

Primates in three protected areas in the middle Solimões basin, Brazilian Amazon

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ABSTRACT – Species inventories are essential for protected area management plans. Here we report on primate inventories in three protected areas (PAs) in the middle Solimões basin in the state of Amazonas, Brazil. We surveyed two areas of sustainable use – the Rio Jutai Extractivist Reserve (RESEX Rio Jutai) and the Auatí-Paraná Extractivist Reserve (RESEX Auatí-Paraná) – and a strictly protected area, the Jutai-Solimões Ecological Station (ESEC Jutai-Solimões). We updated the occurrence and distribution of some primates of the region, contributing to the species lists for the management plans of these areas. In 2014 and 2015, we collected data in the ESEC Jutai-Solimões and RESEX Rio Jutai for 35 days during three expeditions. We collected data for 24 days in the RESEX Auatí-Paraná in April 2015 (wet season). We used rapid survey methods for mammal inventories including walking existing trails and use of small canoes to sample the flooded forest. All the records presented here were based on sightings and on specimen collection when necessary. The material collected was stored in the Mammal Collection of the Mamirauá Institute. Twenty-two species and subspecies of 14 genera of primates occur in the three protected areas. The ESEC Jutai-Solimões and RESEX Rio Jutai have 11 and 13 confirmed primate taxa, respectively. The RESEX Auatí-Paraná has seven confirmed species. These records are an important step to know the primate diversity in PAs of the middle Rio Solimões.

Keywords: Auatí-Paraná; Jutai; mammals inventory; management plan; primates survey.

RESUMO – Primatas em três unidades de conservação na bacia do médio Rio Solimões, Amazônia brasileira. O inventário de espécies é um dos pontos essenciais para consolidar os planos de manejo em áreas protegidas. Neste trabalho, apresentamos o resultado dos inventários de primatas em áreas protegidas (APs) no médio rio Solimões, Amazonas. Nós amostramos duas APs de uso sustentável – a Reserva Extrativista Rio Jutai (RESEX Rio Jutai) e a Reserva Extrativista Auatí-Paraná (RESEX Auatí-Paraná) – e uma estação ecológica (ESEC Jutai-Solimões). Atualizamos a ocorrência e distribuição de primatas nessas áreas contribuindo para a lista de espécies dos planos de gestão. Em 2014 e 2015, coletamos dados na ESEC Jutai-Solimões e RESEX Rio Jutai durante 35 dias em três expedições. Foram coletados dados durante 24 dias na RESEX Auatí-Paraná em abril de 2015, na estação chuvosa. Os levantamentos foram realizados em trilhas previamente existentes, sendo a amostragem nas florestas alagadas realizada com canoas. Os registros apresentados aqui foram baseados em avistamentos ou na coleta de espécimes, quando necessária. O material coletado foi depositado no Acervo de Mamíferos do Instituto de Desenvolvimento Sustentável Mamirauá. Registrou-se um total de 22 espécies e subespécies pertencentes a 14 gêneros nas três APs. A ESEC Jutai-Solimões e a RESEX Rio Jutai possuem, respectivamente, 11 e 13 táxons confirmados, enquanto a RESEX Auatí-Paraná possui sete táxons. Os registros aqui apresentados são um ponto de partida importante para o entendimento da diversidade de primatas em APs do médio Solimões.

Palavras-chave: Auatí-Paraná; inventário de mamíferos; Jutai; plano de gestão; levantamento de primatas.

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RESUMEN – Primates en tres áreas protegidas en el medio Río Solimões, amazonia brasileira.

El inventario de especies es uno de los puntos esenciales para consolidar los planes de manejo en áreas protegidas. En este trabajo, presentamos el resultado de los inventarios de primatas en áreas protegidas (APs) en el medio río Solimões, Amazonas. Se muestrearon dos áreas protegidas uso sostenible – la Reserva Extractivista Rio Jutai (RESEX Rio Jutai) y la Reserva Extractivista Auati-Paraná (RESEX Auati-Paraná) – y una Estación Ecológica (ESEC Jutai-Solimões). La ocurrencia y distribución de los primates en estas áreas se ha actualizado, lo que contribuye a la lista de especies de los planes de gestión. En 2014 y 2015, se recogieron datos en la ESEC Jutai-Solimões y Río RESEX Jutai durante 35 días en tres expediciones. Además, se recogieron datos durante 24 días en la RESEX Auati-Paraná en abril de 2015, en la estación lluviosa. Se realizaron levantamientos en caminos previamente existentes y el uso de canoa en el bosque inundado. Los registros presentados aquí se basaron en avistamientos o en la recolección de especímenes, cuando era necesario. El material recolectado fue depositado en el Acervo de Mamíferos del Desenvolvimento Sustentável Mamirauá. Se registró un total de 22 especies y subespecies pertenecientes a 14 géneros en las tres AP. La ESEC Jutai-Solimões y la RESEX Rio Jutai poseen, respectivamente, 11 y 13 taxones confirmados, mientras que la RESEX Auati-Paraná posee siete taxones. Los registros aquí presentados son un punto de partida importante para el entendimiento de la diversidad de primates en APs del medio Solimões.

Palabras clave: Auati-Paraná; inventario de mamíferos; Jutai; plan de gestión; levantamiento de primates.

Introduction

Species conservation, legislation, management, and monitoring are compromised if we cannot describe, identify, and recognize the biodiversity we need to protect (Mace 2004). In the Amazon, new species are constantly being described, even from groups believed to be relatively well known – 65 mammals were described between 1999 and 2015 (Charity *et al.* 2016). In all, 123 species and subspecies of primates are found in the Amazon (Dalponte *et al.* 2014, Marsh 2014, CPB/ICMBio 2017), more than anywhere else on Earth.

Although varying according to different taxonomies, and with new studies, approaches, and revisions (Rylands *et al.* 2012, Rylands & Mittermeier 2014), Brazil has approximately 150 species and subspecies of primates, 21 of them described in the last 25 years (Rylands *et al.* 2012, Dalponte *et al.* 2014, Marsh 2014). The insufficient information on their taxonomy, distributions, and population densities might difficult the assessment of their conservation status. Recent surveys in Amazonian protected areas have revealed a staggering diversity of vertebrates (Araújo & Costa-Campos 2014, Dalponte *et al.* 2016, Lees *et al.* 2014, Röhe 2007). A number of these areas, however, need further studies, involving researchers, students, local communities, and policymakers. Species inventories are essential – a first step to consolidate the management plans for these protected areas and the conservation of the species that occur in them. Currently, protected areas and indigenous lands comprise almost 50% of the Brazilian Amazon (Scarano *et al.* 2012). Although their effectiveness is debated (Nolte *et al.* 2013), they now cover more than 90% of the primate species and subspecies in the Amazon rainforest (Pinto *et al.* 2014).

The National System of Protected Areas (SNUC) encompasses two broad categories: strictly protected areas and those of sustainable use (Rylands & Brandon 2005). The primary aim of the first is to conserve biodiversity with no resource extraction permitted. The second category allows for the sustainable use of the natural resources they contain. Indigenous lands in Brazil are under the jurisdiction of the National Indian Foundation (FUNAI), but they are not considered protected areas following the IUCN categorization (Nelson & Chomitz 2011). However, although Indigenous peoples are granted permanent residence and are allowed to exploit the natural resources found locally (Schwartzman & Zimmerman 2005), these indigenous groups have been shown to be effective in impeding large-scale deforestation within their territories (Barber *et al.* 2012).

Here we report on primate surveys in three protected areas in the central Amazon, in the middle Solimões basin. We surveyed two reserves of sustainable use – the Rio Jutai Extractivist Reserve (RESEX Rio Jutai) and the Auati-Paraná Extractivist Reserve (RESEX Auati-Paraná) – and

a strictly protected area, the Jutai-Solimões Ecological Station (ESEC Jutai-Solimões). The aim was to update information on the occurrence and distribution of the primate taxa in each area in order to contribute to the development of their management plans.

Study areas

ESEC Jutai-Solimões

The Jutai-Solimões Ecological Station (289,511.76 ha) was created by decree number 88541 on July 21, 1983 (Brasil 1983). While visitation is closed to the public, the category of ecological station specifically encourages scientific research (Nogueira Neto 1992, Rylands & Brandon 2005). The Jutai-Solimões Ecological Station is located on the west (left) bank of Jutai River, in the Solimões-Jutai interfluvium ($03^{\circ}7'56''\text{S}$, $67^{\circ}35'17''\text{W}$) (Figure 1). Three indigenous areas border the ecological station in its northern extension – São Domingos do Jacapari, Macarrão and Espírito Santo – and one in the south-west, Betânia. It overlaps with two of these indigenous areas: São Domingos do Jacapari and Betânia, corresponding to 33,245 ha and 5,427 ha, respectively. No surveys had been carried out there, and its fauna and flora are largely unknown.

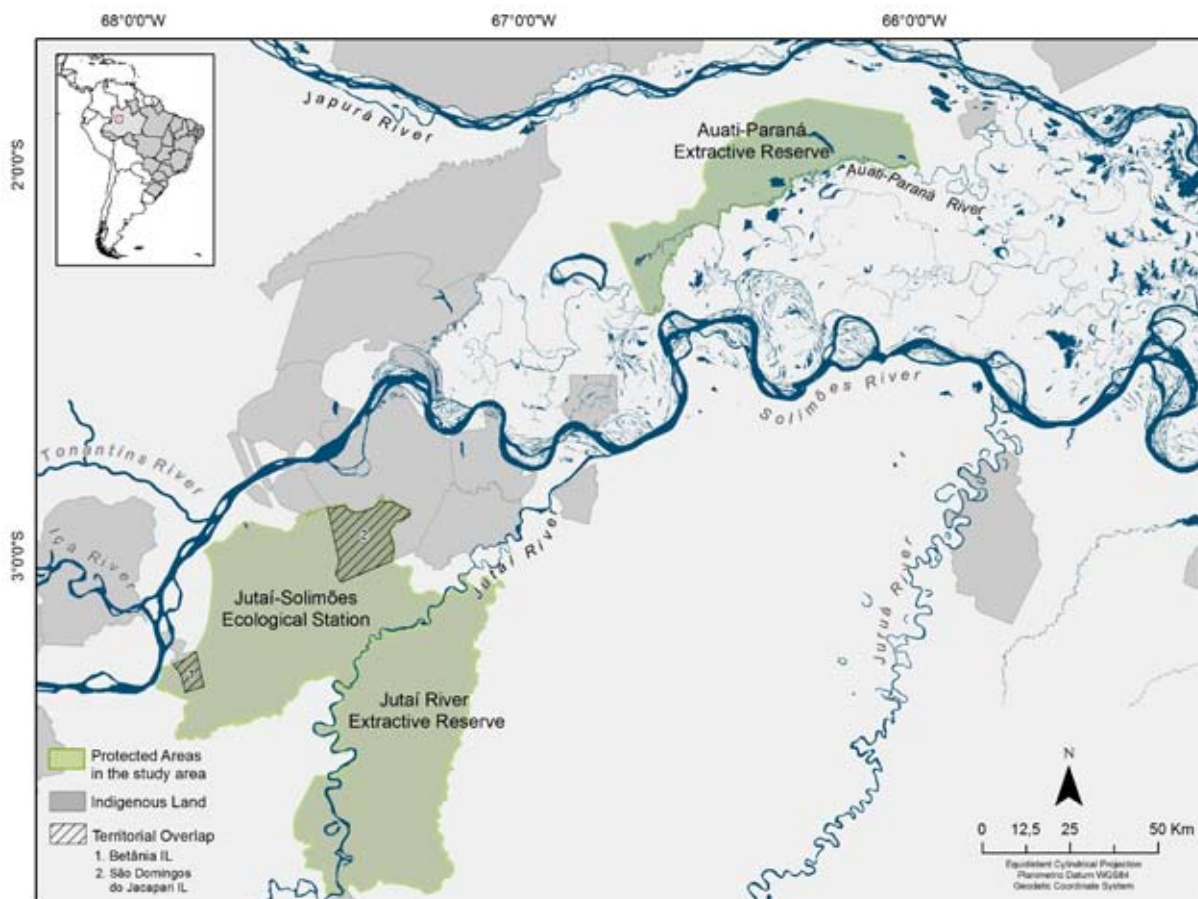


Figure 1 – The protected areas of middle Solimões River surveyed for primate species and the territorial overlap between indigenous lands and Jutai-Solimões Ecological Station.

RESEX Rio Jutai

The Rio Jutai Extractivist Reserve (275,513.52 ha) was created by decree on July 16, 2002 (Brasil 2002). Most of the reserve is located in the Jutai-Riozinho interfluvium – only a small portion in the south-west of this reserve extends across the Jutai River to the left bank (3°27'34"S, 67°19'39 W) (Figure 1). At the northwest, it borders the Jutai-Solimões Ecological Station. The vegetation has a diverse physiognomy of unflooded and flooded forest influenced by the seasonal changes in water level of the main rivers, the Jutai and Riozinho (Brazil, MMA 2011a).

RESEX Auati-Paraná

The Auati-Paraná Extractivist Reserve (146,948.05 ha) was created by decree on August 7, 2001 (Brasil 2001). The reserve extends east-west along the northern bank of the Auati-Paraná, a channel that extends between the lower Japurá River and the Solimões (2°0'58"S, 66°25'10"W). The hydrographic system of the RESEX Auati-Paraná includes tributaries of the Japurá and lakes, streams, channels that differentially influence the local habitats according to their seasonal flooding regimes (Brazil, MMA 2011b). Extractivist reserves allow for sustainable development, and they are occupied by traditional communities, with livelihoods based on the commercialization of such as Brazil nuts and rubber, subsistence agriculture, fishing and to some extent the breeding of chickens and pigs.

Methods

In 2014 and 2015, we collected data in the ESEC Jutai-Solimões and RESEX Rio Jutai for 35 days during three expeditions. We collected data during 24 days in the RESEX Auati-Paraná in April 2015 (wet season). We used rapid survey methods for mammal inventories (Fonseca 2001, Young *et al.* 2003) and the records were based on sightings and collection of specimens when necessary using firearm (Sikes *et al.* 2016). The species collection followed the Brazilian laws (SISBio permits 42111-1, 42111-2, 42111-3) and the guidelines of the American Society of Mammalogists for the use of wild mammals in research (Sikes *et al.* 2016). The euthanasia, when necessary, followed the protocols and guidelines of the National Council for the Control of Animal Experimentation (CONCEA), the Ethics Committee on Animal Use of IDSM (CEUA/IDSM) and the Resolution n. 1000 of May 11, 2012, of the Federal Council of Veterinary Medicine. The material collected was stored in the Mammal Collection of Mamirauá Institute (Table 1).

We surveyed throughout the day for diurnal primates and the first hours of the evening for night monkeys. Most sightings were in the early morning. The surveys included walks along existing trails and we used an outboard to search for species in riparian forest along the river, and small canoes with paddles in the flooded areas. All records were noted with coordinates using Global Positioning System (GPS) devices. Here, we report on the primates we identified based on the taxonomic classifications suggested by Rylands *et al.* (2000), updated by Boubli *et al.* (2012), Defler (2014), Marsh (2014), Byrne *et al.* (2016), and Rylands *et al.* (2016).

Results and discussion

Twenty-two primates, species and subspecies, from 14 genera were recorded in the three protected areas (Table 2). Although no previous study has recorded these taxa in the respective study areas, the occurrence of some of them was expected based on their known or supposed geographical distributions. We recorded the Juruá Red Howler *Alouatta juara* (Elliot 1910) and the large-headed capuchin *Sapajus macrocephalus* (Spix 1823) in all three protected areas. These species are wide-ranging, occurring also in neighbouring Amazonian countries.

Table 1 – The species and subspecies collected in the three protected areas and stored in the Mammal Collection of Mamiraua Institute for Sustainable Development.

Lat	Long	Taxon	Code	Protected Area
-1.9469	-66.2381	<i>Alouatta juara</i>	AP08	Auati-Parana
-1.8933	-66.2881	<i>Alouatta juara</i>	AP13	Auati-Parana
-1.9469	-66.2381	<i>Cheracebus lucifer</i>	AP19	Auati-Parana
-1.8214	-66.4650	<i>Cheracebus lucifer</i>	AP22	Auati-Parana
-1.9886	-66.2017	<i>Cheracebus lucifer</i>	AP38	Auati-Parana
-1.9294	-66.2686	<i>Lagothrix lagothricha lagothricha</i>	AP02	Auati-Parana
-1.9294	-66.2686	<i>Lagothrix lagothricha lagothricha</i>	AP05	Auati-Parana
-1.9350	-66.2644	<i>Leontocebus fuscus</i>	AP03	Auati-Parana
-1.9228	-66.2709	<i>Leontocebus fuscus</i>	AP10	Auati-Parana
-1.9353	-66.2642	<i>Leontocebus fuscus</i>	AP14	Auati-Parana
-1.9471	-66.2382	<i>Leontocebus fuscus</i>	AP20	Auati-Parana
-1.9471	-66.2382	<i>Pithecia hirsuta</i>	AP07	Auati-Parana
-1.9296	-66.2689	<i>Pithecia hirsuta</i>	AP09	Auati-Parana
-1.9296	-66.2689	<i>Pithecia hirsuta</i>	AP21	Auati-Parana
-1.9350	-66.2644	<i>Saguinus labiatus thomasi</i>	AP04	Auati-Parana
-1.9225	-66.2708	<i>Saguinus labiatus thomasi</i>	AP11	Auati-Parana
-1.9353	-66.2642	<i>Saguinus labiatus thomasi</i>	AP15	Auati-Parana
-1.9353	-66.2642	<i>Saguinus labiatus thomasi</i>	AP27	Auati-Parana
-1.9222	-66.2677	<i>Saimiri cassiquiarensis macrodon</i>	AP01	Auati-Parana
-1.9116	-66.2464	<i>Saimiri cassiquiarensis macrodon</i>	AP06	Auati-Parana
-1.9870	-66.2049	<i>Saimiri cassiquiarensis macrodon</i>	AP29	Auati-Parana
-1.9938	-66.1978	<i>Saimiri cassiquiarensis macrodon</i>	AP30	Auati-Parana
-1.8208	-66.4456	<i>Sapajus macrocephalus</i>	AP23	Auati-Parana
-1.8178	-66.4594	<i>Sapajus macrocephalus</i>	AP24	Auati-Parana
-1.9797	-66.1986	<i>Sapajus macrocephalus</i>	AP33	Auati-Parana
-3.2158	-67.4072	<i>Alouatta juara</i>	JT067	ESEC Jutai-Solimões
-3.2000	-67.4206	<i>Alouatta juara</i>	JT069	ESEC Jutai-Solimões
-3.1739	-67.3894	<i>Ateles chamek</i>	JT008	ESEC Jutai-Solimões
-3.1733	-67.3897	<i>Ateles chamek</i>	JT009	ESEC Jutai-Solimões
-3.1733	-67.3897	<i>Ateles chamek</i>	JT010	ESEC Jutai-Solimões
-3.3114	-67.5475	<i>Cacajao calvus rubicundus</i>	JT078	ESEC Jutai-Solimões
-3.2008	-67.4225	<i>Cacajao calvus rubicundus</i>	JT062	ESEC Jutai-Solimões

-3.2006	-67.4225	<i>Cacajao calvus rubicundus</i>	JT063	ESEC Jutaí-Solimões
-3.1394	-67.3639	<i>Plecturocebus cupreus</i>	JT037	ESEC Jutaí-Solimões
-3.1381	-67.3650	<i>Plecturocebus cupreus</i>	JT038	ESEC Jutaí-Solimões
-3.2044	-67.4319	<i>Plecturocebus cupreus</i>	JT068	ESEC Jutaí-Solimões
-3.3117	-67.5325	<i>Cebuella niveiventris</i>	JT079	ESEC Jutaí-Solimões
-3.1761	-67.3939	<i>Cebus unicolor</i>	JT029	ESEC Jutaí-Solimões
-3.1828	-67.3894	<i>Pithecia inusta</i>	JT041	ESEC Jutaí-Solimões
-3.1825	-67.3889	<i>Pithecia inusta</i>	JT042	ESEC Jutaí-Solimões
-3.1428	-67.3661	<i>Leontocebus fuscicollis fuscicollis</i>	JT049	ESEC Jutaí-Solimões
-3.1442	-67.3650	<i>Leontocebus fuscicollis fuscicollis</i>	JT072	ESEC Jutaí-Solimões
-3.1444	-67.3678	<i>Leontocebus fuscicollis fuscicollis</i>	JT073	ESEC Jutaí-Solimões
-3.1472	-67.3572	<i>Leontocebus fuscicollis fuscicollis</i>	JT080	ESEC Jutaí-Solimões
-3.1472	-67.3572	<i>Leontocebus fuscicollis fuscicollis</i>	JT081	ESEC Jutaí-Solimões
-3.1792	-67.3883	<i>Saguinus mystax mystax</i>	JT025	ESEC Jutaí-Solimões
-3.1781	-67.3917	<i>Saguinus mystax mystax</i>	JT052	ESEC Jutaí-Solimões
-3.1775	-67.3878	<i>Saguinus mystax mystax</i>	JT055	ESEC Jutaí-Solimões
-3.1517	-67.3664	<i>Saimiri cassiquiarensis macrodon</i>	JT033	ESEC Jutaí-Solimões
-3.1503	-67.3656	<i>Saimiri cassiquiarensis macrodon</i>	JT034	ESEC Jutaí-Solimões
-3.1508	-67.3681	<i>Saimiri cassiquiarensis macrodon</i>	JT035	ESEC Jutaí-Solimões
-3.1494	-67.3647	<i>Saimiri cassiquiarensis macrodon</i>	JT036	ESEC Jutaí-Solimões
-3.1717	-67.3953	<i>Sapajus macrocephalus</i>	JT043	ESEC Jutaí-Solimões
-3.2222	-67.3875	<i>Alouatta juara</i>	JT060	RESEX do Rio Jutaí
-3.2222	-67.3875	<i>Alouatta juara</i>	JT061	RESEX do Rio Jutaí
-3.7269	-67.4425	<i>Alouatta juara</i>	JT096	RESEX do Rio Jutaí
-3.2886	-67.3242	<i>Aotus nigriceps</i>	JT040	RESEX do Rio Jutaí
-3.2886	-67.3242	<i>Aotus nigriceps</i>	JT048	RESEX do Rio Jutaí
-3.8336	-67.4275	<i>Ateles chamek</i>	JT076	RESEX do Rio Jutaí
-3.8333	-67.4275	<i>Ateles chamek</i>	JT077	RESEX do Rio Jutaí
-3.2994	-67.3739	<i>Cacajao calvus calvus</i>	JT003	RESEX do Rio Jutaí
-3.3128	-67.3944	<i>Cacajao calvus calvus</i>	JT022	RESEX do Rio Jutaí
-3.0561	-67.1506	<i>Cacajao calvus calvus</i>	JT082	RESEX do Rio Jutaí
-3.2981	-67.1369	<i>Cacajao calvus calvus</i>	JT085	RESEX do Rio Jutaí
-3.7917	-67.4583	<i>Cacajao calvus calvus</i>	JT088	RESEX do Rio Jutaí
-3.7711	-67.4500	<i>Cacajao calvus calvus</i>	JT090	RESEX do Rio Jutaí

-3.7906	-67.4697	<i>Plecturocebus cupreus</i>	JT074	RESEX do Rio Jutáí
-3.7906	-67.4694	<i>Plecturocebus cupreus</i>	JT075	RESEX do Rio Jutáí
-3.2797	-67.3158	<i>Cheracebus regulus</i>	JT051	RESEX do Rio Jutáí
-3.2886	-67.3244	<i>Cheracebus regulus</i>	JT053	RESEX do Rio Jutáí
-3.2886	-67.3244	<i>Cheracebus regulus</i>	JT054	RESEX do Rio Jutáí
-3.2814	-67.3181	<i>Cheracebus regulus</i>	JT071	RESEX do Rio Jutáí
-3.2178	-67.3342	<i>Cebuella niveiventris</i>	JT056	RESEX do Rio Jutáí
-3.2178	-67.3342	<i>Cebuella niveiventris</i>	JT057	RESEX do Rio Jutáí
-3.7356	-67.4692	<i>Cebuella niveiventris</i>	JT095	RESEX do Rio Jutáí
-3.2178	-67.3342	<i>Cebuella niveiventris</i>	JT032	RESEX do Rio Jutáí
-3.2172	-67.3350	<i>Cebus unicolor</i>	JT031	RESEX do Rio Jutáí
-3.2989	-67.3719	<i>Lagothrix lagothricha poeppigii</i>	JT015	RESEX do Rio Jutáí
-3.3000	-67.3722	<i>Lagothrix lagothricha poeppigii</i>	JT016	RESEX do Rio Jutáí
-3.2533	-67.3144	<i>Pithecia cazuzai</i>	JT050	RESEX do Rio Jutáí
-3.7947	-67.4556	<i>Pithecia cazuzai</i>	JT086	RESEX do Rio Jutáí
-3.7944	-67.4556	<i>Pithecia cazuzai</i>	JT087	RESEX do Rio Jutáí
-3.7728	-67.4722	<i>Pithecia cazuzai</i>	JT091	RESEX do Rio Jutáí
-3.2700	-67.3244	<i>Saguinus mystax mystax</i>	JT021	RESEX do Rio Jutáí
-3.2667	-67.3239	<i>Saguinus mystax mystax</i>	JT027	RESEX do Rio Jutáí
-3.1833	-67.1319	<i>Saguinus mystax mystax</i>	JT084	RESEX do Rio Jutáí
-3.7200	-67.4450	<i>Saguinus mystax mystax</i>	JT094	RESEX do Rio Jutáí
-3.2844	-67.3192	<i>Saimiri cassiquiarensis macrodon</i>	JT030	RESEX do Rio Jutáí
-3.2764	-67.3339	<i>Saimiri cassiquiarensis macrodon</i>	JT059	RESEX do Rio Jutáí
-3.2842	-67.3194	<i>Sapajus macrocephalus</i>	JT024	RESEX do Rio Jutáí
-3.3136	-67.3933	<i>Sapajus macrocephalus</i>	JT026	RESEX do Rio Jutáí
-3.2844	-67.3194	<i>Sapajus macrocephalus</i>	JT028	RESEX do Rio Jutáí

Table 2 – Primates recorded in three protected areas of the middle Solimões basin, the forest types where each taxon was recorded (Terra Firme – TF, Flooded Forest – FF), and their global (IUCN, 2017) and Brazilian national (Brazil, MMA, ICMBio 2014) conservation status. (NA = not assessed). Hyphens means that the taxon was not recorded in that PA.

Primates	ESEC	RESEX	RESEX	IUCN	National
	Jutaí-Solimões	Rio Jutaí	Auatí-Paraná	Category	List
<i>Cebuella niveiventris</i>	FF	FF	-	LC	LC
<i>Leontocebus fuscicollis fuscicollis</i>	TF	-	-	LC	LC
<i>Leontocebus fuscus</i>	-	-	TF	LC	LC
<i>Saguinus labiatus thomasi</i>	-	-	TF	LC	LC
<i>Saguinus mystax mystax</i>	TF	TF	-	LC	LC
<i>Saimiri cassiquiarensis macrodon</i>	TF, FF	FF FF	LC	LC	LC
<i>Sapajus macrocephalus</i>	TF	FF	TF, FF	LC	LC
<i>Cebus unicolor</i>	TF	FF	-	LC	LC
<i>Cebus albifrons</i>	-	-	-	LC	LC
<i>Aotus nigriceps</i>	-	FF	-	LC	LC
<i>Cheracebus regulus</i>	-	TF	-	LC	LC
<i>Cheracebus lucifer</i>	-	-	TF	LC	LC
<i>Plecturocebus cupreus</i>	TF	FF	-	LC	LC
<i>Pithecia cazuzai</i>	-	TF, FF	-	NA	NA
<i>Pithecia hirsuta</i>	-	-	TF, FF	NA	NA
<i>Pithecia inusta</i>	FF	-	-	NA	NA
<i>Cacajao calvus calvus</i>	-	FF	-	VU	VU
<i>Cacajao calvus rubicundus</i>	FF	-	-	VU	VU
<i>Alouatta juara</i>	FF	FF	TF, FF	NA	LC
<i>Ateles chamek</i>	TF	TF	-	EN	VU
<i>Lagothrix lagothricha lagothricha</i>	-	-	TF, FF	VU	VU
<i>Lagothrix lagothricha poeppigii</i>	-	TF	-	VU	VU

The eastern pygmy marmoset *Cebuella pygmaea niveiventris* Lönnberg, 1940, was recorded in the two reserves on the Jutaí River. The Western pygmy marmoset *C. p. pygmaea* (Spix 1823) occurs north of the Solimões to the Japurá River and may occur in the RESEX Auatí-Paraná, but we were unable to confirm this. The red-chested moustached tamarin (*Saguinus labiatus thomasi*) and Lesson's saddle-back tamarin (*Leontocebus fuscus*) were recorded in the Auatí-Paraná Extractive Reserve. This is the first confirmation of the occurrence of *L. fuscus* on the left bank of the Tonantins River – a tributary of the north bank of the Solimões. The Auatí-Paraná channel is the eastern limit for *S. l. thomasi* (as indicated by Silva-Júnior 1988) and possibly for *L. fuscus*. Although within the ranges already known (Herskovitz 1977, Rylands *et al.* 1993), we were able to confirm the presence of *Leontocebus fuscicollis fuscicollis* in the ESEC Rio Jutaí, and of *Saguinus mystax mystax* in both of the Jutaí River reserves south of the Solimões for the first time.

There are two subspecies of Humboldt's squirrel monkey *Saimiri cassiquiarensis* (Lesson 1840) in the central Amazon, the nominate subspecies and the Ecuadorian squirrel monkey *S. c. macrodon* Elliot, 1907 (Lynch Alfaro *et al.* 2015). *Saimiri c. cassiquiarensis* occurs to the north

of the Japurá River (Hershkovitz 1984, Lynch Alfaro *et al.* 2015), except for a small area in the Mamirauá Reserve near its mouth, while the Ecuadorian squirrel monkey *S. c. macrodon* Elliot, 1907, occurs to the south of the Japurá-Solimões, (Paim *et al.* 2013). We recorded *S. c. macrodon* in the RESEX Auatí-Paraná, in the ESEC Jutai-Solimões and in the RESEX Rio Jutai.

The taxonomy and distributions of the Amazonian gracile white-fronted capuchin monkeys (*Cebus*) are still poorly known. Our understanding today is based on Hershkovitz (1949) and Hill (1960). Ruiz-García *et al.* (2010) and Boubli *et al.* (2012) carried out molecular phylogenetic analyses that helped considerably in clarifying the taxonomy of the genus, but only a very few specimens were available for the four Amazonian taxa identified by Hershkovitz (1949). We follow Hershkovitz's (1949) suggestion, as did Boubli *et al.* (2012), that Humboldt's white fronted capuchin *Cebus albifrons* (Humboldt 1812) is the form north of the Solimões, and therefore the form in the RESEX Auatí-Paraná, and Spix's white-fronted capuchin *Cebus unicolor* Spix, 1823 (type locality: Rio Tefé, near its junction with the Amazon) as the form south of the Solimões, and therefore that of the two Jutai reserves. While we recorded *Cebus unicolor* in both Jutai PAs, we could not confirm the occurrence of *Cebus albifrons* at RESEX Auatí-Paraná.

We recorded night monkeys in the RESEX Rio Jutai. The Jutai River is the western limit of the range of the black-headed night monkey *Aotus nigriceps* Dollman, 1909 (Cornejo & Palacios 2008a), and Ma's night monkey *Aotus nancymae* Hershkovitz, 1983 is expected to occur on the left bank (Cornejo & Palacios 2008b). Unfortunately, we were unable to confirm the latter species in the ESEC Jutai-Solimões.

Byrne *et al.* (2016) proposed a new genus-level taxonomy for the titi monkeys: the *torquatus* group of Hershkovitz (1990) was ascribed to *Cheracebus* n. gen. and the *modestus*, *donacophilus* and *moloch* groups of Hershkovitz (1990) to *Plecturocebus* n. gen. Following this arrangement, we confirmed these two genera in the RESEX Rio Jutai: the Juruá collared titi (*Cheracebus regulus*) and the coppery titi (*Plecturocebus cupreus*). The latter was also recorded in the ESEC Jutai-Solimões. The yellow-handed titi (*Cheracebus lucifer*) was recorded in the RESEX Auatí-Paraná.

South of the Solimões, the Jutai River clearly separates the ranges of two species of sakis (*Pithecia*), two subspecies of uakaris (*Cacajao*), and two species of night monkeys (*Aotus*). The records of the three saki monkeys were important regarding some gaps in our understanding of their ranges. We recorded the recently described Cazuza's saki *Pithecia cazuzai* Marsh, 2014, in the RESEX Rio Jutai, on the right bank of Jutai River. The description of this species included only a few specimens, and only three known localities, two of them from the north bank of the Solimões River – Paraná da Volta (Barroso Community), Uarini (type locality) and the Mamirauá reserve—and one from Fonte Boa, just upstream of the mouth of the Juruá River on the south bank of the Solimões. Our records represent an important range extension of Cazuza's saki to the east bank of the Rio Jutai River. The species recorded in the RESEX Auatí-Paraná was the hairy saki *Pithecia hirsuta* (Spix 1823), extending its known range east between the Solimões and Japurá to the Auatí-Paraná (*P. cazuzai* occurs east of the Auatí-Paraná). We recorded the burnished saki *Pithecia inusta* (Spix 1823) in the ESEC Jutai-Solimões, left bank of Jutai River, which extends its known range way north. It is otherwise known from the middle and upper Ucayali basin and upper and middle Juruá (Marsh 2014). Although we obtained no records of this species in the RESEX Rio Jutai, the southwestern portion of the reserve encompasses the left bank of Jutai River, and there is no reason not to assume the presence of *P. inusta* there as well. The identification of these sakis was based on voucher specimens in the Mamirauá Institute collection (L. K. Marsh, pers. comm.).

The bald-headed uakaris (*Cacajao calvus* ssp.) were recorded on both banks of Jutai River. We confirmed the occurrence of the white bald-headed uakari *Cacajao calvus calvus* (I. Geoffroy Saint-Hilaire, 1847) in the RESEX Rio Jutai. Cardoso *et al.* (2014) first recorded this subspecies on the right bank of Jutai River. In the ESEC Jutai-Solimões, we recorded the red bald-headed uakari *Cacajao calvus rubicundus* (I. Geoffroy Saint-Hilaire & Deville 1848). The only previous record of this subspecies on the left bank of Jutai River was a photograph in Nogueira-Neto (1992). We did



not record bald-headed uakaris in the RESEX Auatí-Paraná, although both subspecies have been recorded along the Auatí-Paraná channel (Cardoso *et al.* 2014, Vieira *et al.* 2008). Interestingly, the ranges of *P. cazuzai* and *C. c. calvus* are similar in extending across the Solimões to the Auatí-Paraná, while otherwise occurring south of the Solimões, west of the Juruá.

Rabelo *et al.* (2014) documented the occurrence of the black spider *Ateles chamek* (Humboldt 1812) in the várzea of the Mamirauá State Sustainable Development Reserve, the only locality for this species north of the Solimões, it is otherwise wide-ranging south of the Solimões, west from the Tapajós River, and was recorded in the RESEX Rio Jutai and the ESEC Jutai-Solimões. We found no evidence for its occurrence in the RESEX Auatí-Paraná, which, with the lower Japurá River, probably marks the northern limit of its range on the northern side of the Solimões. Poepig's Woolly Monkey *Lagothrix lagothricha poeppigii* Schinz, 1844, and Humboldt's Woolly Monkey *L. l. lagothricha* (Humboldt 1812) occur to the south and the north of the Solimões River, respectively. We recorded the former in the RESEX Rio Jutai, and the latter north of the river in the RESEX Auatí-Paraná. Rabelo *et al.* (2014) recorded *Ateles chamek* but not *Lagothrix* on the south bank of Auatí-Paraná. Both atelids occur in lowland primary terra firma forest, but occasionally use other forest types (Haugaasen & Peres 2005, Peres 1997, Rabelo *et al.* 2014). The Auatí-Paraná is evidently the eastern limit of the range of *Lagothrix l. lagothricha* in the Japurá-Solimões interfluvium.

Conclusions

In summary, our records extend the range of three taxa: *Leontocebus fuscus*, *Pithecia cazuzai*, and *Pithecia hirsuta*. Although there are very few records of *Pithecia cazuzai*, it evidently extends between the Juruá and Jutai rivers. Our records of *Pithecia hirsuta* and *Leontocebus* extend their known ranges to the Auatí-Paraná. The ESEC Jutai-Solimões and RESEX Rio Jutai have 11 and 13 confirmed primate taxa, respectively. The RESEX Auatí-Paraná has seven confirmed primate taxa. These are the first species lists for primates for the ecological station and extractive reserve of the Jutai River. For the RESEX Auatí-Paraná, the primates' species list contribute to further review of the management plan since the current version presents some taxa either misidentified or mentioned only at a generic level (Brasil 2011b).

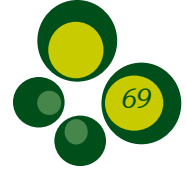
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References

- Araújo, A.S. & Costa-Campos, C.E. 2014. Anurans of the Reserva Biológica do Parazinho, municipality of Macapá, state of Amapá, eastern Amazon. **Check List**, 10(6): 1414-1419.
- Barber, C.P.; Cochrane, M.A.; Souza Jr., C. & Veríssimo, A. 2012. Dynamic performance assessment of protected areas. **Biological Conservation**, 149(1): 6-14.
- Boubli, J.P.; Rylands, A.B.; Farias, I.; Alfaro, M. & Lynch Alfaro, J. 2012. *Cebus* phylogenetic relationships: a preliminary reassessment of the diversity of the untufted capuchin monkeys. **American Journal of Primatology**, 74: 381-393.

- Brasil, 1983. Decreto nº 88.541, de 21 de julho de 1983. Cria a Reserva Ecológica de Jutai-Solimões, em área de terra que indica e dá outras providências. **Diário Oficial da União**. < <http://www.icmbio.gov.br/portal/images/stories/imgs-unidades-coservacao/esecc-jutai-solimoes.pdf>>. (Acesso em 07/10/2017).
- Brasil, 2001. Decreto de 07 de agosto de 2001. Cria a Reserva Extrativista Auatí-Paraná, no Município de Fonte Boa, Estado do Amazonas, e dá outras providências. **Diário Oficial da União**. < http://www.planalto.gov.br/ccivil_03/DNN/2001/Dnn9288.htm>. (Acesso em 07/10/2017).
- Brasil, 2002. Decreto de 16 de julho de 2002. Cria a Reserva Extrativista do Rio Jutai, no Município de Jutai, Estado do Amazonas, e dá outras providências. **Diário Oficial da União**. < http://www.planalto.gov.br/ccivil_03/DNN/2002/Dnn9610.htm> (Acesso em 03/10/2017).
- Brasil, 2011a. **Plano de Manejo da Reserva Extrativista do Rio Jutai**. Ministério do Meio Ambiente (MMA), Brasília. 235p.
- Brasil, 2011b. **Plano de Manejo Participativo da Reserva Extrativista Auatí-Paraná**. Ministério do Meio Ambiente (MMA), Brasília. 356p.
- Brasil, 2014. Portaria nº 444, de 17 de dezembro de 2014. **Diário Oficial da União**, Seção 1, 245, 18/12/2014: 121.
- Byrne, H.; Rylands, A.B.; Carneiro, J.C.; Lynch Alfaro, J.W.; Bertuol, F.; da Silva, M.N.F.; Messias, M.; Groves, C.P.; Mittermeier, R.A.; Farias, I.P.; Hrbek, T.; Schneider, H.; Sampaio, I. & Boubli, J.P. 2016. Phylogenetic relationships of the New World titi monkeys (*Callicebus*): first appraisal of taxonomy based on molecular evidence. **Frontiers in Zoology**, 13: 10.
- Cardoso, N. de A.; Valsecchi, J.; Vieira, T & Queiroz, H.L. 2014. New records and range expansion of the white bald uakari (*Cacajao calvus calvus*, I. Geoffroy, 1847) in Central Brazilian Amazonia. **Primates**, 55(2): 199-206.
- Charity, S.; Dudley, N.; Oliveira, D. & Stolton, S. 2016. **Living Amazon report 2016: a regional approach to conservation in the Amazon**. WWF Living Amazon Initiative. 113p.
- Cornejo, F. & Palacios, E. 2008a. *Aotus nigriceps*. **The IUCN Red List of Threatened Species**. < <http://www.iucnredlist.org/details/41542/0>>. (Accessed in 23/09/2016).
- Cornejo, F. & Palacios, E. 2008b. *Aotus nancymae*. **The IUCN Red List of Threatened Species**. < <http://www.iucnredlist.org/details/41540/0>>. (Acesso em 23/09/2016).
- Dalponete, J.C.; Silva, F.E. & Silva-Júnior, J. de S. 2014. New species of titi monkey, genus *Callicebus* Thomas, 1903 (Primates, Pitheciidae), from Southern Amazonia, Brazil. **Papéis Avulsos de Zoologia**, 54(32): 457-472.
- Dalponete, J.C.; Gregorin, R.; Esteves-Costa, V.A.; Rocha, E.C. & Marcelino, R. 2016. Bat survey of the lower Juruena River and five new records for the state of Mato Grosso, Brazil. **Acta Amazonica**, 46(2): 227-232.
- Defler, T. R. 2014. Colombian *Lagothrix*: analysis of their phenotype and taxonomy, pp. 33-58. In: Defler, T.R.; Stevenson, P.R. (orgs.). **The woolly monkey: behavior, ecology, systematics, and captive research**. Springer. 314p.
- Fonseca, G.A.B. 2001. Proposta para um programa de avaliação rápida em âmbito nacional, p. 150-156. In: I. Garay & B. Dias (orgs.). **Conservação da Biodiversidade em Ecossistemas Tropicais**. Editora Vozes. 430p.
- Haugaasen, T. & Peres, C.A. 2005. Mammal assemblage structure in Amazonian flooded and unflooded forests. **Journal of Tropical Ecology**, 21(2): 133-145.
- Hershkovitz, P. 1949. Mammals of northern Colombia. Preliminary report nº 4: Monkeys (Primates) with taxonomic revisions of some forms. **Proceedings of the U.S. National Museum**, 98: 323-427.
- Hershkovitz, P. 1977. **Living New World Monkeys (Platyrrhini) with an introduction to primates**. Vol. 1, The Chicago University Press. 1132p.
- Hershkovitz, P. 1983. Two new species of night monkeys, genus *Aotus* (Cebidae, Platyrrhini): A preliminary report on *Aotus* taxonomy. **American Journal of Primatology**, 4: 209-243.



- Hershkovitz, P. 1984. Taxonomy of squirrel monkeys, genus *Saimiri* (Cebidae, Platyrrhini): A preliminary report with description of a hitherto unnamed form. **American Journal of Primatology**, 6: 155-210.
- Hershkovitz, P. 1990. Titis, New World monkeys of the genus *Callicebus* (Cebidae, Platyrrhini): a preliminary taxonomic review. **Fieldiana Zoology, New Series**, 55: 1-109.
- Hill, W.C.O. 1960. **Primates comparative anatomy and taxonomy IV. Cebidae Part A**. Edinburgh University Press. 537p.
- ICMBio (Instituto Chico Mendes de Conservação da Biodiversidade). Espécies e subespécies de Primatas Brasileiros. **Instituto Chico Mendes de Conservação da Biodiversidade**. < <http://www.icmbio.gov.br/cpb> > (Acesso em 10/10/2017).
- IUCN (International Union for Conservation of Nature). The IUCN Red List of Threatened Species. Version 2017-1. URL. **International Union for Conservation of Nature**. <<http://www.iucnredlist.org/>> .
- Lees, A.C.; Naka, L.N.; Aleixo, A.; Cohn-Haft, M.; Piacentini, V. de Q.; Santos, M.P.D. & Silveira, L.F. 2014. Conducting rigorous avian inventories: Amazonian case studies and a roadmap for improvement. **Revista Brasileira de Ornitologia**, 22(2): 107-120.
- Lynch Alfaro, J.W.; Boubli, J.P.; Paim, F.P.; Ribas, C.C.; Silva, M.N.F. da; Messias, M.R.; Röhe, F.; Mercês, M.P.; Silva Júnior, J.S.; Silva, C.R.; Pinho, G.M.; Koshkarian, G.; Nguyen, M.T.T.; Harada, M.L.; Rabelo, R.M.; Queiroz, H.L.; Alfaro, M.E. & Farias, I.P. 2015. Biogeography of squirrel monkeys (genus *Saimiri*): South-central Amazon origin and rapid pan-Amazonian diversification of a lowland primate. **Molecular Phylogenetics and Evolution**, 82: 436-454. Available at: <http://dx.doi.org/10.1016/j.ympev.2014.09.004>.
- Mace, G.M. 2004. The role of taxonomy in species conservation. **Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences**, 359: 711-719.
- Marsh, L.K. 2014. A taxonomic revision of the saki monkeys, *Pithecia* Desmarest, 1804. **Neotropical Primates**, 21(1): 1-163.
- Nelson, A. & Chomitz, K.M. 2011. Effectiveness of strict vs. multiple use protected areas in reducing tropical forest fires: A global analysis using matching methods. **PLoS ONE**, 6(8): 1-14.
- Nogueira-Neto, P. 1992. **Ecological Stations: A saga of ecology and environmental policy**. Empresa das Artes. 103p.
- Nolte, C.; Agrawal, A.; Silvius, K.M. & Soares-Filho, B.S. 2013. Governance regime and location influence avoided deforestation success of protected areas in the Brazilian Amazon. **Proceedings of the National Academy of Sciences**, 110(13): 4956-4961.
- Paim, F.P.; Silva-Júnior, J.S.; Valsecchi, J.; Harada, M.L. & Queiroz, H.L. de. 2013. Diversity, geographic distribution and conservation of squirrel monkeys, *Saimiri* (Primates, Cebidae), in the floodplain forests of Central Amazon. **International Journal of Primatology**, 34: 1055-1076.
- Peres, C.A. 1997. Primate community structure at twenty western Amazonian flooded and unflooded forests. **Journal of Tropical Ecology**, 13: 381-405.
- Pinto, M.P.; Silva-Júnior, J.S.; Lima, A.A. & Grelle, C.E.V. 2014. Multi-scales analysis of primate diversity and protected areas at a megadiverse region. **PLoS ONE**, 9(8): e105205.
- Rabelo, R.M.; Silva, F.E.; Vieira, T.; Ferreira-Ferreira, J.; Paim, F.P.; Dutra, W.; de Souza e Silva Júnior, J. & Valsecchi, J. 2014. Extension of the geographic range of *Ateles chamek* (Primates, Atelidae): Evidence of river-barrier crossing by an amazonian primate. **Primates**, 55(2): 167-171.
- Röhe, F. 2007. Mamíferos de médio e grande porte, pp. 195-209. In: Rapp Py-Daniel, L.; Deus, C.P.; Henriques, A.L.; Pimpão, D.M. & Ribeiro, O.M. (orgs.) **Biodiversidade do Médio Madeira: Bases Científicas para Propostas de Conservação**. Instituto Nacional de Pesquisas da Amazônia (INPA). 244p.
- Ruiz-García, M.; Castillo, M.I.; Vásquez, C.; Rodríguez, K., Pimedo, M.; Shostell, J. & Leguizamon, N. 2010. Molecular phylogenetics and phylogeography of the whit-fronted capuchin (*Cebus albifrons*: Cebidae, Primates) by means of mtCOII gene sequences. **Molecular Phylogenetics and Evolution**, 57: 1049-1061.

- Rylands, A.B.; Coimbra-Filho, A.F. & Mittermeier, R.A. 1993. Systematics, distributions and some notes on the conservation status of the Callitrichidae, p.11-77. In: Rylands, A.B. (org.), **Marmosets and Tamarins: Systematics, Behaviour, and Ecology**. Oxford University Press. 396p.
- Rylands, A.B.; Schneider, H.; Langguth, A.; Mittermeier, R.A.; Groves, C.P. & Rodríguez-Luna, E. 2000. An assessment of the diversity of New World primates. **Neotropical Primates**, 8(2): 61-93.
- Rylands, A.B. & Brandon, K. 2005. Brazilian Protected Areas. **Conservation Biology**, 19(3): 612-618. Also published in Portuguese. Unidades de conservação brasileiras, **Megadiversidade**, 1(1):27-35, 2005.
- Rylands, A.B.; Mittermeier, R.A. & Silva Júnior, J.S. 2012. Neotropical primates: Taxonomy and recently described species and subspecies. **International Zoo Yearbook**, 46(1): 11-24.
- Rylands, A.B. & Mittermeier, R.A. 2014. Primate taxonomy: Species and conservation. **Evolutionary Anthropology**, 23(1): 8-10.
- Rylands, A.B.; Heymann, E.W.; Lynch Alfaro, J.W.; Buckner, J.; Roos, C.; Matauschek, C.; Boubli, J.-P.; Sampaio, R. & Mittermeier, R.A. 2016. Taxonomic review of the New World tamarins (Callitrichidae, Primates). **Zoological Journal of the Linnean Society**, 177: 1003-1028.
- Scarano, F.; Guimarães, A. & da Silva, J.M. 2012. Rio + 20: Lead by Example. **Nature**, 486: 25-26.
- Schwartzman, S. & Zimmerman, B. 2005. Conservation alliances with indigenous peoples of the Amazon. **Conservation Biology**, 19(3): 721-727. Also published in Portuguese. Alianças de conservação com povos indígenas da Amazônia. **Megadiversidade**, 1(1):165-173, 2005.
- Sikes, R.S.; the Animal Care & Use Committee of the American Society of Mammalogists. 2016. Guidelines of the American Society of Mammalogists for the use of wild mammals in research and education. **Journal of Mammalogy**, 97(3): 663-688.
- Silva-Júnior, J. de S. 1988. A range extension for *Saguinus labiatus thomasi*. **Primate Conservation**, (9): 23-24.
- Vieira, T.; Oliveira, M.; Queiroz, H. & Valsecchi, J. 2008. Novas informações sobre a distribuição de *Cacajao calvus* na Reserva de Desenvolvimento Sustentável Mamirauá. **Uakari**, 4(2): 41-51.
- Young, B.; Sedaghtkish, G. & Rocha, R. 2003. Levantamentos de Fauna, p. 91-117. In: Sayre, R.; Roca, E.; Sedaghtkish; Young, B.; Roca, R. & Sheppard, S. (orgs.). **Natureza em Foco: Avaliação Ecológica Rápida**. The Nature Conservancy. 175p.

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