

## Deforestation in Protected Areas in the Brazilian Amazon: the case of Rondonia

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The establishment of Protected Areas (Conservation Units and Indigenous Lands) is one of the most effective and recommended strategies for conserving the Amazon rainforest. Some 34% of the Legal Amazon is in Protected Areas and, for the most part, these areas have served as a barrier against the advance of deforestation. However, in Rondonia, Protected Areas are being threatened by illegal deforestation. By 2004, deforestation had reached some 6.3% of the territory in the Protected Areas, while the average for the Amazon is only 1.7%. Furthermore, ten reserves had already lost more than 20% of the original forest and the deforestation rate has been increasing in these areas over the last few years. In this *The State of the Amazon*, we have quantified deforestation in the Rondonia Protected Areas up to 2004. Additionally, we have identified those Protected Areas that are most threatened by deforestation. The results obtained will be useful for guiding enforcement efforts and improving policies for maintaining the integrity of the State's Protected Areas.

### Protected Areas in Rondonia

Most (54%) of Rondonia Protected Areas<sup>1</sup> were created between 1993 and 2002, when the Planaflo program<sup>2</sup> was in effect. One of the goals of that project was to assure conservation of biodiversity through creating and implementing a major network of Protected Areas in the State. Creation of state Conservation Units was a pre-condition for executing the program.

Currently, the Protected Areas total 106,617km<sup>2</sup>, or 45% of Rondonia. There are 84 Protected Areas decreed in the State, of which 20 are Indigenous Lands, 15 are Fully Protected Conservation Units and 49 are Sustainable Use Conservation Units. In the case of the Conservation Units, the great majority (52) are administered by the state government, while only 12 are managed by the federal government (Figure 1). In a State where approximately one third of the original vegetation cover has already been deforested, the Protected Areas have an essential role in conserving the forest remnants.

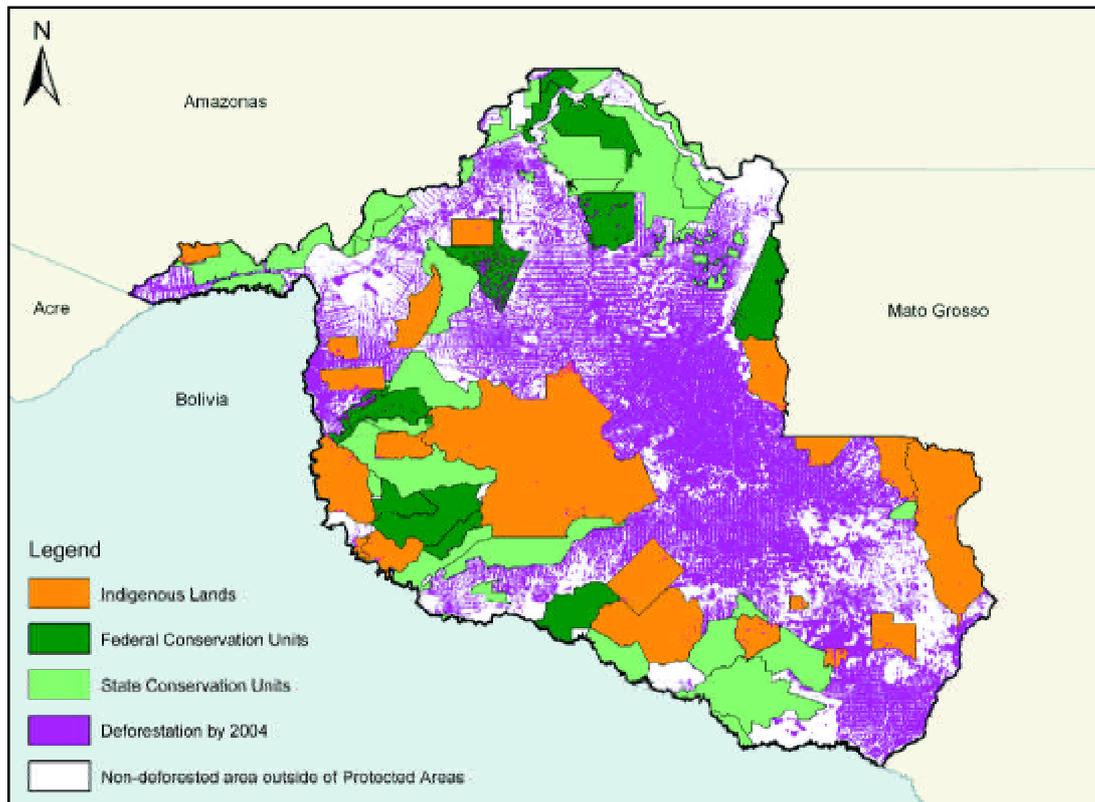


Figure 1. Protected Areas in the State of Rondonia.

**Deforestation in the Protected Areas**

As of 2004, 6.3% (approximately 6,700 km<sup>2</sup>) of the territory in the Rondonia Protected Areas had already been deforested (Figure 1).<sup>4,5,6</sup> This is a significant area, considering that deforestation in Protected Areas is illegal. Of the 84 Protected Areas, the majority (51) shows little deforestation (less than 5% of the area); while in 21 areas, deforestation is between 5% and 20%. In the remainder (10), deforestation has already exceeded 20% of the area (Table 1).

**Most Deforested Protected Areas**

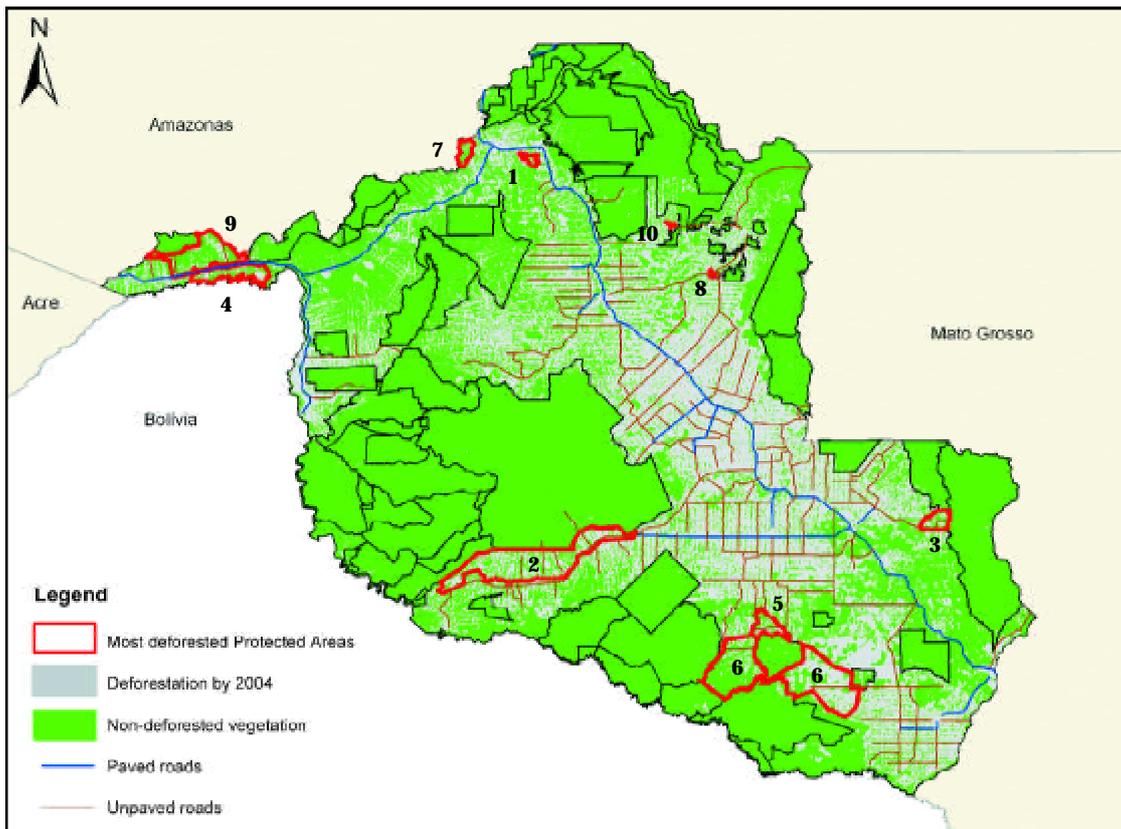
The ten most critical Protected Areas in Rondonia are state Conservation Units, of which eight are for sustainable use and two for full protection. In these units, deforestation ranged from 23% to 68%. Candeias State Park, near Porto Velho, is the most deforested unit (68%, or 58km<sup>2</sup> deforested). Next comes the Sustainable Yield State Forest (Florsu) of Rio São Domingos (62%, or 1.803km<sup>2</sup>) and Rio Roosevelt Florsu (52%, or 150km<sup>2</sup>) (Table 2; Figure 2). The annual deforestation rate for some of these areas is also extremely high. In the Rio São Domingos Florsu, for example, the average annual deforestation rate over the last four years was 5.7%. If this rate is maintained, the area will lose its entire forest cover in eight years.

**Table 1. Conservation status of Rondonia Protected Areas in 2004.**

Class	% of the area deforested	N° of Protected Areas	Total area (km <sup>2</sup> )	% of the total protected area in the state
Conserved	0-5	51	77,428	72
Intermediate	5-20	21	19,852	19
Critical	> 20	10	9,337	9
<b>TOTAL</b>		82	106,617	100

**Table 2. The most deforested Protected Areas in Rondonia in 2004.**

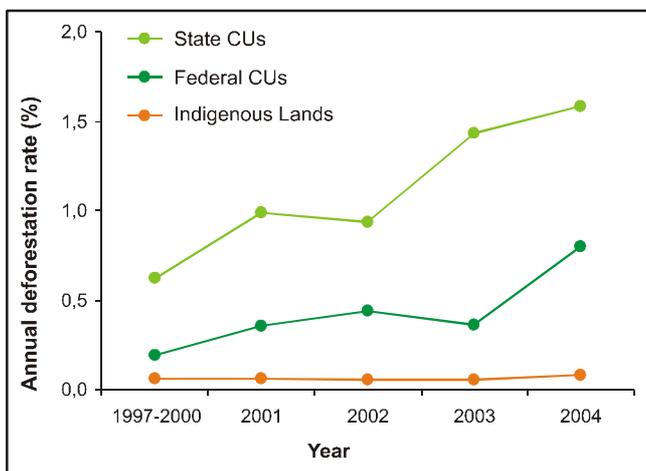
Name	Area (km <sup>2</sup> )	Deforestation <sup>7</sup> (%)	Annual deforestation rate 2001-2004 (%)
Candeias State Park	86	68	1.4
Rio São Domingos Florsu	2,908	62	5.7
Rio Roosevelt Florsu	288	52	1.2
Rio Abunã Florsu	507	48	3.9
Serra dos Parecis State Park	375	46	4.0
Rio Mequéns Florsu	3,630	43	2.0
Rio Vermelho Florsu(c)	207	38	1.9
Jatobá Extractive Reserve	13	34	1.6
Rio Vermelho Florsu(d)	1,311	32	5.1
Periquito Florsu	12	23	0.5



**Figure 2. Critical Protected Areas in Rondonia in 2004. The numbers indicate the ten most deforested areas (in decreasing order).**

**Increase in deforestation rates**

The state Conservation Units in Rondonia showed the highest annual deforestation rates from 1997 to 2004, while the Indigenous Lands showed the lowest rates for that period. In an intermediate position are the federal Conservation Units. The annual deforestation rate of the state and federal Conservation Units has been increasing since 1997, while that of the Indigenous Lands has remained practically constant<sup>8</sup> (Figure 3).



**Figure 3. Annual deforestation rate for state and federal Conservation Units and Indigenous Lands in Rondonia, from 1997 to 2004.**

**Institutional Vulnerability of the Conservation Units**

Despite having been decreed, several of the state Conservation Units have not even been demarcated<sup>9</sup>, as is the case of the Rio São Domingos Florsu, the area with the highest deforestation rate over the last few years. Additionally, 11 decreed state Conservation Units<sup>10</sup> are no longer being considered as Protected Areas by the state government<sup>11</sup>, although no specific law modifying the land-title situation in these areas has been found<sup>12,13</sup>. Furthermore, titles have been issued by Incra in areas where Conservation Units had already been decreed, for example, in the Corumbiara and Serra dos Parecis State Parks, as well as in the Rio São Domingos Florsu.<sup>14</sup>

Preparation of management plans, a legal requirement for Conservation Units, is one indicator of the degree of implementation of the Protected Areas. According to federal legislation, the management plans are to be concluded up to five years after creation of the unit.<sup>15</sup> Of the 52 state

Conservation Units only 7 have management plans. Besides that, there is no management plan concluded or being prepared for any of the ten most deforested Units. On the other hand, of the 12 federal Units, 7 have management plans concluded or in the preparation phase.<sup>16</sup>

An analysis of the Planaflo program carried out by the World Bank considered that, despite the significant advances in creation of the Protected Areas, effective protection of these Reserves by the State has been highly unsatisfactory.<sup>17</sup> This situation was aggravated after the conclusion of Planaflo, in 2002, since on the part of the Rondonia government no new sources of financial resources were assured for maintaining the Protected Areas that had been created.

### Suggestions for Public Policies

The results of this study indicate that Protected Areas are essential for conservation of tropical forests<sup>18,19</sup>, however, merely creating them has not been sufficient for containing illegal deforestation. Additional measures that guarantee protection of these areas are extremely important, principally in regions with strong pressure for deforestation, as is the case with the State of Rondonia. The lessons learned in Rondonia about the threats to Protected Areas, especially the Conservation Units, reveal some measures that may be adopted for increasing the effectiveness of these areas in the Amazon region.

**Preparation of Management Plans.** In the Conservation Units, preparation and implementation of a management plan is essential. Adopting the plan assures a minimum presence of the government in that unit both in basic infrastructure and in allocating employees. Also, the management plan requires creation of an advisory or deliberative body, and, therefore assures that the key stakeholders involved and interested in the unit will participate in its management.

**Strategic Enforcement.** Information on deforestation generated by the Deter system (Real time deforestation detection), developed by Inpe using the Modis satellite, may be used for frequent monitoring of the forest cover in the Protected Areas. This information can guide enforcement actions in the field in the most critical Protected Areas. Monitoring will make it possible to regularly inform the Public Prosecution Service, Ibama, state environmental agencies and Funai about the risk situation of the Protected Areas, so that actions for combating and controlling deforestation may be adopted.

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### References and Notes

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- <sup>1</sup> The State of Rondonia was chosen because it underwent an intense occupation process associated with high rates of deforestation and because, currently, a major part of its continuous forests are inside of Conservation Units and Indigenous Lands. Additionally, Rondonia was the State in the Legal Amazon with the highest proportion of its territory deforested in 2004.
- <sup>2</sup> This program was an initiative of the World Bank to compensate for the environmental problems brought about by Polonoroeste, a project also sponsored by the Bank during the 1980s and which supported the expansion of agriculture and infrastructures in Rondonia.
- <sup>3</sup> The areas overlapping in Conservation Units and Indigenous Lands were removed and only those Indigenous Lands ratified and delimited were considered (Source: ISA 2004). Besides this the Pacaás-Novos National Park and the Rio Pacaás-Novos Extractive Forest were excluded from the analysis due to their complete overlapping with other Protected Areas.
- <sup>4</sup> For the analyses in this study we utilized deforestation data supplied by Prodes (Inpe, 2005) for the years 1997, 2000, 2001, 2002, 2003 and 2004. To identify forest vegetation, we used data from IBGE (1989).
- <sup>5</sup> Although deforestation is the indicator of the greatest and most direct impact on the Amazon rainforest, it does not represent the total dimension of impacts of human activities in the Protected Areas. Other activities, such as logging, subsistence agriculture and hunting, may significantly expand human impacts in those areas.
- <sup>6</sup> We did not discount deforestation before creation of the protected areas. However, due to the colonization process that occurred during the 1980s, it is possible that some of those Reserves already had deforested areas before they were created.
- <sup>7</sup> Proportion in relation to the total area protected.
- <sup>8</sup> The stability in the deforestation rate for the Indigenous Lands, however, does not mean that these areas have not been undergoing strong pressure in the last few years. To the contrary, many of the Indigenous Lands have been target for illegal logging, deforestation and invasions (Ricardo, C.E. 2000. *Povos Indígenas do Brasil, 1996-2000*. Instituto Socioambiental, São Paulo – SP).
- <sup>9</sup> *Políticas Públicas e Desenvolvimento Sustentável em Rondônia: Situação Atual e Abordagem para um Planejamento Participativo de Estratégias para o Estado*. Governo do Estado de Rondônia, Secretaria de Planejamento e Coordenação Geral, Projeto de Cooperação Técnica ao PLANAFLO. June 1998. Projeto BRA/94/007. 112 p.
- <sup>10</sup> Laranjeiras Extractive Forest (Florex), Pacaás-Novos Florex, Rio Preto Jacundá Florex, Rio Abunã Florsu, Rio Madeira Florsu (c), Rio Mequéns Florsu, Rio Roosevelt Florsu, Rio São Domingos Florsu, Rio Vermelho Florsu (a) and (d), Candeias State Park and Serra dos Parecis State Park
- <sup>11</sup> Information obtained from the State Secretariat for Environmental Development (Sedam) and the report "As Unidades de Conservação de Rondônia". Seplad/ Planaflo/ UNDP. 2002. 2. ed. Project BRA/00/004. 97 p.
- <sup>12</sup> According to Law 9985/2000, "the disfranchisement or reduction in the boundaries of a Conservation Unit may only be done through a specific law" (art. 22 § 7), even when the unit has not yet been effectively implemented (Machado, P.E.L. 2003. *Direito Ambiental*. Malheiros Editores, São Paulo, SP).
- <sup>13</sup> Complementary Law No. 152/96, however, despite not being a specific law, legitimates occupation and land-title regularization in the State Parks of Serra dos Parecis and Candeias and in the Rio São Domingos Florsu.
- <sup>14</sup> Legal Analysis and Review of State Conservation Units in the Brazilian States of Acre, Amazonas and Rondonia, with Comparisons to the Federal System. The Report to the Gordon and Betty Moore Foundation. June 2004. Washington, D.C.
- <sup>15</sup> Article 22 of Law 9985 of July 18, 2000. SNUC – National System for Conservation Units.
- <sup>16</sup> Information supplied by Ibama – Rondonia
- <sup>17</sup> World Bank. 2003. Implementation Completion Report on a Loan in the Amount of US\$ 167.0 Million to the Federative Republic of Brazil for a Rondonia Natural Resources Management Project. Washington, D.C.
- <sup>18</sup> Bruner, A.G., R.E. Gullison, R.E. Rice and G.A.B. da Fonseca. 2001. Effectiveness of Parks in Protecting Tropical Biodiversity. *Science* **291**: 125-128.
- <sup>19</sup> Ferreira, V.L., E. Venticinque and S. Almeida. 2005. O desmatamento na Amazônia e a importância das áreas protegidas. *Revista de Estudos Avançados – Dossiê Amazônia Brasileira I* **19** (53): 157-166.