from USAID and the Nature Conservancy for the elaboration of the management plan for the Serra do Divisor National Park, Acre;
- As of 1997, The International Tropical Timber Organization - ITTO is financing a 5-year project for sustainable management in the Tapajós National Forest, Pará;
- Since 1992, the Overseas Development Administration - ODA, the European Union and the Wildlife Conservation Society, New York, have contributed around US$ 5 million to the Mamirauá Sustainable Development Reserve, Amazonas (a state protected area). ODA expects to invest a further US$4 million between 1997 and 2001;
- In February 1997, the Inter-American Development Bank - IDB and the Government of Bahia set aside approximately R$ 2 million for the creation of the Serra do Conduru State Park (8,400 ha), near the Una Biological Reserve, in southern Bahia. This was the result of collaboration with the Department of Forest Development of Bahia, and resulted in the doubling of the protected area in the region, which holds a world record for plant species richness, with 454 tree species recorded in a single hectare.

Table 2-29. Federal Environmental Protection Areas (APAs) In Brazil.

Name	State	Region	Area (ha)
Petrópolis	RJ	South-east	59,049
Piaçabuçu	AL	North-east	8,600
Bacia do Rio Descoberto	DF/GO	Central-west	32,100
Bacia do Rio São Bartolomeu	DF/GO	Cetnral-west	84,100
Guapi-Mirim	RJ	South-east	14,340
Jericoacoara	CE	North-east	6,800
Cananéia-Iguape e Peruíbe	SP	South-east	202,832
Cairuçu	RJ	South-east	33,800
Guaraqueçaba	PR	South	291,500
Serra da Mantiqueira	MG/SP/RJ	South-east	402,517
Fernando de Noronha	PE	-	2,700
Garapé Gelado	PA	North	21,600
Cavernas do Peruaçu	MG/SP/RJ	South-east	150,000
Carste de Lagoa Santa	MG	South-east	35,600
Morro da Pedreira	MG	South-east	66,200
Serra da Tabatinga	MA/TO	North	61,000
Ibirapuitã	RS	South	318,000
Anhatomirim	SC	South	3,000
Barra do Mamanguape	PB	North-east	14,640
Delta do Parnaíba	MA/PI/CE	North-east	313,800
Costa dos Corais	PE/AL	North-east	413,563
Chapada do Araripe	CE/PE/PI	North-east	1,063,000
Ilhas e Várzeas do Rio Paraná	PR/MS	South/Central-west	1,003,059
Várzea da Ilha Grande	RJ	South-east	1,003,000
TOTAL: 24 APAs			**5,604,800**

See Figure 1-1 for Brazilian regions and states.
Source: Modified from Brazil. MMA. IBAMA. *Relatório Nacional do Brasil, 2ª versão. In: Congresso Latino-Americano de Parques Nacionais e Outras Áreas Protegidas, 1.* Brasília (1997).

Several of these international agreements for loans or donations require the restructuring of the projects in order to ensure best returns from the investment. One of the chief difficulties has been the restrictions imposed by the donators regarding the use of the money to purchase land or to pay salaries for staff in the protected areas - two pressing problems for a very large number of the protected areas.

Despite this, some of the greatest advances in the conservation of the biological diversity of Brazil have been the result of international partnerships, a good example being the tropical rain forests which are benefiting from the Pilot Programme for the Brazilian Tropical Forests - PPG-7 (Programa Piloto para Proteção das Florestas Tropicais do Brasil). In this programme, some of the most important advances have been in the part dealing with the setting up and equipping of protected areas in the Amazon Forest.

Table 2-30. National Forests In Brazil.

Name	State	Forest type	Legislation	Area(ha)
South Region				**15,020**
01 Açungui	PR	Mixed ombrophilous forest	Edict 559/68	728
02 Caçador	SC	Mixed ombrophilous forest	Edict 560/68	710
03 Canela	RS	Mixed ombrophilous forest	Edict 561/68	517
04 Chapecó	SC	Mixed ombrophilous forest and seasonal deciduous forest	Edict 560/68	1,606
05 Ibirama	SC	Closed ombrophilous forest	Dec. 95,818/88	570
06 Irati	PR	Mixed ombrophilous forest	Edict 559/68	3,495
07 Passo Fundo	RS	Area of transition savannah mixed ombrophilous forest	Edict 561/68	1,328
08 São Francisco de Paula	RS	Steppe and mixed ombrophilous forest	Edict 561/68	1,607
09 Três Barras	SC	Mixed ombrophilous forest	Edict 560/68	4,459
South-East Region				**13,181**
10 Capão Bonito	SP	Ecotone	Edict 558/68	4,344
11 Ipanema	SP	Ecotone	Dec. 530/92	5,179
12 Mário Xavier	RJ	Closed ombrophilous forest	Dec. 93,369/86	493
13 Passa Quatro	MG	Ecotone	Dec. 568/68	335
14 Rio Preto	ES	Closed ombrophilous forest	Dec. 98,845/90	2,830
North-East Region				**38,626**
15 Araripe-Apodi	CE	Ecotone	Dec. 9,226/46	38,626
North Region				**15,052,460**
16 Altamira	PA	Not classified	Dec. 2,483/98	589,012
17 Amapá	AP	Closed ombrophilous forest	Dec. 96,630/89	412,000
18 Amazonas	AM	Closed ombrophilous forest, area of ecological transition and *campinarana* (tall forest on sandy soil)	Dec. 97,546/89	1,573,100
19 Bom Futuro	RO	Open ombrophilous forest and closed ombrophilous forest	Dec. 96,188/88	280,000
20 Carajás	PA	Not classified	Dec. 2,486/98	411,948
21 Caxiuanã	PA	Closed ombrophilous forest	Dec. 239/61	200,000
22 Cubaté	AM	*Campinarana* (tall forest on sandy soil)	Dec. 99,105/90	416,532
23 Cuiari	AM	Closed ombrophilous forest and ecotone	Dec. 99,109/90	109,518
24 Humaitá	AM	Not classified	Dec. 2,485/98	468,790
25 Içana	AM	ecotone	Dec. 99,110/90	200,561
26 Içana-Aiari	AM	Open ombrophilous forest, area of ecological transition and *campinarana* (tall forest on sandy soil)	Dec. 99,108/90	491,400
27 Itacaiunas	PA	Not classified	Dec. 2,480/98	141,400
28 Itaituba I	PA	Not classified	Dec. 2,481/98	220,034
29 Itaituba II	PA	Not classified	Dec. 482/98	440,500
30 Jamari	RO	Open ombrophilous forest and closed ombrophilous forest	Dec. 90,224/84	215,000
31 Macauã	AC	Closed ombrophilous forest	Dec. 96,189/88	173,475
32 Mapiá-Inauini	AM	Open ombrophilous forest and closed ombrophilous forest	Dec. 98,051/89	311,000
33 Pari-Cachoeira I	AM	Closed ombrophilous forest	Dec. 98,440/89	18,000
34 Pari-Cachoeira II	AM	Closed ombrophilous forest, ecotone and *campinarana* (tall forest on sandy soil)	Dec. 98,440/89	654,000
35 Piraiauara	AM	Ecotone and *campinarana* (tall forest on sandy soil)	Dec. 98,111/90	631,436
36 Purus	AM	Closed ombrophilous forest	Dec. 96,190/88	256,000
37 Roraima	RR	open ombrophilous forest and closed ombrophilous forest *campinarana* (tall forest on sandy soil) and ecological sanctuary	Dec. 97,545/89	2,664,685
38 Saracá-Taquera	PA	Closed ombrophilous forest	Dec. 98,704/89	429,600
39 Tapajós	PA	Open ombrophilous forest and closed ombrophilous forest	Dec. 73,684/74	600,000
40 Tapirapé-Aquiri	PA	Open ombrophilous forest and closed ombrophilous forest	Dec. 97,720/89	190,000
41 Taracuá I	AM	Area of ecological transition and c*ampinarana* (tall forest on sandy soil)	Dec. 99,112/90	647,744
42 Taracuá II	AM	Area of ecological transition and *campinarana* (tall forest on sandy soil)	Dec. 99,113/90	559,504
43 Tefé	AM	Closed ombrophilous forest	Dec. 97,629/89	1,020,000
44 Urucu	AM	Closed ombrophilous forest	Dec. 99,106/90	66,496
45 Xingu	PA	Not classified	Dec. 2,484/98	252,790
46 Xié	AM	Ecotone	Dec. 99,107/90	407,935
TOTAL: 46 FLONAs (National Forests)				**15,119,287**

See Figure 1-1 for Brazilian regions and states; Dec. = Decree

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

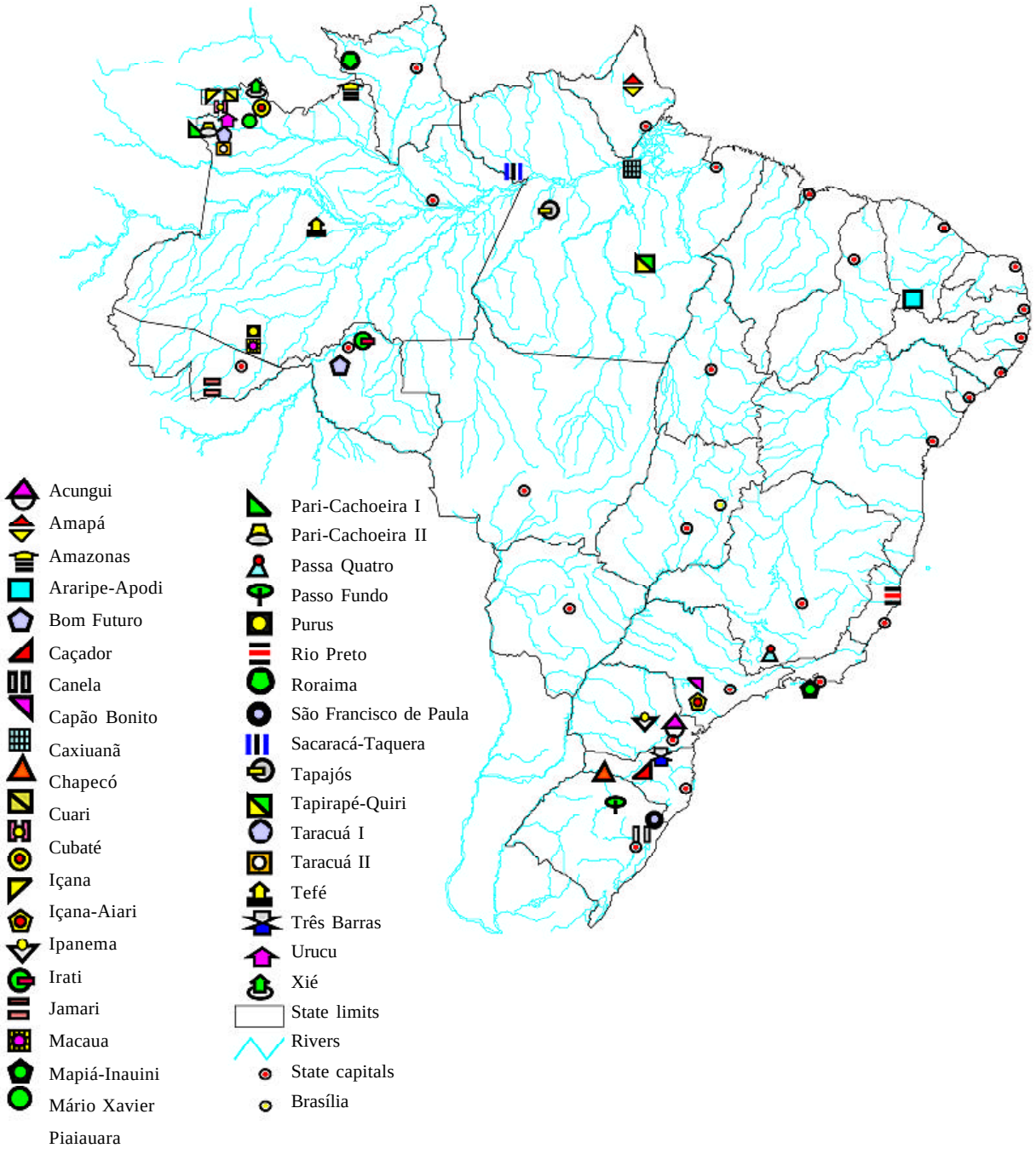

Figure 2-23. Location of National Forests. Seven created in 1998 are not included.
Source: Brazil, MMA (1997).

This is being done as part of the Subprogramme for Protected Areas and Management of Natural Resources, which involves projects for biodiversity conservation and the sustainable use of natural resources. The subprogramme is comprised of six projects, two of which, ´Extractivist Reserves´ and ´Indigenous Lands´, are already underway. Three more, ´Parks and Reserves´, ´Management of Natural Resources in Inundated Forest´ and ´Monitoring and Control of Deforestation and Forest Fires´, are in preparation, and the sixth, ´Support for Forest Management´, will begin when the agreements have been signed.

By the third trimester of 1997, of the US$273.16 million already invested or ear-marked for the PPG-7, a little more than US$50 million was allocated to this subprogramme: US$ 9.4 million for the Extractivist Reserve component; US$22.7 million for the Indigenous Lands and US$18.7 million for Forest Management (Table 2-37).

The Extractivist Reserve Project - RESEX is testing economic, social and environmental administration models, as well as working on the perfection of traditional methods and procedures used by local populations in administering

Table 2-31. Federal Extractivist Reserves (RESEXs) in Brazil.

Name	State	Municipality	Decree	Area (ha)	Estim. Pop.	Principal Managed Resource
Alto Juruá	AC	Cruzeiro do Sul, Marechal Thaumaturgo de Azevedo	98,863, 23rd January 1990	506,186	3,600	Rubber
Chico Mendes	AC	Rio Branco, Xapuri, Brasiléia, Sena Madureira, Assis Brasil, Plácido de Castro	99,144, 12th March 1990	970,570	7,500	Brazil nuts, cobaíba. rubber
Rio Cajari	AP	Laranjal do Jari, Masagão	99,145, 12th March 1990	481,650	3,800	Brazil nuts, cobaíba. rubber, acaí
Rio Ouro Preto	RO	Guajará-Mirim	99,166, 12th March 1990	204,583	700	Brazil nuts, cobaíba. Rubber
Pirajubaé	SC	Florianópolis	533, 20th May 1992	1,444	600	Shellfish, fish, crustaceans
Ciriaco	MA	Imperatriz	534, 20th May 1992	7,050	1,150	Babassu, subsistence agriculture
Extremo Norte do est. de Tocantins	TO	Carrasco Bonito	534, 20th May 1992	9,280	800	Babassu, fish, subsistence agriculture
Mata Grande	MA	Imperatriz	534, 20th May 1992	10,450	500	Babassu, fish, subsistence agriculture
Quilombo de Frexal	MA	Marizal	534, 20th May 1992	9,542	900	Babassu, fish, subsistence agriculture
Médio Juruá	AM	Carauari	No number, 4th March 1997	253,226	700	Rubber, fish
Arraial do Cabo	RJ	Arraial do Cabo	No number, 3rd January 1997	600	600	Fishing
TOTAL: 11 Extractivist Reserves [RESEXs]				**2,454,581**	**20,850**	

State, see Figure 1.1. Pop. = Population; Estim. = Estimated.

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