

Figure 2-17g. Monthly variation in the incidence of fires (heat spots) - 1997.

Source: INPE/Núcleo de Monitoramento Ambiental da EMBRAPA/Ecoforça/Agência Estado (1992/1997).

**Table 2-22.** Number of fires (heat spots) in Brazil, 1992 to 1997.

Year	June	July	August	September	October	November	Total	Satellite
1992	5,363	13,100	71,643	92,357	107,993	-	290,733	NOAA14
1993	6,635	19,771	83,032	110,431	95,397	-	314,490	NOAA14
1994	1,856	8,528	60,988	33,699	12,119	-	117,190 <sup>1</sup>	NOAA14
1995	10,358	38,889	73,319					
			(1st fortnight)			-	-	NOAA14
			13,526					
			(2nd fortnight)	15,069	-	-	32,215	NOAA12
1996	6,419	52,182					58,601	NOAA14
			11,688	17,601	4,420	2,056	35,765	NOAA12
1997	7,951	28,363					36,314	NOAA14
			13,226	27,677	11,350	4,150	56,403	NOAA12

<sup>1</sup> From 2nd fortnight of August onwards, data from satellite NOAA12.

**Source:** INPE/Núcleo de Monitoramento Ambiental da EMBRAPA/Ecoforça/Agência Estado. *Relatórios sobre queimadas 1992/97.*

### b) Fire Management

Fire damage in federal protected areas has put at risk the preservation of their biodiversity and ecosystems. Minimising the damage will be made possible through Fire Management Plans (Planos de Manejo de Fogo) which, by using techniques for the suppression of and controlled use of fire, will reduce their direct and indirect effects on the ecosystem and the community in general. This objective will give priority to the elaboration of Fire Management Plans for the protected areas annually affected by fires, especially those in the Cerrado ecosystem.

### c) Monitoring

The Satellite System for Monitoring Heat Spots (Sistema de Monitoramento dos Focos de Calor por Satélite - SMS) will be set up at the state level, with the establishment of Fire

Monitoring Centres (Centros de Monitoramento de Incêndios), which will receive detailed information of the location of fires detected in each municipality. Through these state monitoring centres, PREVFOGO will be decentralised in the monitoring, prevention and combat of forest fires.

### d) Training

This objective provides continuity for training in fire-prevention and fire-fighting (formation of fire brigades), aerial combating (training of pilots) and the training of experts in the detection of the causes of forest fires.

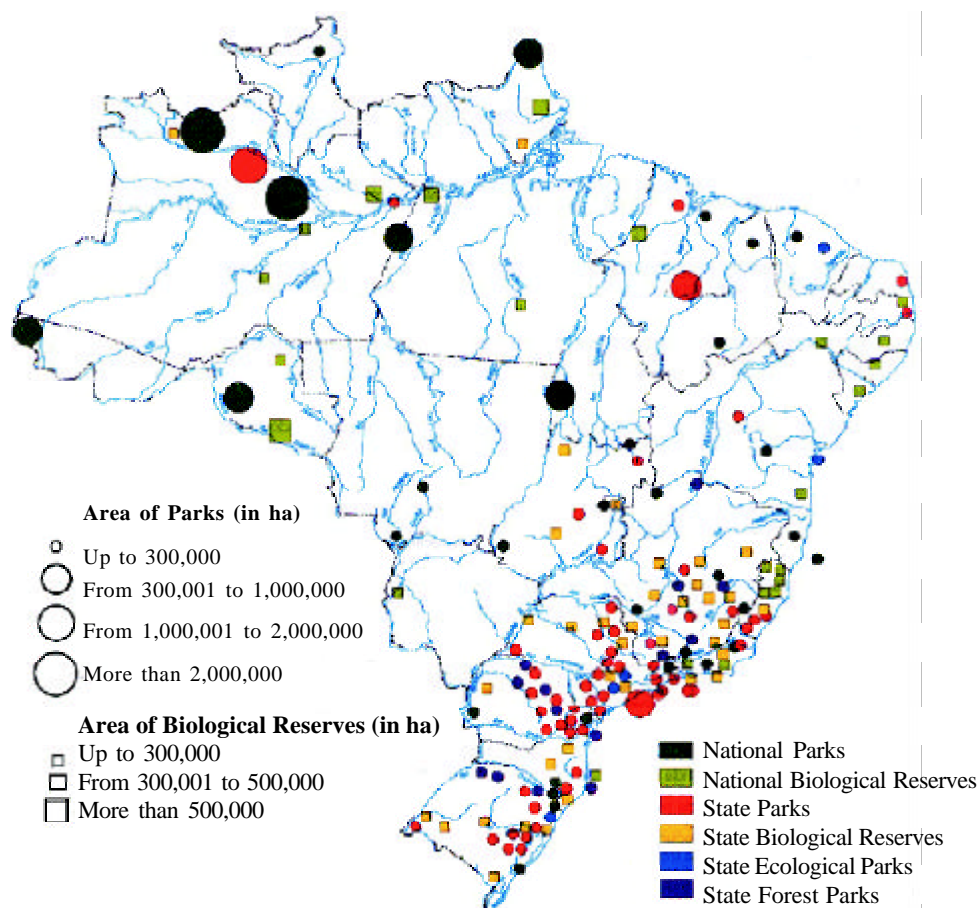
### e) Prevention and Combat

This objective aims to facilitate the prevention and combat of fires in IBAMA's protected areas. Hiring support staff in the form of voluntary and temporary fire brigades, as well as

**Table 2-23.** Federal protected areas administered by IBAMA.

Category		Nº	Total Area (ha)	% of country
Indirect use	National Parks	36		
	Biological Reserves	23		
	Ecological Stations	21		
	Ecological Reserves	5		
	Areas of Significant Ecological Interest	18		
Subtotal	Indirect use	103	15,889,543	1.87
Direct use	Environmental Protection Areas	24		
	National Forests	46		
	Extractivist Reserves	11		
Subtotal	Sustainable use	81	23,178,668	2.72
<b>Total</b>	<b>Federal Protected Areas</b>	<b>184</b>	<b>39,068,211</b>	<b>4.59</b>

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



**Figure 2-18.** Federal and state protected areas. distribution and size classes. The Ilha Grande National Park is not included.

Source: IBGE.

re-equipping permanent fire brigades, will improve the prevention and control of forest fires in the protected areas administered by IBAMA. The UNDP support, through the Project BRA/95/028 - Environmental Macro-monitoring and the accompanying technical co-operation agreements, are also expected to continue. IBAMA also plans to step up its activities through PREVFOGO in environmental education, as well as the prevention and monitoring (with the Departamento de Fiscalização - DEFIS) of man-made fires and forest fires.

## 2.2.6 Evaluation of Impacts Caused by Man-made Fires

A World Wide Fund for Nature - WWF report, published in December 1997, pointed to a vicious circle in forest fires: 'The propagation of fire is both a result of climate change and a contributing factor towards it'. The report also states that burning of pasture in the Amazon region increased in 1997, a factor which, along with the phenomenon of El Niño which prolonged the dry season until November instead of

late September/early October, contributed significantly to the increase in forest fires.

Another report, published by the Environmental Defence Fund, also in December 1997, concluded that, in spite of the fact that 70% of the fires were in deforested areas, burns along with deforestation, presented a serious threat to biodiversity, since the fires affect primary forest, pasture and secondary forest.

An appraisal by the Amazon Environmental Research Institute (Instituto de Pesquisas Ambientais da Amazônia - IPAM) and The Woods Hole Research Center - WHRC, published in an IPAM bulletin in December 1997, stated that the increase in the number of man-made fires in the Amazon region in 1997 did not necessarily mean an increase in the rate of deforestation. Extensive fieldwork, involving 370 rural properties (about 1 million ha) in four Amazonian states (Acre, Mato Grosso, Pará and Rondônia), showed that the area burnt did in fact increase from 1994 to 1995. Although fires in pasture and young secondary forest (capoeira) rather than in primary forest were the cause of this increase, this does not mean that the rate of deforestation did not increase