

## THE IGARAPÉS CASE STUDY AT TAPAJÓS NATIONAL FOREST (PARÁ – BRAZIL)

Robert Burns

Jasmine Cardozo Moreira

**RESUMO:** O objetivo deste artigo é discutir o monitoramento de visitantes em uma área protegida na região amazônica do Brasil, a Floresta Nacional do Tapajós (Pará). O estudo de caso demonstra a importância crítica do monitoramento de uso dos visitantes em parques e áreas protegidas. Em 2014, a West Virginia University (EUA), desenvolveu uma parceria com o USDA Forest Service Programs International. O acordo foi concebido para facilitar as melhores práticas em gestão do uso do visitante em determinadas áreas manejadas pelo Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio). Visitas não autorizadas e o incremento na recreação ao ar livre começaram a ocorrer depois de um programa de televisão local que mostrou igarapés da Flona Tapajós. Este artigo mostra que as decisões locais de gestão do ICMBio foram sólidas e eficazes, e com base em dados. Um problema de gestão crítica foi identificado e uma solução foi rapidamente implementada, usando dados de monitoramento visitante.

**Palavras-chave:** Floresta Nacional; Monitoramento; Uso Público; Unidade de Conservação.

**ABSTRACT:** The purpose of this paper is to discuss visitor monitoring in a park/protected area (PPA) in the Amazon region of Brazil, on the Tapajós National Forest (Pará State). A case study demonstrates the critical importance of measuring visitor use in parks and protected areas. In 2014, West Virginia University, a US based university, developed a partnership with the USDA Forest Service International Programs (USFSIP). The agreement was designed to facilitate best practices in tourism/visitor use management in selected Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) settings. Unauthorized and quickly increasing outdoor recreation began occurring after a local television program showcased the setting. Specifically, this paper shows that the local ICMBio management decisions were sound and effective, and based on data. A critical management problem was identified and a solution was quickly implemented, using data from the visitor monitoring effort.

**Keywords:** National Forest; Protected Area; Monitoring; Public Use.

### INTRODUCTION

In 2014, West Virginia University, a US based land-grant university, developed a partnership with the USDA Forest Service International Programs (USFS-IP). The agreement was designed to facilitate best practices in tourism/visitor use management in selected Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) settings in the Amazon Region of Brazil. The Tapajós

National Forest was named as a demonstration site, and the Igarape case study discussed here is located within the Tapajós National Forest.

The focus of this 5-year demonstration project is to refine research methods, survey instruments and develop partnerships for a sustained effort in the Amazon region of Brazil. Since 2014, USFS / WVU has a field team with 3 different interviewers, to collect data directly from visitors within the Tapajós National Forest. The data collection includes understanding visitor use profiles, economic expenditures, satisfaction and motivations. In addition, the interviewers conducted an additional research project at the igrapes area, on the Tapajós National Forest.

Because of visibility of some of the Tapajós National Forest recreation areas on television, including the igrapes, some areas experienced sudden increases in visitor use. This visitor use was occurring not only in designated recreation areas, but also in areas that are not designated for recreation use, such as the igrapes.

Because the areas were not prepared to receive tourists, some problems started to occur very quickly. Visitors began developing social trails and parking cars in informal parking areas that had not previously existed in order to access the igrapés. Additionally, people lit unauthorized fires for barbecues and in some cases loud music created noise pollution.

After the recognition of a problem at the igrapé site, an interviewer who was already trained and highly proficient in data collection and visitor monitoring was deployed to the site. As a result, over a period of 89 survey days (between January 6 and April 11, 2016), the interviewer observed visitor use that was occurring at the Igarapés area. The interviewer conducted observations from 10:00 to 14:00 each day, the prime time for visitation at the area.

This paper shows the results of this data collection effort, and demonstrates how visitor use data can be used to help land managers (ICMBio) make the best possible decision. Visitor monitoring is important because it is the best science available to assist ICMBio managers in making critical decisions. When a manager understands the visitors who use an area, they can also determine if the use in a given area is appropriate.

This case study demonstrates the critical importance of measuring visitor use in parks and protected areas. Specifically, this paper shows that the local ICMBio

management decisions were sound and effective. A critical management problem was identified and a solution was quickly implemented.

## **1. THE PARTNERSHIP BETWEEN THE US FOREST SERVICE, UNIVERSITIES AND ICMBIO**

This demonstration is being conducted on ICMBio units in the Amazon Region, which began in 2013 at the Tapajós National Forest, in Pará, and now takes place on multiple ICMBio units. The partnership tasks WVU researchers with conducting several demonstration projects in the Amazon region over a period of five years.

The Amazon Region study will serve as baseline visitor use monitoring data a preliminary database that will allow ICMBio resource managers and the US Forest Service IP to better understand which methodologies are most effective in what settings. Cooperators from the US Forest Service and the Universidade Estadual de Ponta Grossa (UEPG - Paraná, Brazil) shared in this effort, under the guidance of USFS-IP.

Previous research suggested the 2014 World Cup and 2016 Summer Olympics would result in a substantial influx of tourists to Brazil over the upcoming years, (LOHMANN & DREDGE, 2012; WTO, 2011). It is expected that the number of tourists visiting Brazil will double from 5.2 million in 2010 to over 10 million by 2020 (SMALE, 2011). In reality, the economic and political crises have dampened these expectations.

Nonetheless, an opportunity to expose the world to Brazil's parks and protected areas is a realistic goal. The ICMBio has identified numerous parks in close proximity to both the Olympic and World Cup sites (Parques da Copa). Focusing on these parks as demonstration sites for research planning is an effective way to maximize value for the money spent on research projects. The management planning efforts for these critical sites can be used as benchmark information for other parks as funding becomes available in the future (BURNS & MOREIRA, 2013; MOREIRA *et al.*, 2015).

With the help of the partners (USFS, WVU and UEPG), ICMBio also has begun a sustained effort to develop baseline visitor management data, and to create a systematic data collection process that is identical in all parks and protected areas. This degree of similarity between the parks would result in a strong methodology that will be more reliable (replicable across the nation's parks and protected areas) and more statistically valid.

This research/visitor management study utilizes Best Practice methods of park and protected area management and planning (BAAS & BURNS, 2016). Best Practices indicates the planning and management methods have been effective in key natural resource settings in the US, Europe and Asia, and can be replicated elsewhere. A major advantage of using the Best Practices method is that the survey questionnaires are already developed, and can be field-tested at ICMBio settings.

The numeric scales used in measuring visitors' desires/expectations, motivations, trip experience levels, and crowding/conflict levels have been used effectively to collect over 15,000 completed surveys and used in critical management decisions. Making use of existing surveys and survey instrument items results in a streamlined process where the surveys only need be modified for use in a specific park or protected area and translated into Portuguese. Best Practices also indicates that cooperators involve faculty and students from Ponta Grossa State University, as their local knowledge will be critical in developing survey instruments and sampling methods. The cooperating universities have conducted visitor monitoring studies at parks and protected areas and have been involved in recreational visitor management processes in the US, Europe, Asia, and Brazil.

Previous outdoor recreation and nature-based tourism research has clearly indicated that users to different types of recreation settings may have very different expectations, motivations, experiences, and drivers of overall trip quality (BAAS AND BURNS, 2016). The visitors at ICMBio settings in the Brazilian Amazon region (e.g., Anavilhanas National Park or Floresta Nacional do Tapajós) will most likely differ from those visitors hiking along a trail in Paraná (e.g., Parque Nacional do Iguaçu or Parque Nacional Do Superagüi). Through the visitor monitoring process, resource managers will gain valid and reliable data and data collection methodologies

including an understanding of visitor use patterns, as well as their expectations/desires, motivations, trip experience, and crowding/conflict levels.

As noted earlier, the focus of this five-year demonstration project is to refine research methods, survey instruments and develop partnerships for a sustained effort in the Amazon region of Brazil. This demonstration is taking place on a selection of ICMBio units located near in the Amazon Region, including the Tapajós National Forest, in Pará.

## **2. TAPAJOS NATIONAL FOREST AND THE IGARAPES CASE STUDY**

### **2.1 Tapajós National Forest Characteristics**

The Tapajós National Forest (FLONA Tapajós) is a Federal Protected Area, managed by Chico Mendes Biodiversity Conservation Institute – ICMBio. It is located in the western portion of Pará State, within the Amazon region, and was created in 1974. It is situated 50 km west of the city of Santarém and encompasses the municipalities of Placas, Rurópolis, Belterra and Aveiro. The name is derived from the river with which it shares a border - the Tapajós River; a tributary of the Amazon River.

There are about 100 miles of river beaches in the Protected Área, and because of this and the natural beauty, it is one of the most highly visited protected areas in the northern region of Brazil. But, because it is a National Forest, the main goals involve sustainable multiple use of forest resources and scientific research, with emphasis in methods for sustainable use of native forests.

Similar to all ICMBio Protected Areas, the Tapajós National Forest has a Management Plan that allows for recreation activities to take place in specific settings. In 1994 ecotourism was embraced and planned in the Tapajós National Forest, which developed after an assessment study regarding the touristic potential of the area (IBAMA, 2004).

There are many traditional communities within the FLONA and the three most visited are São Domingos, Maguary and Jamaraquá. These three communities were selected by the USFS / WVU team for several important reasons. First, they are

closest in proximity to the city of Santarém, they are easily accessed via road or river, and receive a great deal of tourism visitation by national and foreign visitors. Finally, the area represents a sample of the Amazonian lifestyle, with preserved forests, huge trees, igarapés streams, river, wildlife and riverine culture (Figure 01). It is possible to spend the night in the área, but facilities are simple and usually are an extension of the residents' own houses. A typical lodging may consist of a bed (or hammocks) and breakfast service. (MOREIRA & BURNS, (forthcoming)).

**FIGURE 01: One of the river beaches at the Tapajós River, inside the Tapajós National Forest**



Some of the attractions at the area include the beautiful beach *Ponta do Maguary*, a Sumauma tree trail (a nine-kilometer hike in which visitors have access to one of the largest and oldest trees in the region), handcrafts made with seeds, latex, biojewelry and vine, and canoe trips through the igarapé streams.

## 2.2 Igarapés Case Study

Late in 2015, Brazilian national news outlets broadcasted segments featuring the Tapajós National Forest, and in particular the community of Jamaraguá. As a



result of these broadcasts, visitation to the community of Jamaraquá increased quickly. Visitors soon discovered the natural features surrounding the community, particularly the igarapés streams. ICMBio management suggested the popularity of the igarapés increased dramatically as a result of discussions about the area on social media outlets and blog posts. According to the ICMBio, the combined news and social media attention has caused an unforeseen spike in visitor use at both the igarapés and Jamaraquá.

The igarapés include two different bodies of water south of Jamaraquá:

- a) The Bridge, leading to the communities beyond Jamaragua;
- b) Terra Preta.

Both of these locations are accessible by ground vehicles but lack appropriate parking facilities.

Terra Preta is the closest entrance point to the igarapés. Located only one kilometer south of the community area of Jamaraquá, Terra Preta is accessible by both land and water. There are unconfirmed reports that this particular site became popular last year due to poor beach conditions in Jamaraquá. As a result, people began exploring inland water sources for recreation purposes.

**FIGURE 02: The Bridge Igarapé, ICMBio staff and visitors recreating**



The bridge is a wooden structure along a municipal road that suffered extreme damage during the rainy season of 2014. The maintenance and repair of this bridge is the responsibility of the municipality of Belterra, even though it lies inside federally protected lands of the Tapajós National Forest. The bridge is located approximately 1.2 kilometers south of the community area of Jamaraquá. It is very common for people to visit and recreate at this location due to the shade that the bridge offers (FIGURE 02).

By December 2015, complications from the sudden dramatic influx of visitors began to emerge. Concerns about crowding, environmental impacts and park management strategies have been voiced by both community members and ICMBio managers.

Visitors began developing social trails and informal parking lots that had not previously existed in order to access the igarapés. Additionally, people lit unauthorized fires for barbecues and in some cases loud music created noise pollution. Furthermore, visitors started to notice an increase in water turbidity due to the constant human disturbance of the sandy creek bed. All of these actions are a direct infringement of forest rules and regulations. The issues were evident at both recreation sites and were expressed publicly via social media postings and local news blogs.

As noted previously, the new and dynamic recreation use that was occurring resulted in WVU researchers being asked to assist in understanding visitor use in the area.

### **3. RESULTS**

On December 13, 2015, ICMBio began a campaign to educate the public and raise awareness of forest rules. This education and awareness campaign was directed specifically at visitors using the igarapés. Following a meeting with ICMBio personnel on December 30, 2015, an interviewer began collecting visitor and vehicle counts at both igarapé sites. This interviewer is a resident of FLONA Tapajos and has been collected data since 2014.



The methodology being utilized for this visitor and vehicle count is a roaming survey conducted hourly between 10:00 – 14:00 PM at each site. This timeframe was determined by WVU and ICMBio as the peak time for visitor use in the area. Visitor and vehicle counts began on January 6, 2016 and the data presented were collected until April 11, 2016. The data collection will continue until further notice. No interviews were conducted in addition to the observations. The observations included how many visitors, cars and motorcycles at both áreas (Terra Preta and Bridge Site).

On January 8, 2016, the FLONA Tapajós manager issued an adjusted list of rules and regulations that was released to the public via social media. Among these rules was the requirement that all vehicles must park at the Jaramaquá community area and walk to the creek access. ICMBio has requested that WVU interviewers provide visitors with information on Forest policies at each site.

On January 15th 2016, ICMBio closed the bridge site to all vehicle traffic (both visitors and residents) due to rising concerns of its structural integrity.

**FIGURE 3: Visitor Numbers at Terra Preta and Bridge Access between January 6 and April 11, 2016**

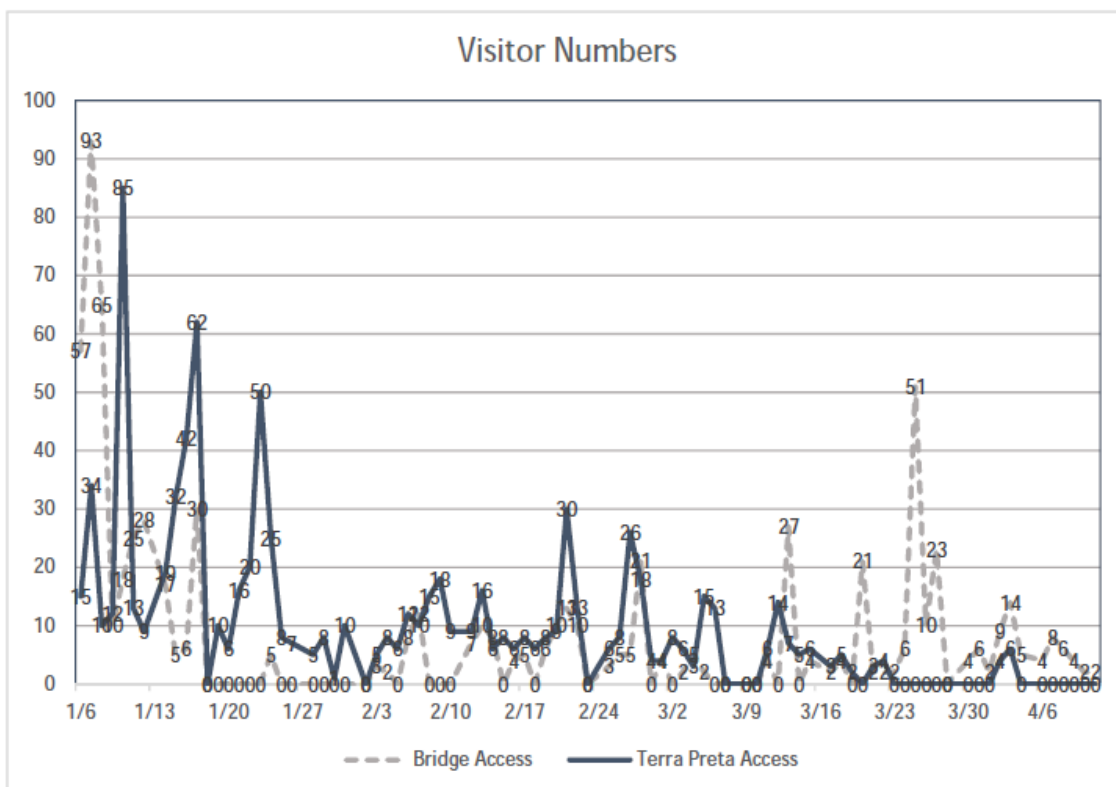
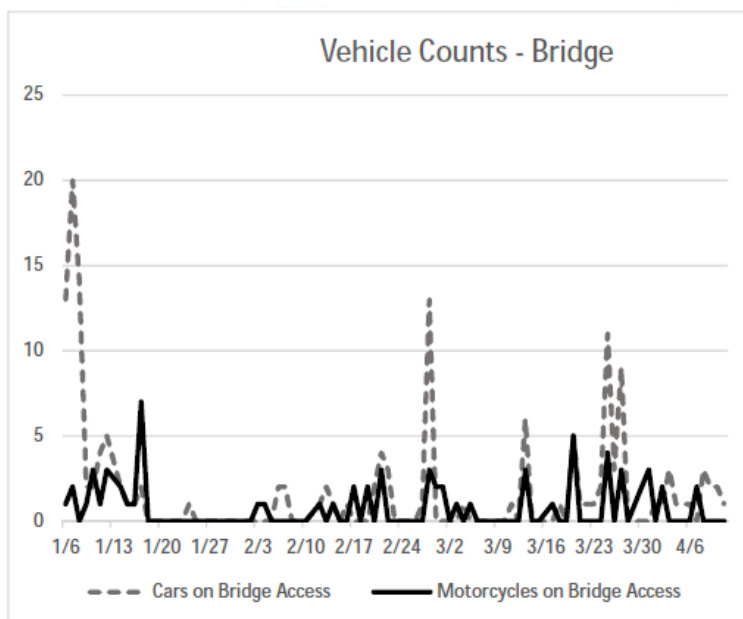


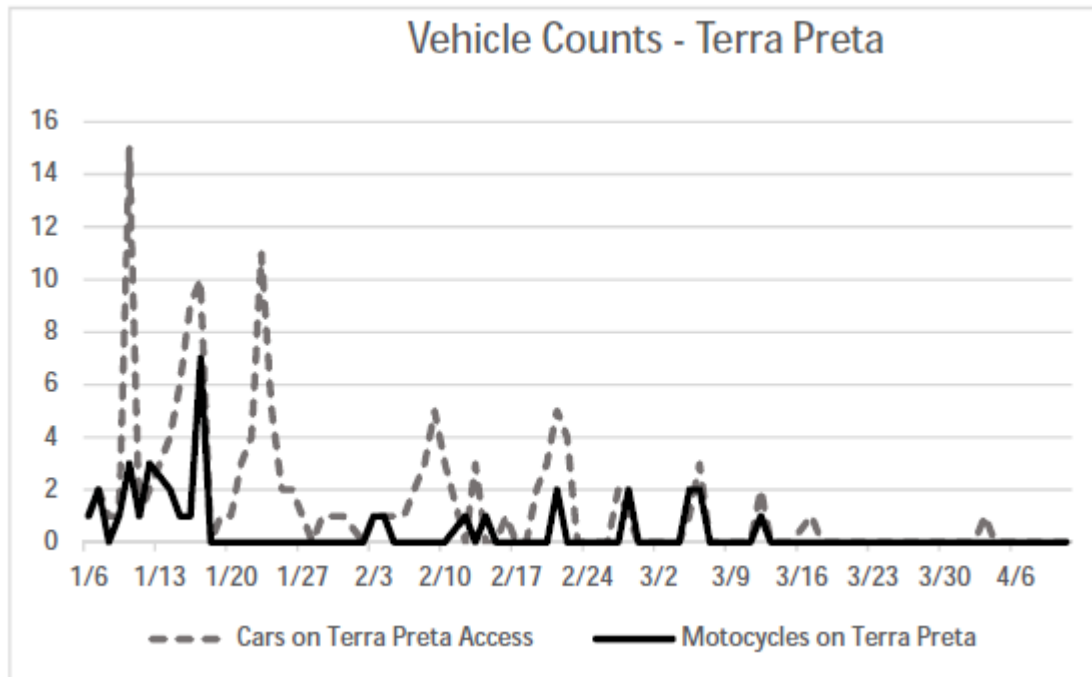
Figure 3 shows an immediate sharp decline in visitation at the bridge site after new parking restrictions were enacted on January 8, 2016, at both sites. Visitation at Terra Preta has remained relatively constant. This may be due to the shorter walking distance required to reach Terra Preta (1 km) from Jaramaquá, as well the condition of the access road and paths. The bridge is a farther distance (1.2 km) from Jaramaquá and also requires walking up a considerable incline upon return. It should also be noted that visitation at the bridge dropped again after the ICMBio closure enacted on January 15, 2016. After a lull in visitor numbers at the end of January, there was an increase in visitors at both locations from February 5-9, during the Carnival holiday.

**FIGURE 4: Vehicle Counts at Bridge Site**



Figures 4 and 5 reinforce the previous assessment and allow researchers to track the number of vehicles at the Terra Preta and on the Bridge sites. Cars are the preferred method of transportation to the bridge site. Again, the graph shows a precipitous drop immediately after the recreation ban. In contrast to the bridge site, car usage at Terra Preta increased after the January 8, 2016, parking restrictions. There was also another slight spike in vehicle use during the Carnival holiday from February 5-9, 2016.

**FIGURE 5: Vehicle Counts at Terra Preta**



Accordingly, the analysis of the data shows:

- Bridge Access Point (BAP): Prior to the management decree banning vehicles from parking at the bridge site, an average of 32.1 people were visiting the BAP between 1300-1600 hours on a daily basis. The average dropped to 11.4 persons after the ban.
- After the recreation ban in the area, use dropped to just a few visitors per day at the BAP, with the exception of a few large groups visiting during the Carnival period.
- Terra Preta Access Point: The average at the Terra Preta area was 50.2 people per survey period, and dropped to 11.4 persons after the vehicle ban.
- However, the Terra Preta area saw a steady flow of visitors upon the vehicle ban at the Bridge Access Point.
- This purposeful management action successfully changed the use pattern to protect the environmentally sensitive stream.
- The use of cars dropped significantly, as did motorcycle use, following the recreation ban at the *igarapés* bridge location.

- At Terra Preta, there was continued weekend use by visitors in cars through January 24th, and then an overall drop-off of use. Motorcycle use as well dropped to virtually nothing after January 17th.
- Overall use at the two sites trended downward after January 17th. The average number of vehicles counted, at both sites combined) dropped from 15 to 3.

#### 4. CONCLUSIONS

The fast moving social media of 2015/6 resulted in an immediate impact on a specific área at Tapajós National Forest, in Pará. The use of proactive management by local ICMBio resource managers, combined with a systematic visitor monitoring effort, resulted in a change in the social setting.

This case study demonstrates the critical importance of measuring visitor use in parks and protected areas. Specifically, this paper shows that the local ICMBio management decisions were sound and effective. A critical management problem was identified and a solution was quickly implemented. The solution was successful in diverting recreationists (tourists and locals) from an environmentally sensitive, unmanaged recreation area (Bridge Access Point) to an established recreation area (Terra Preta Access).

This management change was implemented with the intent of reducing negative impacts in an environmentally sensitive setting within a protected area. Previous research suggests that making such preemptive management actions helps to build community and therefore has the likelihood of building capacity within the community.

Continued systematic monitoring should continue within the Community Corridor, and existing WVU staff can react as necessary to assist management if this issue should occur in other areas. This case study emphasizes the need for visitor monitoring, and the importance that short-term monitoring can play in daily management. Frequently managers do not make use of short-term monitoring data, and do not take advantage of “real-time” data in decisionmaking. In this case study, the resource managers were progressively using visitor monitoring data as the best science available to make decisions.

Finally, it should be noted that resource managers can only take advantage of short-term data when it is available—and such data is typically only available when a *long-term* visitor monitoring effort is in place. With scarce financial and personnel resources, resource managers often struggle to develop and implement a long-term visitor monitoring effort. This case study provides one example of why managers should invest in visitor monitoring.

## REFERÊNCIAS

BASS, J.; BURNS, R. C. **Forthcoming. Outdoor Recreation Planning**. 314 pages. Sagamore Publishing; Urbana, Illinois.

BURNS, R. C., MOREIRA, J. C. 2013. **Visitor Management in Brazil's Protected Areas: Benchmarking for Best Practices in Resource Management**. *The George Wright Forum*, (30), 163 - 170.

IBAMA. 2004. **Plano de Manejo da Floresta Nacional do Tapajós**. Volume I. Disponível em: <[http://www.icmbio.gov.br/portal/images/stories/imgs-unidadesconservacao/flona\\_tapajoss.pdf](http://www.icmbio.gov.br/portal/images/stories/imgs-unidadesconservacao/flona_tapajoss.pdf)>. Retrieved on August 17, 2015.

ICMBIO. **Guia do Visitante**. Disponível em: <<http://www.icmbio.gov.br/flonatapajos/guia-do-visitante>>. Retrieved on August 17, 2015.

MOREIRA, J. C. and BURNS, R. C. 2016. Public Use and Visitor Perceptions at the Tapajós National Forest (Brazil). In: **Visitor Management in Tourist Destinations** (Ed. Albrecht, J.), CABI. New Zealand.

MOREIRA, J. C., COUTINHO, G. C. T. P., BURNS, R., HAURA, F., FOLMANN, A. C. **A Percepção do Visitante do Parque Estadual de Vila Velha: Coleta de Dados Baseada no Método National Visitor Use Monitoring (Nvum) – Eua** In: VIII Congresso Brasileiro de Unidades de Conservação, 2015, Curitiba. Anais do VIII CBUC. Curitiba: Editora da Fundação Grupo Boticário, 2015. v.1. p.1-14.

LOHMANN, G., & DREDGE, D. 2012. **Tourism in Brazil: Environment, Management and Segments**. Routledge, New York.

SMALE, W. 2011. **Brazil Prepares for Major Tourism Boost**. Disponível em: <<http://www.bbc.co.uk/news/business-15824562>>. Acesso em: 15 set. 2013.

WTO. World Tourism Organization. 2013. Disponível em: <<http://www2.unwto.org/>>. Retrieved on August 17, 2015.